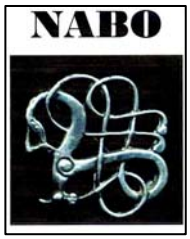

NORSEC

Third Interim Report on Analysis of Archaeofauna from Undir Junkarinsfløtti, Sandoy, Faroe Islands

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ABSTRACT: Archaeological excavations were carried out at the site of Undir Junkarinsfløtti, on the island of Sandoy, Faroe Islands in the summers of 2003 through 2006. These excavations produced a substantial amount of well-preserved midden material associated with a Viking Age to Late Norse structure. Ongoing analysis of these archaeofauna has resulted in the identification of nearly 50,000 bone and shell fragments, over 38,000 of which have been identified to species level. This preliminary research has found evidence for a subsistence economy at Undir Junkarinsfløtti that differs significantly from those seen elsewhere in the Norse North Atlantic. In addition to the usual suite of domestic mammals (cattle, pigs, sheep and goats), the Undir Junkarinsfløtti assemblage suggests a heavy, sustainable exploitation of local seabird populations (primarily puffins and guillemot). Fishing appears to have focused primarily on cod, much of which appears to have been processed for export rather than on-site consumption.

Keywords: Faroe Islands, Zooarchaeology, Norse Settlement, Seabirds, Fishing, Farming.

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INTRODUCTION

This paper presents an update on the ongoing analysis of the archaeofauna recovered during the 2003 – 2006 excavations at the site of Undir Junkarinsfløtti (UJF), located in the village of Sandur on the island of Sandoy, Faroe Islands. Excavations revealed a Viking Age to Late Norse structure partially filled with a large amount of very well preserved midden material some 2 meters below a sterile shell sand overburden (Arge 2001; Church *et al*. 2005; Lawson *et al*. 2005). Though ongoing, analysis of the faunal material recovered has resulted in the identification of nearly 50,000 bone and shell fragments, with a total number of specimens identified to species level reaching over 38,000. Throughout all occupation phases at the site, the archaeofauna is dominated by bird, shellfish and fish remains, with domestic and marine mammals making up no more than 6% of the total.

EXCAVATION AND RECOVERY

Excavations at Undir Junkarinsfløtti were carried out following natural stratigraphy, with the removal of one layer at a time. Following NABO protocol, all deposits were dry-sieved using 4mm mesh, while bulk samples (2—12 liters) were taken from each context for flotation and sedimentary analyses (Church *et al*. 2005). Additionally, a series of Kubiena tin samples were taken for use in soil micromorphology analysis (*ibid*.).

Based on radiocarbon dates, stratigraphy, and artifact analysis, the occupational deposits excavated at the site have been separated into five phases: UJF 0, representing the earliest, ephemeral deposits; UJF 1 (dated to 9th—12th centuries calAD); UJF 2 (11th—12th centuries calAD); UJF 3 (11th—13th centuries calAD); UJF 4, representing the wind-blown sand deposits covering the archaeology; and UJF 5, representing the amended soil and topsoil, which is late- to post-Medieval in date. The faunal material discussed in this report comes only from phases UJF 1 through 3. These three phases will be referenced in this report when discussing temporal trends in the data. Such grouping is useful in that it produces larger sample sizes and a clearer picture of general changes in the faunal assemblage through time.

LABORATORY METHODS

Analysis of the Undir Junkarinsfløtti archaeofauna has been carried out at the Hunter College and Brooklyn College Zooarchaeology Laboratories and making use of the extensive comparative skeletal collections at both laboratories, including specimens on loan from the American Museum of Natural History. All fragments were identified as far as taxonomically possible (selected element approach not employed), though most mammal ribs, long-bone shaft fragments, and vertebral fragments were assigned to "Large Terrestrial Mammal" (cattle-horse sized), "Medium Terrestrial Mammal" (sheep-goat-pig-large dog sized), and "Small Terrestrial Mammal" (small dog-fox sized) categories. Only those elements positively identifiable as *Ovis aries* were assigned to the "sheep" category, while all other sheep/goat elements were assigned to a general "caprine" category. Fish identifications follow the most current ICAZ Fish Remains Working Group recommendations (including most cranial and vertebral elements), with only positively identified fragments being given species level identification, thus creating a large cod-family or *gadid* category as well as a substantial number of unidentified fish bones. Following NABO Zooarchaeology Working Group

recommendations and the established traditions of North Atlantic zooarchaeology, we have made a simple fragment count (NISP) the basis for most quantitative presentation. Measurements of fish bones (made to the nearest millimeter using a Mitoyo Digimatic digital caliper) follow Wheeler & Jones (1989). Mammal elements have been measured following von den Dreisch (1976). Mammal tooth-eruption and wear recording follows Grant (1982). General presentation follows Enghoff (2003).

Digital records of all data collected were made following the 9th edition NABONE recording package (Microsoft Access database supplemented with specialized Excel spreadsheets, available as a free download at http://www.nabohome.org/index.html). All digital records (including archival element-by-element bone records) and the faunal assemblage itself will be permanently curated at the Faroese National Museum. A digital copy of this report is available upon request from seth.brewington@gmail.com.

TAPHONOMY

As has long been acknowledged and thoroughly discussed by zooarchaeologists (e.g. Grayson 1984; Lyman 1994), archaeofauna are subject to a wide variety of environmental factors that impact the degree to which these remains do or do not survive in the archaeological record. A great many processes—such as scavenging, trampling, wind or water erosion, soil acidity, and site disturbance—can affect how much, if any, of an animal will remain in the archaeological record after it dies. Add to this the difficulties of obtaining full recovery of faunal assemblages in any archaeological excavation and it should become clear that archaeofauna are not direct representations of the past, but rather proxy data. As such, zooarchaeological data must be used with care and should be prefaced with an examination of the taphonomic factors that likely had an impact on the assemblage under study.

Fragment Size

The maximum dimension of each bone fragment was measured and placed into one of five size categories. The UJF archaeofauna appears highly fragmented, with the majority of bone fragments in all three phases measuring at or below 2 cm. However, it should be noted that, as will be discussed below, the majority of this material is fish and (especially) bird bone, much of which is relatively small even when whole. Nevertheless, the mammal bones analyzed thus far have indeed been highly fragmented.

Scavenging

Signs of scavenging by dog or rodent are relatively rare in all phases at UJF. Rodent and dog tooth marks are present on far less than 1% of all bone and shell fragments for each of the three phases. Tooth marks have not been observed on fish bone from the site (which is unsurprising, given that fish bones are not generally dense enough to withstand gnawing) and are likewise absent thus far from the bird bone and shell analyzed. Several occurrences of rodent gnawing have been observed on bird bone, however.

Burning

As is illustrated in Figure 1, burnt bone makes up a relatively low percentage (no more than 5%) of the total faunal assemblage in all three phases at Undir Junkarinsfløtti. The low percentage of burnt bone at UJF—particularly the calcined bone that has been subjected to greater temperatures

than the blackened material—is particularly interesting when compared to comparable Viking Age sites in Iceland. As an example, Figure 1 includes data from Sveigakot, a roughly contemporaneous site in the Mývatnssveit region of Iceland (Vésteinsson 2001).

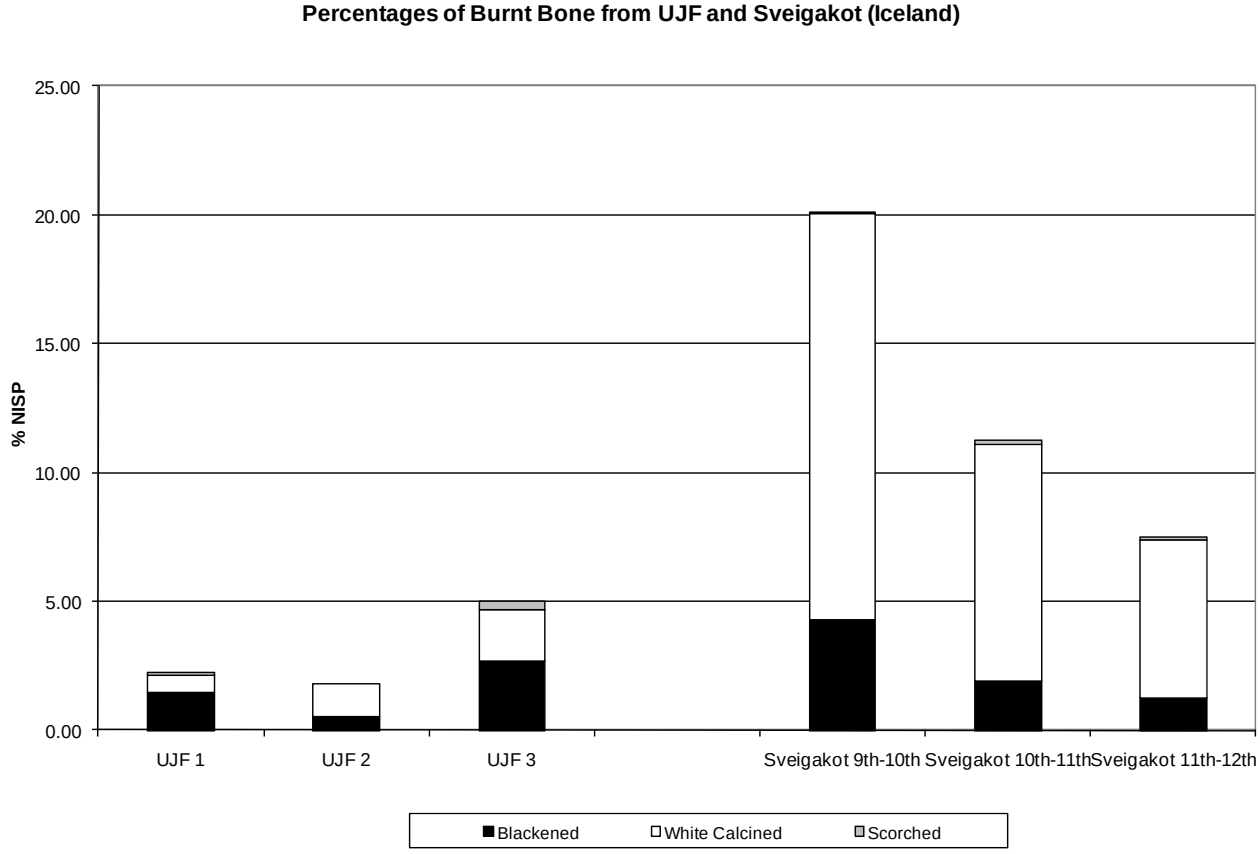

Figure 1.

SPECIES PRESENT

Overview of Taxa

Analysis of the UJF faunal assemblage has identified several species of domestic mammals, birds, fish, and sea mammals. Figure 2 illustrates the relative prominence of each of the major taxa represented in the UJF archaeofauna. As is clearly evident in this graph, domestic mammals make up a relatively small percentage of the total number of specimens identifiable to species level (NISP) in all three phases, comprising at maximum only about 6% (in UJF 2). Rather, the UJF archaeofauna is characterized by large proportions of bird, fish, and mollusk. While the fish component outnumbers the bird in UJF 1, the relationship has reversed by the next phase (UJF 2) and by the last phase (UJF 3) the bird and mollusk components are each far larger than the fish.

In several respects, the overall pattern of taxonomic representation in the UJF archaeofauna is remarkably different than the patterns seen in contemporary Icelandic and Greenlandic sites. Figure 3 presents the same Undir Junkarinsfløtti data illustrated in Figure 2 alongside Norse farm sites in Iceland, Greenland, and a typical contemporaneous site in Norway. The sites are placed in roughly chronological order, with earliest sites/phases located on the far left of the graph and the latest on the right. Compared with all of these sites, UJF maintains a very low proportion of domestic mammals and a very high proportion of wild bird and fish through time. Contrasting with

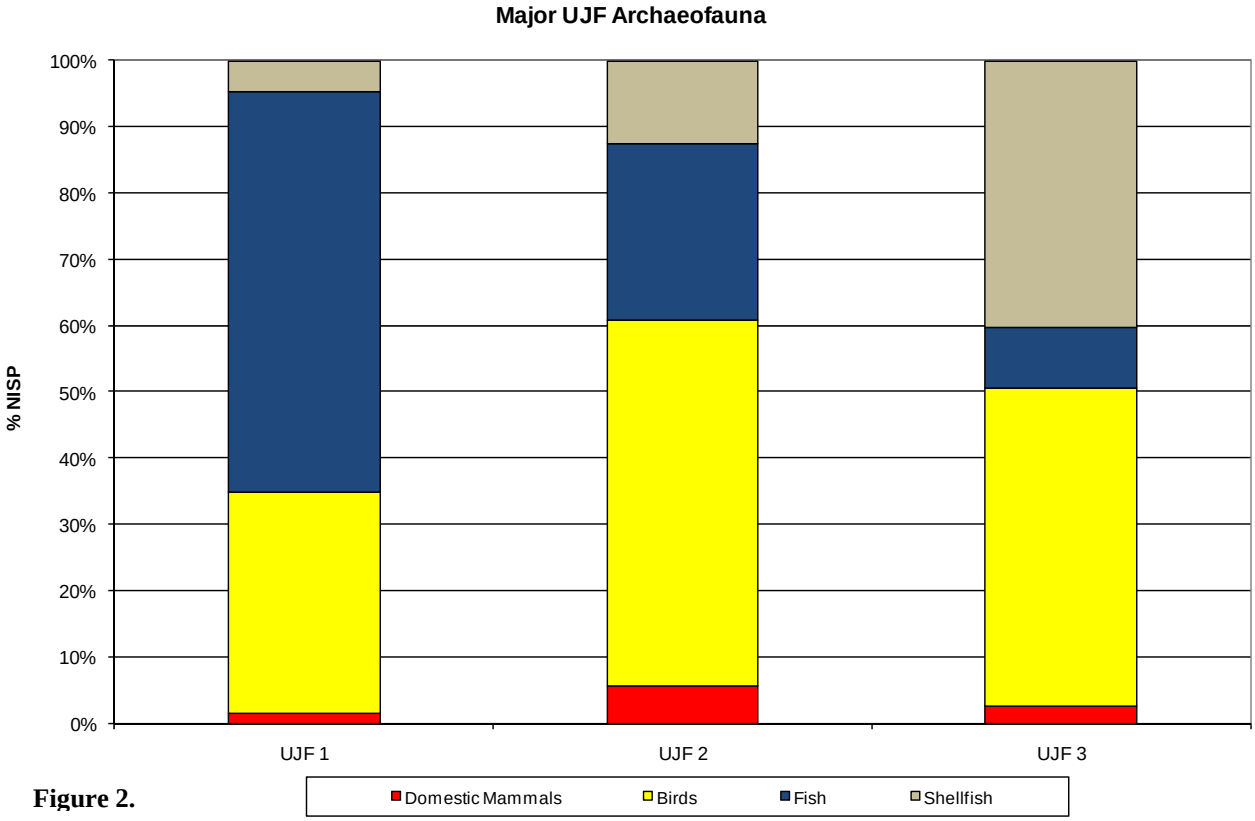

Figure 2.

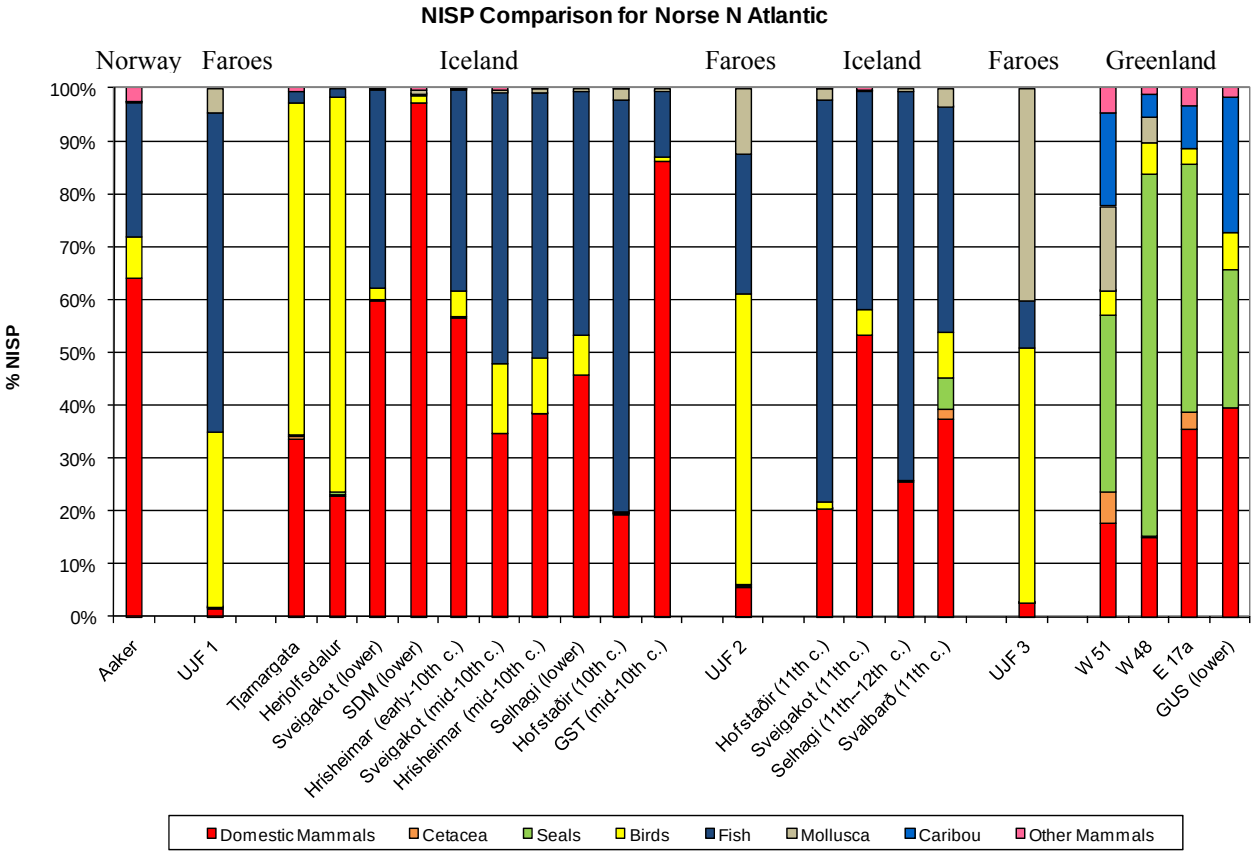

Figure 3.

UJF, domestic mammals make up at least 20% of the archaeofauna in all but two of the comparison sites (W51 and W48 in Greenland). While wild birds are taken in large numbers upon initial settlement (*landnám*) in Iceland, the proportion of birds soon drops drastically as the populations of seabirds are greatly reduced by over-exploitation. Over-harvesting of seabirds does not appear to have occurred at Undir Junkarinsfløtti, where birds make up from about 33% to 55% of the total assemblage in each phase. Also interesting is the trend in fish bone representation through time at UJF. Unlike the early sites in Iceland, the earliest phase at UJF is dominated by fish bone (about 60% of the total). As noted above, fish then decline in representation in the later two phases (about 27% of the total in UJF 2 and 9% in UJF 3). This is certainly not the case in the Icelandic sites, where the fish component is relatively large and generally increases through time.

Domestic Mammals

Figure 4 presents a breakdown by phase of species representation within the domestic-mammal component of the Undir Junkarinsfløtti assemblage. The domestic assemblage is dominated in all three phases, but increasingly through time, by sheep (*Ovis aries*) and goat (*Capra hircus*), or "caprines," as they are collectively termed. Sheep and goat skeletons are morphologically very similar to each other and are distinguishable on only a very few elements (Zeder & Pilaar 2010). The majority of sheep and goat material is therefore only identifiable to the "caprine" level. Nevertheless, nearly all of the distinguishable caprine bones from the UJF assemblage (with the exception of one) have thus far been sheep. While this apparent paucity of goats at UJF is unusual in comparison with typical Norse North Atlantic sites, it might be attributable to the highly fragmented nature of the assemblage, a factor that has made differentiation of sheep versus goat impossible on all but a relatively few number of specimens.

Another unusual characteristic of the UJF domestic assemblage is the apparent maintenance of relatively large numbers of pigs (*Sus scrofa*) through all three phases. While pigs are generally relatively numerous in *landnám*-period sites in Iceland and Greenland (McGovern et al. 2001), their numbers drop dramatically by about the mid-11th century. At UJF, however, the situation is different. While the relative proportion of pigs declines by the final phase (from around 17% of the total in UJF 2 to around 9% in UJF 3), pigs nevertheless remain a significantly large percentage of the total domestic assemblage until at least the 12th century.

The proportion of cattle (*Bos taurus*), while comprising over 20% of the domestic assemblage in the earliest phase, declines significantly in the subsequent two phases. This pattern is typical of Norse North Atlantic sites, where the initial settlers of Iceland and even Greenland sought to keep relatively large numbers of cattle, presumably based on an ideal farming strategy more common (and feasible) in the Norwegian homeland (Amorosi *et al*. 1997).

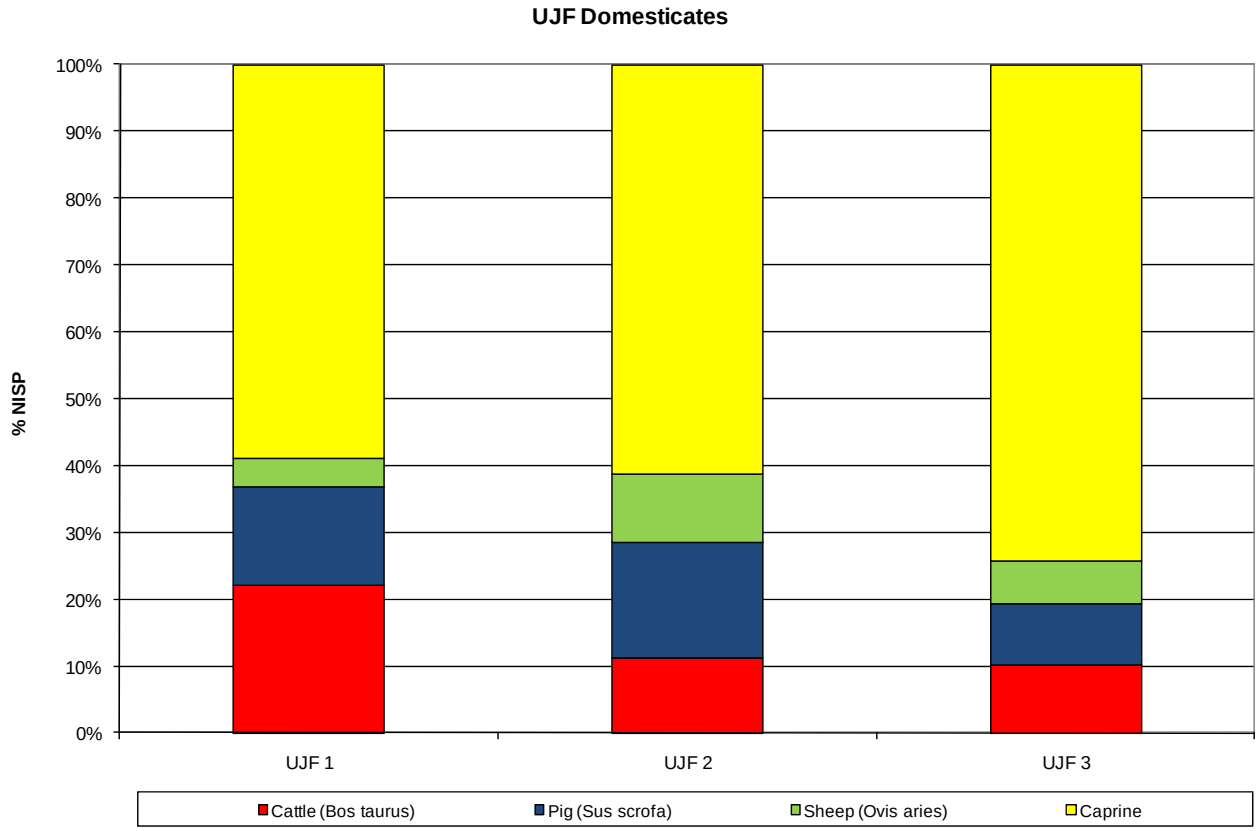

Figure 4.

Livestock Management

Examination of the age-at-death profiles of Undir Junkarinsfløtti's domestic archaeofauna can potentially be useful in determining the probable livestock management strategies being employed at the site through time, since different management regimes (i.e. dairying vs. meat-consumption) typically involve quite different culling strategies (Halstead 1998). Given the relatively low number and fragmented nature of the Undir Junkarinsfløtti's domestic archaeofaunal assemblage analyzed to date, an examination of management strategies at UJF is capable of providing only provisional (and potentially misleading) results. Nevertheless, analysis of the data available suggests livestock mortality rates very similar to those found at contemporaneous Icelandic sites (McGovern *et al*. 2001). Specifically, the morality profile for cattle at UJF seem to correspond well with the Icelandic sites, where some 20—50% of the individuals were culled while still neonatal (less than 3 months old) or foetal (unborn) (*ibid*.), a pattern consistent with a primarily dairying-based economy (Halstead 1998).

Figure 5 provides counts and relative proportions of adults versus juveniles among the identifiable cattle, caprine, and pig specimens. Determination of age-at-death was made by examining longbone epiphyses fusion states and general bone morphology. The percentage of neonatal or foetal cattle in the UJF assemblage ranges from around 52% (UJF 1) to 36% (UJF 3), with a trend toward the culling of fewer young cattle through time. The data for caprines suggest that relatively few (about 2—10%) were culled while juveniles, while the pig data suggest an even lower juvenile mortality rate (from 0—7%). Again, it must be stressed that these results are only tentative, since they are based on generally very low sample sizes.

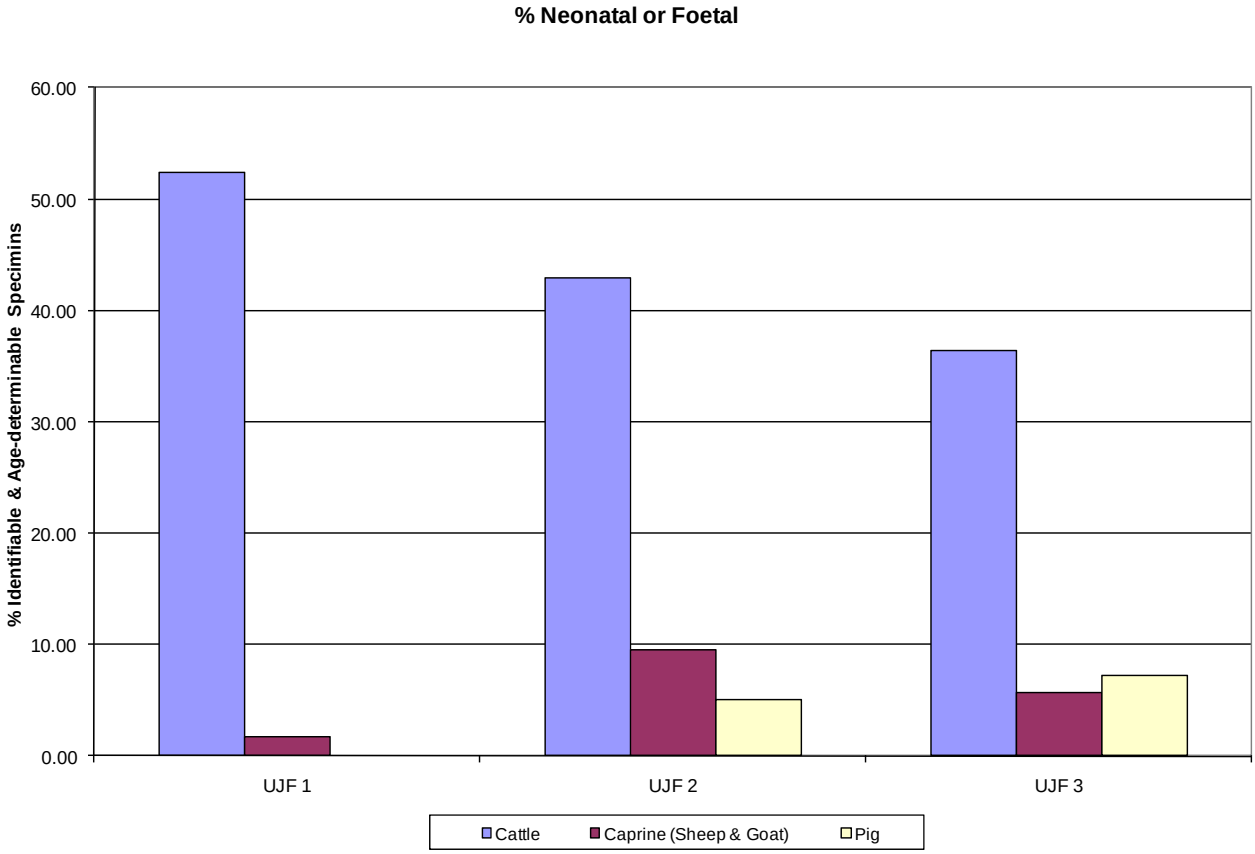

Figure 5.

Age-at-death can also be determined through an examination of tooth eruption and wear states. As with the longbone fusion data, the available dental data is, as yet, too hampered by small sample size to allow for a confident assessment of livestock management at Undir Junkarinsfløtti. Three of the four cattle mandibles and the single pig mandible come from young animals. The caprine mandibles come from animals of varying ages, though many belonged to young individuals.

Sea Mammals

The number of sea mammal bones recovered in the UJF assemblage has been quite small. It is likely that much of the whale bone thus far analyzed represents craft-working debris; all but a few of the whale bone fragments are 2cm or less in size and several display cut marks consistent with craft-working activity. The small size of these whale bone fragments prohibits a determination of species. Species-level identification of the seal bone was likewise largely unsuccessful, though this was due not to small fragment size but rather the extreme intra-species variation of seal skeletal morphology. Nevertheless, five seal teeth were identifiable as belonging to the grey seal (*Halichoerus gryphus*). The non-dental seal material could at least be assigned to a general size category and, based on size and known species distribution, most of the seal material likely came from either grey or harbor (*Phoca vitulina*) seals.

Birds

The vast majority of bird bone in all phases at Undir Junkarinsfløtti has been identified as puffin (*Fratercula arctica*). If we consider only that portion of the avifauna identifiable to species level, puffins account for about 77% (in UJF 1) to 90% (UJF 3) of the total bird bone assemblage. It should be added, though, that most of the bird bone not identifiable to species level is almost certainly puffin, further adding to prominence of this species in the UJF avifaunal assemblage. There were several other species identified in the assemblage, however, most notably the guillemot Figure 5 presents the relative proportions of only the major taxa identified thus far.

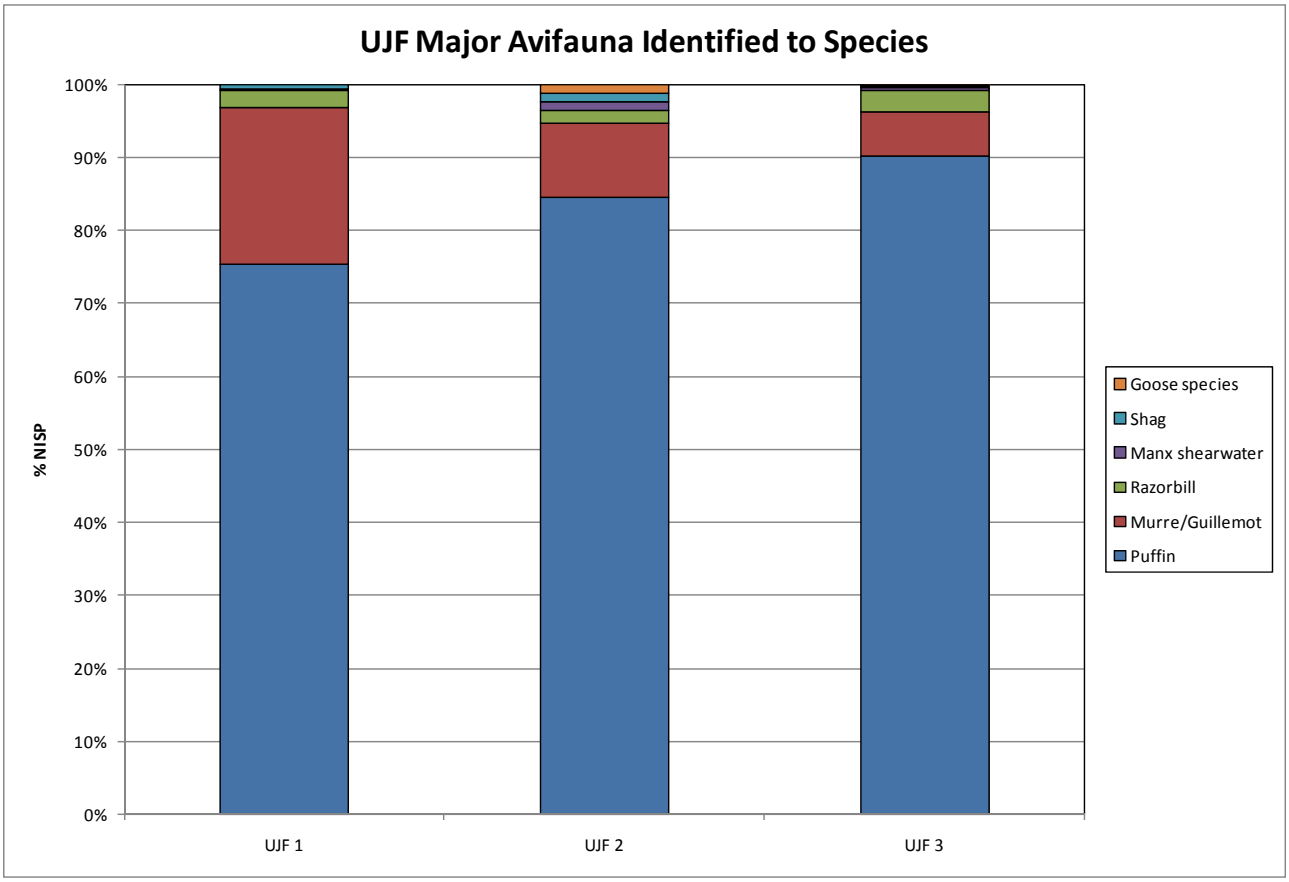

Figure 5.

Fish

Figure 6 provides a graph of the relative proportions of each of the identified fish species. Of the specimens identifiable to species level, the cod family (*Gadidae*) makes up by far the largest component of the Undir Junkarinsfløtti fish archaeofauna, with the majority of cod bones belonging to the Atlantic cod (*Gadus morhua*). Of the unidentifiable fish bone fragments, it is likely that the vast majority also belong to cod. As with the avifaunal portion of the UJF assemblage, then, the fish component appears to be largely dominated by one species.

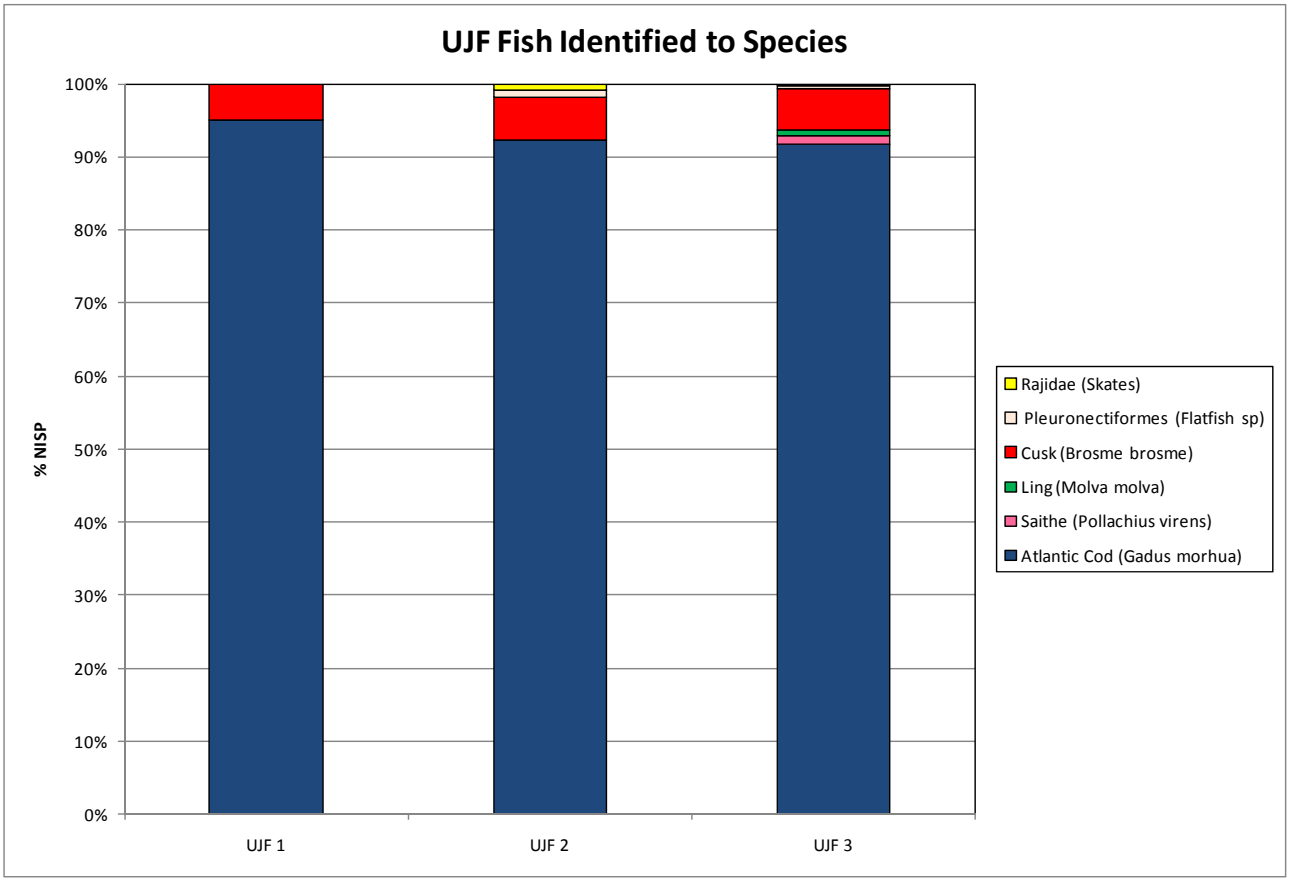

Figure 6.

Preliminary analysis of Atlantic cod element distribution for the UJF specimens suggests a clear over-representation of cranial relative to axial elements, a pattern that appears in all three phases. These data suggest that a significant portion of the cod bone at UJF may be the byproduct of flat-dried fish (*rotscher* or *råskjær*) production, rather than mere on-site consumption. This interpretation is only preliminary and will require further analysis of the UJF fish bone assemblage.

Mollusks

As illustrated in Figure 2, mollusks make up a significant portion of the total Undir Junkarinsfløtti archaeofauna, particularly in the last phase, UJF 3. The great majority of the identifiable mollusk fragments (and probably most of the unidentifiable fragments as well) belong to the common limpet (*Patella vulgata*) (Figure 7). Unfortunately, mollusk shells are easily fragmented and therefore tend to be over-represented in the faunal assemblage. When only whole shell and those fragments containing the center of the shell are considered, the total count for each species is greatly reduced, though the limpet remains by far the most represented.

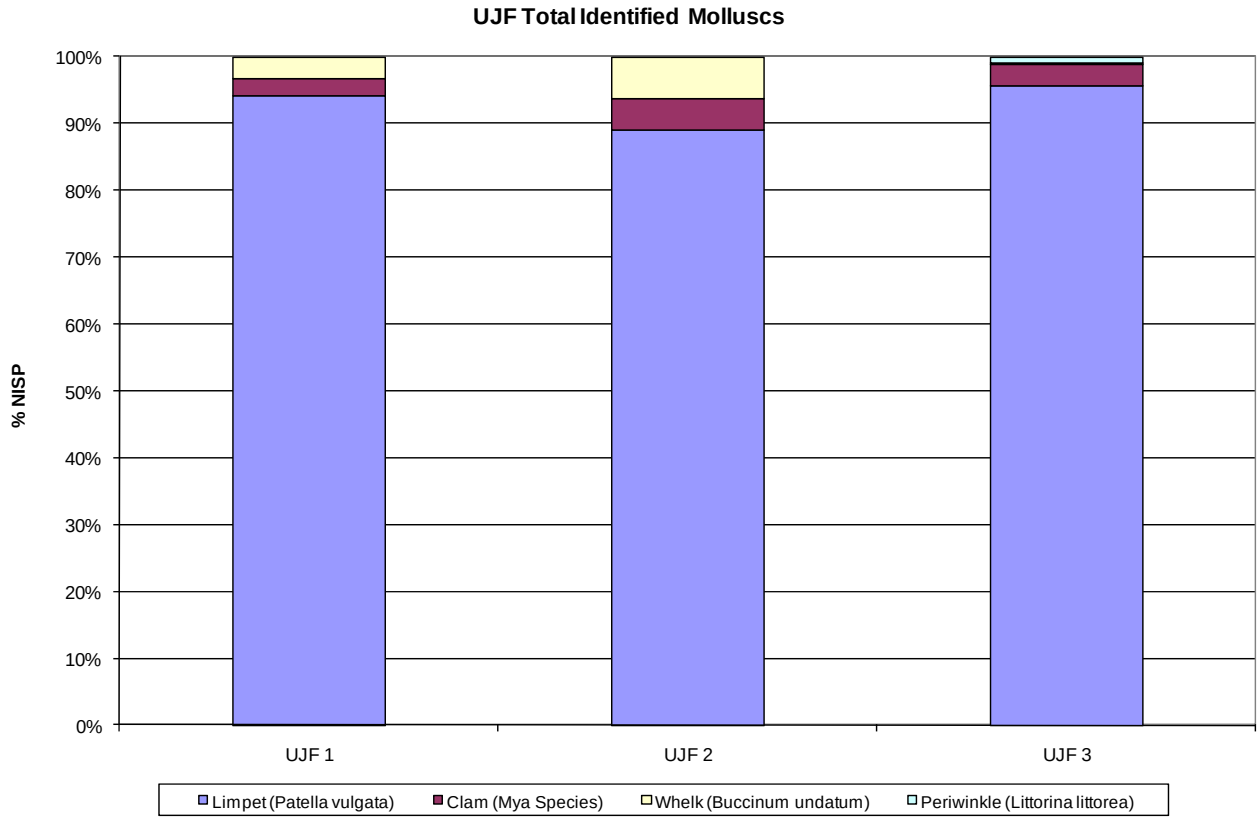

Figure 7.

DISCUSSION

In all three phases of occupation at Undir Junkarinsfløtti the traditional Norse suite of domesticates—cattle, sheep and goats, and pigs—were supplemented by wild local resources such as seabirds and fish. When compared with contemporary Norse sites elsewhere in the North Atlantic, a few unusual patterns stand out in the UJF assemblage, including:

1) the apparent paucity of goats,
2) the relatively late maintenance of pig-keeping,
3) the relatively high proportion of wild resources (particularly seabirds) relative to domesticates, and
4) the decrease in relative proportion of fish through time.

Though analysis of the UJF archaeofauna is ongoing, we can comment at least provisionally on each of these points.

Goats

With only one specimen thus far identified, it would seem that goats were exceedingly rare throughout occupation at Undir Junkarinsfløtti. As noted above, this picture is made somewhat unclear by the heavily fragmented nature of the UJF assemblage. Even given the inherent difficulties in distinguishing goat from sheep remains, however, it seems likely that goats were far

less common at UJF than in contemporaneous Icelandic or Greenlandic sites. One explanation for the scarcity of goats at UJF might be related to the fact that the Faroes appear to have been, at the time of first settlement by the Norse, largely treeless (Edwards & Craigie 1998, Hannon *et al*. 2001, Jóhansen 1985, Lawson *et al*. 2005). Such a landscape might well have made goat-keeping far less appealing to the settlers, since goats are relatively easy to maintain in forested environments.

Pigs

Figure 8 presents a comparison of relative proportions of domesticates during the three phases of occupation at UJF and some roughly contemporaneous sites in Norway, Iceland, and Greenland. As is clear in the graph the relative proportion of pigs at UJF remains fairly constant through time, in rather stark contrast to the other sites. Various lines of evidence suggest that pig-keeping in the Faroe Islands was an important component of the domestic economy up to at least the beginning of the 13th century (Arge *et al*. 2009). The relatively successful maintenance of piggery in the Faroes likely employed a management system that combined both fodder and free-range pannage, depending on the season (*ibid*.).

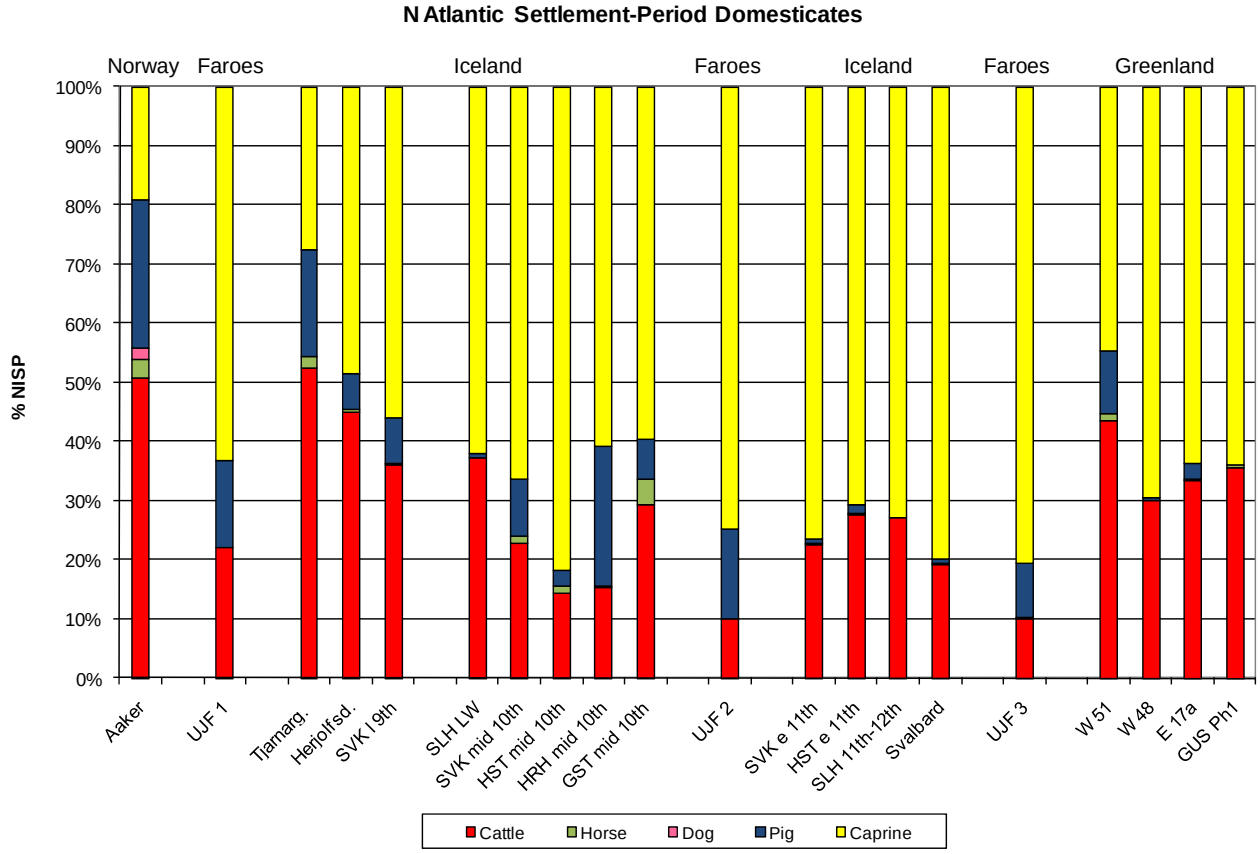

Figure 8.

Wild Resources

Wild-resources clearly played an important role at Undir Junkarinsfløtti (and likely throughout the Faroes). A clear pattern evident in the archaeofauna analyzed thus far is the much larger proportion of wild seabirds and fish in all three phases relative to the domesticates (Figure 2). While the relative proportion of fish declines in the later two phases, the aviary component

increases. The birds are nearly exclusively guillemot and (especially) puffins. There are several puffin and guillemot nesting locations on Sandoy and neighboring islands today, and the archaeofauna would seem to suggest that the same was likely the case during the occupation of UJF. Whether or not the relatively large representation of seabirds in the UJF assemblage is unique to the site or typical of early Faroese settlements will require further research.

The decline in fish relative to seabirds and domestic mammals from the earliest to the latest phases at Undir Junkarinsfløtti (Figure 2) contrasts sharply with the trends seen in contemporaneous sites in Iceland (Figure 3). As noted above, the majority of fish bone from UJF comes from cod and appears to be the byproduct of flat-dried fish production, presumably for export. Provided this picture is accurate, does the relative decline in fish through time represent a diminishing emphasis on *rotscher* production at the site? Again, further analysis of the assemblage (especially metric analysis) is needed before a clear understanding of the role of fishing at UJF can be gained.

CONCLUSION

Undir Junkarinsfløtti is a unique and important archaeological resource. The excellent preservation conditions and long-term occupation of the site provide the opportunity to learn a great deal about early Faroese subsistence and trade economies. Preliminary analysis of the site's archaeofauna is suggesting that the earliest Norse settlers of the Faroe Islands quickly adapted the traditional Norse farm-based subsistence economy to the unique environmental and ecological characteristics of their new home. The important multi-disciplinary research at UJF, combined with research at other locations throughout the Faroes, will allow us to more fully understand the evolution of the Faroese palaeoeconomy and its relation to the rest of the Norse world.

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