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Title:
From The Fish Middens to the Herring: Medieval and Post-Medieval Fishing in the Northern Isles of Scotland

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Abstract:
The heyday of Viking Age and medieval fishing in the Northern Isles of Scotland can be traced in the huge deposits of fish bones that appear circa AD 1000. This "fish event horizon" is a phenomenon clearly recognised in the British Isles and linked to numerous factors, including the growing commercialisation of sea fishing in the North Sea and North Atlantic region. However, a few hundred years after the fish midden first appear, fishing in the Northern Isles took a dramatic downturn. Small-scale, subsistence fishing in relatively safe coastal waters became the norm. Early modern writers deplored the state of fishing in the islands in the late 18th century, while repeated attempts to develop commercial fisheries floundered due to lack of knowledge and investment. This paper discusses the archaeological evidence for the period between the 15th to the 19th centuries. Using estimates of fish sizes, species abundance and historical sources, it reconstructs fishing methods and likely fishing grounds, and asks why there was such a striking decline in fishing fortunes in the Northern Isles. The curious absence of herring bones from the archaeological record will also be discussed, a particularly relevant and perplexing question given that the
The “fish event horizon” of c. 1000 AD is sharply resolved in the zooarchaeological record for the Northern Isles of Scotland, marking an important transformation in the character of fishing and the orientation of maritime economies. Changes in the composition of many dated fish middens are complemented by the human isotopic record, indicating that marine protein consumption peaked between the 11th and 13th centuries (Barrett and Richards 2004). This is observed at fish middens like Quoygrew, Westray (Harland and Barrett 2012), St. Boniface, Papa Westray (Cerón-Carrasco 1998) and Pool, Sanday (Nicholson 2007), where extensive layers of fish bones are laid down over relatively short periods of time to form characteristic mounds comprising fish and shell with some mammal and bird bone. Almost all of the fish found in these middens were Gadidae (cod family), including large cod (Gadus morhua), ling (Molva molva), saithe (Pollachius virens) and pollack (Pollachius pollachius). This intensive period of fishing is linked to numerous factors, including the demands of Christian fasting practice, the rise of urbanization creating market-led demands, and the start of a trade in preserved fish from Northern producer areas to southern consumer regions (Barrett and Orton 2016; Harland and Barrett 2012; Barrett et al 2011; Barrett, Locker and Roberts 2004). This focus on fishing for large cod family fish lasted only for a few centuries within the Northern Isles, and this paper aims to explore what happens after the fish middens stop being used. Why does Orkney seem to cease intensive fishing for large gadids? What evidence is there, and how does this correlate with historical sources describing the start of modern commercial fishing in Northern Scotland?
2. The sites

The data presented here are derived from three sites on three different islands within the Orkney archipelago, which lies c.16km due north of the northern coast of mainland Scotland (Fig. 1). Orkney has a long history of archaeological investigation, from antiquarian interest to present-day research, and this is due in part to the excellent survival of settlements, artefacts and ecofacts. The later medieval and post-medieval periods have, however, been a neglected area of study compared with prehistory, the Viking Age and the Late Norse period. These three sites described here include a fully published and research-driven excavation, a rescue excavation in advance of coastal erosion, and a community-based project that has just started; each has produced fish bones but the quantities, scales of investigation and dating evidence is variable. That said, while there are limits to interpretation, the three assemblages allow us to track several trends in fishing and the consumption of fish over time. What is offered here is a first step towards a more comprehensive investigation of maritime exploitation in the later medieval, post-medieval and modern periods.

[Fig. 1]

2.1 Quoygrew

Located on the northern coast of Westray, one of the more northerly isles in the Orkney archipelago (HY 4433 5065), this large-scale excavation and related fieldwork spanned several years (Barrett 2012). The site includes remains of a Viking Age and medieval settlement, associated fish and kitchen middens, upstanding early modern ruins, a plaggen infield, and it has now been prepared for public display. The
Viking Age and Late Norse fish midden and farm mound midden were the focus of the zooarchaeological research (Harland 2006, Harland and Barrett 2012), but the site extended into the 15th and 16th century and produced some quantities of fish bones. Throughout its occupation Quoygrew appears to have been an ordinary status farmstead, without any high status associations.

2.2 Stackelbrae

This site is a large medieval and post-medieval settlement mound located on the south end of the island of Eday (HY5641 2884). Under threat from coastal erosion, the site has seen relatively limited field investigation, but sufficient to identify at least five main phases, and to sample a suite of midden deposits (Brend 2010). The main sequence spans the 15th to the 19th centuries, with phases of relatively high status occupation, defined on the basis of architectural detail, up until the 17th century. In the remaining phases the site becomes more ‘ordinary’ status, typical of farmsteads throughout Orkney at that time. The majority of the fish remains are from two distinct phases: the high status 15th to mid 17th centuries, and the ‘ordinary’ in status mid 17th to early 19th centuries (Harland 2013). Future work may refine these chronologies, which are based on limited C14 dates and artefact typologies at the moment.

2.3 Skaill Farm

The third site is part of a small agricultural settlement on the island of Rousay dating from the 18th and 19th centuries (Fig. 2). This site was first excavated over only a few days in 2015, as part of a community engagement project, with a week of excavation in 2016 and further work planned for 2017. Upstanding ruins are supplemented by historical maps and documentary evidence. The excavation has focused on the garden soils adjacent to a post-medieval ruined croft building, with the
primary aim of investigating late medieval through to early modern midden material. Two large samples were taken in 2015 which were fully sieved and which have produced numerous mammal, bird and fish bone fragments. This midden material has been dated by the presence of 19th century pottery and by a single worn 1743 George II halfpenny located towards the bottom of the trench (Figure 2, top right and middle right). [[Fig. 2]]

3. Methods
The fish remains were all analysed by the author using consistent recording methods (Harland et al 2003) and using both her personal reference collection and the comprehensive reference collection held in BioArch, University of York. All bones were recovered from samples sieved to 2mm.

Saithe and pollack bones can be difficult to distinguish, particularly when small. For those elements that are easier to distinguish (premaxillae, maxillae and posttemporals) all appeared to be saithe. It was therefore decided to use the saithe attribution to all elements, even those that are extremely difficult to separate between saithe and pollack.

4. Results:
Quoygrew was the first site to produce a substantial quantity of well-sieved, stratified fish remains from the 15th and 16th centuries in Orkney. In contrast to earlier assemblages from the site, including the Viking Age and Late Norse fish midden and
farm mound, these later deposits had only very small quantities of cod (Fig. 3). Instead, most of the fish bones found were now saithe. Running in parallel were trends in the size ranges present in deposits. Big fish of >80cm total length no longer dominated. The few cod that were recovered tended to be smaller. The saithe were smaller too, almost all now less than 50cm total length. Some small saithe were also found in the 11th to 13th centuries at Quoygrew, but they were a secondary resource compared to the substantial quantities of very big cod and other gadids. These changes in the composition of assemblages, and in the sizes of individual fish, are likely to indicate a shift in fishing grounds, from deeper open waters in the Late Norse period to shallow in-shore or shore-based fishing. [[Fig. 3]]

The trends at Quoygrew can be compared to those from the other two sites. Stackelbrae was initially a high status settlement, maintaining an elevated position between the 15th and the 17th centuries. The assemblage from that part of the sequence indicates that some deeper water fishing for cod was still taking place even though the sizes and proportions of fish found in contemporary layers at Quoygrew were very different. This may be directly attributed to status differences between the two sites. The inhabitants of Stackelbrae potentially had the resources needed either to acquire or to undertake targeted fishing for larger cod, albeit on a much reduced scale to that seen in earlier centuries at Quoygrew and other sites in the Northern Isles. Small saithe appeared to be less important to the inhabitants of Stackelbrae during the 15th to mid 17th centuries. After that, the site seems to have operated as a domestic settlement like many others across the region, and the fish assemblage is marked by an absence of evidence for deep water exploitation: almost all the fish found in the mid 17th to early 19th century were saithe, and they were primarily 15-30cm total
length. Much the same picture can be traced in the fish remains from Skaill Farm, which show similarly local patterns of exploitation, focused on small saithe, persisting through to the 19th century. Although the sample size from Skaill Farm is small – so far only two samples have been excavated and identified – the site is markedly similar to the later phases at Quoygrew and Stackelbrae. At Skaill Farm, only 2 cod bones were found, but 124 saithe bones were identified and almost all of these were saithe between 15 and 30cm total length.

Other fish taxa were present at all three sites, but only in small quantities. A few other gadids were noted at all three sites, including small rocklings and other small inshore gadids, but in general the cod family fish comprised at least 95% of the identified assemblages.

Several of the small saithe found at Stackelbrae and Skaill Farm display a distinctive butchery pattern: many maxillae have been cut or chopped separating the lateral and medial portions of the bone (Fig. 4). A few saithe dentaries were also butchered from Stackelbrae. Explanations are not forthcoming as to why this butchery strategy has now been observed at two separate sites. There is no indication that any parts of the fish are over- or under-represented, but these butchered mouth elements might relate to simple smoking or air drying. Figure 5 shows small saithe being preserved at one of Orkney’s farm museums, and here, a thin pole is threaded through the saithe jaws and out the underside of the mouth. Removing the preserved fish from this pole may have led to the butchery pattern; further experimental and ethnographic work is needed to fully understand its function. [[Fig. 4]] [[Fig. 5]]
The recent fishing history of the Northern Isles has been dominated by the herring fishery, which brought wealth, people and modernisation in the 19th and early 20th centuries (Murray 2015). Classic images of the herring fleets in harbour at Stromness, or the plethora of barrels and warehousing at Whitehall in Stronsay are in marked contrast to these harbours today. The prominence of the herring industry is, however, an anomaly in the fishing history of the Northern Isles.

Skaill Farm and the later phases at Stackelbrae are contemporary with the beginnings of Orkney’s herring industry, yet herring bones are almost entirely absent. Two fragments were identified from Skaill Farm, and one fragment was identified from Stackelbrae (mid 17th to early 19th century), but none were observed in the 15-16th phase at Quoygrew. A recent examination of all published, archived and grey literature pertaining to fish remains from Orkney uncovered only 195 herring identifications from a total of over 160,000 identified fish fragments from the Viking Age to the present day (Harland 2006). This is not a reflection of taphonomic or recovery biases, as herring bones can be very common in sieved archaeological material found elsewhere. They are moderately robust and regularly survive along with other larger and smaller taxa.

Why were so few herring fished in the past, when recent centuries have indicated how important and lucrative the herring fishery can be? Why are herring bones apparently absent from Stackelbrae and Skaill Farm, even though these deposits are contemporary with Orkney’s herring boom?
5. Discussion

The assemblages from Quoygrew, Stackelbrae and Skaill Farm show us that by the mid 17th century, Orcadians were no longer going out into deeper water to fish for large cod. Instead, all of their fishing effort is focussed on catching small, juvenile saithe from inshore or coastal waters. This shift has taken place even earlier at Quoygrew: there, by the 15th century, the very large cod and ling that are emblematic of the 11th to 13th century fish middens have gone, entirely replaced by smaller saithe.

These chronological trends are tentative at best. However, what we have suggests a shift over time in the pattern of people’s relationship with the sea. The increasing importance of small saithe and the virtual absence of larger deep water fish is consistent with localized patterns of small-scale fishing. Caught from small boats inshore, or from the shore itself, saithe became an important part of the diet of ordinary Orcadians, a key element in subsistence until the early 20th century (Fig. 4) (Fenton 1978). In the Northern Isles different sizes of saithe are known as *sillocks* (first year), *pillocks* (second year) and *cuiths* (first to third year) (Fenton 1978, 527; Watt 1989). These young saithe formed an important part of the subsistence diet into the 19th and early 20th century (Barry 1808, Low 1813). These were fished throughout much of the year, with certain peaks of seasonal abundance, and they could be preserved to keep for seasons when fishing was more difficult, less rewarding, or when agricultural or kelp-making demands kept people away from the water. An evening’s fishing could easily produce hundreds of fish, enough to maintain several families for a few days (Towsey 2002, 41), so they were routinely eaten both fresh and preserved.

Excess small saithe not needed for immediate consumption would be cleaned
immediately, then salted for a few days. They could then be hung to dry outside or indoors (Towsey 2002, 41-42). The heads were left with the bodies, as “that was how we hung them on the line” (Towsey 2002, 42) and thus no distinctive element patterning would be apparent in the archaeological record, even if they had been lightly preserved. Their value also extended beyond food: livers were rendered down for oil, for lighting and for trade (Nicholson 2005).

Only at Stackelbrae do we see larger fish persisting alongside a fishery for small saithe during the 15th to mid 17th century period. The numbers are small, and their significance should not be over-exaggerated. However, it may be that here at least, the social status of the inhabitants was such that they were still able to call upon the capital needed to engage in deep-water fishing, or to participate in wider markets. We might also speculate that by the 15th century or so, the consumption of deep water fish, such as large cod, may have been regarded as the prerogative of only a few. Whatever the case, even at this site, the pattern did not hold for long; by the mid 17th century, saithe dominate all three assemblages entirely.

Early historic accounts often mention cod, ling and haddock, most of which were described as frequently seen and in good condition in waters just off shore, yet not readily exploited by the inhabitants (Barry 1808, 294; Low 1813, 190-192); the evidence from the sites here confirm this. Skates and rays are mentioned as useful eating for the “poorer sort”, as they could be dried and stored, but some were “little better than horse” (Low 1813, 168-69). These fish are harder to identify archaeological, owing to the paucity of ossified elements, yet there appear to be few of the readily identifiable vertebral centra appearing at any of these sites. Various
flatfish could be caught around Orkney’s coastline and in slightly deeper waters using hooks or nets, and they were mostly eaten when fresh (Low 1813, 212-14). Dogfish were sometimes caught in shoals and were useful as a good source of oil for lighting, as well as for food and fertiliser (Low 1813, 170). However, the archaeological evidence for flatfish and dogfish is very limited. Historically-known fishing methods included using rods and lines, using long lines baited with hundreds of hooks left out overnight to fish in deeper offshore waters (for ling and similar taxa), and hand lines (Low 1813). These methods were probably similar to those used from the Viking Age onwards, and were probably used to catch the larger of the fish at Stackelbrae.

Various lamentations for the state of fishing in Orkney can be read in the earliest of the historical sources. The first statistical account mentions the “very much neglected” state of Orkney’s fisheries in the late 18th century (Liddell 1927, 69), and the complete absence of professional fishermen and proper commercial markets (Ross 1927, 194). Herring shoals were described as an “inexhaustible treasure” in July and August in Orcadian waters in 1808, yet local inhabitants “are either destitute of time, capital, or industry to avail ourselves of this” (Barry, 288). Low also mentions their vast shoals passing through Orkney waters in the summer months, and although he mentions that boats from Fife used to catch them in quantity in the early 17th century, he says they are no longer fished (Low 1813, 226-27; Hepburn 1885, 22). However, the Dutch were fishing for herring around the North Sea, including in Orkney waters, from the 16th century (Koninklijke Bibliotheek nd).

It wasn’t only the herring that were being ignored or severely under-exploited, according to these early historical sources: this applied to most species, aside from the
small saithe that provided immediate and easily-accessible subsistence fare. A total of only 30 dedicated fishing boats were identified during the first statistical account of 1795-98, each with only 4 to 6 oars, and all using hand lines (multiple baited lines) to fish for cod, ling, haddock, dogfish, flatfish and skate (Ross 1927, 194); this would have been in addition to numerous small, inshore boats co-owned by several families and used for inshore saithe fishing, but is still quite a small number of vessels and is a considerably reduced investment in fishing technology and knowledge compared to the heyday of the Viking Age and Late Norse periods.

Early pleas for investment in the herring and large gadid fisheries largely fell on deaf ears. Local land owners and ministers were keen to provide a boost to local economies, particularly as most were able to see the benefits that the Dutch fishery brought to the Netherlands (Poulsen 2016): “though [the Orcadian] situation is favourable to almost every kind of fishery, and the multitude and variety of excellent fish on the coasts promise to reward amply the labour of the people who might be thus engaged, very little attention has hitherto been bestowed on this object” (Barry 1808, 385).

Why? Barry speculates that Orkney didn’t have the local industry to support a commercial fishery. All ropes, nets, and sails had to be imported at great expense but Orkney lacked sufficient warehousing to store any imported goods (Barry 1808, 385, 389); presumably Orkney therefore also lacked suitable storage to allow a surplus to build up in a secure, protected location prior to export. Orkney also lacked the landing stages, docks and boat yards to facilitate large scale unloading and processing of fish for export, and even if local land-owners were keen to develop the industry,
they lacked the capital for investment. High duties on the salt needed to preserve fish was a further hindrance to investment and development of Orkney’s fisheries in the 18th and early 19th century (Ross 1927, 194). Local knowledge of deep water fishing had been lost, and was undermined by the kelp-making industry, which was lower risk and which corresponded seasonally to the best times for deeper water fishing (Barry 1808, 385-87). Local boat technologies were not suitable for larger-scale fisheries either – the small boats used for subsistence-level fishing couldn’t withstand the rougher seas and poor weather routinely encountered during commercial fishing (Barry 1808, 388). Fish like herring, which appear for short periods of the year in tremendous quantities before moving on elsewhere, may have been too difficult to exploit for local inhabitants without the resources (in both labour and materials) or the storage facilities needed for preservation and packing on a grand scale. Even a simple consideration of fishing methods might explain the reluctance to fish herring: herring are caught using nets, but fishing in the Northern Isles was always traditionally undertaken using hook and line.

Small-scale commercial fisheries for preserved cod family fish were established – or rather, re-established – in the late 18th and early 19th centuries following over a century of letters and pleas for investment in Orkney’s fisheries. Cod and ling were fished successfully on a commercial scale in Shetland (there termed the *haf* or *haaf* fishery) by the mid 18th century (Goodlad 1971), and in Orkney, a thriving export industry for dried cod was underway by 1840. This exported about 444 tons annually, primarily from Westray, Eday, Rousay and Shapinsay (Grant 1842, 100). First-hand accounts of Orkney’s fisheries in 1786 mention exports of preserved cod and ling from Westray and Papa Westray, but on a very small scale – perhaps the predecessor
of the 19th century commercial enterprises, but the authors stress that the vast majority of fish caught at this time was small-scale subsistence fare only (Anon 1786). As a contrast, a newspaper report from 1769 describes a ship arriving into Stromness with a full cargo of salted cod from Newfoundland (Orkney Archives). Orkney’s commercial herring industry only starts on a small commercial scale in 1816, initially with the aim of supply cheap herring to an Orkney landowner’s slaves in the West Indies (Thomson 2001, 369). After a slow start, the herring industry only really established itself in the mid to later part of the 19th century (Thomson 2001, 370). We have yet to see the product of any of these commercial ventures appearing archaeologically. It is possible that we are simply looking in the wrong place: the archaeological traces of the herring and cod industries might be present in Orkney, but not at the domestic scale.

6. Conclusion

Small assemblages pose as many questions as they provide answers. Given current data, two questions stand out. Why did people turn away from open water sea fishing? More specifically, where are the herring? The later phase at Stackelbrae and all of Skaill Farm are contemporary with Orkney’s herring industry, yet herring bones are absent from both assemblages. It is possible that herring were deliberately avoided in Orkney even during the peak fishing in the Viking Age and Late Norse periods, an avoidance that carried on into the recent past. Perhaps we are seeing here a different expression of the same shifts of focus that give us saithe dominated assemblages. Where the 15th century and later fishing in Orkney was essentially local, almost settlement-based in its scale and orientation, communities neither had the capital, the
wider economic organisation or the motivation to bother with the silver darlings. Even when they were eventually produced commercially in the Northern Isles, it would appear that herring were either too valuable as an export to be eaten locally, or they were simply not liked.

Which brings us to the question of why people turned away from the open water at some point between the 15th to 17th centuries. Overfishing was not responsible; historical sources indicate there were plenty of big fish available. So why do we see these shifts? There are, in all likelihood, several factors involved. Climatic downturn played a role: after the end of the medieval climatic anomaly in the later 13th century, the Scottish climate worsened, weather events became more extreme and, importantly for fisheries, the oceans became stormier (Oram 2014, 226-8). The Northern Isles were hit badly by the Black Death in 1349 (Thompson 2001, 169), which combined with the changing climate, may have led the inhabitants of Orkney to focus on arable and pastoral agricultural activities rather than engaging with the increasingly risky activity of deeper water fishing. By the 15th and 16th centuries Orkney and Shetland were no longer preferred suppliers of preserved cod for wider trade, having lost out to the burgeoning Newfoundland markets (Barrett et al. 2011). Economics were also a matter of political geography, and it may be significant that Orkney became part of Scotland in 1468 (Thomson 2001), an alignment that pushed the archipelago away from the Nordic maritime-oriented societies of the North Atlantic. It is also worth considering that there is some historical evidence for Shetland’s haf fishery developing in the 18th century (Goodlad 1971), and similar fisheries developing in Orkney in the 19th century, and yet these early commercial fisheries are not yet recognised archaeologically and may be of limited local dietary impact. As with the
herring fishery, these home-grown commercial enterprises may have reserved all of their fish for export. Although in the final centuries of this study the financial benefits of these commercial fisheries may have been seen locally, the inhabitants appear to have preferred their locally-caught *sillocks* and *piltocks*. These small saithe were the continuation of a centuries-old tradition of local, domestic subsistence scale fishing, a tradition that could fit around agricultural demands and which required no great investment in boats or fishing gear.

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Fig. 1: Map showing the locations of the three sites discussed in the text. (Source: OS VectorMap™ District [SHAPE geospacial data], Scale 1:25000, Tiles: hy,hz,nd, Updated: 9 September 2015, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <http://digimap.edina.ac.uk>, Downloaded: 2016-03-18 08:50:11.342)

Fig. 2: Excavations at Skaill Farm, Rousay, July 2015; clockwise from top left: a worn 1743 George II halfpenny; examples of bulk finds; view from SW showing ruined croft building; view from E showing proximity to coast (taken by Dan Lee and the author)

Fig. 3: Changing proportions and fish sizes, using total length estimates, of cod (top row) and saithe (bottom row) through time

Fig. 4: Butchered saithe maxillae from Stacklebrae, scale bar 1cm (taken by the author)

Fig. 5: Small saithe slowly drying and smoking, at a farm museum in Orkney (taken by the author)
Figure 3
Figure 4
Figure 5