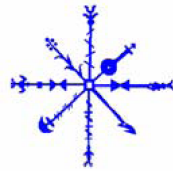


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**Skagafjörður Church and Settlement Survey:
Archaeofauna from the 2016 Field Season**

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Introduction and Excavations

In 2016, as part of the Skagafjörður Church and Settlement Survey (NSF PLR # 1242829, 1345066, 1417772 & 1523025), nine farms on Hegranes (Figure 1) were intensively surveyed, cored, and test pitted. In addition, the Fornbýli Landscape and Archaeological Survey on Hegranes (FLASH) surveyed, cored, and test pitted seven small sites, four of which are included in this research. This report on the archaeofauna from these test pit excavations supplements Bolender et al. (2017) and Catlin et al. (2017) by providing economic context to their survey and excavation results. The only farm excavated in 2016 that will not be reported here is Kotið, because we expanded that excavation unit in 2017 and it will be reported on its own.

The sites explored in Hegranes fall into two major categories—abandoned sites, or *fornbýli*, and those that are currently occupied and farmed. The abandoned sites are small and located physically on the margins of the large farms. These sites are also environmentally marginal, as they tend to be located in eroded areas. SCASS research focuses on the large farms, while FLASH studies the abandoned sites. The vast majority of the *fornbýli* are abandoned by AD 1104.

Test pits were 1x1 meter units, placed in areas of the farm mound with the best tephra preservation and evidence of human activities. The archaeofaunal samples collected from these excavations are too small to present more than a species list, though a few observations based on broader patterns will be discussed once all the data has been presented.

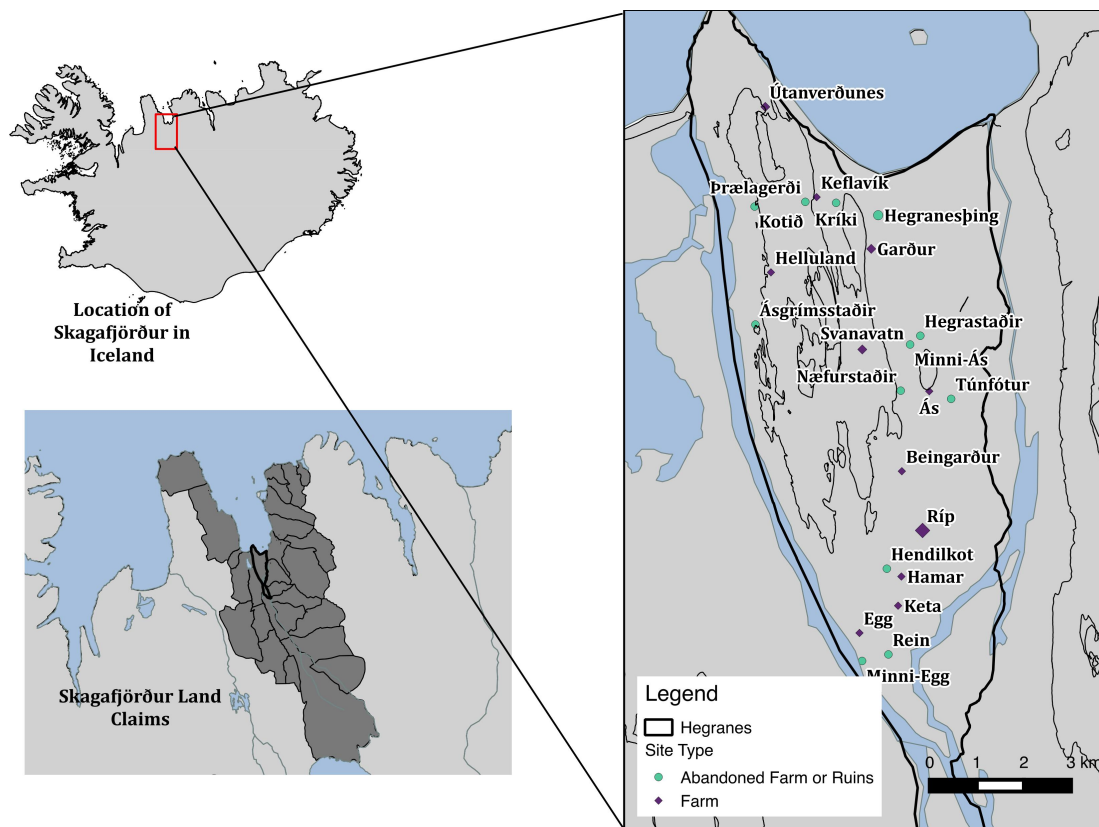


Figure 1: Location of Skagafjörður in Iceland. Lower left shows land claims, with Hegranes outlined in bold. Right shows site locations. Currently active farms are labeled with purple diamonds and abandoned sites are green circles. Symbol size indicates farm mound area in AD 1104.

Methods

The faunal materials were analyzed at the Hunter College Zooarchaeology Laboratory, and made use of the comparative collection there. 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 which can be positively identified as sheep, *Ovis aries*, were assigned to this category 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) and Mainland and Halstead (2005). 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.

Results

For ease of comparison, the results are presented here in one large table containing most of the sites excavated in 2016. Two sites are not included on the tables because their dating does not fall into the phasing categories of the other farms. These are Ríp and Þrælagerði. They are still reported here separately with their own dating scheme.

Each assemblage has been analyzed by time period based on volcanic tephra present during excavation and subsequent radiocarbon dating on carbonized seeds. What follows is a bit of background information on each site, and then tables presenting NISP and TNF (Total Number of Fragments) for all sites during comparable phases. I have broken the sites into two phases—pre-1104 (Table 1) and post-1104 (Table 2). I made this choice because phasing has not been completed for all sites, and we are waiting for results of radiocarbon dating to help clear up stratigraphy where tephra is unclear or not present. However, one tephra layer that is quite obvious is the white AD 1104 tephra and it tends to be present in most of our excavations, making it a perfect place to separate the phases.

Helluland

Helluland is located on the west side of Hegranes (see Figure 1). Much of the land owned by Helluland is quite rocky and eroded, though the area of farming activity still has

deeper soils. This test pit was placed near the modern pig barn, in the old farm mound. Only two time periods of activity have been identified so far: 934-1000 A.D. and 1000-1104 A.D. For the purpose of this analysis, these two phases have been lumped together, though most of the material (92 of 100 TNF, and the entire 29 NISP) comes from the later phase, 1000-1104. It is possible that the main farm moved after 1104, and that is the reason that no material was found after the 1104 tephra.

Identifiable marine animals found at Helluland include cod ($n=2$), puffin ($n=2$), and guillemot ($n=3$). The single pig bone, a mandible fragment, comes from the 1000-1104 phase. Pigs are common in the Viking Age, but become rare in archaeofauna after about AD 1100. However, this pig is not totally unexpected during this time period. The majority of the bones recovered from this test pit were unburned.

Ásgrímsstaðir

Ásgrímsstaðir is located across the modern road from the farm of Helluland and is part of its current landholdings. It is currently unfarmed and was abandoned in early modern times, by 1579 A.D. (Bolender et al. 2017:36). While it is currently abandoned, it is included as part of SCASS research, rather than FLASH, since it is considered a major farm and not a ruin (Catlin et al. 2017:36). Two 1x1 test pits were dug at Ásgrímsstaðir, but only TP1 yielded any faunal remains. The test pit was placed in the west side of the farm mound, where an early tephra sequence was visible (Bolender et al. 2017:39).

One dog tooth was present at Ásgrímsstaðir, indicating presence of at least one dog on site, though no bones showed evidence of gnawing. The majority of the wild resources discovered at Ásgrímsstaðir are fish, with nine cod elements identified and six from the gadid family. The birds are marine—five



Figure 2: Looking west from Test Pit 1 at Ásgrímsstaðir.

guillemot and three puffins. These birds indicate summer acquisition, likely from Drangey, where the birds nest over the summer months. Only one neonatal cattle bone was recorded and the majority of the material recovered was unburnt.

Egg

Egg is located near the southern tip of Hegrane. In AD 1388, it was listed as belonging to the bishopric of Hólar (Steinberg et al. 2016:8). Three test pits were excavated at Egg, but only TP1 contained animal remains. The majority of cultural material was found below the 1104 tephra and the patchy 1000 tephra (Steinberg et al. 2016:37). It appears that this area of the site was not in continual use, and perhaps that it was used early and then abandoned (Steinberg et al. 2016:37).

Few of the bones at Egg were identifiable. Of the 21 total bird bones, just one—a guillemot humerus—was identifiable to species. No bones from neonatal animals were present and one bone showed evidence of rodent gnawing. None of the caprine bones were identifiable as sheep or goat. The bones that were burnt (n=5) were white and completely calcined.

Rein

Rein is an abandoned farm that is currently the property of the modern farm Egg. Historically, the farm belonged to the bishopric of Hólar, and based on documentary records, was first abandoned by AD 1449. It went through several periods of reoccupation and abandonment, before being permanently unoccupied in 1931 (see Bolender et al. 2017:16-23 for a more thorough overview of the site's history and survey results).

Two test pits were excavated at Rein, both focused on areas with evidence of human activity before the AD 1104 tephra (Bolender et al. 2017:21). The first pit, TP1, was shallower and contained fewer faunal remains than TP2. Faunal remains from TP1 only came from one time period, pre-1104. In TP2, there are four distinct periods based on the tephra present. TP2 has material after the AD 1766 tephra, though there was not much from this period. For the purpose of comparison, the four periods have been combined into two—pre and post-1104. In TP2, there are actually three phases after 1104, though they all had low NISP numbers—1104-1300 (NISP 36), 1300-1766 (NISP 48), and post-1766 (NISP 11).

One seal bone was recovered from TP1. None of the birds recovered were identifiable to species. Four gadid family fish elements were identified, with the rest of the fish being unidentifiable beyond “fish.” There are neonatal vertebral fragments, likely belonging to a caprine. Most elements are unburnt, but those that are run the spectrum from lightly scorched to completely calcined.

Útanverðunes

Útanverðunes is the most northern farm of Hegrane, extending all the way up to the main road. Its lands include a lake, Nesvatn, and to the east and south of the modern house are boggy areas (Bolender et al. 2017:30). Two test pits were excavated at Útanverðunes, but only TP1 contained faunal remains. This test pit was placed on the northwest of the farm mound,

and the upper layers were mixed with gravel and modern refuse from various construction projects (Bolender et al. 2017:32).

This test pit had a distinct burned layer, underneath which the majority of the archaeofauna were retrieved. Most of the bones come from one context, [116], which was collected nearly in its entirety and then wet screened to retrieve all of the small bones. This context was full of mostly bird remains, though some domesticated mammals were also identified. The identifiable bird remains are from seabirds, exclusively puffin (*Fratercula arctica*, n=155) and guillemot (*Uria aalge*, n=43). There are floor layers above this context, as well as the 1104 tephra. Radiocarbon dating from context [109] returned a very early date (Steinberg, personal communication), indicating that all contexts beneath this, including the bird-rich layer, are even earlier, perhaps right at settlement.

Two samples of whale bone were sent for aDNA analysis and a species-level identification was made. One was a humpback whale and the other was sperm whale (Szabo, personal communication). The presence of whale bone fragments does not necessarily mean that people were hunting whales specifically, but often represent scavenged beach finds. Whale bones are large and often used as surfaces, like chopping blocks, or raw material for craft projects. Whales also get stranded and washed ashore, and whoever has legal rights to the whale stranding spot can take its meat.

The presence of such a large quantity of bird bones very close to settlement may indicate exploitation of an abundant wild resource. Frei et al. (2015) suggest that wild resources, mostly walrus, were a driving factor in the colonization of Iceland. In Skagafjörður, there is a small steep-sided island, Drangey, that hosts hundreds of thousands of nesting seabirds every year. It has been called the “food pantry of Skagafjörður” and people have been collecting eggs and birds there for all of recorded history, and likely before that as well. It is possible that the abundance of bird bones we see in this early context at Útanverðunes represent a specialized activity, happening one time, rather than a habitual subsistence practice. This would also indicate a communal hunting endeavor. Further excavation is needed to understand this outlier and is planned for the summer of 2018.

Keta

Keta is located just north of Egg on a dry ridge between two bogs (Bolender et al. 2017:23). The farm mound is located near the modern road, and seems to have been truncated during construction. The test pit here was placed west of the road, where coring indicated that deep soils and pre-1104 midden were preserved intact (Bolender et al. 2017:26). The uppermost layers were disturbed by bulldozing, likely during construction, and only two time periods produced any archaeofauna.

One neonatal caprine and one cattle bone were present. Sheep are born in May, so the presence of this bone, while not positively identified as a sheep, points to human activity at the site in the summer. Most of the bones were unburnt, and none showed evidence of butchery or gnawing by animals. Only three bird bones were identifiable, and all were puffin. Two bones were positively identified as adult sheep.

Hendilkot

Hendilkot is located northwest of the modern farm of Hamar and across the road, and is now part of their landholdings (Figure 3). The site is near a lake, Hendilkotsvatn, and plowing has truncated many of the deposits. Coring and the 1x1 meter test excavation found that most deposits above 1300 AD were affected by plowing. Few tephra were found during excavation, and the phasing is still being sorted out.

The identifiable fish at Hendilkot were cod ($n=9$) and most of the identifiable birds were puffin ($n=3$) and guillemot ($n=3$), indicating use of marine resources. The seabirds are also migratory, present in Iceland only during the summer months. There was one ptarmigan bone, and these birds are present in Iceland year-round. One seal bone was recovered.

There are neonatal cattle elements ($n=3$) as well as medium terrestrial mammal vertebrae ($n=2$) that are likely from neonatal caprines. Cattle are born in the spring, so the presence of these neonates indicates springtime activity, while neonatal caprines indicate a summer occupation.



Figure 3: View of the lush green areas of Hendilkot. This land is now owned by the farm of Hamar, and they still grow hay here in the summer.

Næfurstaðir

Næfurstaðir is located on the modern day landholdings of Ás, west of the medieval farm (Catlin et al. 2017:12). The site itself is currently abandoned, and was likely out of use by AD 1104. Investigations here are part of Catlin's focused work on marginal sites, or *fornbýli*. The test pit excavation at Næfurstaðir was a 1x1 meter pit with evidence of human occupation very shortly after settlement. While the name may suggest that goats were kept on the site at some point during its use (Catlin et al. 2017), no goats were present in the archaeofauna.

Catlin (2017:21) identifies three main periods of occupation at Næfurstaðir. There is some evidence of site use after AD 1104, but it is not intensely occupied and was likely just used for animal barns (Figure 4).

The archaeofauna are a mix of wild and domestic mammals, as well as wild birds, fish, and mollusks. Upon settlement of the site and during its first occupational period, the majority of the assemblage is made up of wild resources, especially fish. All identifiable fish were gadids, likely cod or haddock though some saithe were present as well. During its final major occupational phase, a pattern of fewer fish and more mollusks can be seen. There are not many domestic mammals used in any of the occupational phases, though the ones that can be identified are cattle and caprines, and therefore not unexpected. However, a typical farm would be expected to have many more domesticated animals than wild, at least after an initial settlement phase. Since this is not the case at Næfurstaðir, it would seem that the site did not function as a proper farm, but perhaps an outpost or specialized activity area of the main farm of Ás. Summer fieldwork in 2018 will expand this test pit in order to understand its use and relation to the main farm at Ás.



Figure 4: Næfurstaðir during excavation. The white line near the middle of the unit is the AD 1104 tephra. The 1000 tephra is present as a grey-ish line below the 1104, and the ca. 950 tephra is present in the unit, but not visible in this photo. The blue arrow is pointing to the 1000 tephra.

Pre-1104	Helluland	Ásgrímsstaðir	Egg	Rein		Útanverðunes	Keta	Hendilkot	Næfursstaðir
DOMESTICATES				TP1	TP2				
<i>Bos taurus</i>	0	0	20	0	0	6	2	3	15
<i>Equus caballus</i>	0	1	0	0	0	0	0	0	0
<i>Canis familiaris</i>	0	0	0	0	0	1	0	0	0
<i>Sus scrofa</i>	1	0	0	0	0	0	0	0	0
<i>Ovis aries</i>	4	0	0	0	2	0	2	0	1
<i>Capra hircus</i>	0	0	0	0	0	0	0	0	0
Ovis/Capra sp.	0	1	12	0	0	4	13	22	9
SEALS									
Phocid sp.	0	0	0	1	0	0	0	0	1
CETACEA									
Cetacea sp.	0	0	0	0	0	3	0	0	0
BIRDS									
Wildfowl - sea birds	5	0	1	1	0	198	3	5	5
Wildfowl - land birds	0	0	0	0	0	0	0	1	0
Bird sp.	5	2	16	3	1	291	1	15	9
FISH									
Gadid sp.	2	0	0	0	3	0	0	12	32
Fish sp.indet.	11	0	0	0	9	1	2	29	141
MOLLUSCA									
Mollusca sp.	1	0	0	2	0	0	0	2	45
TOTAL NISP=	29	4	49	7	15	504	22	89	259
Medium Terrestrial Mammal	20	0	5	15	3	27	24	33	54
Large Terrestrial Mammal	4	0	3	3	0	19	9	0	12
Unidentified Frags	47	0	22	10	9	333	32	265	113
TOTAL TNF=	100	4	79	35	27	883	87	387	496

Table 1: Pre-1104 data from all farms except Ríp and Þrælagerði. NISP (Number of Identified Specimens) and TNF (Total Number of Fragments) are both reported.

Post-1104	Ásgrímsstaðir	Rein TP2	Utanverdunes	Keta	Hendilkot	Naefursstaðir
DOMESTICATES						
<i>Bos taurus</i>	5	1	1	0	2	0
<i>Equus caballus</i>	0	1	0	0	0	0
<i>Canis familiaris</i>	1	0	0	0	0	0
<i>Ovis aries</i>	3	1	0	0	0	0
<i>Capra hircus</i>	0	0	0	0	0	0
Ovis/Capra sp.	19	8	1	1	1	4
SEALS						
Phocid sp.	0	0	0	0	1	0
BIRDS						
Wildfowl - sea birds	8	1	0	0	1	1
Bird sp.	5	8	0	3	3	4
FISH						
Gadid sp.	15	1	0	0	0	0
Fish sp.indet.	22	65	0	0	11	0
MOLLUSCA						
Mollusca sp.	0	9	0	0	0	8
TOTAL NISP=	78	95	2	4	19	17
Small Terrestrial Mammal	1	0	0	0	0	0
Medium Terrestrial Mammal	52	29	1	10	38	16
Large Terrestrial Mammal	14	0	3	0	8	1
Unidentified	66	195	19	15	144	24
TOTAL TNF=	211	319	25	29	209	58

Table 2: Post-1104 data from all farms with a post-1104 component. Fornbýli are mostly abandoned by this time, and only TP2 at Rein contained material post-dating 1104.

Ríp

Ríp is one of the largest farms on Hegranes. Multiple test pits were excavated, but only one yielded faunal material that is included in this analysis. Unfortunately, the tephra sequence in TP1 was not very clear, and the only time periods that can be separated are pre- or post-AD 1766.

	Post 1766	Pre 1766	Total
DOMESTICATES			
<i>Bos taurus</i>	0	20	20
<i>Equus caballus</i>	0	1	1
<i>Ovis aries</i>	0	3	3
<i>Capra hircus</i>	0	0	0
Ovis/Capra sp.	7	38	45
BIRDS			
Wildfowl - sea birds	0	4	4
Bird sp.	0	2	2
FISH			
Gadid sp.	0	1	1
Fish sp.indet.	2	3	5
TOTAL NISP=	9	72	81
Small Terrestrial Mammal	0	4	4
Medium Terrestrial Mammal	6	76	82
Large Terrestrial Mammal	1	15	16
Unidentified	2	55	57
TOTAL TNF=	18	222	240

Table 3: TNF and NISP for TP1 from Ríp.

The birds identified at Ríp were all puffin (*Fratercula arctica*). Some of the cattle elements (n=7) were from neonates, indicating a spring occupation and possibly a cattle management strategy aimed at dairy production.

Þrælagerði

Þrælagerði is located on land currently owned by Keflavík, but it is also quite close to Útanverðunes. Historical documents say that the site has never been occupied (Catlin et al. 2017:61), though its name may suggest an area where thralls lived or worked. The nearby bog seems to have been cut for peat at some point in the past.

The test pit here was placed based on a core that showed a dark, charcoal-rich midden layer. There was a large rock in the unit that took up most of one corner, but it was placed on top of the midden deposit. Unfortunately, due to its size, the rock was not removed during excavation and the material underneath it was not recovered. The tephra layers were unclear, but I have used Catlin et al.'s (2017:66) estimation for the three analytical phases here.

	Post 1000	~1000	Pre ~950	Total
DOMESTICATES				
<i>Bos taurus</i>	0	0	2	2
<i>Ovis aries</i>	0	1	0	1
<i>Capra hircus</i>	0	0	0	0
Ovis/Capra sp.	0	3	0	3
WILD MAMMALS				
<i>Alopex lagopus</i>	0	0	1	1
BIRDS				
Wildfowl - sea birds	1	5	17	23
Bird sp.	3	9	15	27
FISH				
Gadid sp.	0	0	9	9
Fish sp.indet.	0	0	29	29
TOTAL NISP=	4	18	73	95
Small Terrestrial Mammal	0	0	0	0
Medium Terrestrial Mammal	2	1	18	21
Large Terrestrial Mammal		1	3	4
Unidentified	5	11	30	46
TOTAL TNF=	11	31	124	166

Table 4: TNF and NISP for Þrælagarði.

The fox bone is from a neonate. This could indicate preventative hunting of kits before they leave the dens in order to protect some other wild resource. In Mývatn, this is a common practice to protect the local nesting duck colonies (McGovern, personal communication). It is unclear if ducks or other ground nesting birds were present in the vicinity of this site in the past, though in the present there are not large nesting grounds nearby. No land birds were present in the assemblage and no eggshell was found in this small excavation, so more research is needed to understand if this was a strategy for the sustainability of another wild resource.

The identifiable birds were all puffin (n=23), indicating summer harvesting from their nesting cliffs. The majority of the bones are unburned; however, of the burned bones, most are completely calcined. This is evidence of being in a very hot fire for a long period of time, perhaps as a processing strategy for bone grease.



Figure 5: CMD work in a potential structure at Þrællagerði in 2017. In the background, you can see an eroded outcrop of bedrock.

General Patterns/Observations

While the sample sizes from these test pits are too small for any major conclusions to be drawn, some patterns have emerged that warrant further discussion and future excavation. The first and most obvious pattern from the archaeofauna is the difference in wild versus domestic resources used at a site. Small, abandoned sites seem to use more wild resources, while large farms use more domesticates. Figure 6 below shows which percentage of the assemblage is wild and which is domestic based on NISP.

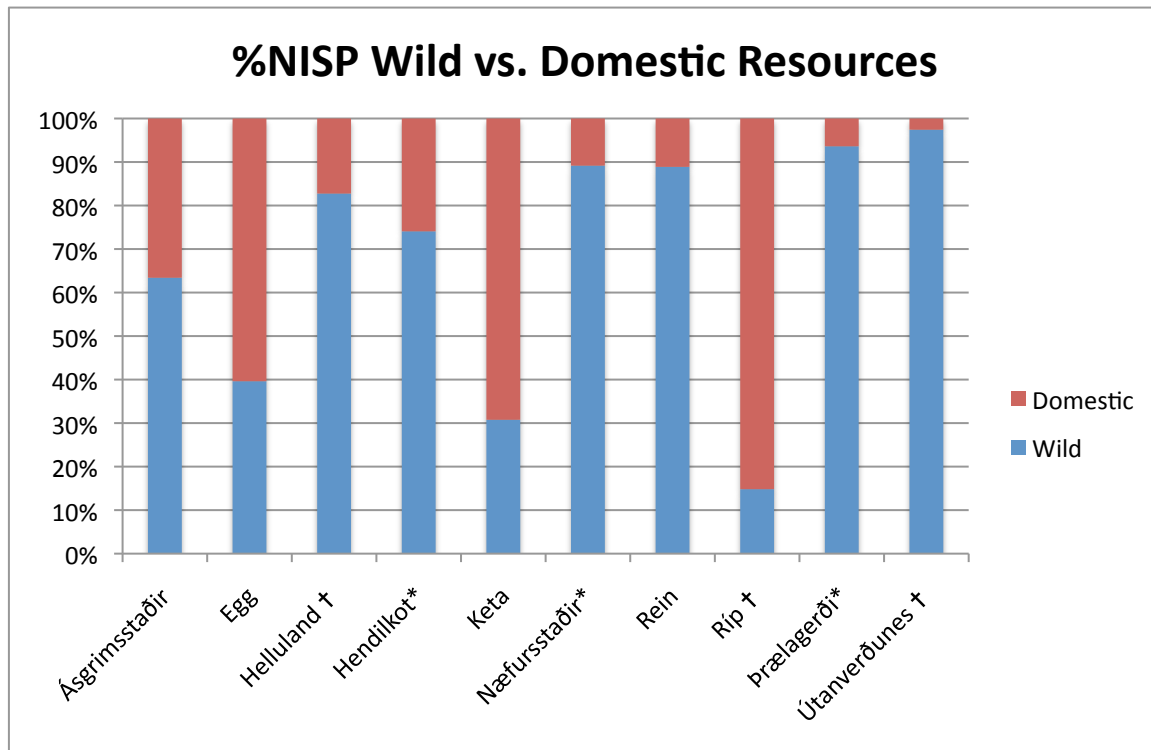


Figure 6: Graph showing percent of wild versus domestic resources present at each site. Sites with a cross (†) after their name are historically known to have had churches. Sites with an asterisk (*) are *fornbýli*.

The major outlier is Útanverðunes, a large farm that is currently occupied, and that has over 97% of its NISP from wild resources. The most likely explanation for this is that TP1 was placed in a specialized activity area for bird processing, rather than in the proper farm midden. Further excavations are planned in the summer of 2018 in order to understand animal resource use and human activities at this site.

Further, looking at just the wild resources (Figure 7) shows another difference between sites. Again excluding Útanverðunes as an outlier, we can see that some sites focus on fish, like Næfurstaðir, Ásgrímsstaðir, and Rein, while others have a more even mix of fish and birds. Very few sites used sea mammals, and mollusks do not make up a large proportion of any assemblage either, though they are present in the highest quantities at Næfurstaðir.

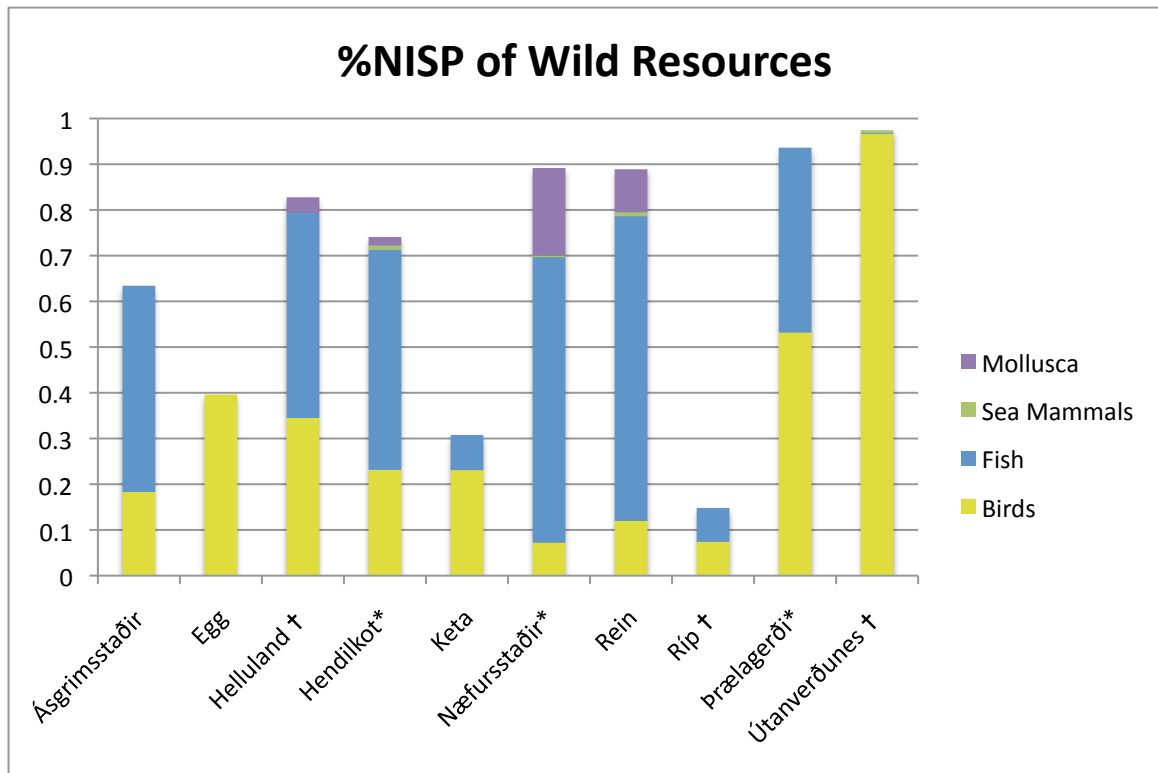


Figure 7: Graph showing the breakdown of types of wild resources by site. Sites with a cross (†) after their name are historically known to have had churches. Sites with an asterisk (*) are *fornbýli*.

Conclusions

Again, it is important to remember that sample sizes here are small. None of the observations discussed above can be proven with the data at hand. However, the patterns seen here do warrant further investigation. One of the major questions we have is why the small sites fall out of use all at once, around AD 1104. What were the social, environmental, and/or political factors at play during this time that might have affected the longevity of sites? The relationships of the small sites to the larger farms is unclear, and continued research, including zooarchaeological analyses, will help to understand the complex interactions at play on the landscape.

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References

Boessneck, J.

1969 Osteological differences between sheep (*Ovis aries* Linné) and goats (*Capra hircus* Linné). In *Science in Archaeology*, edited by D. Brothwell and E. Higgs, pp. 331–358. Thames and Hudson, London, UK.

Bolender, Douglas J., John M. Steinberg, Brian N. Damiata, and Guðný Zoëga

2017 *Hegranes Settlement Survey: Rein, Keta, Hamar, Utanverðunes, Ásgrímsstaðir. Interim Report 2016*. University of Massachusetts, Boston, Fiske Center.

Catlin, Kathryn A., John Steinberg, and Douglas Bolender

2017 *Fornbýli Landscape and Archaeological Survey on Hegranes (FLASH): Interim Report 2016*. Byggðasafn Skagfirðinga, Sauðárkrúkur.

von den Driesch, Angela

1976 *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Peabody Museum Bulletin 1. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Massachusetts.

Frei, Karin M., Ashley N. Coutu, Konrad Smiarowski, Ramona Harrison, Christian K. Madsen, Jette Arneborg, Robert Frei, Gardar Guðmundsson, Søren M. Sindbæk, James Woollett, Steven Hartman, Megan Hicks, and Thomas H. McGovern

2015 Was it for walrus? Viking Age settlement and medieval walrus ivory trade in Iceland and Greenland. *World Archaeology* 47(3): 439–466.

Grayson, Donald K.

1984 *Quantitative Zooarchaeology*. Academic Press, Orlando, FL.

Mainland, Ingrid, and Paul Halstead

2005 The Economics of Sheep and Goat Husbandry in Norse Greenland. *Arctic Anthropology* 42(1): 103–120.

Steinberg, John M., Brian N. Damiata, Rita S. Shepard, Kathryn A. Catlin, and John W. Schoenfelder

2016 *Egg on Hegrans: Geophysical Prospection, Coring, and Test Excavations*. Fiske Center for Archaeological Research, Boston.