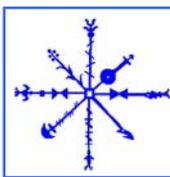


**Interim Report of faunal analysis from the 2006 Midden excavation at  
Möðruvellir, Eyjafjörður, N Iceland**

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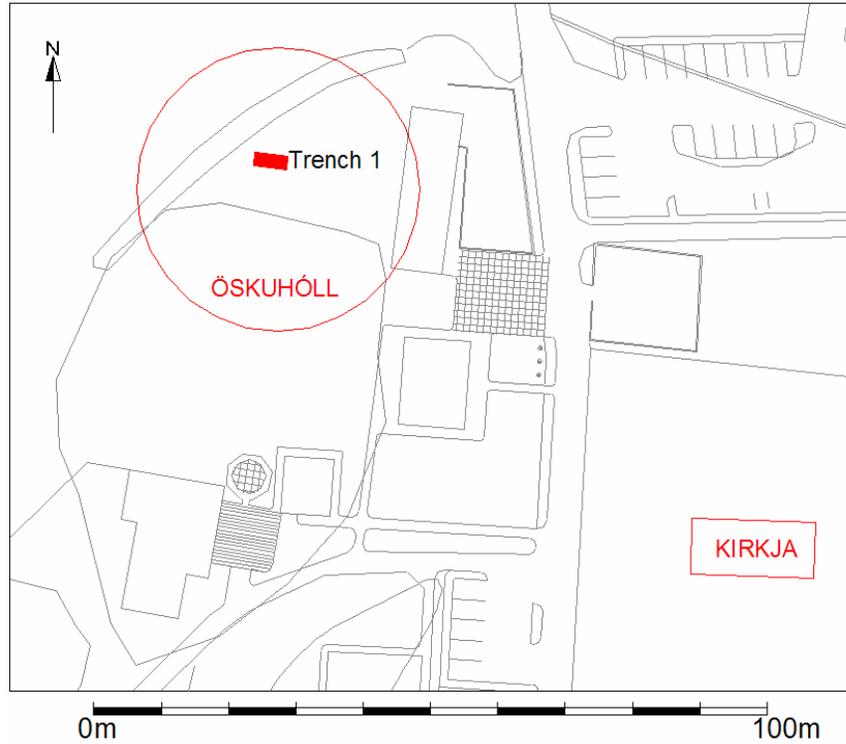
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*March 1, 2007*

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*This report is a product of the North Atlantic Biocultural Organization (NABO) Research Cooperative and the Leverhulme Trust funded “Landscapes Circum Landnám” Project. With additional funding provided by the Thor Thor’s Fund and the Leifur Eiríksson Society.*

### The Möðruvellir Midden – Öskuhóll:



Plan 1 – Source: Harrison & Roberts, 2006

### Summary

The faunal material used for this interim report stems from an exploratory trenching exercise at the Möðruvellir Midden or Öskuhóll (Ash Hill), carried out in the summer of 2006 (July 31 through August 9<sup>th</sup>). The excavation was undertaken by Fornleifastofnun Íslands, FSI (Icelandic Archaeological Institute), under supervision of Ramona Harrison. It is part of an ongoing project directed by Howell Roberts and Orri Vésteinsson and aims at gathering information on the existing subsistence strategies in late medieval Eyjafjord.

Aim of the Möðruvellir Midden exercise was to locate and collect faunal and artefactual remains as well as environmental samples from a well stratified midden sequence associated with the medieval and the more recent subsistence activities at the Möðruvellir monastery (medieval) site. Plan 1 situates the Ash Hill in relationship with the modern Church (Kirkja). The original farm and church associated with the medieval monastery have not been positively located yet. For more information, please consult the preliminary FSI excavation report (Harrison & Roberts, 2006).

Analysis of the **faunal remains** was carried out at the CUNY Northern Science & Education Center laboratories as part of the North Atlantic Biocultural Organization cooperative effort, with funding provided by the UK Leverhulme Trust, the Thor Thor’s Fund, and the Leifur Eiríksson Foundation.

Since the faunal materials stem from one single 2m by 5m trench, the results discussed below are just a sample of the materials still remaining in the midden mound thought to have been in use for many centuries (Vésteinsson, Möðruvellir 2001). A larger excavation sample of the well preserved archaeofauna would yield even better data on the subsistence strategy in place at Möðruvellir, chronological stratification offering ideas on changes in the site's economic and social practices throughout hundreds of years – (such as a potential change from Catholic to Lutheran dietary habits in the 16<sup>th</sup> Century).

**Dating** of the midden deposits is still under way and currently the artifact remains indicate that the various contexts excavated are following the law of superposition. More thorough analysis of the pottery, pieces of cloth and metal are of great importance to give a **relative** age to the various midden contexts. The soil samples collected for each deposit will be processed at FSÍ and further analyzed by Dr. Mike Church at Durham University.

Zooarchaeological data collected from the 2006 trench excavation amounts to a total NISP (Number of Identified Species) of **2,560** out of a TNF (Total Number of Fragments) of **5,356**. The species present include domestic cattle, sheep, goat, and horse (one maxillary molar) as well as seal, bird and a large number of fish remains. The APL, or Mallard listed as one element in the NISP actually consists of a series of elements belonging to one articulated individual showing pathology or at least extra bone growth on the left side of the furcula (wishbone) as well as on the distal end of the left scapula. This individual duck will be discussed further below.

**Cattle bone** constitutes about 25 % of the domesticated remains in the assemblage, with a caprine/cattle ratio of about 3 caprine bones for every cattle bone. The high percentage of cattle bone is similar to very high status late medieval sites in S Iceland (Viðey and Bessastaðir being most similar), whereas typical farm butchery patterns would produce a caprine/cattle ratio of 20: 1 (see Harrison in Roberts, 2005). Until a larger bone assemblage can be analyzed and placed into contemporaneous time frames, the caprine/cattle ratio from Trench 1 do not allow for a definite conclusion on the site's domesticated management system. The lack of pig remains in the assemblage is consistent with the absence of these domesticated after the late medieval period. Fish remains make up the majority of faunal remains from the trench (TR 1), with all identified species falling into the gadid family. As Fig. 3 demonstrates the **fish** category accounts for more than 90 % of the total archaeofauna. While more analysis is required and more excavation work is likely to increase the number of identified fish species, the analyzed fish elements can already give indications on a certain form of gadid management.

The **fish remains** were very well preserved and show a pattern of predominantly cranial remains, hinting towards a form of preparation of predominantly fresh Cod (*Gadus morhua*). While the numbers are not large enough to argue for commercial fish processing, the lack in postcranial elements throughout the excavated contexts, and especially in the fills for cuts [015] and [031] hint towards on-site preparation of fish (Perdikaris, personal communication, February 2007). Despite close proximity to the Hörgá, a river containing salmonids (a), there is currently no positive evidence of their presence in the midden material.

The most interesting discovery that the archaeofauna has offered so far was the difference in contents between earlier, lower deposits and the chronologically later fills of the cuts mentioned (and highlighted in graphs) throughout this report.

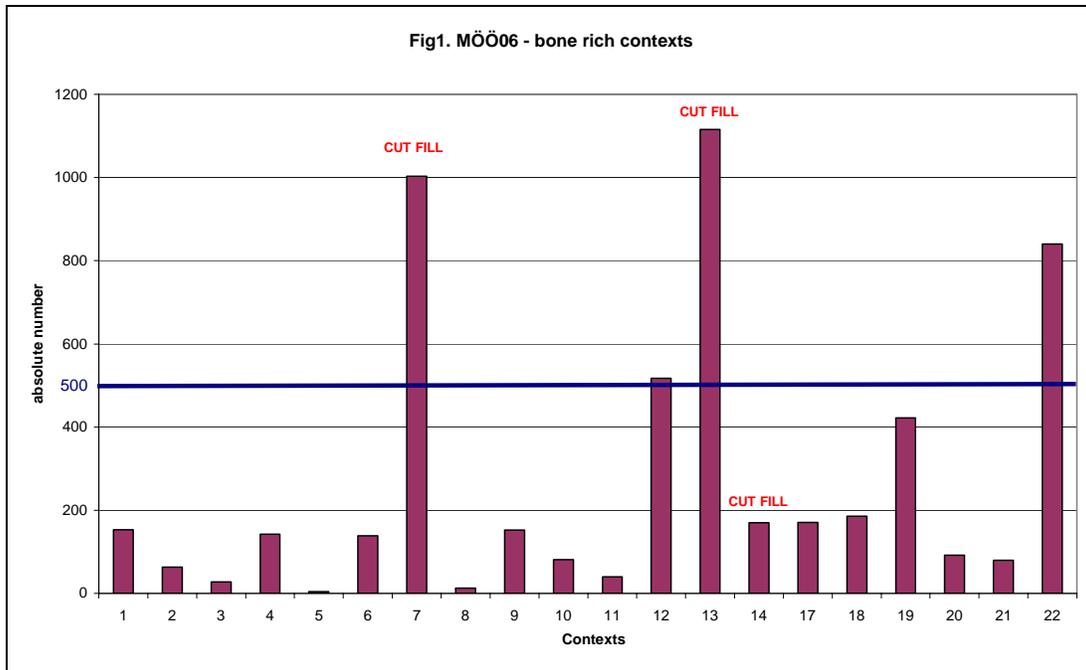
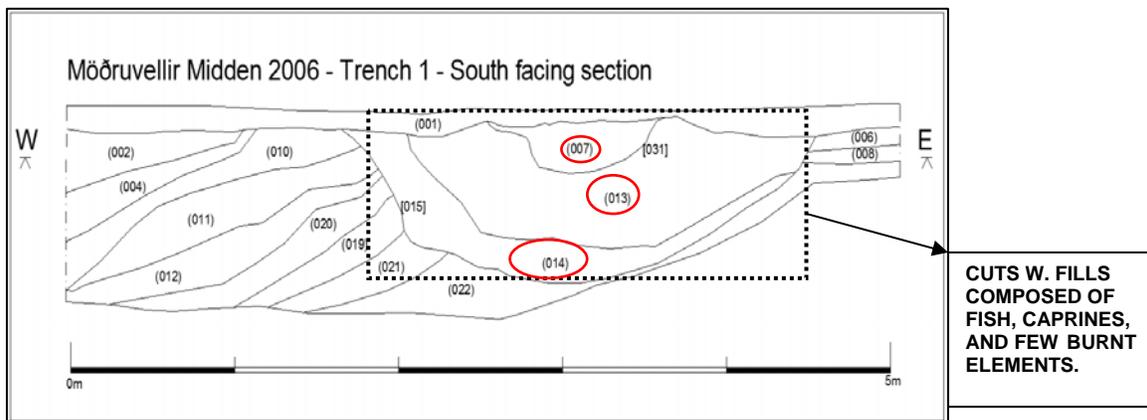


Figure 1 presents a comparison of total elements per context. Contexts [007] and [013] have large amounts of fish fragments that are beyond speciation. They further contain most of the analyzed gadid bones (fig. 4) and will be discussed in the **fish** section.



Plan 2-Source: Harrison & Roberts, 2006 – (edited by R. H.)

The midden was excavated stratigraphically, yielding 20 contexts with various assortments of faunal remains, therefore a number of contexts will be concentrated on individually to balance the very generous pattern offered by a total number of remains represented in the NISP graphs. Again, excavation of a larger area will yield more appropriate (larger) faunal samples per context.

**Burnt elements**, mostly reduced to white calcined bone, indicating very strongly burnt elements that may have been immediately burnt upon meat consumption, are very abundant in the midden assemblage (Figure 2). For a discussion of the implications connected with white calcined burning see Edvarsson et al, 2004.

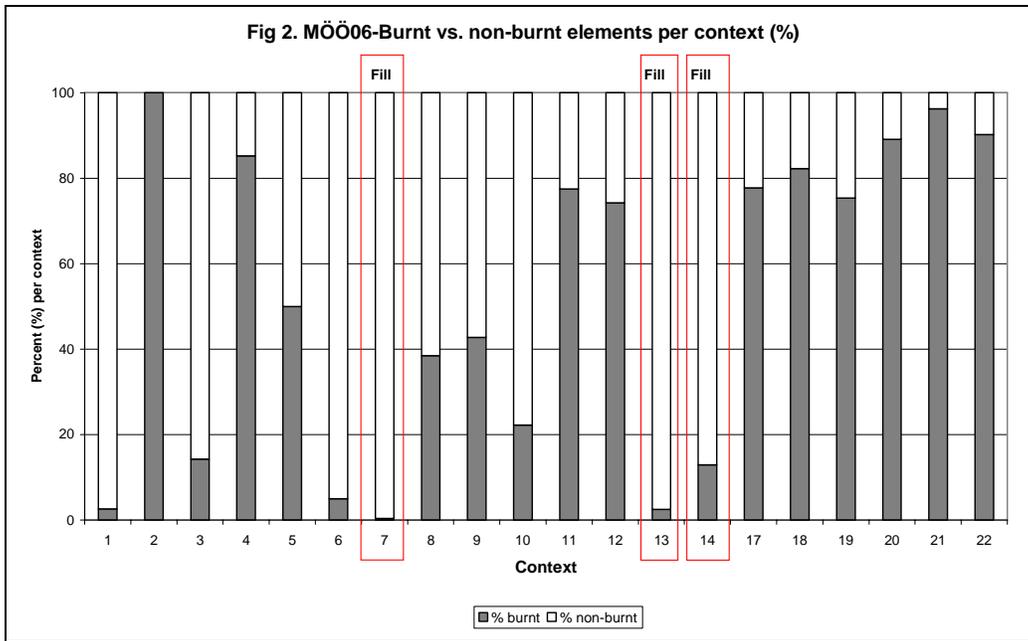
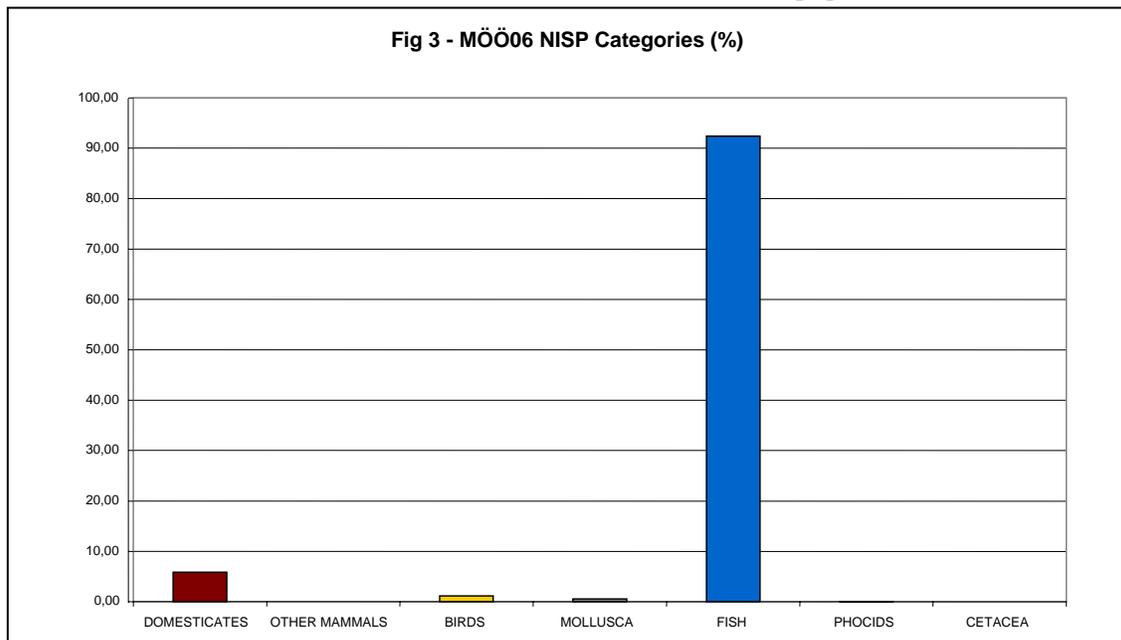


Fig 1 presents the low percentage of burnt elements in the fills of cuts discussed later in this report. These contexts are: [007], [013], and [014]. The contexts [017] through [022] are chronologically older/earlier deposits and demonstrate a high percentage in burnt elements. Plan 2 shows most of the contexts discussed in this paper.



### Overview of Species Present

Figure 3 presents the 2006 Möðruvellir archaeofauna as a Total Count. **NISP** (number of identified specimens) refers to all fragments that could be identified to a useful level. **TNF** is a count of all bone fragments (identifiable or not), **MTM** is “medium terrestrial mammal” (sheep-dog-pig sized), **LTM** is “large terrestrial mammal” (cattle-horse sized),

**UNIM** or unidentified mammal are small fragments that cannot be identified beyond this broad category. This graph demonstrates the large number of fish bones in the total assemblage.

Table 1 presents a breakdown of all the fragments by species categories:

Table 1 Möðruvellir Midden 2006		Fragment Count
Taxon	Number of Elements	
<b>Domestic Mammals</b>		
Cattle ( <i>Bos taurus dom L</i> )	37	
Horse ( <i>Equus cab. dom L.</i> )	1	
Pig ( <i>Sus scrofa dom L.</i> )	0	
Dog ( <i>Canis fam. L</i> )	0	
Goat ( <i>Capra hircus dom L</i> )	1	
Sheep ( <i>Ovis aries dom L</i> )	13	
Caprine	98	
total Caprine	112	
total Domestic	150	
<b>Wild Mammals</b>		
Seal species	1	
total Seal	1	
<b>Birds</b>		
Mallard ( <i>Anas platyr.</i> )	1	
Eider duck ( <i>Somateria moll.</i> )	3	
Ptarmigan/grouse ( <i>Lagopus mutus</i> )	2	
Bird species indeterminate	23	
total Bird species	29	
<b>Fish</b>		
Cod ( <i>Gadus morhua</i> )	397	
Haddock ( <i>Melanogr. aeglef.</i> )	14	
Gadid sp	364	
Trout ( <i>Salmo trutta</i> )	0	
Pleuronectiformes	0	
Salmonid species	0	
total Fish species identified	775	
Fish species indeterminate	1590	
Total Fish species	2365	
<b>Mollusca</b>		
Periwinkle ( <i>Litt. l.</i> )	1	

Clam ( <i>Mya sp.</i> )	9
Moll. Species	5
total Moll. Species	15
<b>total NISP</b>	<b>2560</b>
Large Terrestr. Mammal	124
Medium Terrestr. Mammal	532
Small Terrestr. Mammal	2
Unidentified Mammal Frag.	2138
<b>total TNF</b>	<b>5356</b>

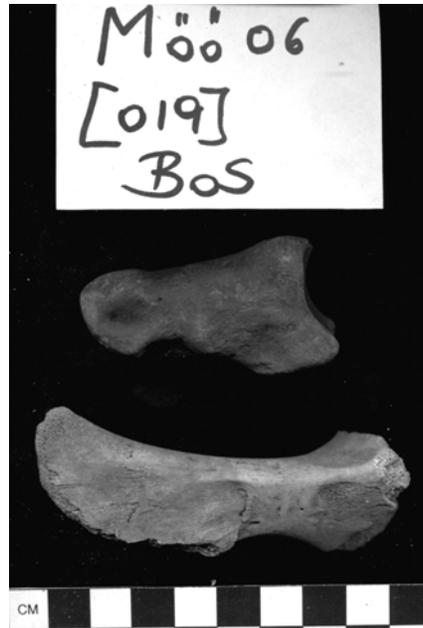
### Domestic Mammals

Table 2 presents the relative Percentage of the domestic mammals for the 2006 contexts. The total ratio emerging from the trench excavated: caprine/cattle = 1 to 3.03 which translates into a 3:1 ratio of caprine to cattle. The sheep/goat ratio is 1:13, indicating that goats were a minor portion of the collective caprine category.

Taxon	Percentage of total
<i>Bos taurus</i>	24,67
<i>Equus caballus</i>	0,67
<i>Canis familiaris</i>	0
<i>Felis cattus</i>	0
<i>Sus scrofa</i>	0
<i>Ovis aries</i>	8,67
<i>Capra hircus</i>	0,67
<i>Ovis/Capra sp.</i>	65.33

### Cattle

Context [019] seems to contain four very young bos elements, possibly belonging to the same individual. Since the overall assemblage consists of many midden deposits, a statement on the site's cattle (domesticated) management strategy seems too general. What can be said is that the two contexts [018] and [019], contain the most cattle elements, 6 (3, 2 % from total) and 9 (2, 13 % from total), respectively. Albeit the very low sample size, the neonatal and old cow elements from the same context (photo 1 below) can at least raise the thought of a dairy-farm economy (Halstead 1998).



**Photo 1 – old (black burned Phalanx) and young (part of neonatal innominate) cattle *Bos taurus*.**

### Caprines

There is a sizeable amount of Caprines in the total assemblage, although the 112 identified elements amount to less than 5 % of the total NISP.

The contexts most abundant in caprine elements are [013] and [014], with 24 and 18 identified elements, respectively. One discarded horn core from [007] represents craft working debris.

### Horse

The only identified horse element is an upper M1 or M1 that may have been discarded and does not positively indicate the animal's death.

### Dog

Trench 1 did not yield any dog elements, but rather traces for the presence of this species on site in general. A certain amount of bones bear dog gnawing marks and indicate that these canines had access to some of the elements. Contexts [013], [014], [018] and [019] each yielded at least one dog chewed/gnawed bone. The gnaw marks were found on three ribs and one ulnar fragment of MTMs (medium terrestrial mammals) and one humeral and one femoral element speciated to OVCA.

### Wild Mammals

#### Seal

One black burned complete Phalanx is the only evidence for the presence of a phocid, potentially of larger size since the element was between 5 and 10 cm long.

## Birds

Table 3: Identified Bird Species	Absolute #
<b>Wildfowl - sea birds</b>	
Migratory Waterfowl	
Mallard Duck ( <i>Anas platyrhynchos</i> )	1
Eider Duck ( <i>Somateria mollissima</i> )	3
Mute Swan ( <i>Cygnus olor</i> )	
<b>Wildfowl - land birds</b>	
Ptarmigan/grouse ( <i>Lagopus mutus</i> )	2

Table 3 demonstrates the low number in bird species identified from the Möðruvellir Midden material. The Mallard (*Anas platyrhynchos*) was collected from context [006] and offers a good amount of the articulated skeleton determined to belong to one individual as listed above. The remaining elements are in very good condition, even tracheal rings are preserved. There seems to be a pathological condition that may have caused the death of this water fowl. The furcula (wishbone) shows extra bone growth on the left side of the skeleton. This asymmetry on the left side repeats in the scapula (see red circles), and very subtly in the humerus. The duck could have been either a sick domesticated or wild one, maybe discarded because as inedible.



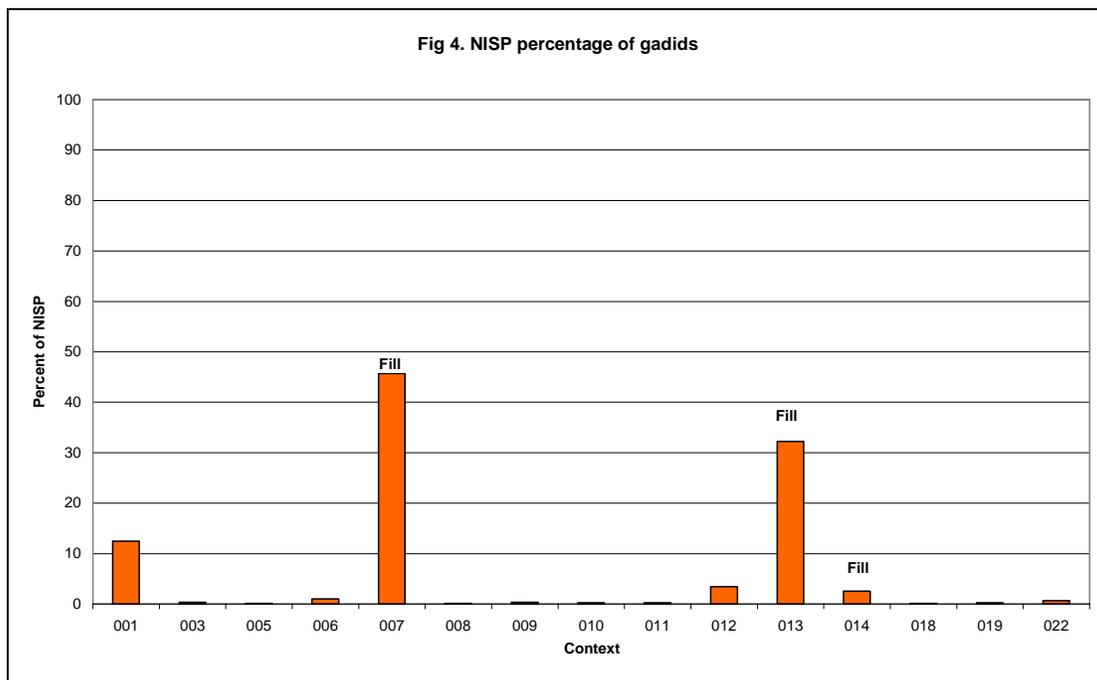
Photo 2 – Mallard (*Anas plath.*) elements – pathology highlighted in red.

Both Eider duck and Ptarmigan are birds residing in the Eyjafjord area (Hilmarrsson, 2000); their presence in the site assemblage is not extraordinary.

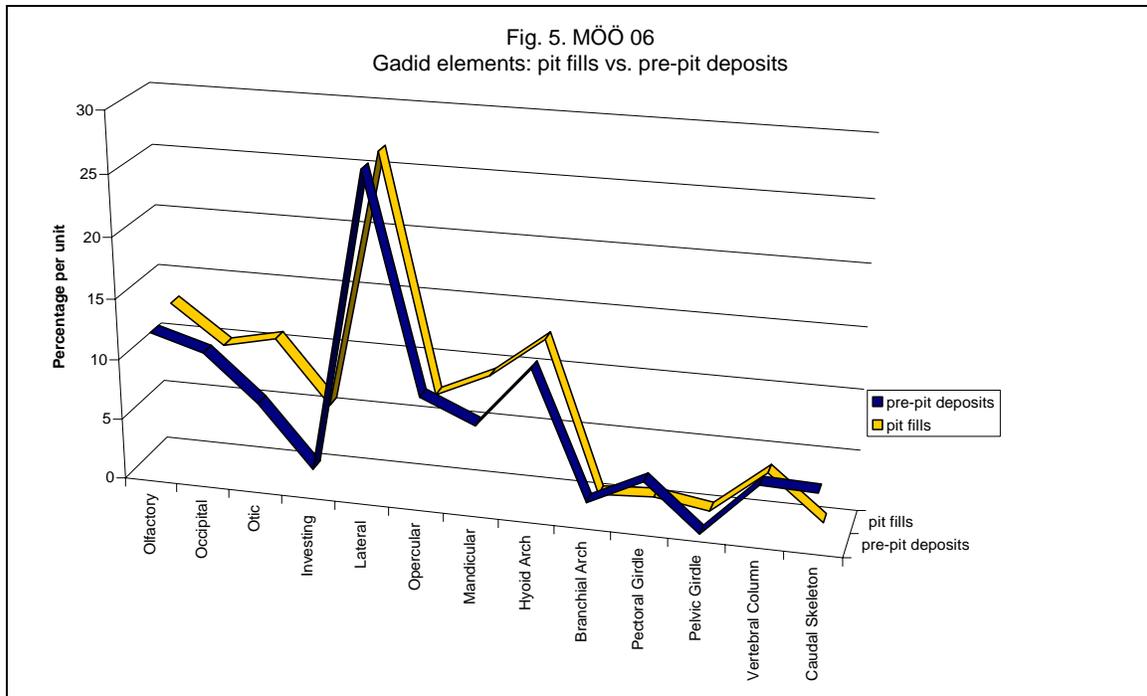
## Fish

As mentioned earlier, the fills of cuts [031] and [015] are rich in fish remains and further contain the majority of the elements speciated to the gadid family, including Cod and Haddock. The picture of the *South facing section* above demonstrates the location of the three (or two, if 13 and 14 are put together in the group 16 as they were during excavation) contexts mentioned throughout this zooarchaeological report.

Context [007] represents one of the latest activities associated with the building of the mound, at least in the area of the trench. Its cut (031) digs into the earlier cut (015) and fill(s) [013] and [014] underneath it. Cut (015) thus chronologically was created earlier in time than cut (031). How much earlier is hard to say at this time, lacking reliable relative (Pottery and other artefactual analyses) and absolute (in form of isotopic analyses) dates.



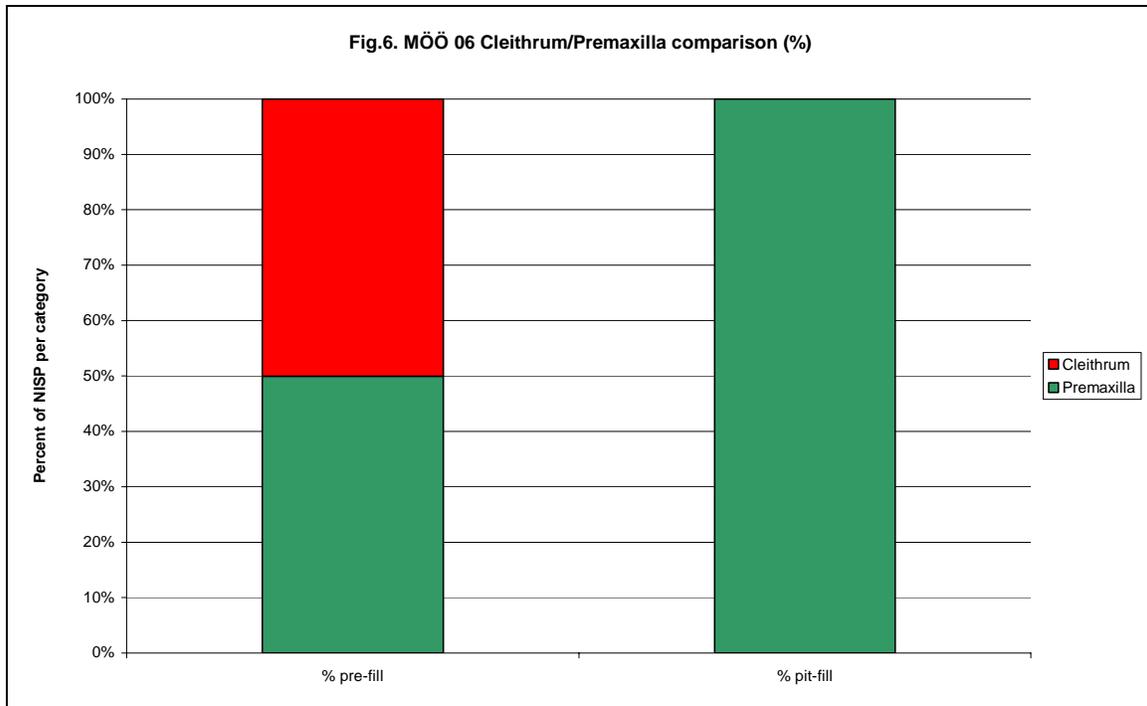
As figure 4 demonstrates, the fills for the cuts contain the majority of the identified gadid elements. Context [001] is abundant in gadid bones; however, it is a cleaning deposit and thus represents more of an initial overview of the faunal remains present in this midden trench.



The comparative gadid element distribution graph (fig 5) demonstrates an overall predominance of fish heads present and fish tails absent. The pattern indicates preparation of the fish, potentially in form of stock fish drying methods (Krivogorskaya, 2006). Presented in the graph are the ‘pre-pit deposits’, and the ‘pit-fill deposits’. They exhibit a similar overall pattern, with a slightly clearer indication towards fresh fish being prepared on site. It should be remembered that the pit-fill deposits contain considerably more gadid elements (fig. 4) than the earlier deposits. Due to small sample size, there is no clear argument for on-site preparation of dried fish. It is however safe to say that the fresh cod reached Möðruvellir in complete form and was then processed, with the fish heads discarded in the pits referred to above (McGovern, personal communication, February 2006).

## Discussion

There is a distinct difference in the midden contents deposited prior to the fills of the cuts. The earlier, pre-fill deposits contain more burnt elements and show a different species distribution, including neo-natal and old cow bones (photo 1) vs. few burnt elements and many gadids, the majority of total fish elements, as well as caprines found in the pit-fill deposits. The pit fill deposits are clearly chronologically younger and raise the issue of a change in the nature of food preparation at Möðruvellir. A larger sample size and deeper stratigraphy could clarify this emerging pattern. To return to the fish one more time, the distribution of fish heads (signified by premaxilla elements in the skull of the fish) vs. fish tails (presence of gadid cleithra) will be demonstrated in a graph below (Perdikaris & McGovern 2006). Figure 6 again uses the distinction of pre-fill deposits vs. pit-fill deposits, based on two elements only:



The *cleithrum vs premaxilla comparison* demonstrates that the pre-fill deposits contain an equal amount of heads and tails. According to figure 6, the pit-fills contain heads only and are thus indicators for fresh fish processing, with the heads remaining in the midden deposit and the tails going somewhere else. The 50/50 split in the pre-fill deposits could indicate fresh fish consumption, but again, small sample size is too small for speculation on the gadid management prior to the accumulation of the fish pits.

## Conclusions and Further Work

The key target of this project started in summer of 2006 has been met: the team was able to excavate a sample of a very well stratified midden hill. The very basic initial artifact analysis (see Harrison & Roberts, 2006) of finds collected with the faunal remains suggests that the top of the midden, (thus the most recent deposits) was located.

This very preliminary report also highlights a number of points to be addressed and depend on further funding:

- **Dating**

*Absolute* dating by means of isotopic studies could be arranged for with the University of Durham and/or the Scottish Universities Reactor Center in East Kilbride Scotland, directed by Dr. Gordon Cook, and aimed at a better understanding of the variations in Marine Reservoir Effect (MRE), affecting age estimates via C14 isotopic analysis (Ascough et al 2006).

- *Relative* dating of the artifacts can be undergone by an artifact specialist at FSI. This will place the materials into a better historic time frame. At this point, the most recent midden deposits may be from the late 19<sup>th</sup> to early 20<sup>th</sup> centuries (Vésteinsson, 2004).

- **Further Excavation work**

- The well preserved archaeofauna demonstrates the presence of stratified midden deposits. In order to assess the socio-political aspects of the monastery in comparison with the later medieval trading station at Gásir (Roberts, 2005) and the hinterlands in Eyjafjord, faunal data needs to be collected from lower contexts of this midden. A larger area opened will also yield a more representative sample of the faunal patterns from all layers.

- **Size reconstruction and ageing**

- Large enough samples of measurable elements such as long bones and tooth rows in mammals and certain cranial parts in gadids can yield reliable age and size estimates, potentially indicating the farming/fishing practices in place at various times (McGovern et al, 2001).

This data would allow for a better understanding of the monastery's context within medieval local and greater realm.

**Acknowledgments:**

This lab report was made possible by generous support from the Leverhulme Trust Landscapes Circum Landnám project, the CUNY Northern Science & Education Center, CUNY PSC Grants Program, US National Science Foundation Office of Polar Programs Arctic Social Science program, US National Science Foundation REU program, US National Science Foundation Archaeology program, the National Geographic Society, the Icelandic Science Council, and FSI (Fornleifastofnun Íslands).

Special thanks go to the Leifur Eiriksson Foundation and the Thor Thor's Fund (ASF). Further thanks for advice and editing to Prof. McGovern and Prof. Perdikaris and Howell Roberts for his advice and supervision in the field. Oddgeir Hansson (FSÍ) was instrumental in the excavation according to strata and I am thankful for Marina Matatova's help with the initial analysis of the archaeofauna. I would also like to thank the FSÍ staff for their help and friendship during my time in Reykjavík.

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