



**Centre for Human Palaeoecology**  
Department of Archaeology  
The King's Manor, York YO1 7EP

## Reports from the Centre for Human Palaeoecology, University of York

Report **2003/07**

Zooarchaeological analysis from the Scotland's First Settlers Project (including  
Sea Loch Survey) 2002 season

by

Rachel L. Parks

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## **Introduction**

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This report presents an analysis of mammal, bird and fish bone from the 2002 fieldwork season undertaken by the Scotland's First Settlers Project (SFS), incorporating the Sea Loch Survey (SLS). Bone was recovered from three test-pitted sites, one from the Island of Rona (SFS17) and two from the Sea Loch survey along Loch Carron and Loch Torridon (SFS10 and SFS171) (Hardy and Wickham-Jones 2002). Dating information was not available at the time of analysis, therefore any conclusions drawn are preliminary.

## **Recovery and methods**

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Recovery methods followed those outlined in Finlayson, Hardy and Wickham-Jones 1999:11. With the exception of SFS171 all samples were wet sieved to 1mm and the 2mm and 4mm fractions retained. Due to its remote location, a 50% sample of excavated material from Meahll na h Airde 2 (SFS171) was dry sieved at the site using a 300m sieve (Hardy and Wickham-Jones 2002:18).

Recording followed the York protocol (Harland *et al* 2003), which uses a system of quantification codes (QC) to distinguish between diagnostic and non-diagnostic elements. Under the York system, 17 diagnostic (QC1) mammal bone elements are routinely recorded in detail, including species, texture, weight and element completeness. The surface texture information is then used as a proxy guide to bone preservation. Elements with special interest such as antler are recorded fully as QC4 elements. All other elements are listed as QC0. For the bird bone follows 8 QC1 elements recorded in full.

Eighteen diagnostic (QC1) fish bone elements are routinely recorded in detail with an estimation of fish size also given. Vertebrae (QC2 elements) are identified to species or family level (as possible) and all other (QC0) elements are recorded as unidentified. Gadidae vertebrae are further identified to eight groups, according to their place along the vertebral column (as defined in Barrett 1997). All bone fragments from all classes were counted and weighed.

An additional note is required with regarding the small mammal identification. Identification to species is difficult and given the absence of pelvis, was only attempted on cranial elements.

Metrical data for mammal and bird from all sites is given in table x.3 and in table x.4 for fish.

## **SFS 17 Church Cave, Rona (NG 6270 5696)**

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Bone was recovered from two test pits within the cave; test pit 1 was located in front of the church pews and test pit 2 in the shell midden at the rear of the cave (Hardy and Wickham-Jones 2002:11).

### **Preservation**

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A total of 153 bones weighing 238.37g were recovered from test pit 1, and 3524 bones weighing 2130.53g from test pit 2. A subset of 19 diagnostic elements (QC1) were analysed in detail from test pit 1 and 229 QC1 elements from test pit 2. Based on the texture of the small sample of QC1 elements from test pit 1, preservation of the mammal bone is generally fair and fish bone is fair to good (table 17.1). Preservation of the mammal, bird and fish QC1 elements from test pit 2 is generally fair to good (table 17.2).

### **Taxonomic abundance**

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Five contexts from test pit 1 were excavated (Hardy and Wickham-Jones 2002:11), bone was recovered from four of these. Eighty-four specimens of mammal bone, 1 specimen of bird bone and 68 of fish bone were recorded (table 17.3). Table 17.3 shows that the majority of bone analysed came from contexts 02, 03 and 04. Both domestic, (sheep and pig) and wild (otter and deer) mammalian taxa are sparsely represented in test pit 1. Only one unidentified specimen of bird bone was recovered from test pit 1, in context 02. The majority of the fish remains from test pit 1 are found in context 04 and are dominated by species belonging to the cod family (gadidae). The salmon, sea bream, and gurnard families are also represented (table 17.3).

Five contexts were also excavated from test pit 02 (Hardy and Wickham-Jones 2002:11); bone was recovered from the upper three, the majority from context 02. All contexts contained both domestic (sheep, cattle, pig) and wild (red deer, deer family, seal, otter) mammalian taxa, with a combined NISP of 1173 (table 17.4). Small mammal remains of watervole, a species of vole and a species of rat were also recorded from test pit 2. A small amount of bird bone (NISP of 28) was recovered. The only diagnostic elements were single specimens of woodcock and either razorbill or guillemot (table 17.4). Fish bone was recovered from contexts 01 and 02 (NISP of 2322), the majority from context 02. As in test pit 01, gadid species, predominately Saithe, dominate the fish assemblage. Other cod family species include Pollack, Cod, Haddock and Ling. Atlantic herring, mackerel and species from the wrasse, salmon, scorpion fish and plaice family were also recorded. The only amphibian specimen from SFS17, a toad (*Bufo sp.*) trunk vertebrae, was recorded in test pit 2 context 02.

### **Element representation**

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For the mammal and bird bone it is hard to comment on element representation due to the small number of QC1 elements. In test pit 1, especially when divided by context, species are represented by single QC1 elements only (table 17.5).

The sample sizes of mammal and bird bone in test pit 2 are also too small to make any meaningful comment on element representation. The fish bone provides a larger sample. Figure 17.1 below shows the combined cod family diagnostic elements and vertebrae from contexts 01 and 02. From both contexts the majority of elements are vertebrae, however, there are differences in the element distribution. Context 01 has relatively fewer appendicular elements than context 02 but this could be a reflection of sample size rather than a real difference in fish processing.

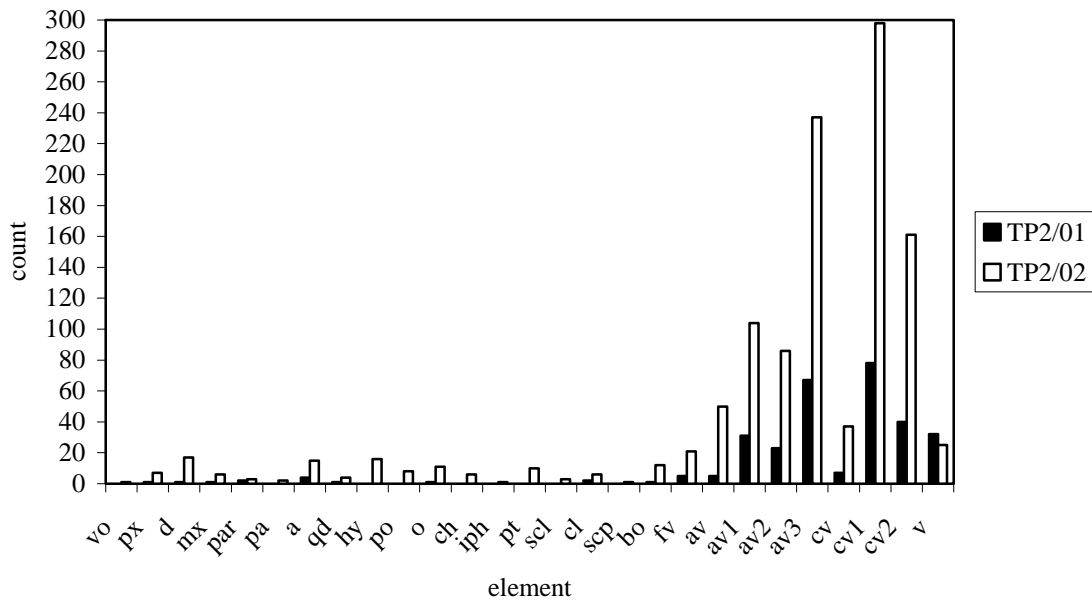


Figure 17.1 Combined cod family QC1 and QC2 element distribution (for element codes see Appendix C)

### Pre-adult bone and fish size

One specimen of juvenile bird bone was recorded from test pit 1, context 02. The majority of juvenile bone was from the limbs of medium to large mammals. Unfortunately no butchery data is recorded from these specimens but presumably they are the result of human consumption. The seal tibia and metapodial are probably from adult individuals as the epiphyses fuse relatively late (Ericson and Storå 1999).

The majority of the fish QC1 elements are from fish of medium size (c.30-50 cm estimated total length), but there are also specimens from large and small fish. Although there are a range of sizes the emphasis on the medium-sized fish suggests that most of the fishing was carried out beyond the shore zone.

## Bone modification

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Bone modification was only recorded from test pit 2. Two of the mammal bones had evidence of carnivore gnawing (table x.1) and three gadid fish bones were crushed, although there was no sign of this being due to ingestion. Butchery evidence was also only recorded from test pit 2. Table x.2 describes the evidence recorded, which was mostly cut and chop marks on mammal limb elements. The cut marks on two otter phalanges, shown in figure 17.2 below, are of particular interest as the fine parallel marks are consistent with skinning.



SFS17-8556  
(actual length = 12.01 mm)



SFS17-8567  
(actual length = 12.92 mm)

Figure 17.2 Skinning marks on otter phalanges (as described in table x.2) drawn by the author

## Discussion

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Given the usage of the site as the island church into the 20<sup>th</sup> century (Hardy and Wickham-Jones 2002:11) it is difficult to ascertain whether the bone assemblages are related solely to this, or to an alternative and perhaps also earlier use. Certainly the fish bone assemblage from test pit 2, in the midden, implies the processing or consumption of fish at the site.

## SFS 10 Allt na Uamha (NG 7679 6490)

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Mammal and fish bone was recovered from a test pit and additional shovel pit dug in the large shell midden in front of this boulder shelter (Hardy and Wickham-Jones 2002:18).

## Preservation

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A total of 126 bones weighing 261.03g were recovered from the test pit, and 205 bones weighing 241.15g from the shovel pit. A subset of 10 diagnostic elements (QC1) were analysed in detail from the test pit and 10 QC1 elements from the shovel pit. Unfortunately, the sample sizes from the test and shovel pit are too small to make any meaningful comment on bone preservation (table 10.1).

## **Taxonomic abundance**

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Mammal bone (NISP of 109) was recovered from four of the excavated contexts from the test pit; identified species were cattle and red deer. Specimens of medium sized mammal and small mammal were also recorded. A small amount of fish bone (NISP of 17) was recovered from contexts 01, 03 and 04. This included single specimens of cod, either cod, saithe or Pollack, and a member of the cod family (table 10.2).

Whilst 170 mammal bone fragments were recovered from the shovel pit, diagnostic mammal elements of sheep, a member of the deer family and a medium sized mammal were recorded. Slightly more fish bone was recovered from the shovel pit than the test pit (NISP of 35); species recorded were cod, either cod, saithe or pollack, atlantic herring and members of the cod, wrasse and plaice families (table 10.2).

## **Element representation**

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With such small sample sizes interpretation is problematic and is not attempted beyond table 10.3, which shows the element representation for the identified mammal and fish bone.

## **Pre-adult bone and fish size**

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The small sample sizes also make interpretation of age and size difficult, beyond stating that some elements from juvenile mammals were present at the site (table 10.4) and that a range of fish sizes are represented (table 10.5).

## **Bone modification**

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Root etching was noted on three unidentified mammal bone fragments and carnivore gnawing on one unidentified mammal fragment (table x.1). Chop marks were recorded on one unidentified mammal fragment and one cattle radius, cut marks were also noted on one unidentified mammal fragment (table x.2).

## **Discussion**

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From the limited butchery evidence available from Allt na Uamha it is probably that some mammal processing or consumption took place at the site. Likewise, the range in fish size rules out the fish being derived from otter spraint deposits. Despite the presence of lithics at the site, suggesting an early prehistoric presence, the remains of domestic cattle suggest that this activity was no earlier than the introduction of this species to Britain, traditionally associated with the Neolithic.

## **SFS 171 Meall na h Airde 2 (NG 8269 3629)**

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Mammal, fish and one bird bone was recovered from two contexts from a test pit dug into the midden remains at the back of the sea cave. Context 02 was a layer of loose stones, and when excavated the upper context, context 01, was noted running through the voids of this layer (Hardy and Wickham-Jones 2002:18). That the majority of the bone from the site is from context 01, (only three unidentifiable fragments are recorded from context 02) is consistent with this interpretation. For this reason context 01 and 02 are combined in the following analysis.

### **Preservation**

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A total of 100 bones weighing 28.91g were recovered from the test pit; a subset of 22, mostly fish, diagnostic elements (QC1) were analysed in detail. The surface texture of these elements is used as a proxy guide to preservation. Due to the small sample sizes only the preservation of the fish bone, which is generally fair, can be commented on (table 171.1).

### **Taxonomic abundance**

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From a NISP of 28 only three diagnostic elements all of field vole were recorded from the site. Of the fish bones (NISP of 71), thirty-two were identifiable to species; these included cod, saithe, haddock, conger eel and species from the cod and plaice families (table 171.2).

### **Element representation**

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The small sample size of the assemblage unfortunately prevents any meaningful comment on the distribution of elements beyond listing them in table 171.3

### **Pre-adult bone and fish size**

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No juvenile mammal or bird remains were recorded from SFS171.

The large fish sizes of gadid species represented (table 171.4) suggests that a method of deep water fishing was used.

### **Discussion**

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Based on the lack of any identifiable mammal bone at Meall na h Airde 2, other than the field vole cranial elements and the small fish bone assemblage, it does not seem unreasonable that the site was used for limited fishing only. It is possible, as the presence of lithics suggest, that the site is early prehistoric in date. Equally, however, the large sizes of fish caught are consistent with both a prehistoric and historic date.



## SFS 17 data tables

York system texture	Description	mammal	bird	fish
Excellent	Majority of surface fresh or even slightly glossy; very localised flaky or powdery patches			
Good	Lacks fresh appearance but solid; very localised flaky or powdery patches	1		4
Fair	Surface solid in some places, but flaky or powdery on up to 49% of specimen	3	1	9
Poor	Surface flaky or powdery over 50% of specimen	1		
<b>Total</b>		5	1	13

Table 17.1. Texture of QC1 elements from SFS17 test pit 1 (all contexts)

York system texture	Description	mammal	bird	fish
Excellent	Majority of surface fresh or even slightly glossy; very localised flaky or powdery patches	2		5
Good	Lacks fresh appearance but solid; very localised flaky or powdery patches	31	5	59
Fair	Surface solid in some places, but flaky or powdery on up to 49% of specimen	30	2	84
Poor	Surface flaky or powdery over 50% of specimen	1		10
<b>Total</b>		64	7	158

Table 17.2 Texture of QC1 elements from SFS17 test pit 2 (all contexts)

<b>Taxon / Context</b>	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>Total</b>
<b>Mammal</b>					
<b>Sheep</b>		1			1
<b>Pig</b>		1			1
<b>Deer family</b>				1	1
<b>Otter</b>	1				1
<b>Small mammal</b>				1	1
<b>Total QC1</b>	1	2		2	5
<b>Total QC0</b>		19	11	49	79
<b>Total mammal</b>	<b>1</b>	<b>21</b>	<b>11</b>	<b>51</b>	<b>84</b>
<b>Bird</b>					
<b>QC0</b>		1			1
<b>Total bird</b>		<b>1</b>			<b>1</b>
<b>Fish</b>					1
<b>Saithe</b>		1	1	14	16
<b>Pollack</b>				1	1
<b>Saithe/Pollack</b>				4	4
<b>Cod/Saithe/Pollack</b>				3	3
<b>Cod family</b>			2	6	8
<b>Salmon family</b>				4	4
<b>Sea bream family</b>				2	2
<b>Gurnard family</b>				1	1
<b>Unidentified fish</b>			2		2
<b>Total QC1 and QC2</b>		1	5	35	41
<b>Total QC0 QC4</b>			2	25	27
<b>Total fish</b>		<b>1</b>	<b>7</b>	<b>60</b>	<b>68</b>
<b>Total NISP</b>	<b>1</b>	<b>23</b>	<b>18</b>	<b>111</b>	<b>153</b>

Table 17.3 Number of identified specimens (NISP) from SFS17 test pit 1

Taxon / Context	01	02	03	Total
<b>Mammal</b>				
Sheep		6	3	9
Sheep/goat	2		1	3
Cow	1	2	1	4
Pig		1	1	2
Red deer	2	4	1	7
Deer family		4		4
Seal sp.	1	1	1	3
Otter		1		1
Wolverine	1	3		4
Vole sp.		2		2
Rat sp.		1		1
Small mammal		8	1	9
Medium mammal 2			1	1
Medium mammal1		4	1	5
Large mammal		4	1	5
Unidentified mammal	2		2	4
<b>Total QC1</b>	<b>9</b>	<b>41</b>	<b>14</b>	<b>64</b>
<b>Dog</b>		present		
<b>Total QC0</b>	<b>124</b>	<b>903</b>	<b>82</b>	<b>1109</b>
<b>Total mammal</b>	<b>133</b>	<b>944</b>	<b>96</b>	<b>1173</b>
<b>Bird</b>				
Razorbill/Guillemot		1		1
Woodcock		1		1
Unidentified bird	1	4		5
<b>Total QC1</b>	<b>1</b>	<b>6</b>		<b>7</b>
<b>Total QC0</b>	<b>2</b>	<b>18</b>	<b>1</b>	<b>21</b>
<b>Total bird</b>	<b>3</b>	<b>24</b>	<b>1</b>	<b>28</b>
<b>Fish</b>				
Saithe	117	598		715
Pollack		15		15
Saithe/Pollack	39	68		107
Cod		5		5
Cod/Saithe/Pollack	43	231		274
Haddock		1		1
Haddock?		1		1

<b>Ling</b>		1		1
<b>Rockling sp.</b>		1		1
<b>Atlantic herring</b>	6	26		32
<b>Atlantic mackerel</b>		1		1
<b>Conger eel</b>		4		4
<b>Cod family</b>	103	227		330
<b>Wrasse family</b>	1	11		12
<b>Salmon family</b>		3		3
<b>Scorpion fish family</b>	1			1
<b>Unidentified fish</b>	42	1		43
<b>Total QC 1 and QC 2</b>	352	1194		1546
<b>Plaice</b>		present		
<b>Plaice family</b>		present		
<b>Total QC4 and QC0</b>	73	703		776
<b>Total fish</b>	<b>425</b>	<b>1897</b>		<b>2322</b>
<b>Amphibian</b>				
<b>Toad sp.</b>		present		
<b>Total QC0</b>		1		
<b>Total amphibian</b>		1		1
<b>Total NISP</b>	<b>561</b>	<b>2866</b>	<b>97</b>	<b>3524</b>

Table 17.4. Number of identified specimens (NISP) from test pit 2

<b>Taxon</b>	<b>Element</b>	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>Total</b>
<b>Mammal</b>						
<b>Sheep</b>	humerus		1			1
<b>Pig</b>	mandible		1			1
<b>Deer family</b>	radius				1	1
<b>Otter</b>	2 <sup>nd</sup> phalanx	1				1
<b>Small mammal</b>	skull				1	1
<b>Total QC1</b>		1	2		2	5
<b>Bird</b>						
<b>Unidentified bird</b>	tarsometatarsus					
<b>Total QC1</b>		1	2		2	5
<b>Fish</b>						
<b>Saithe</b>	articular				1	1
	cleithrum				1	1
	opercular				1	1
	preopercular				1	1
	premaxilla			1		1
vertebrae	av2				2	2
	av3				6	6
	cv1		1		1	2
	cv2				1	1
<b>Pollack</b>	premaxilla				1	1
<b>Saithe/Pollack</b>	basioccipital				1	1
	parasphenoid				1	1
vertebrae	av2				2	2
<b>Cod/Saithe/Pollack</b>						
vertebrae	av1				1	1
	cv1				1	1
	cv2				1	1
<b>Cod family</b>	dentary			2		2
	hyomandibular				1	1
vertebrae	av3				1	1
	cv				1	1
	cv1				3	3

<b>Salmon family</b>						
vertebrae	cv			4	4	
<b>Sea bream family</b>						
vertebrae	av			1	1	
	cv			1	1	
<b>Gurnard family</b>						
	dentary			1	1	
<b>Unidentified fish</b>						
vertebrae	v			2	2	
<b>Total QC1</b>			3	9	12	
<b>Total QC2</b>		1		26	29	1

Table 17.5 SFS17 test pit 1 mammal, bird and fish QC1 and QC2 element representation

<b>Taxon</b>	<b>Element</b>	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>Total</b>
<b>Mammal</b>						
<b>Sheep</b>	femur		1			1
	humerus		1	1		2
	1 <sup>st</sup> phalanx		2			2
	3 <sup>rd</sup> phalanx		1			1
	radius		1	2		3
<b>Sheep/Goat</b>	astragalus			1		1
	humerus	1				1
	radius	1				1
<b>Pig</b>	mandible		1			1
	scapula			1		1
<b>Cow</b>	femur			1		1
	humerus		1			1
	mandible	1	1			2
<b>Red deer</b>	astragalus		1			1
	metapodial		1			1
	metatarsal	1	1	1		3
	1 <sup>st</sup> phalanx	1	1			2
<b>Deer family</b>	astragalus		1			1
	mandible		1			1
	2 <sup>nd</sup> phalanx		1			1
	3 <sup>rd</sup> phalanx		1			1
<b>Seal sp.</b>	metapodial	1				1
	3 <sup>rd</sup> phalanx		1			1
	tibia			1		1
<b>Otter</b>	2 <sup>nd</sup> phalanx		1			1
<b>Wolverine</b>	mandible	1	3			4
<b>Vole</b>	mandible		2			2
<b>Rat sp.</b>	mandible		1			1
<b>Small mammal</b>	femur		1			1
	humerus		4			4
	mandible		1			1
	skull		1			1
	tibia		1	1		2
<b>Medium mammal 2</b>	humerus			1		1

<b>Medium mammal 1</b>	metapodial		1	1
	metatarsal	1		1
	1 <sup>st</sup> phalanx	2		2
	2 <sup>nd</sup> phalanx	1		1
<b>Large mammal</b>	femur	1		1
	metatarsal		1	1
	mandible	1		1
	phalanx	1		1
	scapula	1		1
<b>Unidentified mammal</b>	metatarsal		1	1
	phalanx	1		1
	scapula	1	1	2
<b>Total QC1</b>	9	41	14	64
<b>Bird</b>				
<b>Razorbill/Guillemot</b>	carpometacarpus		1	1
<b>Woodcock</b>	tarsometatarsus		1	1
<b>Unidentified bird</b>	humerus	1	1	2
	tarsometatarsus		2	2
	ulna		1	1
<b>Total QC1</b>		1	6	7

Table 17.6 SFS17 test pit 2 QC1 element distribution for mammal and bird



<b>Taxon</b>	<b>Element</b>	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>Total</b>
<b>Fish</b>						
<b>Saithe</b>	articular	2	5			7
	basioccipital		7			7
	ceratohyal		3			3
	cleithrum	1	2			3
	dentary	1	6			7
	hyomandibular		8			8
	infrapharygeal		1			1
	maxilla		1			1
	opercular		6			6
	palatine		2			2
	preopercular		2			2
	posttemporal		4			4
	premaxilla	1	3			4
	quadrate	1	3			4
	supracleithrum		1			1
	vomer		1			1
vertebrae	fv	3	5			8
	av		3			3
	av1	14	57			71
	av2	10	46			56
	av3	28	137			165
	cv	1	2			3
	cv1	40	198			238
	cv2	15	95			110
<b>Pollack</b>						
vertebrae	av2		1			1
	av3		11			11
	cv1		3			3
<b>Saithe/Pollack</b>						
	articular	1	1			2
	basioccipital	1	3			4
	dentary		6			6
	hyomandibular		3			3
	maxilla	1				1
	opercular	1	2			3
	preopercular		1			1
	posttemporal		2			2
	premaxilla		3			3
vertebrae	av1	9	7			16
	av2	8	15			23
	av3	15	16			31
	cv1	2	4			6
	cv2		2			2
	fv	1	3			4

<b>Cod</b>	vertebrae	av1		1	1	
		av3		1	1	
		cv1		1	1	
		cv2		2	2	
<b>Cod/Saithe/Pollack</b>		articular		3	3	
		basioccipital		2	2	
		ceratohyal		1	1	
		cleithrum	1	2	3	
		dentary		2	2	
		maxilla		3	3	
		opercular		1	1	
		parasphenoid		1	1	
		preopercular		2	2	
		posttemporal		4	4	
		premaxilla		1	1	
		supracleithrum		1	1	
		vertebrae	av	1	12	13
			av1	3	21	24
			av2	1	14	15
		av3	13	51	64	
		cv		14	14	
		cv1	10	59	69	
		cv2	14	33	47	
		fv		4	4	
<b>Haddock</b>		dentary		1	1	
<b>Haddock?</b>		cleithrum		1	1	
<b>Ling</b>	vertebrae	cv1		1	1	
<b>Rockling sp.</b>	vertebrae	av1		1	1	
<b>Atlantic herring</b>	vertebrae	av	2	14	16	
		cv	3	12	15	
		fv	1		1	
<b>Atlantic mackerel</b>	vertebrae	cv		1	1	
<b>Conger eel</b>	vertebrae	av		2	2	
		v		2	2	

<b>Cod family</b>	articular	1	6	7	
	ceratohyal		2	2	
	cleithrum		1	1	
	dentary		2	2	
	hyomandibular		5	5	
	maxilla		2	2	
	opercular		2	2	
	parasphenoid	2	2	4	
	posttemporal		3	3	
	quadrate		1	1	
	supracleithrum		1	1	
	scapula		1	1	
	vertebrae	av	4	35	39
		av1	5	17	22
		av2	4	10	14
	av3	11	21	32	
	cv	6	21	27	
	cv1	26	32	58	
	cv2	11	29	40	
	fv	1	9	10	
	v	32	25	57	
<b>Wrasse family</b>	infrapharyngeal	1	4	5	
	vomer		1	1	
	vertebrae	av		3	
		cv		3	
<b>Salmon family</b>	vertebrae	av	1	1	
		cv	2	2	
<b>Bullhead family</b>	vertebrae	v	1	1	
<b>Unidentified fish</b>	articular		1	1	
	vertebrae	v	42	42	
<b>Total QC1</b>		15	135	150	
<b>Total QC2</b>		337	1059	1396	

Table 17.7 SFS17 test pit 2 QC1 and QC2 element distribution for fish

Bone ID	Test pit	Context	Taxon	Element	Criteria
SFS17-7918	TP1	02	unidentified bird	tarsometatarsus	distal epiphysis unfused, juvenile cortex
SFS17-7923	TP1	04	deer family	radius	distal epiphysis unfused, juvenile cortex
SFS17-7903	TP2	01	red deer	1 <sup>st</sup> phalanx	juvenile cortex
SFS17-8533	TP2	01	seal sp.	metapodial	distal epiphysis fusing
SFS17-8534	TP2	01	unidentified mammal	phalanx	proximal and distal epiphysis fusing
SFS17-8548	TP2	02	small mammal	humerus	distal epiphysis unfused
SFS17-8549	TP2	02	small mammal	femur	distal epiphysis unfused
SFS17-7963	TP2	02	medium mammal 1	1 <sup>st</sup> phalanx	proximal epiphysis unfused
SFS17-7964	TP2	02	medium mammal 1	2 <sup>nd</sup> phalanx	proximal epiphysis unfused
SFS17-7965	TP2	02	medium mammal 1	3 <sup>rd</sup> phalanx	proximal epiphysis fusing, juvenile cortex
SFS17-7957	TP2	02	deer family	2 <sup>nd</sup> phalanx	proximal epiphysis fusing
SFS17-7951	TP2	02	sheep	femur	proximal epiphysis unfused
SFS17-7940	TP2	02	large mammal	phalanx	juvenile cortex
SFS17-7895	TP2	03	small mammal	tibia	proximal epiphysis unfused
SFS17-7874	TP2	03	seal sp.	tibia	proximal epiphysis fusing
SFS17-7870	TP2	03	large mammal	metatarsal	distal epiphysis unfused, juvenile cortex
SFS17-7871	TP2	03	unidentified mammal	scapula	distal epiphysis unfused, juvenile cortex
SFS17-7872	TP2	03	cow	femur	distal epiphysis unfused

Table 17.8 QC1 elements pre-adult bird and mammal bone from SFS17 test pit 1 and test pit 2

<b>Taxon</b>	<b>Size category</b>	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>Total</b>
<b>Test pit 1</b>						
<b>Saithe</b>	large				1	1
	medium				3	3
	small			1		1
<b>Pollack</b>	large				1	1
<b>Saithe/Pollack</b>	large				2	2
<b>Cod family</b>	medium			2	1	3
<b>Gurnard family</b>	large				1	1
<b>Total test pit 1</b>				3	9	12
<b>Test pit 2</b>						
<b>Saithe</b>	large		1			1
	medium	6	41			47
	small		12			12
	tiny		1			1
<b>Saithe/Pollack</b>	large	1				1
	medium	3	19			22
	small		2			2
<b>Cod/Saithe/Pollack</b>	large		2			2
	medium	1	16			17
	small		4			4
<b>Haddock</b>	medium		1			1
<b>Haddock?</b>	medium		1			1
<b>Cod family</b>	large		2			2
	medium	3	20			23
	small		5			5
	tiny		1			1
<b>Wrasse family</b>	large		1			1
	medium	1	4			5
<b>Unidentified fish</b>	medium		1			1
<b>Total test pit 2</b>		15	134			149

Table 17.9 Size of QC1 elements by species and context for SFS17 test pit 1 and test pit 2 (see Appendix B for definitions of the York System size categories)

## SFS 10 data tables

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<b>York system texture</b>	<b>Description</b>	<b>TP mammal</b>	<b>TP fish</b>	<b>S. pit mammal</b>	<b>S. pit fish</b>
Excellent	Majority of surface fresh or even slightly glossy; very localised flaky or powdery patches	1			
Good	Lacks fresh appearance but solid; very localised flaky or powdery patches	3			2
Fair	Surface solid in some places, but flaky or powdery on up to 49% of specimen	1	2		8
Poor	Surface flaky or powdery over 50% of specimen	1	1		
<b>Total</b>		6	3		10

Table 10.1 Texture of QC1 elements from SFS10 test pit and shovel pit (all contexts)

<b>Taxon</b>	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>Test pit total NISP</b>	<b>Shovel pit NISP</b>
<b>Mammal</b>						
<b>Sheep</b>						2
<b>Cow</b>		2	1		3	
<b>Red deer</b>		1	1		2	
<b>Deer family</b>						1
<b>Medium mammal 1</b>	1				1	1
<b>Small mammal</b>		1			1	
<b>Total QC1</b>	1	4	2		7	4
<b>Total QC0 and QC4</b>	29	27	34	12	102	166
<b>Total mammal</b>	30	31	36	12	109	170
<b>Fish</b>						
<b>Cod</b>			1		1	3
<b>Cod/Saithe/Pollack</b>				1	1	2
<b>Cod family</b>	1				1	1
<b>Atlantic herring</b>						1
<b>Wrasse family</b>						3
<b>Plaice family</b>						1
<b>Unidentified fish</b>						1
<b>Total QC1 and QC2</b>	1		1	1	3	12
<b>Total QC0 and QC4</b>	1		12	1	14	23
<b>Total fish</b>	2		13	2	17	35

Table 10. 2 Number of identified specimens (NISP) from SFS10 test pit and shovel pit

<b>Taxon</b>	<b>Element</b>	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>shovel pit</b>	<b>Total</b>
<b>Mammal</b>							
<b>Sheep</b>	2 <sup>nd</sup> phalanx					1	1
	scapula					1	1
<b>Cow</b>	mandible		1				1
	2 <sup>nd</sup> phalanx			1			1
	radius		1				1
<b>Red deer</b>	calcaneum			1			1
	mandible		1				1
<b>Deer family</b>	humerus					1	1
<b>Medium mammal 1</b>	scapula	1					1
	phalanx					1	1
<b>Small mammal</b>	humerus		1				1
<b>Total QC1</b>		1	4	2		4	11
<b>Fish</b>							
<b>Cod</b>	articular			1		1	2
	dentary					1	1
	posttemporal					1	1
<b>Cod/Saithe/Pollack</b>	ceratohyal					1	1
	posttemporal					1	1
	opercular				1		1
<b>Cod family</b>	articular	1				1	2
<b>Atlantic herring</b>	vertebrae					1	1
<b>Wrasse family</b>	cleithrum					2	2
	hyomandibular					1	1
<b>Plaice family</b>	vertebrae					1	1
<b>Unidentified fish</b>	articular					1	1
<b>Total QC1</b>		1		1	1	10	13
<b>Total QC2</b>						2	2

Table 10.3 SFS10 test pit and shovel pit mammal and fish QC1 and QC2 element representation



<b>Bone ID</b>	<b>Provenance</b>	<b>Taxon</b>	<b>Element</b>	<b>Criteria</b>
SFS10-7834	test pit context 01	scapula	medium mammal 1	juvenile cortex
SFS10-7865	shovel pit2	scapula	sheep	distal epiphysis unfused, juvenile cortex
SFS10-7863	shovel pit2	phalanx	medium mammal 1	distal epiphysis unfused, juvenile cortex
SFS10-7861	shovel pit2	humerus	deer family	distal epiphysis unfused, juvenile cortex

Table 10.4 Pre-adult mammal QC1 elements juvenile from SFS10 test pit and shovel pit

<b>Taxon</b>	<b>Size category</b>	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>Test pit total</b>	<b>Shovel pit</b>
<b>Cod</b>	extra large			1		1	
	large						1
	medium						1
	small						1
<b>Cod/Saithe/Pollack</b>	large						1
	medium						1
	small				1	1	
<b>Cod family</b>	large	1				1	
	medium						1
<b>Wrasse family</b>	medium						3
<b>Total</b>		1		1	1	3	9

Table 10.5 Size of QC1 elements by species and context for SFS10 test pit and shovel pit (see Appendix B for definitions of the York System size categories)

## SFS 171 data tables

<b>York system texture</b>	<b>Description</b>	<b>mammal</b>	<b>bird</b>	<b>fish</b>
Excellent	Majority of surface fresh or even slightly glossy; very localised flaky or powdery patches	2		
Good	Lacks fresh appearance but solid; very localised flaky or powdery patches	1		2
Fair	Surface solid in some places, but flaky or powdery on up to 49% of specimen			16
Poor	Surface flaky or powdery over 50% of specimen			1
<b>Total</b>		<b>3</b>		<b>19</b>

Table 171.1 Texture of QC1 elements from SFS171

<b>Taxon</b>	<b>Total</b>
<b>Mammal</b>	
Field vole	3
<b>Total QC1</b>	<b>3</b>
<b>Total QC0</b>	<b>25</b>
<b>Total mammal</b>	<b>28</b>
<b>Total bird (QC0)</b>	<b>1</b>
<b>Fish</b>	
Cod	1
Saithe	2
Haddock	17
Cod family	8
Conger eel	1
Plaice family	2
<b>Total QC1 and QC2</b>	<b>32</b>
<b>Total QC0 and QC4</b>	<b>39</b>
<b>Total fish</b>	<b>71</b>
<b>Total NISP</b>	<b>100</b>

Table 171.2 Number of identified specimens (NISP) from SFS171

<b>Taxon</b>	<b>Element</b>	<b>Total</b>
<b>Mammal</b>		
<b>Field vole</b>	mandible	2
	skull	1
<b>Total QC1</b>		3
<b>Fish</b>		
<b>Cod</b>		
vertebrae	uv	1
<b>Saithe</b>	hyomandibular	1
	premaxilla	1
<b>Haddock</b>	articular	1
	cleithrum	1
	dentary	1
	maxilla	1
	opercular	5
	posttemporal	1
	quadrate	1
<b>vertebrae</b>	av1	1
	cv1	2
	cv2	3
<b>Cod family</b>	cleithrum	2
	hyomandibular	1
	maxilla	1
	opercular	2
	vertebrae	cv2
	v	1
<b>Conger eel</b>		
vertebrae	av	1
<b>Plaice family</b>		
vertebrae	av	1
	cv	1
<b>Unidentified</b>		
vertebrae	v	1
<b>Total QC1</b>		19
<b>Total QC2</b>		13

Table 171.3 SFS171 mammal and fish QC1 and QC2 element representation

<b>Taxon</b>	<b>Size category</b>	<b>Total</b>
<b>Saithe</b>	extra large	1
	large	1
<b>Haddock</b>	large	1
	medium	10
<b>Cod family</b>	medium	6
<b>Total</b>		19

Table 171.4 Size of QC1 elements by species SFS171 (see Appendix B for definitions of the York System size categories)

## Bone modification, butchery evidence and metrical data (all sites)

Bone ID	Provenance	Taxon	Element	Modification
SFS17-7879	TP2/03	large mammal	rib	carnivore gnawing
SFS17-7937	TP2/02	cow	mandible	carnivore gnawing
SFS17-8015	TP2/02	cod family	first vertebra	crushed
SFS17-8052	TP2/02	cod family	caudal vertebra	crushed
SFS17-8053	TP2/02	cod family	caudal vertebra	crushed
SFS10-7824	TP1/01	unidentified mammal	unidentified	root etching
SFS10-7829	TP1/01	unidentified mammal	unidentified	carnivore gnawing
SFS10-7831	TP1/01	unidentified mammal	unidentified	root etching
SFS10-7832	TP1/01	unidentified mammal	unidentified	root etching

Table x.1 Bone modification from all sites

Bone ID	Provenance	Taxon	Element	Butchery	Area	Notes
SFS10-7833	TP1/01	Mammal	Unidentified	cut		
SFS10-7830	TP1/01	Mammal	Unidentified	chop		
SFS10-7841	TP1/02	Cattle	Radius	chop	15	
SFS17-8567	TP2/01	Otter	Phalanx 2	cut	tp	medio-lateral fine cut mark on plantar surface in middle of shaft
SFS17-8567	TP2/01	Otter	Phalanx 2	cut	tp	6 fine cut marks extending medio-laterally above distal articulation on dorsal surface. Consistent with skinning.
SFS17-7907	TP2/01	Red deer	Metatarsal	cut	tp	cut mark on dorsal surface of shaft just underneath proximal articulation
SFS17-7907	TP2/01	Red deer	Metatarsal	cut	fp	cut on proximal surface of proximal articulation
SFS17-7900	TP2/01	Mammal	Vertebra	chop	sp	
SFS17-8556	TP2/02	Otter	Phalanx 2	cut	tp	4 fine roughly parallel cut marks extending medio-laterally on dorsal surface just above the distal articulation. Consistent w
SFS17-7948	TP2/02	Red deer	Metapodial	cut	tp	small cut mark above distal condyle
SFS17-	TP2/02	Cattle	Humerus	chop	tp	chop off of most distal

7977						part of distal condyle
SFS17-7953	TP2/02	Sheep	Humerus	cut	tp	4 cut marks on ventral surface (opp of dorsal)
SFS17-7892	TP2/03	Sheep/goat	Astragalus	cut	34	2 fine cut marks across the dorsal surface
SFS17-7880	TP2/03	Sheep	Radius	cut	tp	series of 7 roughly parallel medio-laterally cut marks on side of shaft
SFS17-7871	TP2/03	Mammal	Scapula	cut		2 parallel cut marks just below articular facet

Table x.2 Butchery marks from all sites (tp = transverse plane, sp = sagittal plane, fp = frontal plane)

Element	Taxon	Bone ID	Provenance	Measurements				
				BFd	Bd	DI	GB	GH
<b>astragalus</b>	Red deer	SFS17-7939	SFS17-TP2/02	32.3	30.3	33.1	51.7	48
	Sheep/goat	SFS17-7892	SFS17-TP2/03	16.1				
<b>calcaneum</b>	Red deer	SFS10-7847	SFS10-03	<b>C</b> 17.3	<b>C+D</b> 38.9			
	Sheep	SFS17-7869 SFS17-7953	SFS17-TP2/03 SFS17-TP2/02	<b>BT</b> 25.4 26.3	<b>HT</b> 16.2			
<b>metatarsal</b>	Red deer	SFS17-7868 SFS17-7931	SFS17-TP2/03 SFS17-TP2/02	<b>GL</b> 33.8 31.7	<b>SD</b>			
	Sheep	SFS17-7873 SFS17-7954	SFS17-TP2/03 SFS17-TP2/02	<b>Bp</b> 26.1 29	<b>BFp</b>			
<b>tibia</b>	Seal sp.	SFS17-7874	SFS17-TP2/03	<b>F</b> 95.48				
<b>tarsometatarsus</b>	Woodcock	SFS17-7984	SFS17-TP2/02	<b>GL</b> 37.4	<b>SC</b> 2.88	<b>Bp</b> 7.14	<b>Bd</b> 7.27	

Table x.3 Mammal and bird metrical data from all sites (QC1 elements) all follow York system protocol (and references therein) except the seal measurement which follows Ericson and Storå (1999)

<b>Taxon</b>	<b>Element</b>	<b>Provenance</b>	<b>Bone ID</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>	
Saithe	Basioccipital	SFS17-TP2/02	SFS17-8174	3.54	5.03		
		SFS17-TP2/02	SFS17-8175	3.88	5.4		
		SFS17-TP2/02	SFS17-8176	3.76	4.96		
		SFS17-TP2/02	SFS17-8177	2.93	4.17		
		SFS17-TP2/02	SFS17-8178	4.01	6.04		
		SFS17-TP2/02	SFS17-8179	3.62	5.54		
		SFS17-TP2/02	SFS17-8237	3.05	4.06		
	Dentary	SFS17-TP2/02	SFS17-8197		3.19		
		SFS17-TP2/02	SFS17-8198	4.22	4.38		
		SFS17-TP2/02	SFS17-8257	3.2	3.22		
		SFS17-TP2/02	SFS17-8258	3	2.93		
		SFS17-TP2/02	SFS17-8259		3.37		
		SFS17-TP2/02	SFS17-8262		2.96		
		SFS17TP2/-01	SFS17-8354	3.55	3.6		
	Opercular	SFS17-TP2/02	SFS17-8205	4.98			
		SFS17-TP2/02	SFS17-8206	3.83			
		SFS17-TP2/02	SFS17-8207	3.75			
		SFS17-TP2/02	SFS17-8208	3.33			
		SFS17-TP2/02	SFS17-8209	4.3			
		SFS17-TP2/02	SFS17-8210	4.02			
		SFS17-TP1/04	SFS17-8417	3.18			
	Otolith	SFS17-TP2/02	SFS17-8402	14.14	5.61		
		SFS17-TP2/02	SFS17-8404	9.49	3.78		
	Premaxilla	SFS17-TP2/02	SFS17-8165	4.38	6.59	4.28	
		SFS17-TP2/02	SFS17-8166	3.84	4.9	4.09	
		SFS17-TP2/01	SFS17-8353	4.67			
	Quadrate	SFS17-TP1/03	SFS17-8460	3.37			
		SFS17-TP2/02	SFS17-8181	3.8			
		SFS17-TP2/02	SFS17-8182	3.7			
		SFS17-TP2/02	SFS17-8245	3.74			
		SFS17-TP2/01	SFS17-8360	4.87			
	Saithe/Pollack	Basioccipital	SFS17-TP2/02	SFS17-8170			
			SFS17-TP2/02	SFS17-8171	3.54	4.55	
SFS17-TP2/02			SFS17-8172	4.46	4.6		
SFS17-TP1/04			SFS17-8447	4.64			
Dentary		SFS17-TP2/02	SFS17-8196				
		SFS17-TP2/02	SFS17-8199	3.64	3.33		
		SFS17-TP2/02	SFS17-8200		3.41		
		SFS17-TP2/02	SFS17-8201	3.16			
		SFS17-TP2/02	SFS17-8260	3.48			
		SFS17-TP2/02	SFS17-8263		1.8		
Opercular	SFS17-TP2/02	SFS17-8203					

		SFS17-TP2/02	SFS17-8204	3.33	
		SFS17-TP2/01	SFS17-8358	5.11	
	Otolith	SFS17-TP2/02	SFS17-8401	13.94	5.51
		SFS17-TP2/02	SFS17-8403	12.94	5.48
	Premaxilla	SFS17-TP2/02	SFS17-8163	6.12	
		SFS17-TP2/02	SFS17-8409	4.56	
Pollack	Premaxilla	SFS17-TP1/04	SFS17-8444	10.11	
Cod/Saithe/Pollack	Basioccipital	SFS17-TP2/02	SFS17-8169		7.43
	Opercular	SFS10-04	SFS10-8468		
		SFS17-TP2/02	SFS17-8202	6.22	
Haddock	Dentary	SFS171-01	SFS171-8498		2.83
		SFS17-TP2/02	SFS17-8411		2.56
	Opercular	SFS171-01	SFS171-8495	5.13	
		SFS171-01	SFS171-8496	5.53	
		SFS171-01	SFS171-8517	4.83	
		SFS171-01	SFS171-8519	3.83	
		SFS171-01	SFS171-8520	6.12	
	Quadrate	SFS171-01	SFS171-8506	4.44	
Cod Family	Dentary	SFS17-TP2/02	SFS17-8410	3.07	2.76
		SFS17-TP2/03	SFS17-8457		3.33
	Hyomandibular	SFS17-TP2/02	SFS17-8146		
	Opercular	SFS171-01	SFS171-8518	4.36	
		SFS171-01	SFS171-8521	4.15	
		SFS17-TP2/02	SFS17-8255	4.04	
	Otolith	SFS17-TP2/02	SFS17-8405		3.61
		SFS17-TP2/02	SFS17-8406	10.99	3.97
		SFS17-TP1/04	SFS17-8435		3.32

Table x.4 Fish metrical data from all sites (QC1 and QC4 elements) all follow York system protocol (and references therein)



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## Appendices

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### A. Latin names for taxa mentioned in the text

Common name	Taxon
Cow	<i>Bos taurus</i>
Sheep	<i>Ovis aries</i>
Sheep/goat	<i>Ovis aries/ Capra hircus</i>
Pig	<i>Sus domesticus</i>
Red deer	<i>Cervus elaphus</i>
Deer family	Cervidae
Dog	<i>Canis familiaris</i>
Seal sp.	Phocidae
Otter	<i>Lutra lutra</i>
Wolverine	<i>Arvicola terrestris</i>
Field vole	<i>Microtus agrestis</i>
Vole sp.	Microtine
Rat sp.	<i>Rattus sp.</i>
Small mammal	rat, mouse and similar
Medium mammal 2	dog, cat, mustelid and similar
Medium mammal 1	sheep, pig and similar
Large mammal	deer, cow and similar
Woodcock	<i>Scolopax rusticola</i>
Razorbill/guillemot	<i>Alca torda/ Uria aalge</i>
Toad sp.	<i>Bufo sp.</i>
Cod	<i>Gadus morhua</i>
Saithe	<i>Pollachius virens</i>
Pollack	<i>Pollachius pollachius</i>
Saithe/Pollack	<i>Pollachius</i>
Cod/Saithe/Pollack	<i>Gadus/Pollachius</i>
Ling	<i>Molva molva</i>
Rockling sp.	<i>Ciliata/Gaidropsarus</i>
Cod family	Gadidae
Conger eel	<i>Conger conger</i>
Haddock	<i>Merlangus aeglefinus</i>
Plaice	<i>Pleuronectes platessa</i>
Atlantic herring	<i>Clupea harengus</i>
Atlantic mackerel	<i>Scomber scombrus</i>
Wrasse family	Labridae
Salmon family	Salmonidae
Sea scorpion family	Cottidae
Plaice family	Pleuronectidae
Sea bream family	Sparidae
Gurnard family	Triglidae

## B. York system size categories used in the text

York system size category	Estimated length of fish
Tiny	<150mm
Small	151-300mm
Medium	301-500mm
Large	501-800mm
Very Large	801-1000mm

## C. Diagnostic element and quantification codes used for fish

Element	Element code	Quantification code
articular	a	1
basioccipital	bo	1
ceratohyal	ch	1
cleithrum	cl	1
dentary	d	1
hyomandibular	hy	1
infrapharyngeal	iph	1
maxilla	mx	1
opercular	o	1
palatine	pa	1
parasphenoid	par	1
preopercular	po	1
posttemporal	pt	1
premaxilla	px	1
supercleithrum	scl	1
scapula	scp	1
quadrate	qd	1
vomer	vo	1
abdominal vertebra	av	2
abdominal vertebra group 1	av1	2
abdominal vertebra group 2	av2	2
abdominal vertebra group 3	av3	2
caudal vertebra	cv	2
caudal vertebra group 1	cv1	2
caudal vertebra group 2	cv2	2
penultimate vertebra	puv	2
ultimate vertebra	uv	2
vertebra	v	2