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Skagafjörður Church and Settlement Survey: Final Report on the Archaeofauna from Grænagerði, Hegranes, Skagafjörður

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Introduction and Excavations

For the past four years, the Skagafjörður Church and Settlement Survey (SCASS) has been exploring the settlement pattern on Hegranes, in Skagafjörður (Figure 1) (e.g., Bolender et al. 2016, 2017; Steinberg et al. 2016). In tandem with SCASS, the Fornbýli Landscape and Archaeological Survey on Hegranes (FLASH) has focused on the small marginal sites on Hegranes (Catlin et al. 2017, 2018). Grænagerði (Figure 2) is one of these marginal sites, formerly part of the land claims of Helluland, but now on a separate piece of property called Hulduland (Catlin et al. 2018:60).

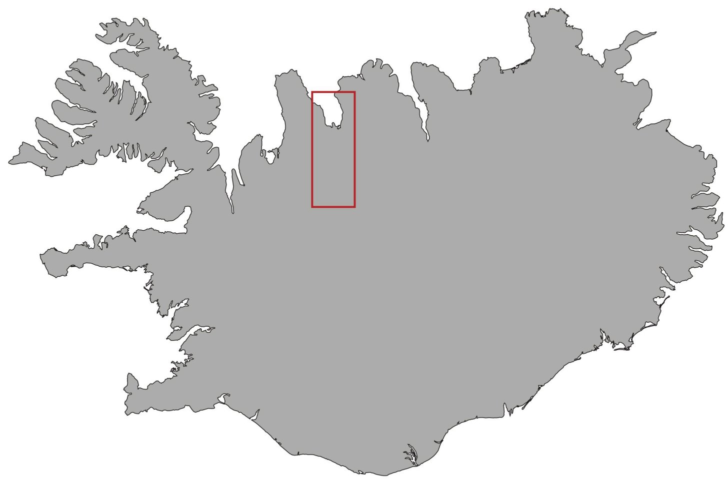

Figure 1: Map of Iceland. Skagafjörður is outlined in the red box.

The first coring at Grænagerði took place in 2015 and found a charcoal-rich midden. In 2017, more coring was done to secure a location for the 1x1 meter test pit. This test pit contained midden material (bones, finds, charcoal) underneath the AD 1104 tephra and no cultural material above the tephra layer. This indicates that the site was no longer used for extensive human occupation after AD 1104, similar to the nearby *fornbýli* site of Kotið (Catlin et al. 2017, 2018; Cesario 2018a). In 2018, the original test pit was used as the northwest corner of a new excavation, which covered 2x2 meters (Ritchey and Cesario 2018). The archaeofauna from both test pits is reported on here.

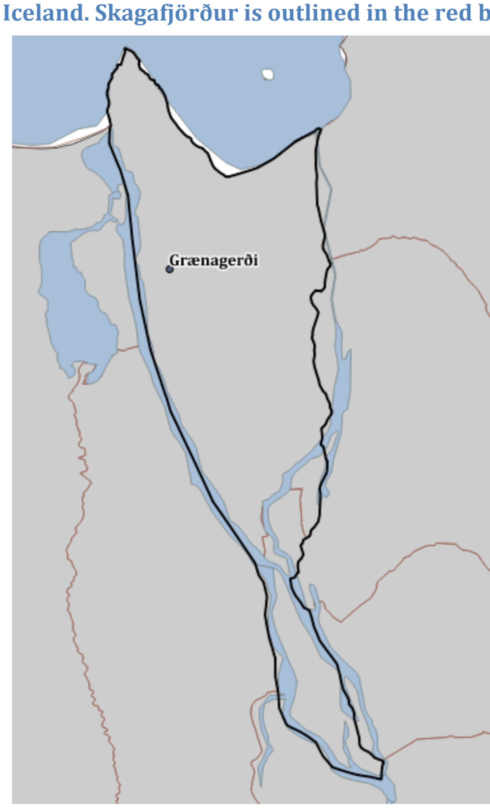

Figure 2: Location of Grænagerði on Hegranes.

Methods

The faunal materials were analyzed at the Hunter College Zooarchaeology Laboratory, and made use of the comparative collection there. The 2018 material was analyzed in Iceland, at Fornleifastofnun Íslands (FSÍ) and using the comparative collection housed at the Agricultural College in Keldnaholt as well as the Natural History Museum in Garðabær. Recording and data curation follow NABONE protocols, utilizing the 9th edition of this recording package (a Microsoft Access database supplemented with specialized Microsoft Excel spreadsheets, available to download at www.nabohome.org). Digital records were all made using this package. The animal bones excavated will be permanently curated at the National Museum of Iceland along with all digital records. Digital records will also be preserved in the NABO collection on The Digital Archaeological Record (tDAR). An electronic copy of this report is available at www.nabohome.org and at the UMB SCASS website/Fiske Center site.

All fragments were identified as far as taxonomically possible, and a selected element approach was not used. Most mammal ribs, vertebrae, and long bone shaft fragments were assigned to "Large Terrestrial Mammal" (cattle or horse sized), "Medium Terrestrial Mammal" (sheep, goat, pig, or large dog sized), and "Small Terrestrial Mammal" (fox or small dog sized). Only those elements that could be positively identified as sheep, *Ovis aries*, or goat, *Capra hircus*, were assigned to these categories while all other sheep/goat elements were assigned to a more general "caprine" category.

Following widespread North Atlantic tradition, bone fragment quantification makes use of the Number of Identified Specimens (NISP) method (Grayson 1984). All mammal measurements follow von den Driesch (1976). Sheep/goat distinctions follow Boessneck (1969), Mainland and Halstead (2005), and (Zeder and Lapham (2010). Only positively identified fragments of fish bone were given species level identification, with those unidentifiable to species placed in the family category where possible, often *gadid*, while others were identified simply as fish. No fish bones from this collection required measurement. Long bone fusion stage calibrations follow Zeder (2006) and presentation of age reconstruction makes use of Enghoff (2003) and McGovern (2009).

The Archaeofauna

The analytical units for this excavation have been separated by time period. Volcanic tephra observed during excavation was used to date the deposits, and carbonized seeds recovered through flotation have been sent for radiocarbon dating in order to get more precise dates. Table 1 below presents the NISP and TNF for all phases at Grænagerði. Phase I is AD 871-1000 and is capped by the dark grey 1000 tephra. Phase II is the period AD 1000-1104 and ends at the white AD 1104 tephra. The 1000 tephra was not continuous across the entire excavation, and therefore the "unphased" column includes fauna from the contexts that cannot be phased (though radiocarbon dates are forthcoming), though it is all pre-1104. The site was mostly abandoned for human activities by AD 1104 and there was only one context above the 1104 tephra. The post-1104 material has a very small NISP and will not be discussed in detail here.

Phase	**I**	**II**	**Unphased**	**Post-1104**	**Total**
Domesticates					
Bos taurus	7	64	44	4	119
Equus caballus	1	0	3	0	4
Canis familiaris	0	2	0	0	2
Sus scrofa	2	39	7	3	51
Ovis aries	5	49	10	3	67
Capra hircus	0	0	0	0	0

Ovis/Capra sp.	47	235	79	10	371
SEA MAMMALS					
Phoca vitulina	0	1	0	0	1
Cetacea sp.	0	1	0	0	1
OTHER MAMMALS					
Alopex lagopus	0	1	0	0	1
BIRDS					
Wildfowl - sea birds	155	22	377	1	555
Wildfowl - land birds	1	3	0	0	4
Bird sp.	50	78	157	0	285
FISH					
Gadid sp.	70	1,013	306	9	1,398
Salmonid sp.	0	1	0	0	1
Other Fish	0	7	0	0	7
Fish sp.indet.	4	247	28	0	279
MOLLUSCA					
Mollusca sp.	9	68	42	0	119
GASTROPODS					
Snail sp.	0	5	3	0	8
TOTAL NISP (Identified fragments) =	**351**	**1,836**	**1,056**	**30**	**3,273**
Small Terrestrial Mammal	0	6	3	0	9
Medium Terrestrial Mammal	76	442	165	35	718
Large Terrestrial Mammal	16	116	52	11	195
Unident. Mammal Frags	290	3,171	1,483	43	4,987
TOTAL TNF (all fragments)	**733**	**5,571**	**2,759**	**119**	**9,182**

Table 1: NISP and TNF for Grænagerði archaeofauna. Total NISP for all phases is 3,273. Note that the Post-1104 material will not be discussed in this report so the NISP for analysis is 3,243.

Taphonomy

Various taphonomic factors can affect bones. Here, four measures of taphonomic effects will be explored to help characterize the entire archaeofaunal assemblage. The taphonomy is discussed in terms of the assemblage as a whole, using the Total Number of Fragments (TNF). Using the whole assemblage for taphonomic analysis, rather than just the identified bones (NISP), gives us a better picture of what happened to the entire assemblage.

Fragment Size

Size of a bone can affect its identification rate. Larger bone fragments are often much easier to identify than smaller, more broken pieces. Some animals, however, have smaller bones that can be recovered whole and identified at a higher rate than broken fragments of a large mammal bone. At Grænagerði, the majority of the bones are in the 1-2 cm and 2-5 cm categories in both phases (Figure 3). Most of the pieces under 1 cm are unidentifiable.

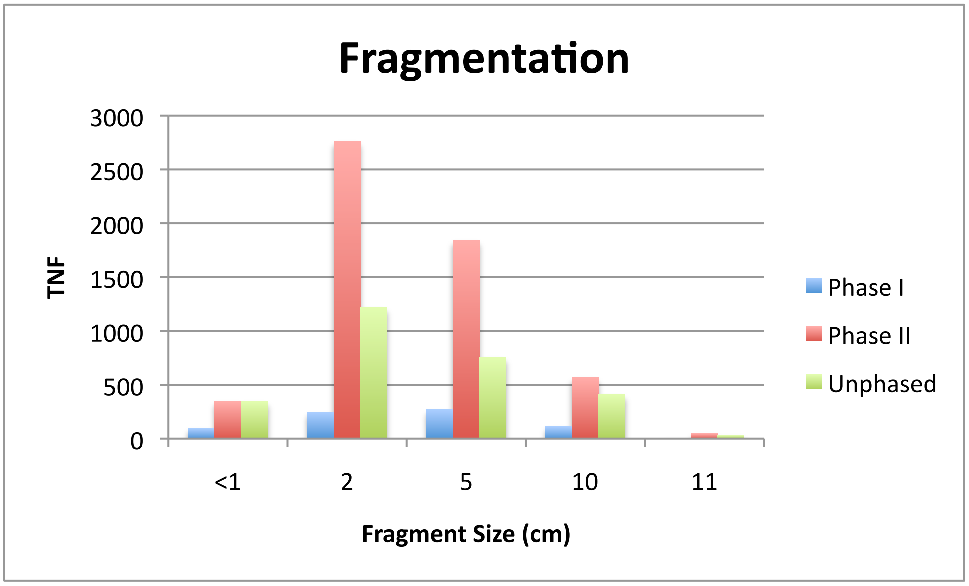

Figure 3: Fragmentation

Burning

As Figure 4 below shows, most of the bones from Grænagerði were unburned. The majority of those that were burned are completely calcined, the "white" category. This indicates a very hot fire. The midden layers at Grænagerði were dark and mostly charcoal-based with little to no peat (Catlin et al. 2018). This darker charcoal midden may indicate that more wood was being burned at the site rather than peat. The white burned bones could have been included in this and burned as fuel, then eventually deposited into the midden during a cleaning event. Another interpretation for white-burned bone in the Viking Age is that people would have disposed of their food waste in the long fire in the middle of the house, then during cleaning of the fire pit, calcined bone fragments mixed with wood charcoal and fire cracked rocks are disposed of in the midden (Thomas McGovern, personal communication).

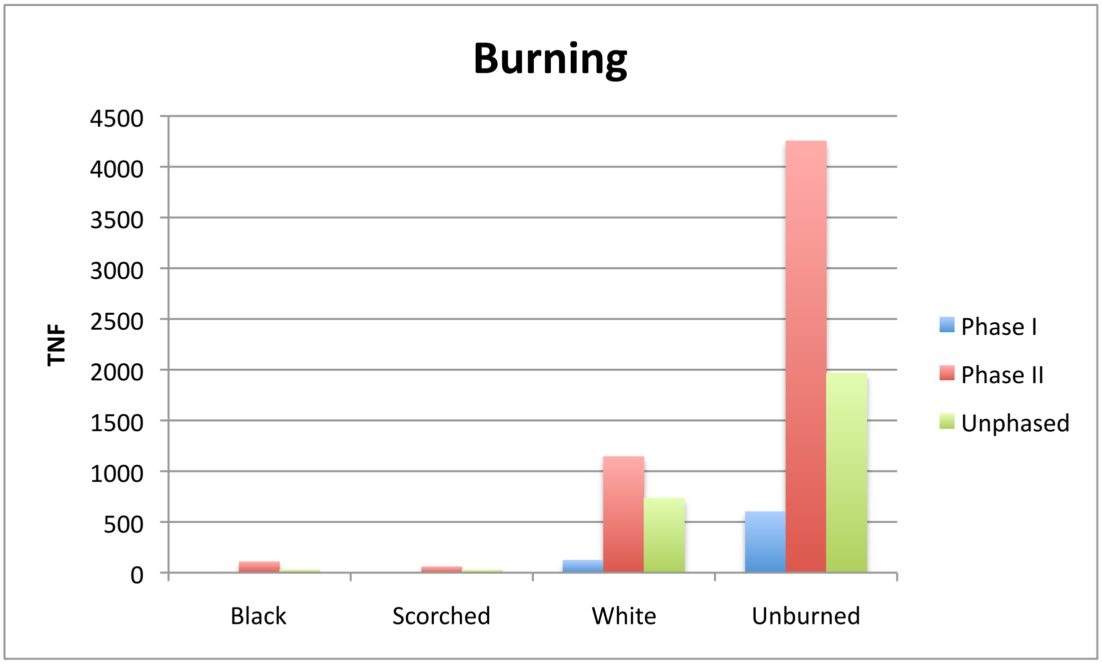

Figure 4: Burned bones at Grænagerði

Gnawing

Dogs gnawed nine total bones in the Grænagerði archaeofauna. Two bones in Phase I and seven in Phase II showed evidence of gnawing. All of the gnawed bones were either caprine or small-medium terrestrial mammal, which are also likely to be caprine based on size. These gnawed bones indicate the presence of dogs on site, even though no dog remains were recovered.

Butchery

Most bones did not show evidence of butchery (Figure 5). More bones in Phase II had knife cutmarks, and more bones in Phase I showed evidence of being chopped.

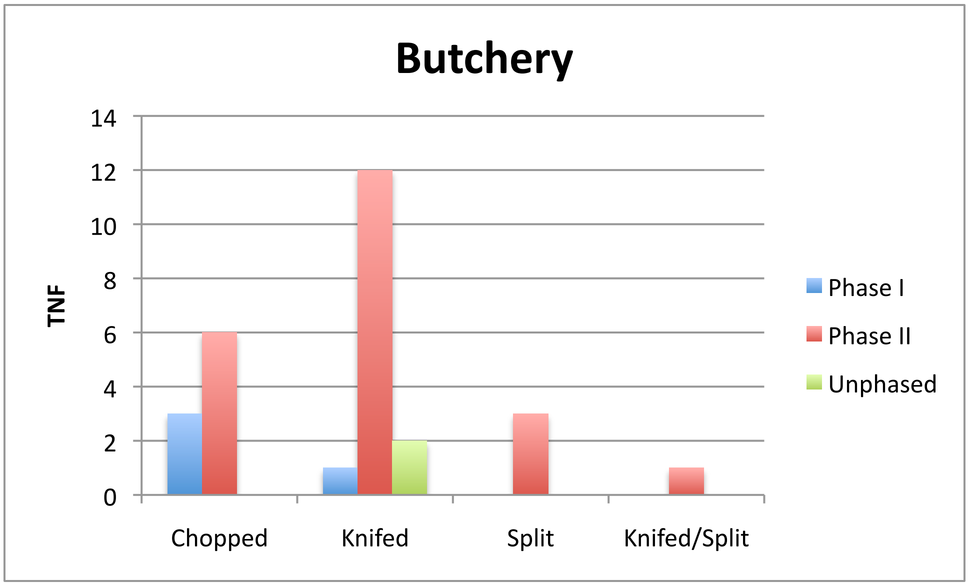

Figure 5: Butchery patterns at Grænagerði

Major Taxa

Figure 6 below shows the major taxa present in the Grænagerði assemblage based on NISP. In Phase I and the unphased material, birds dominate the assemblage at nearly 60% and 50% of the total NISP, respectively. Most of these birds were waterfowl, but see “Bird” section below for more discussion. Domesticates make up less than 50% of the assemblage in all phases, but the number kept in Phase II has more than doubled from Phase I. In addition to an increased domesticate focus, Phase II also sees a heavier reliance on fish, which more than double in Phase II while bird exploitation decreases dramatically. The rest of the assemblage contains small amounts of mollusks and sea mammals. The next sections will discuss these major taxa in more depth in order to understand the activities taking place at Grænagerði.

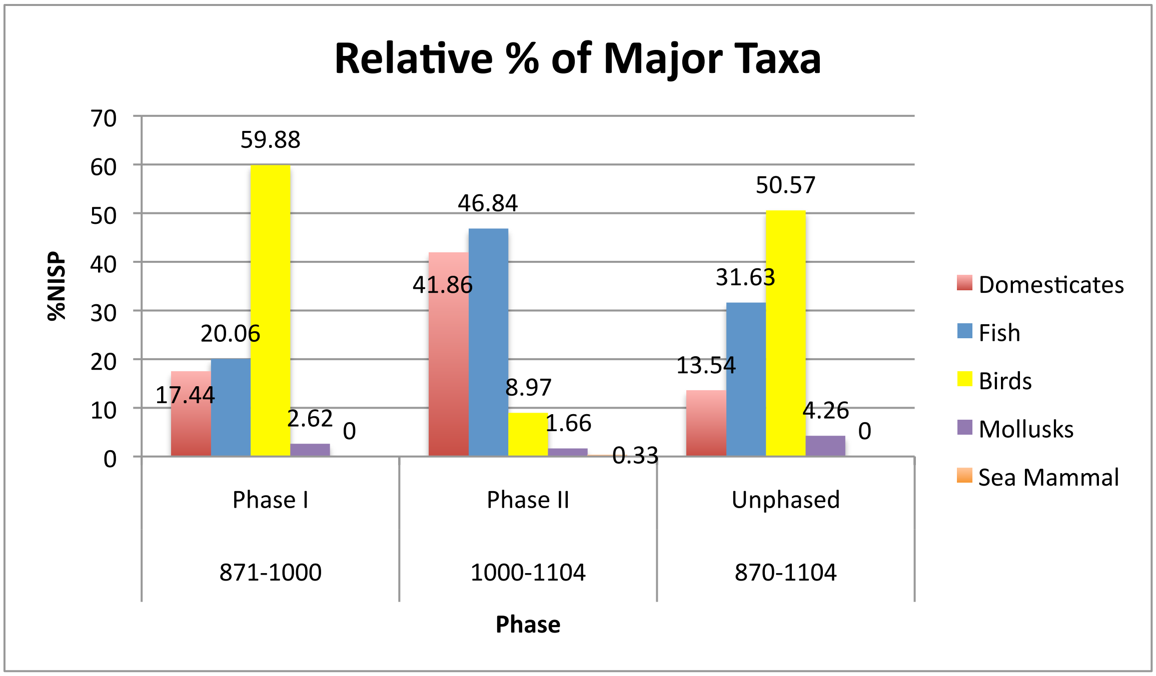

Figure 6: Relative percent of major taxa in all phases at Grænagerði

Caprines

The caprine category includes both sheep and goats. It can be quite difficult to distinguish between the two, especially on phalanges and long bone shafts. However, the ends of many long bones have diagnostic features allowing the identification of sheep or goat (see Boessneck [1969], Mainland and Halstead [2005], and Zeder and Lapham [2010] for a list of elements and their distinguishing features). These distinguishing bones are generally quite dense and preserve well in the archaeological record.

In the Grænagerði archaeofauna, no bones were positively identified as goat. Previous zooarchaeological analyses have shown that goats are uncommon in Skagafjörður (Aaris-Sørensen et al. 2006; Cesario 2016, 2018a, 2018b; Hicks 2016); however, they are not altogether absent from the region (Cesario 2019).

Element Distribution

The caprine elements present in the Grænagerði archaeofauna are from the entire skeleton (Figure 7). The lack of vertebrae and ribs for the unphased material in Figure 7 is likely due to the NABONE protocol of identifying these elements to size categories (see Methods section above) rather than the bones actually being missing from the archaeofauna.

The presence of elements from the entire skeleton indicates a home butchery strategy, where the inhabitants at Grænagerði were sustaining themselves. There is no evidence for extra body parts coming into the site, which would suggest that they were being provisioned from elsewhere, nor is there evidence of specific body parts leaving the site, which would indicate that they were provisioning others.

In Phase I, there is a much higher percentage of lower hindlimb and hindquarter elements than any other elements in the same phase. More cranial elements are present in Phase II than we see in Phase I, and there are more cranial elements than any other element in Phase II.

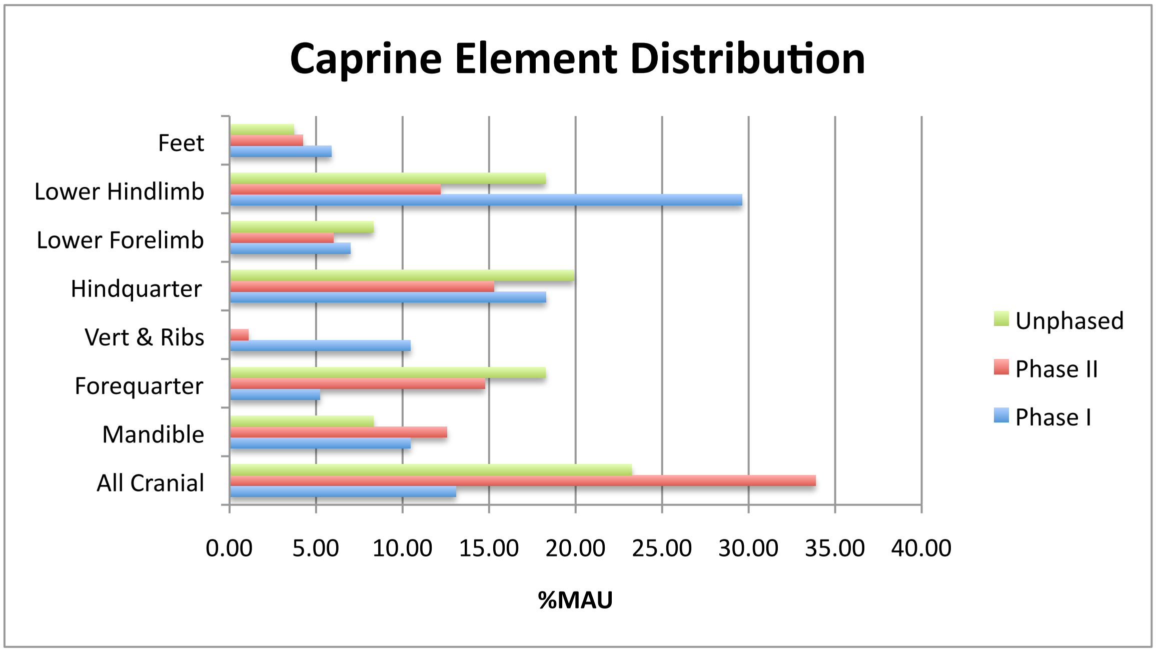

Figure 7: Caprine element distribution for both phases at Grænagerði

Caprine Age Profile

Tooth Eruption and Wear

Mandible fragments and loose teeth were recovered, and 13 mandibles with teeth present in the jaw for aging were available for this collection.

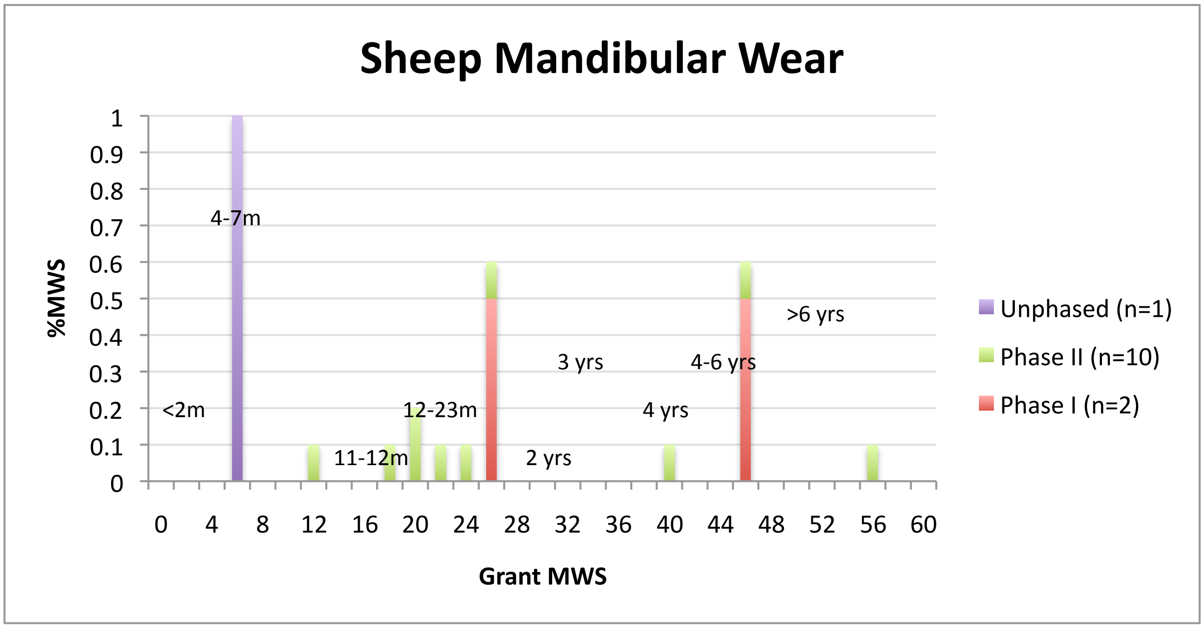

Figure 8: Sheep mandibular wear states. Graph based on McGovern 2009:225 (Figure 4.23) and mandibular wear stage calculations follow Grant 1982.

Figure 8 above shows that this assemblage has both younger and older individuals. However, the small sample size (n=13) is not enough to fully understand the herding strategy at Grænagerði. However; there is a springtime signature, with individuals being culled around one year of age. This pattern also looks like a relatively normal multi-use Viking Age caprine strategy where the herd is being used for multiple products—milk, meat, and wool. The older individuals especially point to use as wool-producers. Along with the cattle to caprine ratios (see Figure 9), this points to non-surplus wool production, likely only for household use.

Long Bone Fusion Stages

Most long bones could not be scored for fusion. In Phase I, one unfused distal tibia indicates an individual less than two years of age, while two fused distal tibiae come from animals over two years old. A fused distal femur comes from an animal over about 3.5 years old (McGovern 2009:226). In Phase II, an unfused distal humerus comes from a neonate, less than 6 months of age. An unfused distal femur indicates an animal under 3.5 years of age while two fused distal tibiae represent animals over two years old (McGovern 2009:226).

Neonates

Neonatal caprines were present in all phases. Phase I had 12 elements identified, while Phase II had five neonates and one fetal element present. The unphased material only included one neonatal bone. The presence of these neonates indicates a dairying strategy, as babies need to be culled to collect milk for human consumption. It also indicates site occupation during the late spring/early summer, since lambs are generally born in May.

The long bone fusion data presented above suggests that the age profile remains relatively stable through the phases, so the herding strategy likely remains the same or similar, with a mixed meat/milk/wool strategy, perhaps leaning more heavily on one than the others over time but not to such a degree that it is visible in the archaeological record.

Cattle to Caprine Ratios

In Iceland, there is a general increase in caprine use over time, especially as sheep gain importance for export of the standardized woolen cloth *vaðmál* as well as remaining a vital part of Icelandic household economy. The tradeoff seems to be that fewer cattle are kept in favor of increasing the number of sheep that can be raised.

At Grænagerði, this is not the case. While there are increased numbers of caprines, the majority of which are likely sheep, in Phase II, the ratio does not change in favor of more caprines. In Phase I, the cattle to caprine ratio is 7.43, so for every head of cattle there are 7.43 caprines (Figure 9). In Phase II, this ratio drops to 4.44. With the increased importance of caprines over time, we might expect that the ratio would increase, as we see with later phases at other sites like Vatnskot. However, we see something similar happen at Stóra-Seyla, located inland in Skagafjörður, where caprine use decreases after the initial phase, in this case between 950-1000, and then increases again in later phases.

Phase I at Grænagerði is most similar to Stóra-Seyla (SK104) in 1000-1104. They seem to be keeping more caprines relative to cattle than anyone else on Hegranes during the same time period. The Phase II decrease looks more similar to Phase I at Vatnskot or the 950-1000 time period at Stóra-Seyla. Both ratios at Grænagerði seem to be well within the range seen in Viking Age Iceland, though the decreased ratio in Phase II does not follow the general pattern of increased caprine use over time. Phase I is on the higher end of this range, with only mid-10th-early 11th century Skuggi (SKÖ, Figure 9) having a higher ratio.

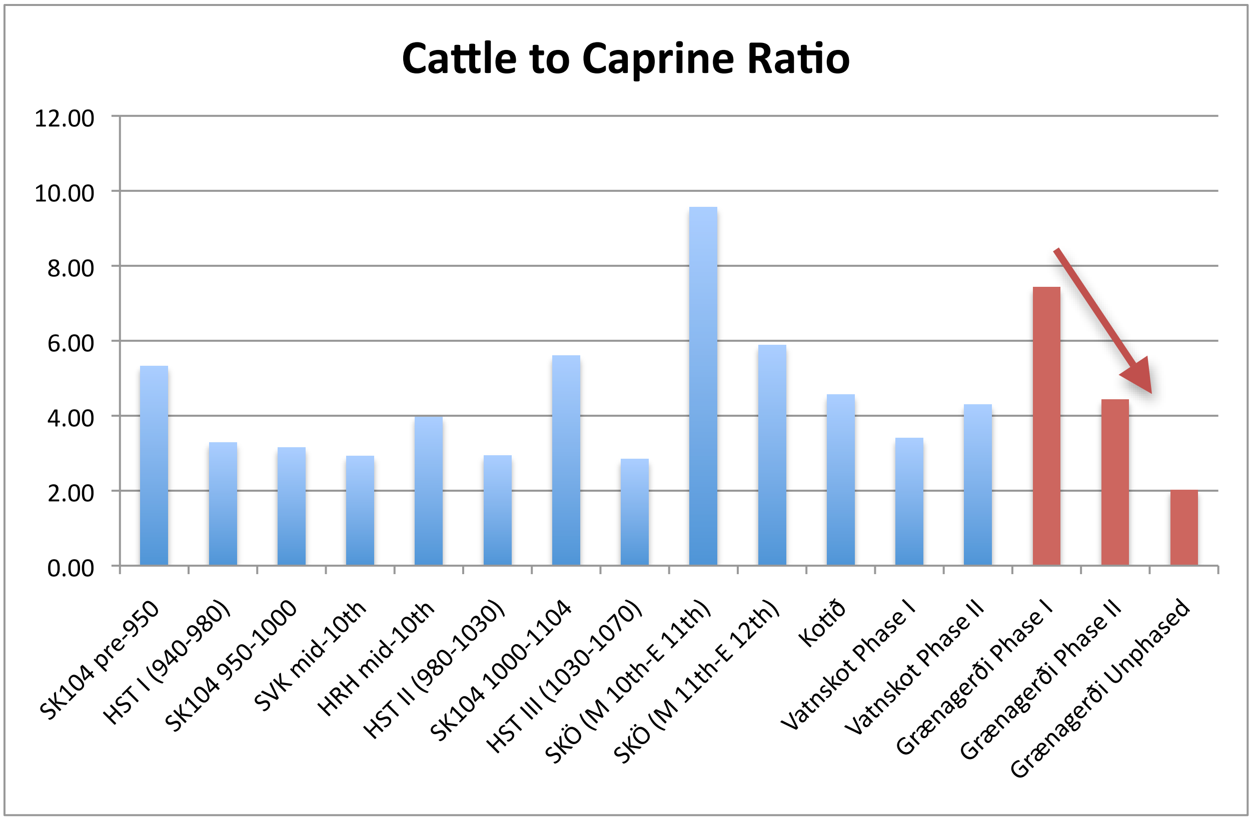

Figure 9: Cattle to caprine ratios throughout Iceland. Grænagerði is highlighted in red. Other sites in Skagafjörður include SK104 (Stóra-Seyla), Kotið, and Vatnskot. As comparisons, we have Skuggi (SKÖ) in neighboring Eyjafjörður and in Mývatnssveit we have Hofstaðir (HST), Sveigakot (SVK), and Hrísheimar (HRH).

Cattle

The number of cattle at Grænagerði increases in Phase II along with the increased use of domesticates overall (Figure 10).

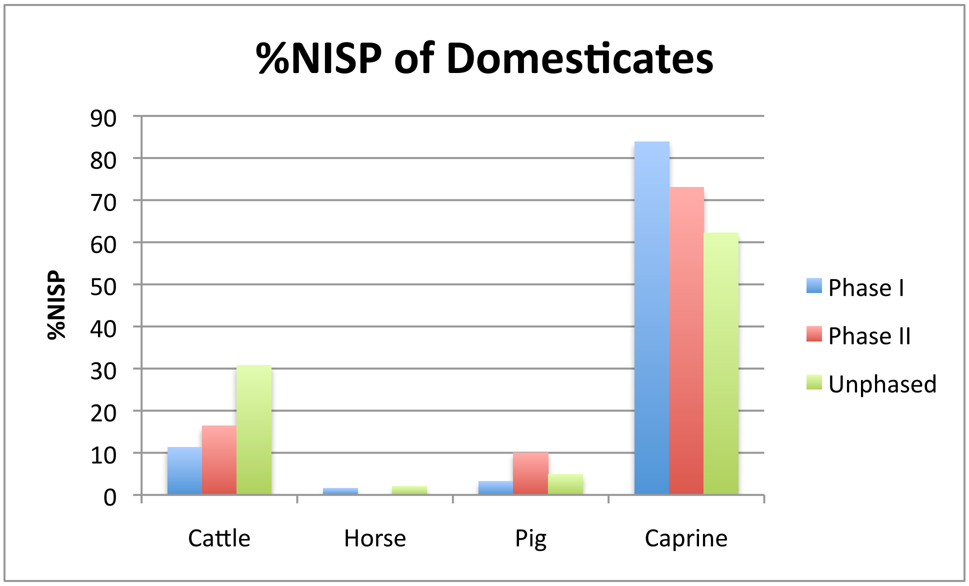

Figure 10: Relative %NISP of domesticates.

Cattle Age Profile

No mandibles with teeth present were recovered and so an age profile based on tooth eruption and wear is not possible. In addition, most long bones could not be scored for fusion, with the exception of one distal femur from Phase II that was unfused. This points to an animal under 3.5-4 years of age at death (McGovern 2009:221).

Neonates

Neonatal cattle were uncommon in both phases. In Phase I, a single third phalanx from a neonate was present. In Phase II, there were six neonatal elements. The unphased material contains two neonatal phalanges. The presence of these young individuals on site points to a springtime occupation, as that is when cattle are traditionally born. It also is a signature of dairy production, as babies would need to be culled in order to collect milk for human use and consumption.

Other Mammals

Other mammals present on the site are a mix of domesticates and wild animals. Pigs are present in both phases, with two in Phase I and 39 in Phase II. Pigs are not common in the archaeological record after about 1100, and it is interesting that the number increases in Phase II. Most of the elements from Phase II are teeth and fragments of mandibles and maxillae, though there are axial elements present as well. Other domesticate bones include a horse molar in Phase I and two dog mandible fragments.

Wild animals were only represented in Phase II. One arctic fox (*Alopex lagopus*) bone was identified, while the others were sea mammals. One unidentifiable whale bone was found as well as one harbor seal (*Phoca vitulina*) tooth.

Mollusks and Gastropods

The mollusks from Grænagerði are shown in Figure 11 below. Phase I has the fewest mollusks, at nine total. This was also the only phase where mussels were identified. Phase II has the highest number of mollusks, and those that were identifiable were clams. These shellfish only make up between 2.62 and 4.26 percent of the archaeofauna from any phase, and therefore did not contribute heavily to the economic strategy at Grænagerði. It is possible that they were collected for food or perhaps for bait, though no tool marks were present on the shells. Shellfish are generally quite easy to collect, and nearly anyone can do it, so they may represent a part-time activity on the shore while fishing or other ventures are also taking place. However, if the clams are *Arctica islandica*, they may be coming from deep water and are more likely to be collected from the beach without meat inside, and therefore not used as bait. These shells are used ethnographically as spoons or scoops, and so this could be another explanation for their presence in the assemblage.

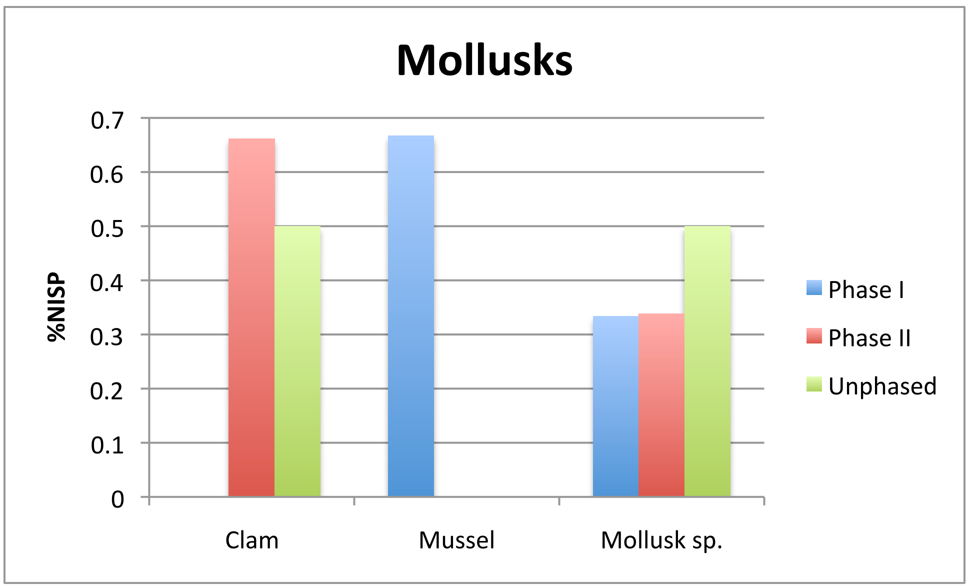

Figure 11: %NISP of mollusks

Gastropods were also found at Grænagerði. These are likely land snails, but a species-level identification has not been made. There were five in Phase II and three in the unphased material.

Birds

Birds are the most common taxa from Grænagerði in Phase I, making up nearly 60% of the assemblage (Figure 6). They drop off to just 9% of the archaeofauna in Phase II. They represent just over 50% of the archaeofauna from the unphased material.

Table 2 below shows all of the birds from Grænagerði. Phase I birds are mostly seabirds—150 guillemot (*Uria aalge*) and 5 puffins (*Fratercula arctica*). There was also 1 ptarmigan (*Lagopus muta*), and 50 unidentifiable birds. Seabirds represent a rich resource in Skagafjörður, as there are good nesting areas in the fjord for them. Seabirds like puffins and guillemot nest on cliffs, and Drangey, a steep-sided island in the fjord, hosts tens of thousands of mating pairs of these birds and others every year. They also represent a communal harvesting strategy, as their collection is dangerous and requires teamwork.

Phase II birds include guillemot and puffin as well as European Golden Plover and ptarmigan. However, the majority are unidentifiable birds. The unphased material is made up of mostly seabirds, and again guillemot make up the highest percentage of these. No identifiable land birds were present in the unphased material.

		I	II	Unphased	Total
Seabirds					
Uria aalge	Guillemot	150	14	316	481
Fratercula arctica	Puffin	5	6	57	68
Alca torda	Razorbill	0	0	1	
Gull sp.	Unidentified gull species	0	2	3	5
Land Birds					
Lagopus muta	Ptarmigan	1	2	0	3
Pluvialis apricaria	European Golden Plover	0	1	0	1
Unidentifiable birds		50	78	157	285
Total		206	103	534	843

Table 2: Birds in all phases at Grænagerði.

Fish

While most of the fish in the Grænagerði archaeofauna are marine, one char (*Salvelinus alpinus*) vertebra was identified (Table 3). Most marine fish were from the gadidae family, with a few Atlantic wolffish (*Anarhichas lupus*) in Phase II.

Phase		**I**	**II**	**Unphased**	**Total**
Marine					
Gadus morhua	Atlantic cod	14	330	104	448
Brosme brosme	Torsk	2	0	0	2
Melanogrammus aeglefinus	Haddock	0	15	3	18
Molva molva	Ling	0	1	2	3
Gadidae	Gadid family	54	667	197	918
Anarhichas lupus	Atlantic wolffish	0	7	0	7
Freshwater					

Salvelinus alpinus	Arctic char	0	1	0	1
Unidentified fish		4	247	28	279
Total		74	1,268	334	1,676

Table 3: Fish NISP by phase at Grænagerði

Phase I Fish

The total NISP for Phase I fish is 74 (Table 3). All of the identifiable fish were gadids, mostly cod. However, two torsk (*Brosme brosme*) elements were identified. Element distributions (Figure 12) indicate that the head parts are more common than those from the rest of the body, and analysis of the vertebrae (Figure 13) has shown that thoracic vertebrae are more common than either precaudal or caudal. This pattern is typical of the production of a flat-dried fish product, as will be discussed further below. There is still evidence of whole fish being consumed, as can be seen through the presence of some precaudal and caudal vertebrae that remained on site.

Phase II Fish

The total NISP for Phase II fish is much higher than that of Phase I at 1,268 (Table 3). A pattern of mostly cod is present in this phase as well, though other gadids include haddock and ling. There were also seven elements of Atlantic wolf fish, which is likely a bycatch from the cod fishing process. This is the only phase that had a freshwater fish, with one char vertebra identified. Element distributions (Figure 12) and vertebral series (Figure 13) indicate the same pattern of the production of a flat-dried fish product and some whole fish consumption as in Phase I.

Unphased Fish

The unphased fish follow the overall species diversity and element patterning that we see in Phase I and II. The NISP of 334 is higher than that in Phase I (Table 3). There is a preponderance of heads in relation to elements from the rest of the body (Figure 12), just like the other two phases. There is a slightly more even distribution of vertebrae (Figure 13), which could point to some fresh fish being eaten on site.

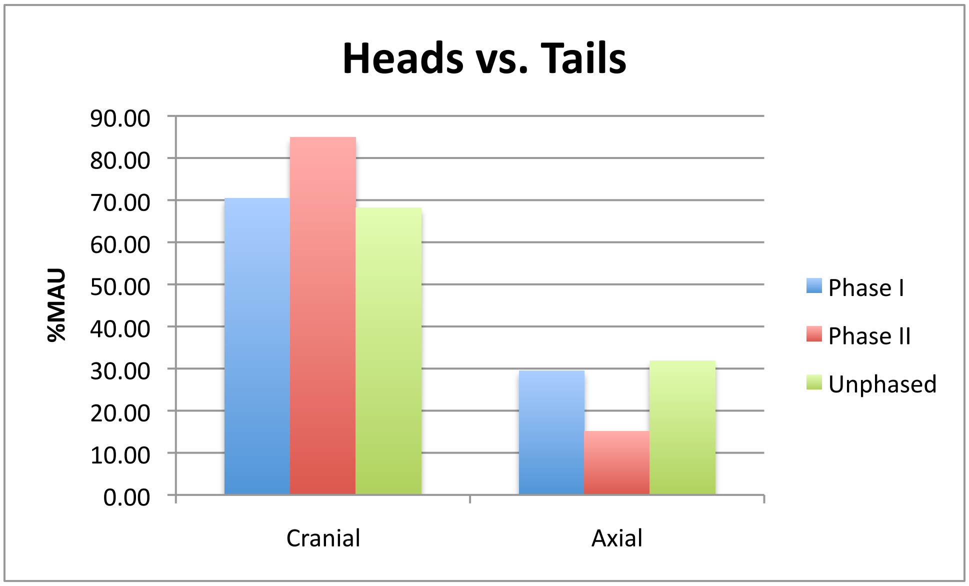

Figure 12: %MAU of cranial elements vs axial in all gadids for all phases

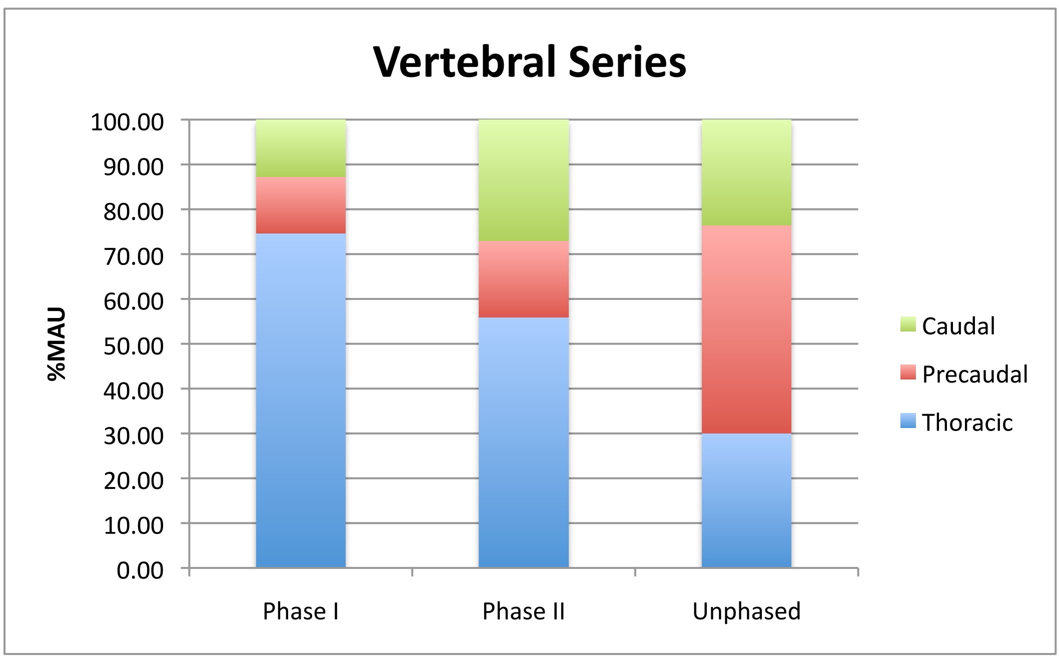

Figure 13: %MAU of different vertebrae from all gadids for all phases

Fish Interpretation

For both Figure 12 and Figure 13, the analysis makes use of %MAU. This normalizes for the number of times an element appears in the skeleton, and makes comparisons possible between areas of the body that have more or less bones without over- or under-representing them. For example, fish skulls are quite complex and include many more bones than the rest of the skeleton. However, to understand butchery patterns and production/consumption, %MAU ensures that these differences are accounted for.

The fish at Grænagerði show a distinct signature of more head elements than those from the tail. There are also more thoracic vertebrae represented than any other type of vertebra in Phases I and II. This signature tells us not only that Grænagerði was a fish-processing site, but that they were producing a flat-dried fish product rather than one dried in the round (e.g., Amundsen et al. 2004, 2005; Perdikaris and McGovern 2008a).

Sites where fish are being processed and dried will contain disproportionately more elements from the head of the fish, since the head is not left with the finished product. Sites where dried fish are consumed will contain more elements from the body of the fish, mostly vertebrae. The kinds of vertebrae present can tell us if the product was dried in the round or dried flat.

Round dried fish closely resemble the historically known “stockfish” later exported in large quantities from late medieval and early modern Iceland. The head is cut off, leaving the cleithrum and most of the vertebrae, though the first few thoracic vertebrae may be cut away with the head, leaving few atlas vertebrae in the finished product. Thus, a site where production of round dried fish is the focus will have mostly head bits and very few vertebrae of any kind. Consumption of round dried fish shows more vertebrae than other elements.

On the other hand, flat-dried fish were more heavily filleted and may have circulated more intensively within Iceland. For a flat-dried product, the head is cut off, and the fish is split down the middle almost all of the way to the tail, leaving the cleithrum to aid in keeping the body together. During the drying process, this filleting allows some vertebrae to fall out. Therefore, at site where production of the flat-dried product is the focus, skull fragments and thoracic vertebrae are expected, as well as some precaudal vertebrae. At a site consuming flat-dried fish, more precaudal and caudal vertebrae will be found. If these fish were instead consumed whole, the graphs above would show equal bars for all vertebrae, as it presents %MAU and thus controls for carrying quantities of each vertebra in the body. There is some evidence for whole fish being consumed on site here; however, the pattern for dried fish production is quite clear.

As can be seen in Figure 12 and Figure 13 above, cranial elements are much more common than axial in both phases. In addition to this, the vertebral analysis shows that mostly thoracic vertebrae are found. This is strong evidence for the production of a flat-dried product at Grænagerði. The presence of other vertebrae and axial elements also indicates that fresh fish were sometimes consumed whole on site. This pattern points to a Viking Age artisanal fishing strategy that began at the settlement of the region. Archaeological investigations at sites further inland in Skagafjörður also confirm a local trade network of this dried fish product. At the site of Stóra-Seyla in Langholt, zooarchaeological analyses point to the consumption of a flat-dried fish product (Cesario 2016). Other nearby sites on Hegranes (Kotið, Vatnskot) also seem to have produced flat-dried fish, illuminating the possibility of an even larger network of producers and consumers (Cesario 2018a, 2019). Patterns of marine fish product production and consumption have considerable potential to shed light on still poorly-understood patterns of pre-commercial, artisanal production and distribution of these characteristic Nordic dried fish products (Perdikaris and McGovern 2008a, 2008b).

With fish bones, there is always the possibility that taphonomy has destroyed many of the bones or that the collection strategy will not favor smaller bones and the archaeofauna will be biased. A biased collection strategy was not the case at Grænagerði, since the caudal vertebrae are the smallest of all the vertebrae and many were collected. The bones from Grænagerði were also wet-screened. The soil was too moist to go through the screen, so the excavators made the decision to screen as much as possible and then collect everything left in the screen for wet screening. Since the smaller bones were preserved, it can be assumed that the soil conditions were favorable, and so taphonomy does not seem to have played a dominant role in the number of fish bones recovered.

Concluding Remarks

The fish remains at Grænagerði along with the heavy reliance on seabirds at settlement tell an interesting story of Viking Age marine adaptations. The fish represent an artisanal fishing enterprise participating in a local trade network. It also looks like fish production increased in Phase II along with the inclusion of more domesticates on site and less of a focus on birds. The heavy reliance on seabirds right at settlement points to their importance as a subsistence resource before farms can be properly established and productive.

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