The Midden at Möðruvellir, 2007
Preliminary Excavation Report

Ramona Harrison
With H. M. Roberts

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Between July 31st and August 10th 2007, staff from Fornleifastofnun Íslands continued excavation of an evaluation trench begun in the summer of 2006. This aimed at investigating the nature and preservation of faunal remains at the so-called Ash Hill (Öskuhóll) at Möðruvellir, in Hörgárbyggð, Eyjafjörður.

As in 2006, the key aim of this effort was to locate and recover animal bones, artefacts, and environmental samples from a well stratified midden sequence at Möðruvellir, in connection with ongoing archaeological work investigating local subsistence strategies in late medieval Eyjafjord.
The trench was extended and deepened, chiefly addressing very deep early modern deposits in the western part of the trench.

This work was initiated by Fornleifastofnun Íslands and funded by Fornleifasjóður. The project was directed by Howell Roberts. Field work was supervised by Ramona Harrison and Howell Roberts, assisted by Meghan Markey and Christine Forrestal.

This work was undertaken in collaboration with RALA (the Agricultural Research Institute at Möðruvellir), and with Minjasafnið á Akureyri (the Akureyri Museum).

The author would like to thank Dr. Thomas H. McGovern and Dr. Sophia Perdikaris from CUNY (New York) for their continuous support and advice, and particularly the staff from FSÍ for their generous help and friendship. Special thanks go to Meghan Markey and Christine Forrestal for their tireless sieving work.

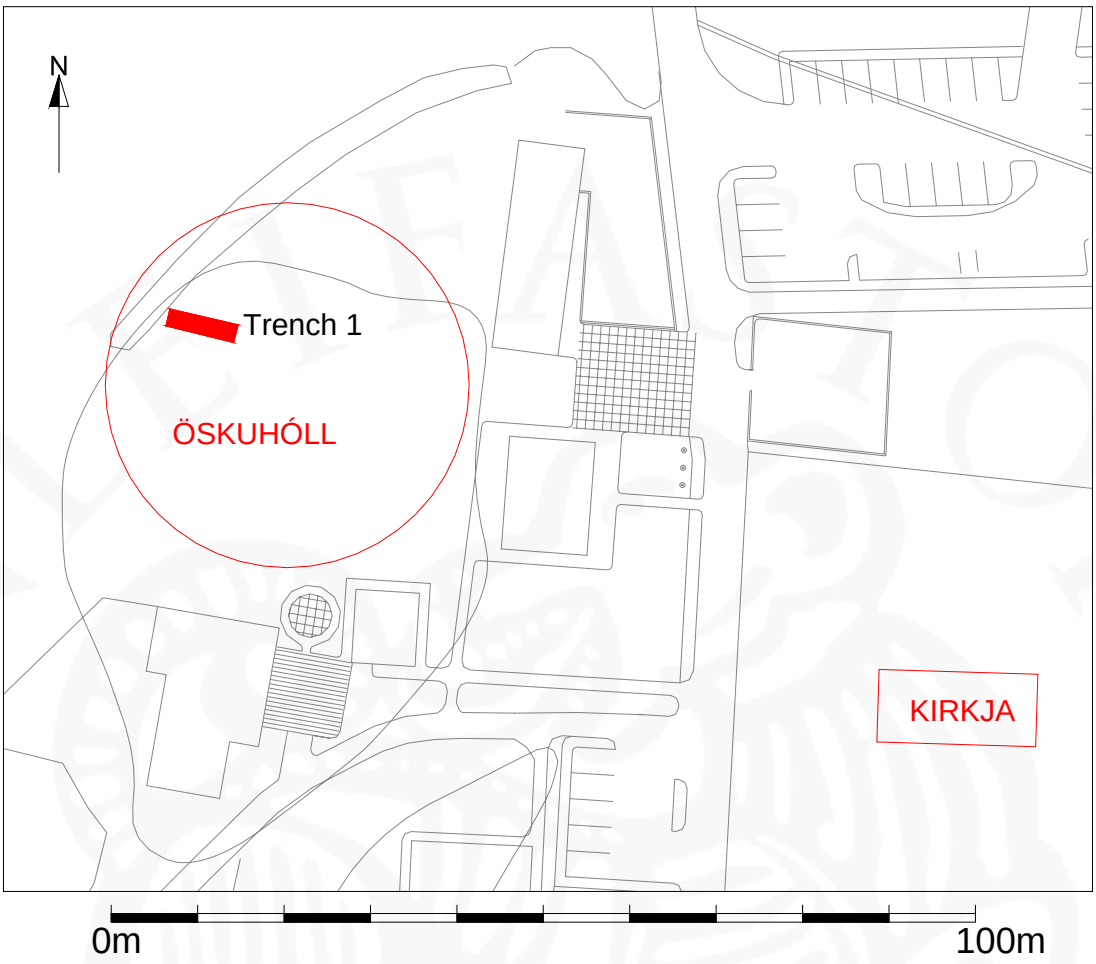

Figure 1 – Location plan

Brief History:

Möðruvellir:
Möðruvellir is located in Hörgárdal, Eyjafjörður, Northern Iceland. The site lies on open lowland pasture, to the north of the river Hörgá, some 13 kilometres north of the modern City of Akureyri. Möðruvellir is situated only a short distance from the delta of the Hörgá, and may be regarded as being within a coastal environment.

Möðruvellir has been a site of considerable importance throughout Icelandic history. It has been the site of a church since at least the second half of the 12th Century (Vésteinsson, 2001:10), and Möðruvellir was established as a House of Canons at the end of the 13th Century. These religious activities were supported by the produce of a large and important farming estate.

The location of original farm and religious buildings is not known with any precision – but they may be assumed to lie beneath the historic farm mound, and it is hoped that clearer evidence may emerge during the course of further excavation. The farm mound and historic buildings at Möðruvellir form a major cultural and archaeological monument of exceptional research potential. The mound itself – formed by the accumulation of centuries of construction and occupation – measures some 80m in diameter and stands some 4-5 metres above the surrounding topography.

The ash mound has seen continued use down to current times, and this will have inevitably caused some minor disturbance to underlying archaeological deposits. Nonetheless, such a mound is a priceless repository of the material remains of past times.

The modern church (see location plan in figure 1) was built in 1865 (www.skolavefurinn.is), and is a protected building of historic importance in its own right. It is the successor to a series of churches and other ecclesiastical buildings.

Öskuhóll:
The 'ash' hill is situated on the northwestern quarter of the farmstead and was supposedly used for discarding of rubbish over many generations. (Vésteinsson, 2001).

> *The hill is probably a natural rise at the base and it is likely that it contains structural remains as well as ash and midden material. It is highest at the west, where there is a ridge which turns eastwards towards the southern end of Stefánsfjós. There is a tight cluster of trees on this ridge but east of it there is a large clearing and then another row of trees between the Öskuhóll proper and an open area behind the dwelling, where the turf-house stood formerly*.
> (Vésteinsson, 2001:34).

Further investigation of the Öskuhóll will provide a better chronology of the deposits unearthed. Animal bones thus recovered will provide an insight into the farm's food supply system over the centuries, and other artefacts such as pottery, iron, leather stone etc will provide intimate evidence of how people lived at Möðruvellir. A site of this importance may be expected to produce a significant quantity of high status imported goods, especially from the late medieval period when a major site of trade operated at Gásir, only some 3km away at the coast.

Analysis of the Möðruvellir faunal assemblage collected in 2006 proved that the bone preservation was very good and that excavation of deposits in chronological order could give detail on the deposits of various midden units and their contents. The number of animals recovered was not sufficient to make general statement about Möðruvellir´s farming and nutrition strategies in the 19th Century (Harrison 2007). A larger sample from layers contemporaneous with the ones excavated in 2006 will thus enable the researchers to establish a better model of the nature of the site's food supply and management of livestock.

Upon establishment of a good understanding of the early modern midden deposits, a thorough investigation of the medieval layers can provide important information on Möðruvellir´s farming and wildlife management strategies through time.

Previous research at Möðruvellir:

Archaeological and historical research regarding the farm was undertaken as early as the 19th Century, by Kristian Kaalund (Vésteinsson, 2001:7).

A kuml (pagan burial mound) was unearthed in the 19th Century and therefore it is safe to assume that the area was settled or at least that people were buried there before the year 1000 AD (Vesteinsson, 2001:10).

In 1985, Guðmundur Ólafsson of the National Museum of Iceland surveyed the area, and produced a list of archaeological sites.

Fornleifastofnun Íslands activity at Gásir:

- 2001 – Orri Vésteinsson, Expanded archaeological survey and site registration. Including a summary of Möðruvellir´s history (Vésteinsson, 2001).
- 2004 – Howell Roberts & Orri Vésteinsson, Excavation of trenches in the boundary at Möðruvellir Fram, in advance of construction works (Roberts, 2004).
- 2005 - Howell Roberts, excavation of an evaluation trench in the churchyard; investigative work prior to planned ground works for central heating and path construction (Roberts, 2005)
- 2006 – Ramona Harrison and Howell Roberts, excavation of an evaluation trench into the Öskuhóll.
- 2007 – Ramona Harrison and Howell Roberts, extension of the evaluation trench opened in 2006.

Results

2007 Trench expansion and connection of deposits

In 2006, an area 2m in width and 5m in length, located at the western edge of the ash hill was excavated. This trench immediately proved to contain a well preserved and well stratified sequence of bone rich peat ash deposits – and all further work was focused on this trench. In 2007 the decision was made to extend the trench to gain a larger sample of faunal as well as artefactual remains from the late 19th and late 18th centuries.

On July 31st, 2007, an additional three meters, expanding the 2006 trench to the east (and thus further toward the center of the ash hill) were marked for excavation. The result was a trench of 2m in width and 8m in length. The depth of the 2007 trench ranges from about 70cm in the East to 2.5 m in the West.

All excavation was carried out in accordance with excavation protocols set out in the Archaeological Field Manual of Fornleifastofnun Íslands, based upon an excavation method of single context planning. All layers were planned at 1:20, and described using pro-forma recording systems, supplemented by photography. All excavated deposits were dry sieved through a 4mm for recovery of artefacts and faunal remains. Further bulk soil samples were taken from each context for the recovery of environmental data, and as a control on the dry sieving process. These await analysis.

Removal of the topsoil/cleaning deposit yielded faunal remains that were well preserved and numerous. Most of the contexts removed contained midden material to a greater or lesser degree. Notable are contexts (039), (041), and (072), all of which contain a large amount of faunal remains a good portion of which is comprised of fish elements. From the 41 contexts that were planned and excavated, a total of 21 kilograms worth of bone materials emerged. The total weight of the bone collection from 2006 was 12 kilograms and thus the 2007 aim of a larger bone sample has been accomplished.

In 2007, focus was placed on connecting the newly excavated midden deposits from the eastern part of TR1 with the ones removed in 2006. A slight disturbance of midden deposits in the Western area of TR1, probably due to agricultural machinery pushing some materials downhill made this task of phasing the various deposits complex, but not impossible.

Most of the various midden events contained a certain amount of either wood or peat ash (or both in some cases), as well as traces of charcoal.

A series of layers that are possibly related to a burnt structure were also excavated in 2007. All the layers that were believed to belong to the ‘cleaning’ of the building remains and dumping the burned structural elements on the Öskuhóll were grouped into **(047).**

Group (047)

Various layers of burned turf remains such as (048) (fig. 2), a charred wood/coal layer (046), as well as ash layers and a 'sudsy' black deposit (057) might be related to the burning down of a structure on the Möðruvellir premises.
One house, a partial timber construction or stokkahúsi possibly called Friðriksgáfa byygð, burned down in 1826 (Vésteinsson 2001, 12), but it is not known where exactly it stood.

Figure 2- Context (048), burned turf remains
Camera Facing South

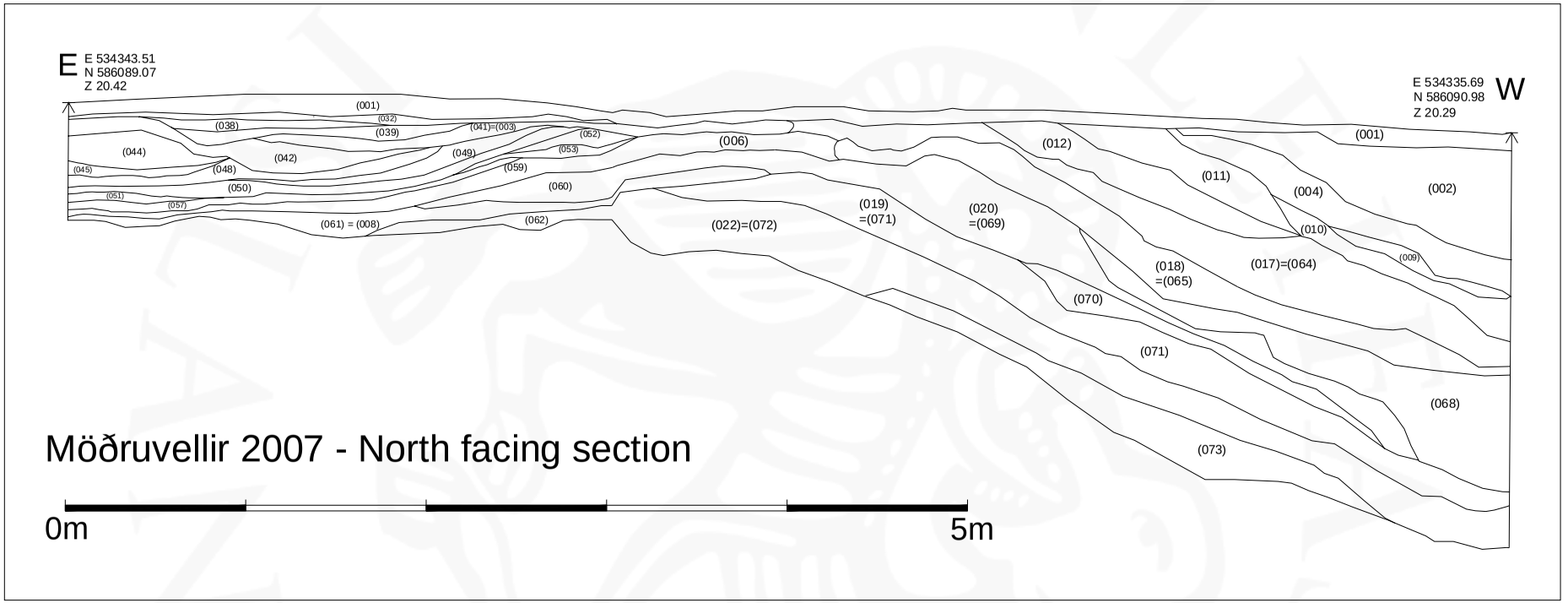

Figure 3 – North facing section

Phasing

All the deposits excavated from TR1 by the end of the 2007 season appear to date from the 19th and 18th Century.

Layers excavated in 2006 were linked up with ones excavated in 2007and placed in chronological order.
It should be noted that these connected deposits may have multiple context numbers, but their equivalence is explained below.

Three depositional phases were distinguished.
(See Harris Matrix in Appendix 1 for detailed phasing of each context - phase 1 deposits are unmarked, phase 2 deposits are highlighted in blue, phase 3 deposits in yellow).

Phase 1:
Phase 1 is composed of the youngest or more recent depositional layers. Many of these were also excavated in 2006, and predominantly located in the western part of TR1. They may partially result from midden materials being disturbed and moved downhill.

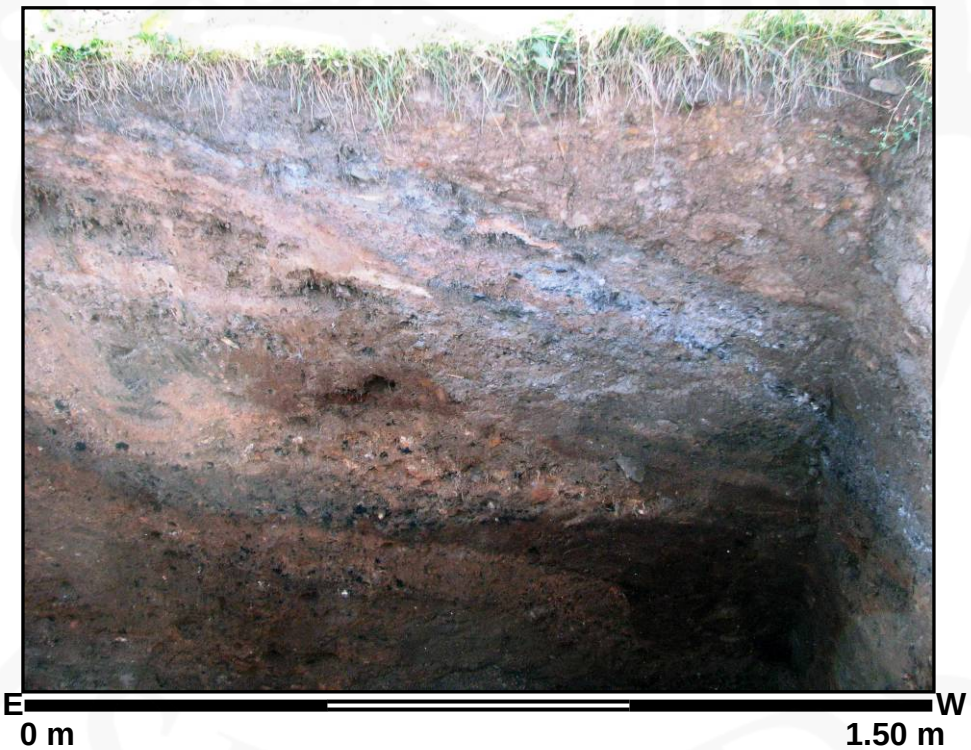

Figure 4 - Western side of North facing profile. Layers associated with Phase 1.

Phase 2:

These layers appear largely undisturbed and contain a group of deposits that are associated with potential building debris (compare with fig. 2). They are likely to be somewhat older than the deposits from Phase 1.

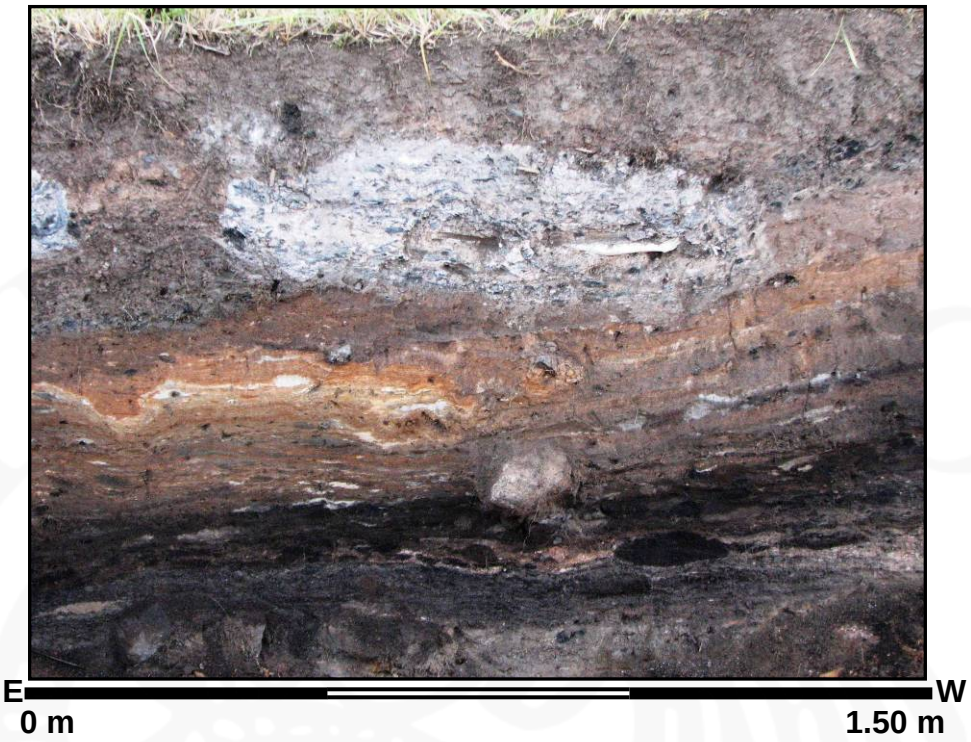

Figure 5 – Eastern side of North facing profile. Layers associated with Phase 2

Phase 3:
Phase 3 is the currently earliest phase of TR1, context (073) being the last and thus oldest deposit excavated in 2007.
Analysis of artefactual and faunal material (potentially including C14 Dating) can help with determination of depositional age.
This phase combines deposits from the eastern and western part of trench and can serve as good connection point for further excavation work in TR1.

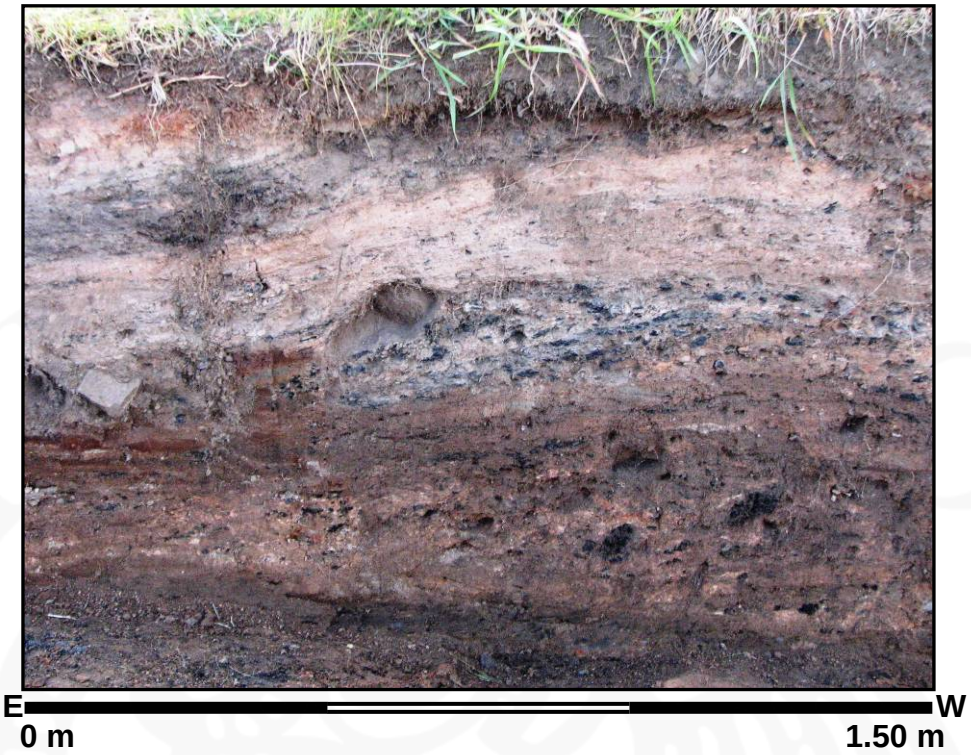

Figure 6 – Central part of North facing profile. Deposits in lower half of picture are in Phase 3.

The analysis of the faunal material will be carried out during the winter/spring of 2007-2008 by Ramona Harrison at the laboratory facilities of City University New York. As with the 2006 archaeofauna, this work will provide detailed evidence as to the nature of the different dumping events.

Artefacts so far recovered from the excavated layers include window glass, bottle glass, and clay tobacco pipes. These items clearly suggest that the excavated layers are fairly recent in date, most likely from the 18th and 19th centuries. The 2007 artefacts are awaiting analysis by a finds specialist and upon completion are expected to provide closer chronological information.

While the medieval occupation has likely not yet been reached, a chronology of deposits going further back in time the deeper they are located can be loosely determined by the finds. These deposits have proved to include some diagnostic material, and especially in phases 2 and 3 appear largely undisturbed. This is very promising for continued excavations.

Context	*Description*
07-001	Cleaning deposit
07-032	Peat Ash mixed w. Charcoal and turf
07-033	Pale grey brown ash deposit under
07-034	Pink Ash deposit under (033)
07-035	Turfy deposit under (034)
07-036	Pink peat ash deposit under (035)
07-037	Dark grey brown ash and soil mix under (036)
07-038	Red brown layer under (037)
07-039	Grey/pink-brown midden deposit
07-040	Pale orange/brown turf (?)
07-041	Grey ash midden
07-042	Mixed peat ash and soil dump w. Charcoal inclusions
07-043	Stripy soil and turf mix
07-044	Brown soil and turf mix under (042)
07-045	Pale pinkish brown striped deposit under (044)
07-046	Charcoal layer from burned building (?) Under (045)
07-047	Layers probably associated w. Burned structure
07-048	Collapse - burned structural turf debris mixed w. Soil
07-049	Reddish black turf collapse under (048)
07-050	Pale pink turf collapse, lensed under (049)
07-051	Very mixed, pink/red/orange turf and peat under (050)
07-052	Mixed midden and burned turf debris under (051)
07-053	Very mixed grey brown and pink midden dep. Under (052)
07-054	Black brown layer
07-055	Mixed turf collapse under (048)
07-057	Sooty layer (?) Black and pink deposit, charred, mixed w. Midden
07-058	Pink peat ash deposit , mixed, under turf debris
07-059	Black-brown layer: charcoal mixed w. Wood ash
07-060	Pink brown dump w. Charcoal
07-061	Black-grey deposit with wood ash inclusion
07-062	Brown orange midden deposit under (061)
07-063	Black grey midden deposit under (062)
07-064	Orange brown turf mix
07-065	Pale orange/pink mixed ash
07-066	Grey wood ash and charcoal
07-067	Orange peat ash
07-068	Grey brown t/c
07-069	Pink orange midden w. Tiny t/c
07-070	Pink peat ash and burned turf
07-071	Mixed brownish pink ash
07-072	Black and pink mixed dump
07-073	Orange pink midden dump

Table 1 – List of contexts excavated from Möðruvellir TR1, 2007

The Möðruvellir bone

A total of 20.8 kg of archaeofauna was recovered from the investigative trench, and will be processed and analyzed in the NORSEC and NABO laboratories of the City University of New York, located at Hunter and Brooklyn College Campuses.

Bag. No	*Context*	*Weight in gr.*
1	001	1414
2	032	118
3	033	161
4	034	56
5	035	9
6	036	21
7	037	448
8	038	62
9	039	2425
10	041	3611
11	042	248
12	043	14
13	045	147
14	048	228
15	049	2
16	050	18
17	051	4
18	052	26
19	053	16
20	055	10
21	057	48
22	058	16
23	059	6
24	060	20
25	061	45
26	062	455
27	063	204
28	064	560
29	065	1211
30	066	287
31	067	46
32	068	117
33	069	276
34	070	395
35	071	2053
36	072	3653
37	073	2390

Table 2 – List of bones

Conclusions and Research Potential

H. M. Roberts

Previous excavation at Möðruvellir in 2006 successfully located and tested a complex sequence of midden deposits, thus achieving our primary aims.

A number of artefacts were recovered, along with a large quantity of animal bone. These came from well stratified deposits including adequate dating evidence. Preservation of both bone and artefacts proved to be excellent – and included the rare preservation of organic items such as wood and cloth.

Continued excavation in 2007 has expanded upon the results from 2006. The artefactual and faunal collections have been substantially increased, and our understanding of the scale and formation of the midden mound has been greatly improved.

Ongoing analysis of these materials will shed new light upon subsistence strategies and husbandry practices at Möðruvellir, and well as giving new information about the lifestyle of the inhabitants and their material culture. This effort will proceed during the winter of 2007-2008.

Excavation at Möðruvellir in 2007 has also begun to reveal the first indications of structural elements (burnt turf and wood – group 47, see figure 2), and these remains clearly highlight the potential for historically documented fires to inform and amplify our understanding of the chronological development of the farm mound.

The exceptional scale and depth of the midden mound has also been underlined during 2007. Although we have continued excavation to a depth of circa 2.5m at the western limit of our trench, it is likely that these excavated deposits date to the early modern period, perhaps the late 18th or early 19th centuries. It remains our intent to continue with excavation through these late deposits, and to eventually recover artefactual and faunal assemblages from throughout the occupation of the site. Such a collection would be exceptional and unrivalled. The early modern material so far recovered is nonetheless of major importance, as this period is severely under-represented in Eyjafjörður and in Iceland as a whole, and will provide important comparative data for early modern collections that have recently come to light elsewhere in Iceland.

Furthermore, it is our intention to expand our focus. Both authors are actively seeking further financial support both in Iceland and abroad[1] to prospect for additional midden sites in Hörgárdalur and the immediate vicinity. We have been greatly assisted in the design and development of these proposals by Elín Hreiðarsdóttir, who has provided detailed descriptions and locations of potential sites from the now complete archaeological survey of Eyjafjörður. This field survey, carried out by Fornleifastofnun Íslands over the last 15 years forms an invaluable resource in our attempts to place sites such as Möðruvellir and Gásir within a detailed and rigorous regional background.

[1] In November of 2007, R. Harrison has applied for a Dissertation Improvement Grant to be funded by the National Science Foundation, a US governmental institution. The NSF OPP (Office of Polar Programs) grant application seeks to support the *Gásir Hinterlands Project* (GHP), an archaeological project heavily focused on Möðruvellir and other regional farmsteads that are contemporary with the high medieval Gásir market station.
The archaeological research will be supplemented by multi-disciplinary environmental studies from UK institutions such as (but not limited to) the Universities of Durham, Edinburgh and Stirling.

A brief statement of the GHP grant application is attached as Appendix 3.

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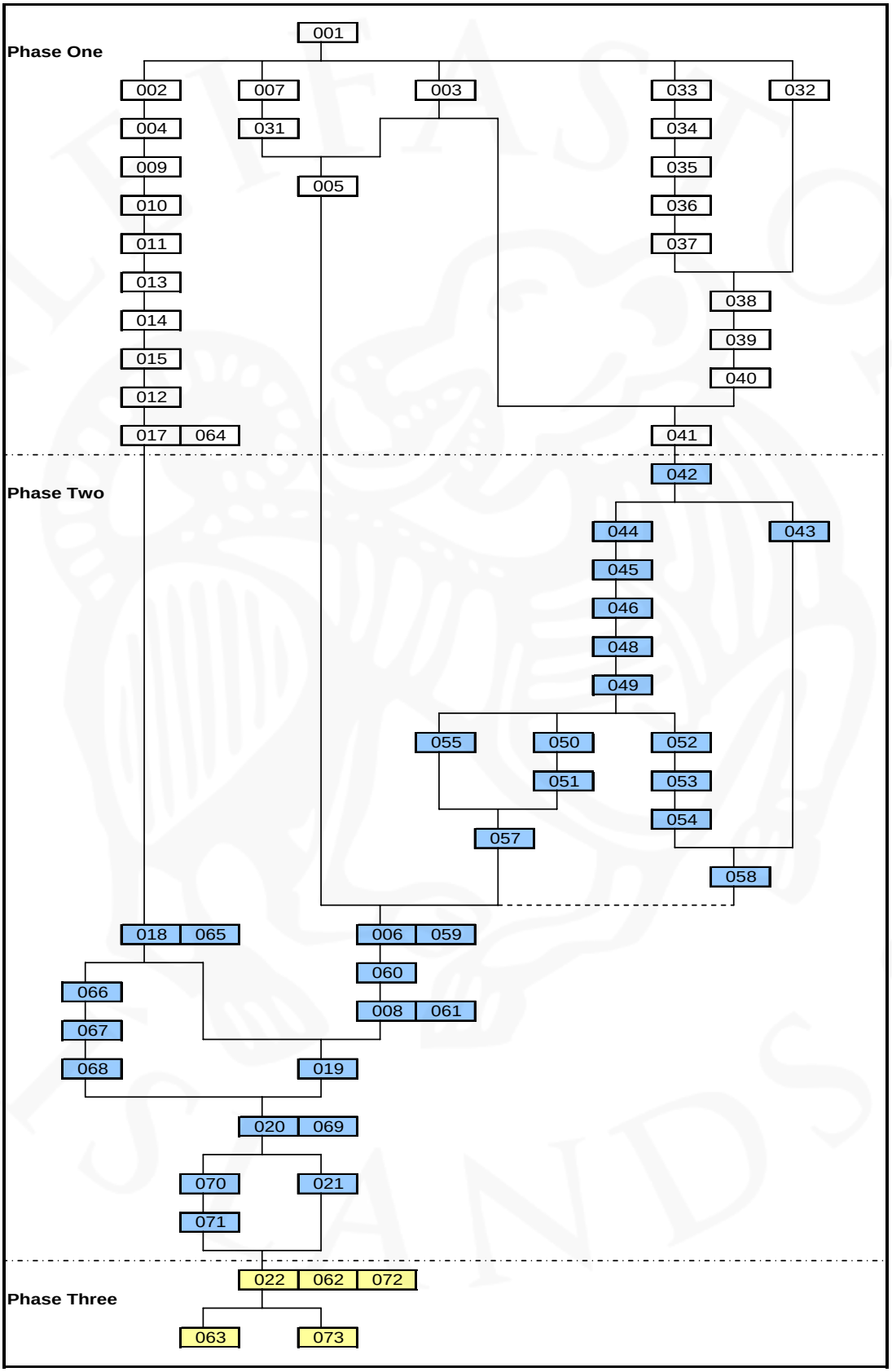
Appendix 1 – MÖÖ 2006-07 Harris Matrix



Appendix 2- List of Artefacts

Find No.	Unit No.	Material	Object	Weight (g)	Count	Comments
069	041	Bone	Button	1	1	16 mm in diameter, four holes
070	041	Bone	Toy	28	1	Blue painted sheep mandible
071	073	Stone	Whetstone	29	1	80x21x7 mm schistose whetstone. Drill hole ´try´ at one end.
072	041	Ceramic	Sinker	595	1	Ovoid shaped weight with hole through long axis. Mark or initials carved on surface (2, V or 8 in a circle)
073	041	Ceramic	Brick	619	1	Pale yellow fabric
074	039	Ceramic	Brick	37	1	Pale yellow fabric
075	041	Ceramic	Brick	79,5	1	Pale yellow/pink fabric, burnt
076	041	Ceramic	Pottery	155.5	28	MNV: 6 Dish, cup, bowl etc. Repair hole on one with lead remains
077	042	Ceramic	Pottery	6	8	Whiteware
078	035	Ceramic	Pottery	1	2	Whiteware
079	041	Ceramic	Pottery	9	1	Willow pattern. 2 conjoining fragments.
080	039	Ceramic	Pottery	5.5	1	Burnt
081	039	Ceramic	Light fitting	84	1	Light fitting in fragments
082	039	Ceramic	Pottery	6.5	1	Whiteware
083	041	Glass	Window	15	5	Machine made window glass
084	041	Glass	Vessel	33.5	25	Medicine and perfume? Bottle
085	041	Glass	Object	5.5	1	Melted glass lump
086	041	Glass	Bottle	70.5	3	Possibly the same
087	039	Glass	Window	8	4	Machine made window glass
088	039	Glass	Vessel	6.5	6	
089	001	Glass	Window	1	1	Machine made window glass
090	041	Copper alloy	Cog	7	1	Small cog.
091	073	Copper alloy	Sheet	0.5	1	Small sheet fragment
092	059	Copper alloy	Sheet	3	1	Folded sheet fragment
093	039	Copper alloy	Thimble	5.8	1	Decorated thimble. Diam 16 mm, height 23 mm
094	039	Copper alloy	Light fitting?	19.3	1	Complete circular light fitting?
095	039	Iron	Nail	39	14	Very corroded nails, all broken, 21-76 mm
096	039	Iron	Screw	7	1	Complete screw 40 mm
097	039	Metal	Object	4	2	Fragments of objects, indet
098	039	Iron	Hoop	105	2	Broken barrel? Hoop - same type as find no. 100 and 109
099	071	Iron	Nail	6.3	1	Very corroded nail 38 mm
100	037	Iron	Hoop	136.2	2	Broken barrel? Hoop - same type as find no. 098 and 109
101	037	Iron	Sheet	37.8	3	Folded and corroded sheets one pierced
102	001	Iron	Nail	5.5	1	Nail with broken head 72 mm
103	001	Iron	Indet	5	1	Flat corroded piece, sheet?
104	041	Iron	Strip	82.3	2	Function unclear

105	041	Iron	Indet	23.7	3	Corroded iron pieces
106	042	Iron	Nail	16.3	3	Corroded nails, possibly one complete horse shoe nail, others broken 25-50 mm
107	041	Iron	Nail	147	42	Corroded broken and complete nails 19-77 mm
108	041	Metal	Wire	16	1	4,5 mm in diameter
109	036	Iron	Hoop	70	1	Broken barrel hoop? - same type as find no. 098 and 100
110	034	Iron	Hoop	107	3	Broken barrel hoop? - 1 junction piece with rivets, 1 fragment with nail, 2 conjoining strip fragments
111	034	Iron	Nail	2.5	1	Nail broken in 2 conjoining pieces, head and tip broken off 42 mm
112	045	Iron	Nail	2.1	1	Broken nail shank 28 mm
113	042	Iron	Strip	37.7	3	Corroded iron strips
114	061	Iron	Nail	6.2	1	T shaped nail with broken tip 37 mm long
115	070	Iron	Object	3.8	1	Part of flat circular object
116	073	Iron	Strip	2.7	1	Small strip fragment, cut
117	073	Iron	Nail	4.4	1	Nail with broken tip, 30 mm
118	041	Iron	Strip	19.3	1	Corroded strip
119	041	Iron	Indet	4.1	1	Corroded piece with one flat side
120	062	Iron	Strip	46	1	Corroded iron strip with stone pebble attached by corrosion
121	062	Iron	Staple	5.8	1	Broken tips
122	037	Iron	Nail	23.5	6	Corroded broken nails 36-55mm
123	037	Iron	Wire	5	1	Wire
124	037	Iron	Indet	12.7	2	Corroded pieces, possibly one rim? fragment
125	038	Slag	Slag	19.6	x	
126	039	Slag	Slag	13.9	x	
127	041	Slag	Slag	50.3	x	
128	042	Slag	Slag	23.1	x	
129	045	Slag	Slag	5.5	x	
130	050	Slag	Slag	5.6	x	
131	064	Slag	Slag	252.2	x	
132	065	Slag	Slag	190.3	x	
133	071	Slag	Slag	1.8	x	
134	073	Slag	Slag	11.4	x	
135	045	Glass	Window	0.5	1	Machine made window glass
136	045	Glass	Vessel	0.1	1	
137	045	Ceramic	Pottery	1.5	1	
138	041	Shell?	Unknown	13.6	1	Needs analysis
139	037	Building material	Tar paper	121.4	x	
140	041	Building material	Tar paper	11.2	x	

Table 3 – List of Artefacts (by G. A. Gísladóttir & H. M. Roberts)

Appendix 3 – NSF OPP Dissertation Improvement Grant
Gásir Hinterlands Project Statement

Dissertation Improvement Grant
Gásir Hinterlands Project: Northern Communities and Early Globalization
A. Project Summary
The Gásir hinterlands project (GHP) proposes an integration of documentary sources, site-focused environmental archaeology, & an integrative regional landscape approach to better understand economic and environmental relationships of farms within the Eyjafjörður region with international traders at the Gásir market place. This dissertation improvement proposal investigates interactions of local subsistence and trans-Atlantic regional trading economy in medieval Iceland; integrating artifacts, faunal materials and other environmental data from deeply stratified site middens into a regional landscape. It builds upon prior excavation and survey work in Eyjafjörður and upon successful US-UK-Icelandic interdisciplinary collaboration originally focused upon the large medieval seasonal trading center at Gásir (Roberts 2000-2007 Harrison et al 2007, Harrison et al 2008) and the major monastic center nearby at Möðruvellir (Roberts 2007). Major collaborators include CUNY, Arch. Inst. Iceland (FSI), Akureyri Museum, U Durham, U Stirling, U Edinburgh, U St. Andrews.

1) Intellectual Merit Criteria: The GHP project builds upon regional survey in Eyjafjörður and excavation at Gásir (2002-06) and at Möðruvellir (2006-07). The resulting data will be used to provide a wider context for existing 14th century archaeofauna and artifact assemblages from the seasonal market station at Gásir which suggest major, regional-scaled impact of this early international port on the organization of local Icelandic subsistence economy. The proposed survey, paleo-environmental investigations, and midden excavation will better document the interaction of the monastery and surrounding lower status farms with the trading site and provide a better basis for interpreting the importance of overseas trade in the social and economic organization of medieval Iceland. This project will greatly expand prior work by
a) extending midden excavations at the deeply stratified deposit at Möðruvellir to reach the layers created between 1200 and 1400;
b) undertaking a sampling program on two smaller sites already surveyed by FSI where middens belonging to medieval farms associated with Möðruvellir,
c) combining site location, zooarchaeology, geoarchaeology, and archaeobotany with artifact analysis, radiocarbon chronology, stable isotopic analysis, documentary history, historical climatology and integrative landscape modeling to provide a solid basis for further regional interdisciplinary investigations in Eyjafjörður.

2) Broader Impacts: In modern times, the interactions between local rural northern communities and the global marketplace have had diverse and often massive impact upon northern subsistence economy and social structure. Interdisciplinary investigations at the seasonal trading site of Gásir have produced evidence for a very substantial town-like settlement boasting the second largest church in Iceland, specialized production areas for sulfur processing and bone and walrus ivory working, and large amounts of imported pottery, the bones of gyrfalcons and small fashionable lap dogs, and substantial amounts of cattle raised to “prime beef” age, whose N isotopic signatures suggest were drawn from a wide catchment area. The production

of beef cattle for market directly conflicted with the normal Nordic dairying strategy and would have represented a very high-risk participation in market production for the average Icelandic farmer.

It now appears that Gásir had a major social, economic, and environmental ‘footprint’ in the region, and better understanding of the local - regional – transatlantic interactions requires an expansion from site focus to regional scale. Environmental archaeology in N Iceland is enhancing understanding of long term North-South social and economic interactions whose dynamics continue to shape the circumpolar zone.


FJÁRMÁLAEFTIRLITSSTOFNUN
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Appendix 4

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

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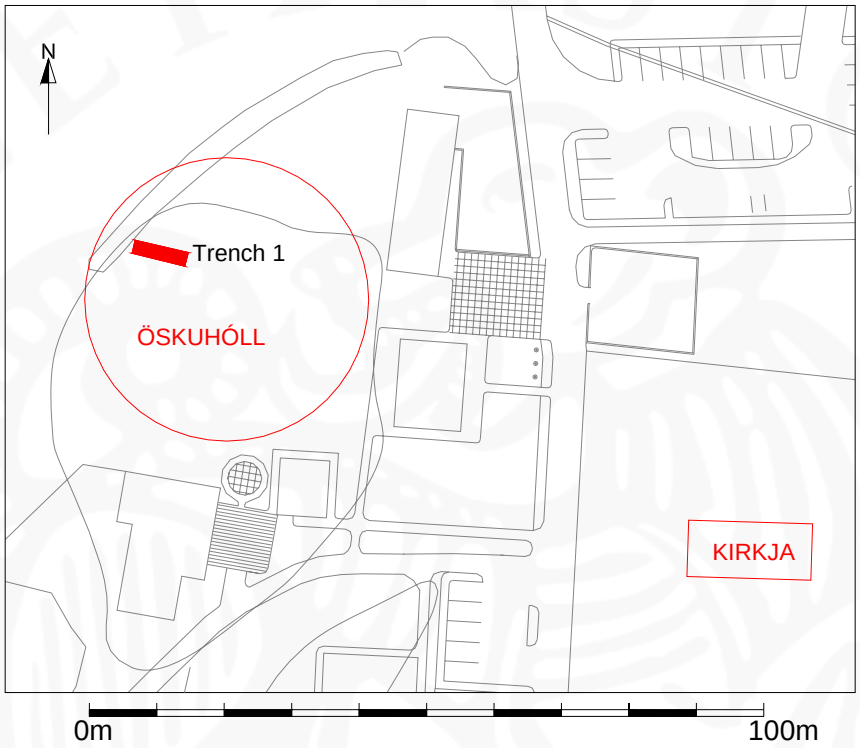
The Möðruvellir Midden – Öskuhóll:



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 9th). The excavation was undertaken by Fornleifastofnun Íslands, FSI (Icelandic Archaeological Institute), under supervision of Ramona Harrison and Howell Roberts. The excavation was funded by Fornleifasjóður (the Archaeology fund), and conducted in collaboration with Minjasafnið á Akureyri (the Akureyri Museum). It forms a part of ongoing research aimed at gathering information on subsistence strategies and modes of exchange in late medieval Eyjafjord.

The 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 16th 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 domesticate 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 domesticate management system. The lack of pig remains in the assemblage is consistent with the absence of these domesticates 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.

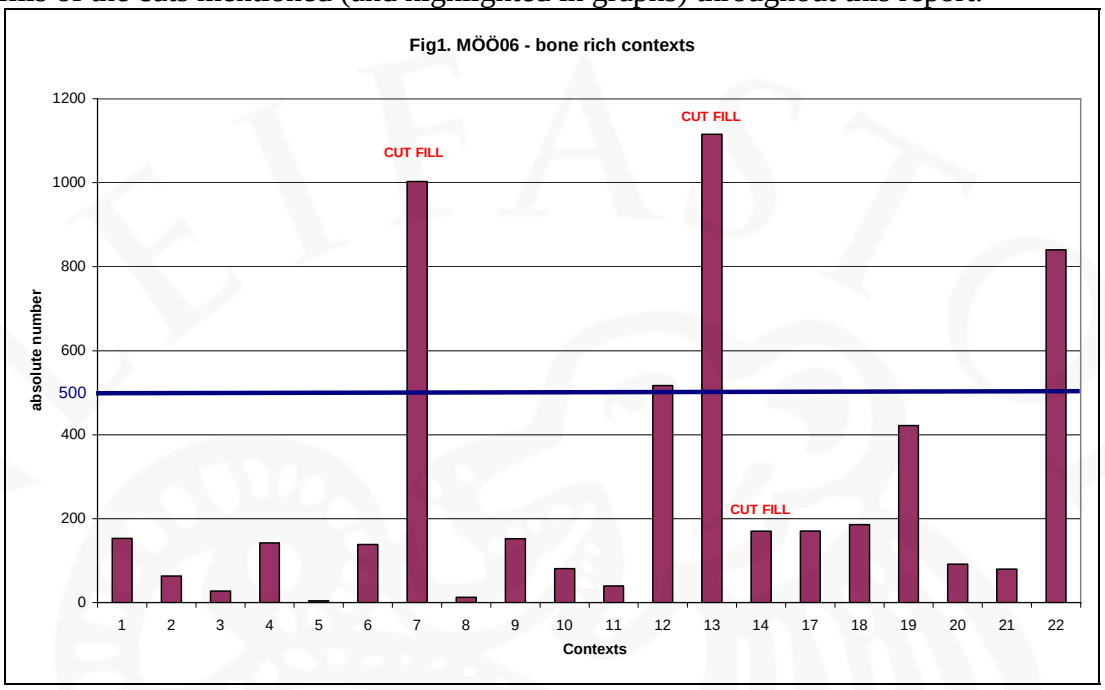
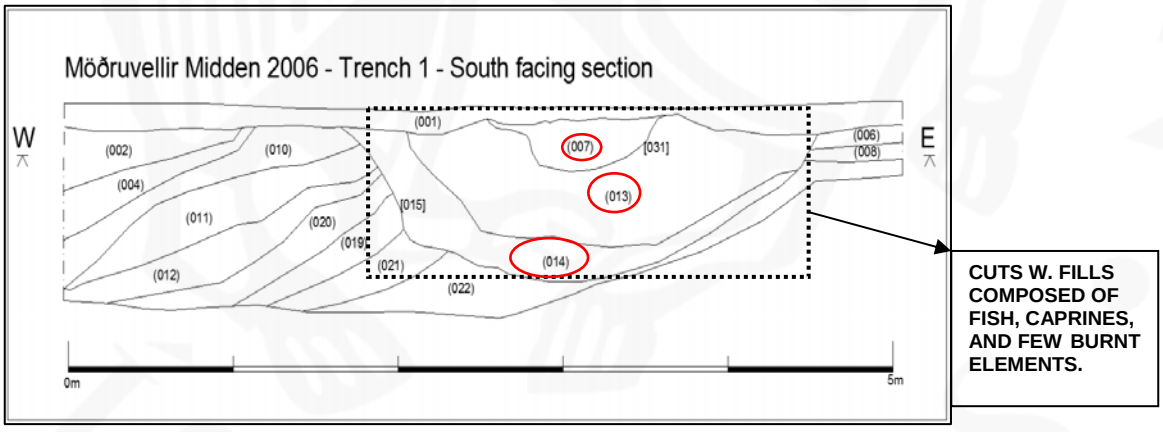


Figure 1 presents a comparison of total elements per context. Contexts [007] and [013] have large amounts of fish fragments that are beyond speciation. They further contain most of the analyzed gadid bones (fig. 4) and will be discussed in the **fish** section.



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.

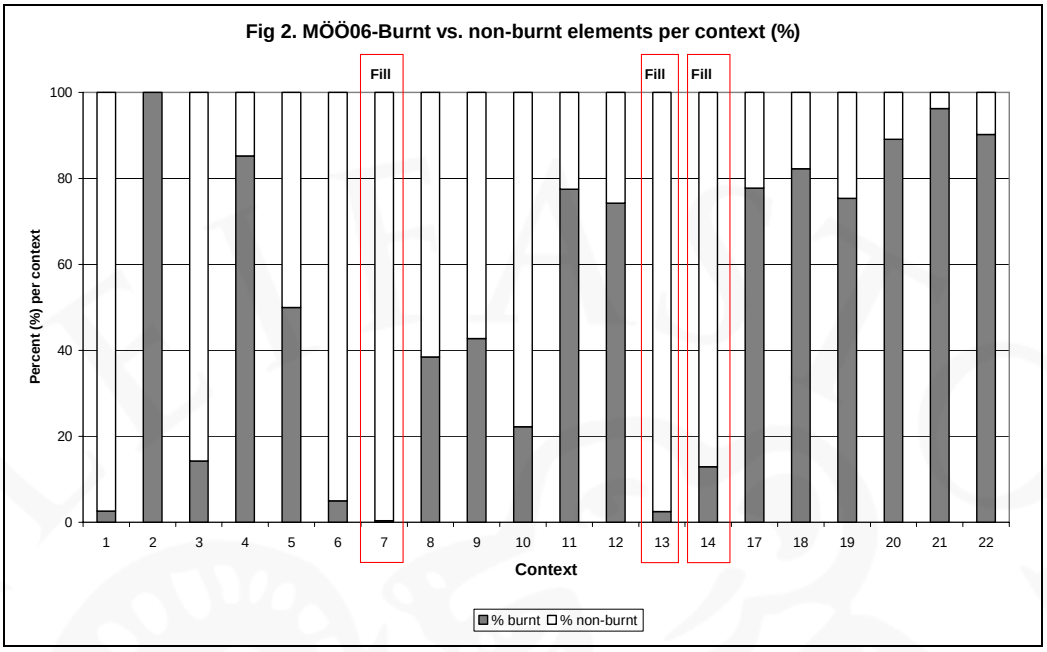
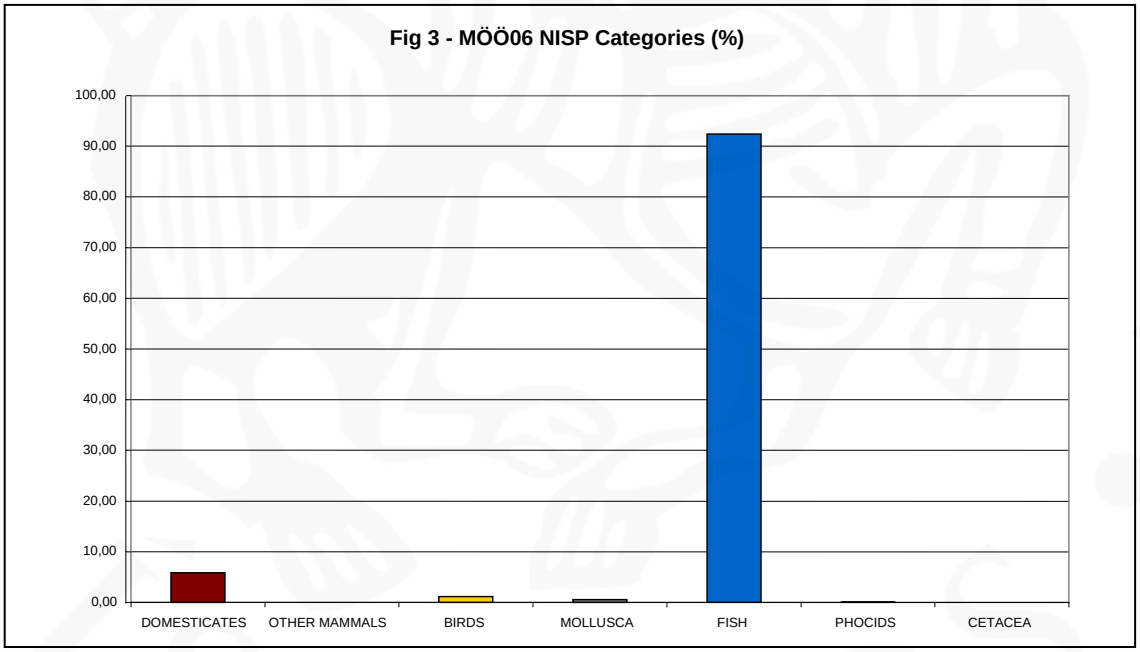


Fig 1 presents the low percentage of burnt elements in the fills of cuts discussed later in this report. These contexts are: [007], [013], and [014]. The contexts [017] through [022] are chronologically older/earlier deposits and demonstrate a high percentage in burnt elements. Plan 2 shows most of the 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
Domestic Mammals	
Cattle (*Bos taurus dom L*)	37
Horse (*Equus cab. dom L.*)	1
Pig (*Sus scrofa dom L.*)	0
Dog *(Canis fam. L*)	0
Goat (*Capra hircus dom L*)	1
Sheep (*Ovis aries dom L*)	13
Caprine	98
total Caprine	112
total Domestic	150
Wild Mammals	
Seal species	1
total Seal	1
Birds	
Mallard (*Anas platyr.*)	1
Eider duck (*Somateria moll.*)	3
Ptarmigan/grouse (*Lagopus mutus*)	2
Bird species indeterminate	23
total Bird species	29
Fish	
Cod (*Gadus morhua*)	397
Haddock (*Melanogr. aeglef.*)	14
Gadid sp	364
Trout (*Salmo trutta*)	0
Pleuronectiformes	0
Salmonid species	0
total Fish species identified	775
Fish species indeterminate	1590
Total Fish species	2365
Mollusca	
Periwinkle (*Litt. l.*)	1
Clam (*Mya sp.*)	9
Moll. Species	5
total Moll. Species	15
total NISP	**2560**
Large Terrestr. Mammal	124
Medium Terrestr. Mammal	532

Small Terrestr. Mammal	2
Unidentified Mammal Frag.	2138
total TNF	**5356**

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.

Table 2 - MÖÖ 06 Domesticate comparison

Taxon	Percentage of total
Bos taurus	24,67
Equus caballus	0,67
Canis familiaris	0
Felis cattus	0
Sus scrofa	0
Ovis aries	8,67
Capra hircus	0,67
Ovis/Capra sp.	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 (domesticate) 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 #
Wildfowl - sea birds	
Migratory Waterfowl	
Mallard Duck (*Anas platyrhynchos*)	1
Eider Duck (*Somateria mollissima*)	3
Mute Swan (*Cygnus olor*)	
Wildfowl - land birds	
Ptarmigan/grouse (*Lagopus mutus)*	2

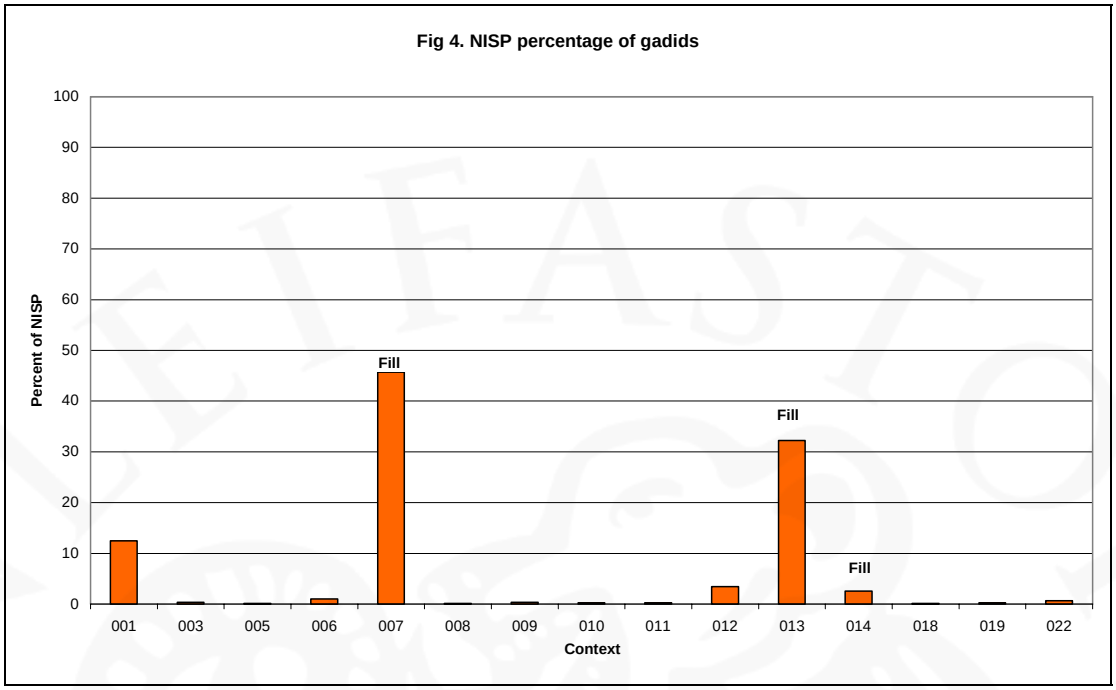
Table 3 demonstrates the low number in bird species identified from the Möðruvellir Midden material. The Mallard (*Anas platyrhynchos*) was collected from context [006] and offers a good amount of the articulated skeleton determined to belong to one individual as listed above. The remaining elements 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 domesticate or wild one, maybe discarded because as inedible.

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

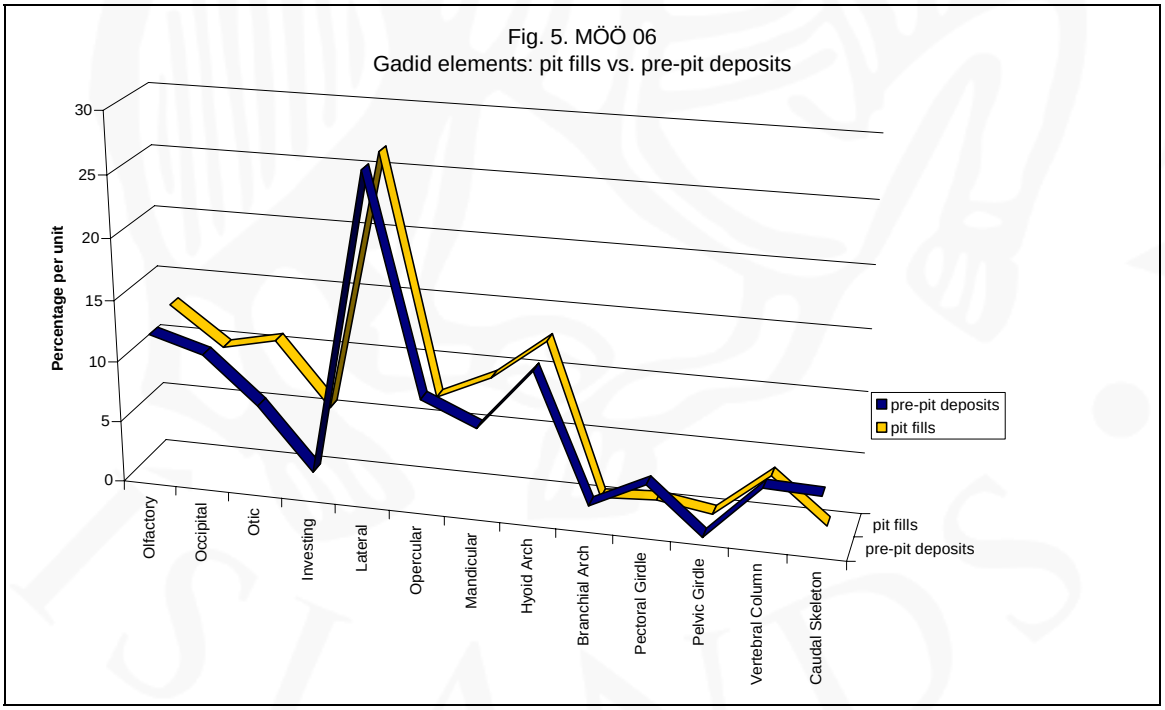
Both Eider duck and Ptarmigan are birds residing in the Eyjafjord area (Hilmarsson, 2000); their presence in the site assemblage is not extraordinary.

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.

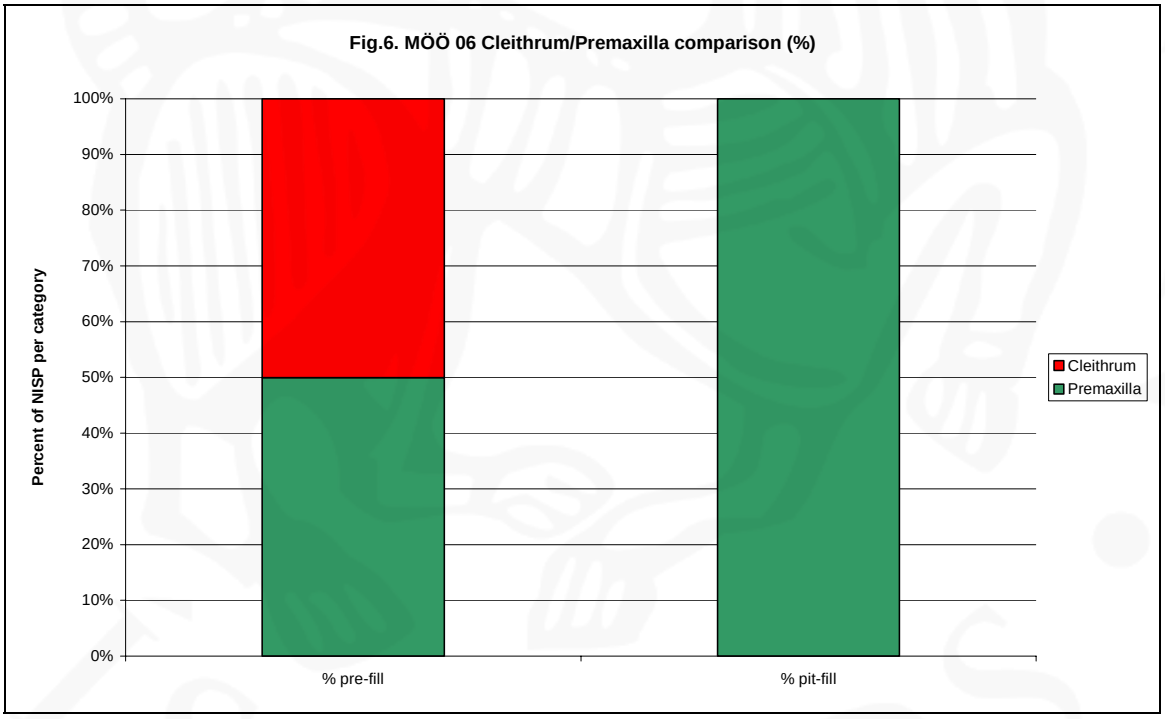


The comparative gadid element distribution graph (fig 5) demonstrates an overall predominance of fish heads present and fish tails absent. The pattern indicates preparation of the fish, potentially in form of stock fish drying methods (Krivogorskaya, 2006). Presented in the graph are the 'pre-pit deposits', 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 resent 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 19th to early 20th 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.

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