Archaeofauna from Skriðuklaustur, East-Iceland

Preliminary report

2002 excavation season

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Executive summary

The archaeofauna was recovered during the first year of the research excavation at the late medieval monastery at Skriðuklaustur East-Iceland directed by Dr. Steinunn Kristjánsdóttir. The collection derives from contexts within the monastery's buildings mostly postdating the Veiðivötn 1477 tephra and was carefully hand collected. The bone preservation at Skriðuklaustur is very good which makes a zooarchaeological analysis very feasible.

The archaeofauna indicates that caprines (sheep and goat) were the most important for the economy of the site but that the monastery had good connections to the sea side as is displayed in the wide variety marine species present. Cattle meat was imported to the site after butchery and the monastery seems to have been given the best cuts of meat.

The importance and status of the monastery is displayed in the consumption of fresh fish, its being provisioned with the best cuts of meat and the presence of small dogs.

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Introduction

This is a report of the faunal analysis of bones recovered in the Skriðuklaustur monastery excavation from the field season of 2002.

Skriðuklaustur was a late medieval monastery active between 1493-1554 (Kristjánsdóttir 2003:4). This was the first full excavation season[1] and a total of four areas (A, B, C & D) 35m^2 in size were uncovered (Kristjánsdóttir 2003:5-6). Turf and stone walls of the monastery were found in areas A, C and D lying on top of the tephra from the Veiðivötn eruption in 1477 but the buildings in area B possibly date to an older construction (Kristjánsdóttir 2003:7). The archaeofauna was carefully hand collected and many small bone fragments are represented.

Due to the relatively low number of bones the collection is treated as a single context for the purposes of this preliminary report. A detailed and context specific look will be more informative when more bones have been analyzed.

[1] Several test pits very dug in the summer of 2000.

Laboratory methods

Analysis of mammal and bird bones was done at the Hunter College Zooarchaeology laboratory by Albína Hulda Pálsdóttir with assistance from Ramona Harrison, George Hambrecht and Dr. Thomas McGovern. Fish bone identifications were done at the Brooklyn College Zooarchaeology laboratory with assistance from Yekaterina Krivogorskaya and Dr. Sophia Perdikaris.
For distinctions between sheep (*Ovis aries*) and goat (*Capra hircus*) bones the standards of Boessneck are followed (Boessneck 1969). Measurements are done according to the metrical standard of Von den Dreisch (Driesch 1976) with digital calibers to the mm.

Basic data was recorded through the NABO Zooarchaeology working group NABONE system (8th edition, see NABO website www.geo.ed.ac.uk/nabo for updates and sample data sets) which combines an Access database with specialized Excel Spreadsheets. A full data archive with coding manual is in the CD R attached to this report, and is also available via nabo@voicenet.com. The NABONE package allows application of multiple measures of abundance, taphonomic indicators, and skeletal element distribution (see Appendix and all text figures) and is the current standard record for Icelandic archaeofauna. Blank NABONE templates are included in the digital archive for the convenience of other workers. NABONE is freeware and should be cited as " North Atlantic Biocultural Organization Zooarchaeology Working Group (2004) *NABONE Zooarchaeological Recording Package 8th edition*, CUNY, NY."

Overview of species present

Table 1 gives an overview of all species present in the Skriðuklaustur 2002 archaeofauna. Table 2 gives a fuller taxonomic breakdown of mammals, Table 3 of birds, Table 4 of fish and Table 5 of mollusks.

The summary tables use the Number of Identified Specimens or NISP, which refers to the number of bones or bone fragment identified to each species.

Table 1: Summary overview of Taxon by Economic Group

Scientific names	*English Common Names*	NISP	% of whole	% of group
DOMESTICATES				
Bos Taurus	Domestic Cattle	80	11,22	14,44
Equus caballus	Domestic Horse	67	9,40	12,09
Felis domesticus	Domestic Cat	Tooth marks		
Canis familiaris	Domestic Dog	8	1,12	1,44
Sus scrofa	Domestic Pig	1	0,14	0,18
Ovis aries	Domestic Sheep	38	5,33	6,86
Capra hircus	Goat	2	0,28	0,36
Ovis/Capra sp.	Caprine	358	50,21	64,62
total Ovis/Capra		398	55,82	71,84
total Domesticates		554	77,70	
SEALS				
Pagophilus groenlandicus	Harp seal	1	0,14	100,00
Phocid sp.	Seal species	20	2,81	
total Phocid		21	2,95	
OTHER MAMMALS				
Rangifer tarandus	Caribou/Reindeer	1	0,14	
Total Other Mammals		1	0,14	
BIRDS				
Wildfowl - sea birds		3	0,42	75,00

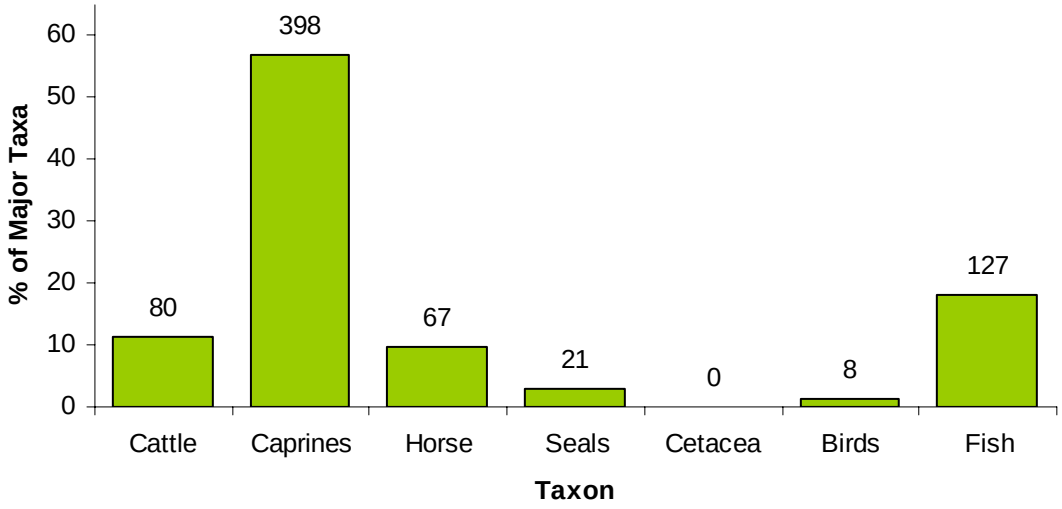
Wildfowl – land birds	1	0,14	25,00
Domestic fowl	0	0,00	0,00
Bird sp.	4	0,56	
Total Birds	8	1,12	
FISH			
Gadid species	84	11,78	97,67
Salmonid species.	0	0,00	0,00
Other Fish	2	0,28	2,33
Fish species indet.	41	5,75	
Total Fish	127	17,81	
MOLLUSCA			
Mollusca species	2	0,28	
Total Mollusca	2	0,28	
TOTAL NISP (Identified fragments) =	713	100,00	
Small Terrestrial Mammal	7		
Medium Terrestrial Mammal	353		
Large Terrestrial Mammal	153		
Unident. Mammal Frags	234		
Unident. Frags	96		
Total number of fragments (TNF)	1.556		

The zooarchaeological (rather than taxonomic) categories of “small terrestrial mammal” (cat-fox sized), “medium terrestrial mammal (pig-sheep-goat-large dog sized) and “large terrestrial mammals (cattle or horse) mainly include vertebral, rib, and long bone shaft fragments that could not be securely identified further, and are probably virtually all from domestic mammals already identified on other elements. The 96 completely unidentifiable fragments likewise probably represent fragments of species already identified. The total bone collection

including these unidentified fragments thus produces a TNF (total number of fragments) of 1.556 specimens.

Note that the term “caprine” refers to sheep and goat collectively. As most elements of these closely related species cannot be reliably distinguished, it is common zooarchaeological practice to combine the totals of bones that can be identified to species level (here 38 sheep and 2 goat bones) with the larger number of bones that can only be identified as one or the other (in this case 398 fragments).

Figure 1: Skriðuklaustur 2002 Relative % of Major Taxa (NISP)[2]



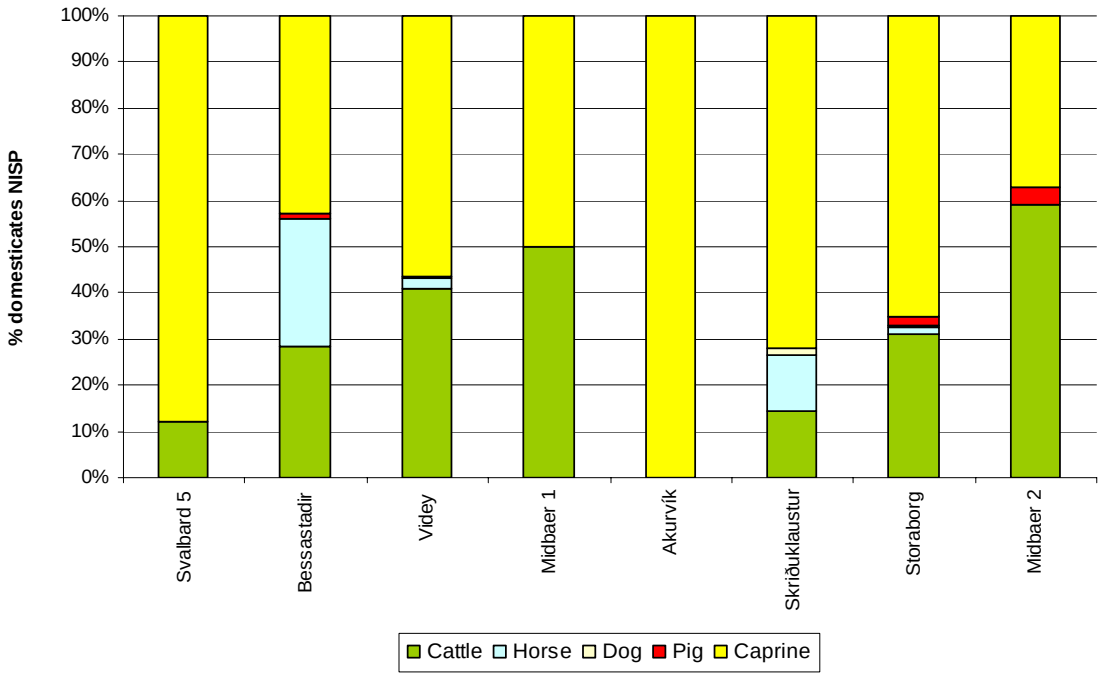
[2] Cetacea referes to whales, but no whale bones have been found in the collection so far.

Mammals

Table 2: Skriðuklaustur 2002 Mammals

Scientific Names	*English Common Names*	*NISP Count*	*% Identified Mammals*
Bos Taurus dom.	Cattle	80	13,89
Equus caballus	Horse	67	11,63
Canis familiaris	Dog	8	1,39
Sus scrofa	Pig	1	0,17
Ovis aries	Sheep	38	6,60
Capra hircus	Goat	2	0,35
Ovis/ Capra sp. Indet.	Caprine	358	62,15
Rangifer tarandus	Caribou/Reindeer	1	0,17
Pagophilus groenlandicus	Harp seal	1	0,17
Phocid sp.	Seal species	20	3,47
	Total	576	

Figure 2: Comparative chart of domestic mammals in Icelandic archaeofauna from the Later Medieval period (14th-15th c) (McGovern 2006).



As Figure 2 displays caprines are the best represented species (NISP) in the Skriðuklaustur 2002 archaeofauna. The horse bone ratio is unusually high when compared to other late medieval archaeofauna with the exception of Bessastaðir

where there are even more horses present. The cattle ratio is relatively low but this might be a sign of regional variation in farming practices with the main focus being on caprines in East-Iceland rather than cattle as seen in archaeofauna from South-Iceland.

Dog – *Canis familiaris*

There are several dog bones present in the Skriðuklaustur collection which is somewhat unusual as they are rarely found in Icelandic archaeofauna. The three dog femurs recovered have a greatest length of 10,8-11,6 cm which gives a reconstructed shoulder height around 30 cm, a small to mid-size dog (Woollet 2005). Bones of small dogs do seem to be a common feature with medieval sites of high status such as the Gásir trading site, Kolkuós the Hólar bishoprics harbor, Hólar and Skriðuklaustur (Hellqvist, Bäckström, Martin, Grandin, Forenius and Hjärthner-Holdar 2003:; Harrison 2005).

Cat – *Felis domesticus*

One bone in the 2002 archaeofauna clearly show signs of cat chewing so cats were present even if none of their bones have been recovered so far.

Pig – *Sus scrofa*

Only one bone of a pig was found in the Skriðuklaustur 2002 archaeofauna, an unfused tibia. This most likely represents imported ham rather than pigs being raised in the area.

Reindeer – *Rangifer tarandus*

The one reindeer element was a piece of worked antler seen in Figure 3. It had been sawn in half by what looks to be a modern saw but this needs to be investigated further and context information checked. Reindeer were introduced to Iceland in the late 18th century and would therefore not have been available at the time of the monastery. The antler fragment might either modern or it could have been imported from Europe.

Figure 3: A piece of sawn reindeer antler

Seals

Seal bones are very hard to speciated due to individual variation. Only one of the seal bones in the collection could be securely speciated, a harp seal (*Pagophilus groenlandicus*) jaw. Harp seal however is not one of the seal species native to Iceland but is a well known visitor in cold winters when it comes to shore with drift ice from Greenland (Nowak 1999:887).

Figure 4: Harp seal jaw

The seal bones recovered come from all parts of the body indicating that whole carcasses were being moved from the shore to Skriðuklaustur. As seal skin was reportedly very popular for use in book covers in medieval Iceland it is possible that there is a connection between the presence of seal bones in the collection and manuscript and book making at the monastery (Pálsdóttir 2004).

Birds

Table 3 breaks down identified bird remains (4 of a total of 8 fragments that were clearly bird), and relative percentages of all bird remains (column 4) and those identified to taxon (column 5).

Table 3: Skriðuklaustur 2002 Bird species present

Scientific Name	*English Common Name*	*NISP*	*% NISP*	*% ID Bird*
Uria aalge	Guillemot	3	37,50	75,00
Lagopus mutus	Ptarmigan (grouse)	1	12,50	25,00
Aves species indeterminate	Unidentified bird	4	50,00	
Total number identified birds		4		
Total all bird		8		

The presence of guillemot which is a sea bird found in the Eastfjords indicates connections to the sea side (Hilmarsson 2000:31). Ptarmigan is common all around Iceland and not an unexpected find at Skriðuklaustur (Hilmarsson 2000:110).

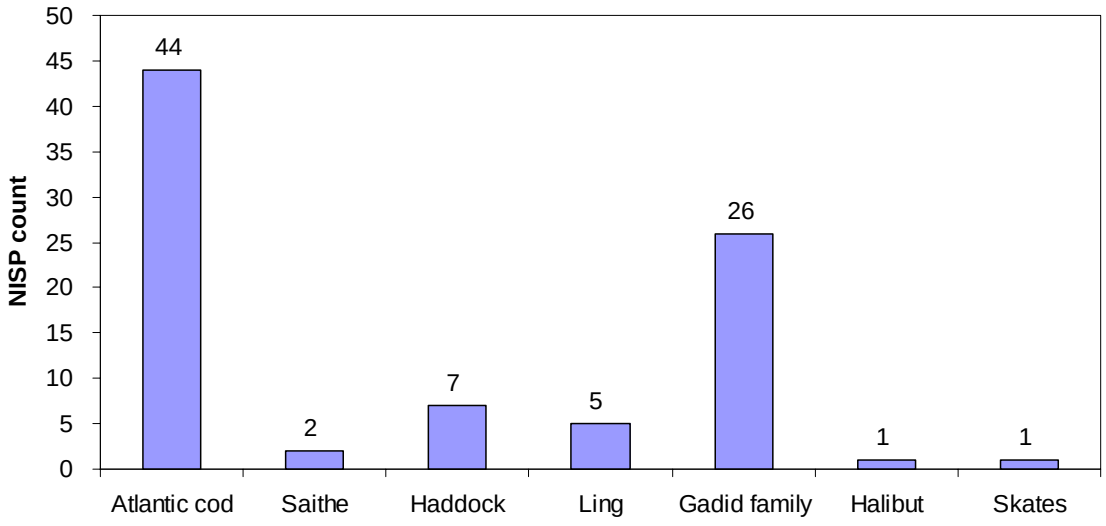
Fish

Fish remains are presented in Table 4 broken down according to family and species.

Table 4: Skriðuklaustur 2002 Fish species present

Scientific Names	*English Common Names*	*NISP Count*	*% all ID Fish*	*% of Family*
Gadidae				
Gadus morhua	Atlantic cod	44	51,16	52,38
Pollachius virens	Saithe	2	2,33	5,00
Melanogramus aeglfinus	Haddock	7	8,14	17,95
Molva molva	Ling	5	5,81	15,15
Gadidae, sp. Indet.	Gadid family	26	30,23	22,81
Other identified fish				
Hippoglossus hippoglossus	Halibut	1	1,16	
Rajidae	Skates	1	1,16	
Total number of identified fish		86		
Unidentified fish				
Fish, sp. & family Indet.	Fish species	41		
Total Fish		**127**		

Figure 5: Skriðuklaustur 2002 Chart of fish species



All the fish bones analyzed so far come from marine species. They are all commonly found in Icelandic archaeofauna.

Mollusks

Table 5 displays mollusks recovered.

Table 5: Skriðuklaustur 2002 Mollusks present

Scientific Name	*English Common Name*	*NISP count*	*% ID Mollusca*
Mollusca sp.	Unidentified mollusk	2	100,00
Total mollusca		2	

A total of two shell fragments were present in the collection both of which were too small and eroded for species identification. Still their presence is interesting given the fact that Skriðuklaustur is located far inland.

Bone preservation & Taphonomy

The bone preservation at Skriðuklaustur is in general very good. Most of the bones are in good condition, there is relatively little exfoliation or erosion. However it would be ideal to take pH measurements in the next field season to understand the soil conditions better and to see if the good conditions are prevalent everywhere in the site.

Fragmentation

Table 6: Skriðuklaustur 2002 fragmentation

Fragment size	*Count*	*% of TNF*
Up to 1 cm	96	6,17
1 - 2 cm	308	19,79
2 - 5 cm	670	43,06
5 - 10 cm	311	19,99
> 10 cm	171	10,99
Total number of fragments (TNF)	1556	

In Table 6 the level of fragmentation of the bones recovered in the 2002 season can be seen. As the collection is hand picked and not sieved the amount of fragments smaller than 2 cm relatively low. The low frequency of burnt bone also contributes to this as burning causes increased fragmentation.

Gnawing

Table 7: Skriðuklaustur 2002 gnawing

Gnawing	*Count*	*% of gnawed*	*% of TNF*
Cat	1	3,45	0,06
Dog	28	96,55	1,80
Total gnawed bones	29		1,86
All other bones	1527		98,14
Total number of fragments (TNF)	1556		

There is one instance of a bone chewed by a cat as seen in Table 1 but there are several bones with dog chewing marks and a number of bones showed signs of having been passed through a dog's digestive tract.

Burning

Table 8: Skriðuklaustur 2002 burning

Burning	*Count*	*% of burnt*	*% of TNF*
Scorched	7	5,34	0,45
Burnt black	5	3,82	0,32
Burnt white	119	90,84	7,65
Total of burnt bones	131		8,42
Unburnt bone	1425		91,58
Total number of fragments (TNF)	1556		

As seen in Table 8 the frequency of burnt bone is very low in the collection or less than 8%. This is much lower than on Viking sites but similar to that found on other medieval Icelandic sites and is most likely due to a change in cooking practices when the long fire fell out of use.

Butchery

The butchery pattern of the Skriðuklaustur collection is of interest.

Table 9: Skriðuklaustur 2002 butchery

Butchery	*Count*	*% of butchery*	*% of TNF*
Bi-perforated	9	10,71	0,58
Chopped	36	42,86	2,31
Chopped/impact fracture	4	4,76	0,26
Chopped/knife marks	4	4,76	0,26
Impact fracture	1	1,19	0,06
Knifed	13	15,48	0,84
Mono-perforated	6	7,14	0,39
Mono-perforated/knifed	1	1,19	0,06
Perforated	2	2,38	0,13
Polished	1	1,19	0,06
Split down saggital plane	2	2,38	0,13

Svið preparation	1	1,19	0,06
Sawn	3	3,57	0,19
Other working	1	1,19	0,06
Total number of bones with butchery marks	84		5,40
Bones w/no butchery marks	1472		94,60
TNF	1556		

The traditional method of marrow extraction from caprine metapodials in Icelandic collections is bi-perforation. A small whole is made on the proximal articular end of the bone and another whole before the distal end. This method becomes common around the beginning of the 13th century and is found in most medieval Icelandic archaeofauna. However, in addition to bi-perforation there are several examples of mono-perforated metapodials in the Skriðuklaustur collection, which are only perforated at the proximal end as seen in Figure 6. This butchery pattern has not been seen in other bone collections analyzed at the CUNY labs so far.**Figure 6: The first five metapodials from left to right are bi-perforated the remaining four are mono-perforated**

Table 10 breaks down the relative frequency of perforation for marrow extraction in the caprine metapodials in the Skriðuklaustur 2002 collection.

Table 10: Perforation in caprine metapodials

Butchery	*Count*	*% of butch mtp*	*% of all mtp*
Bi-perforated	9	50	13
Mono-perforated	7	39	10
Perforated	2	11	3
All other	54		75
Total number of Caprine metapodials	72		

One of the complete horse skulls in the Skriðuklaustur 2002 collection has an impact fracture on the frontal area which is probably a result of the horse being butchered Figure 7.

Figure 7: Horse skull with impact fracture

Element distribution

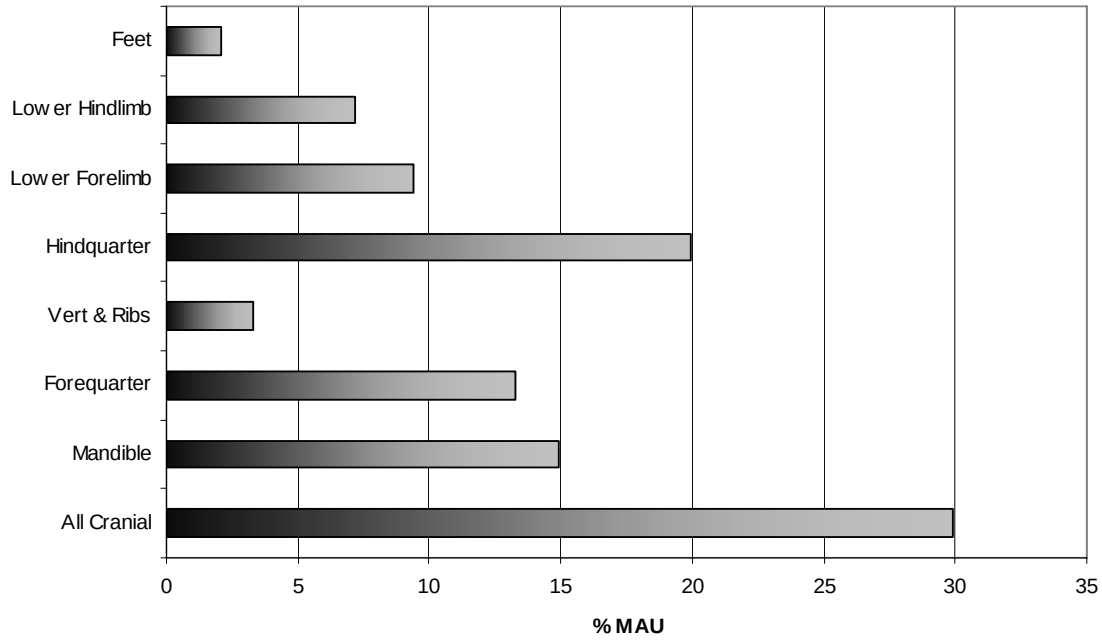
MAU percentages are used for element distribution graphs. The MAU is calculated by dividing the Number of Identified Specimens (NISP) recovered for each species with the frequency of each element in a complete skeleton (Reitz and Wing 1999:216).

Mammal Element Frequency

Cattle

The element distribution for cattle as seen in Figure 8 indicates that cattle was not butchered at the site but that the monastery was provisioned with certain elements. The relatively high ratio of hindquarter elements and low number of feet elements points to the monastery getting the meatiest parts of the cattle from an outside source. This can be attributed to the monastery being a high status site.

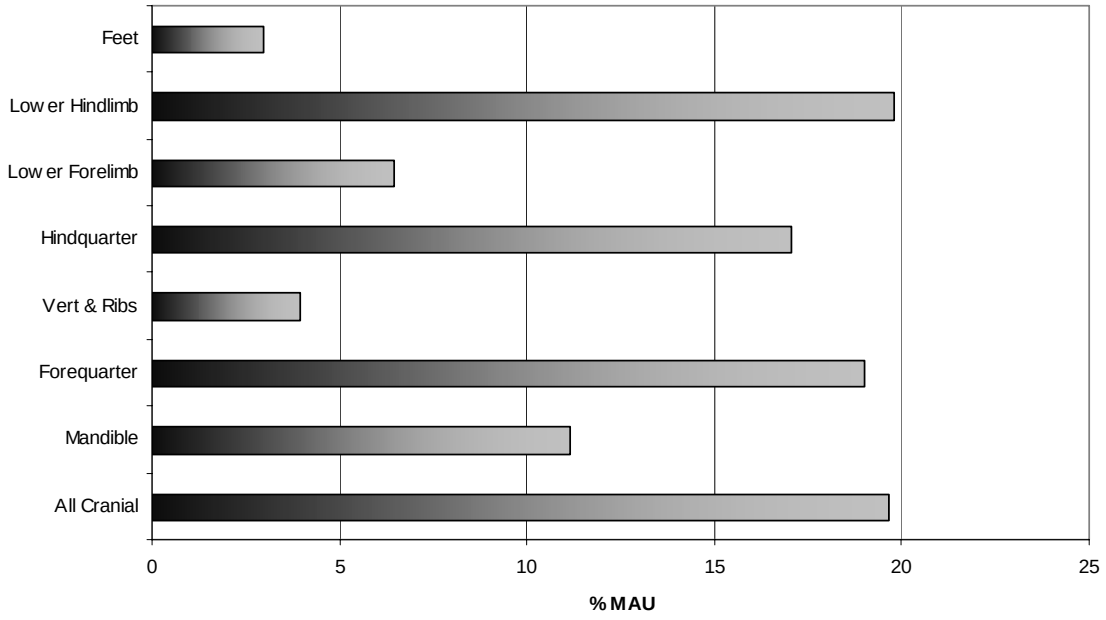
Figure 8: Cattle Bone Element Distribution



Caprines

The caprine element distribution indicates on-site butchery as most body elements are equally represented as Figure 9 shows.

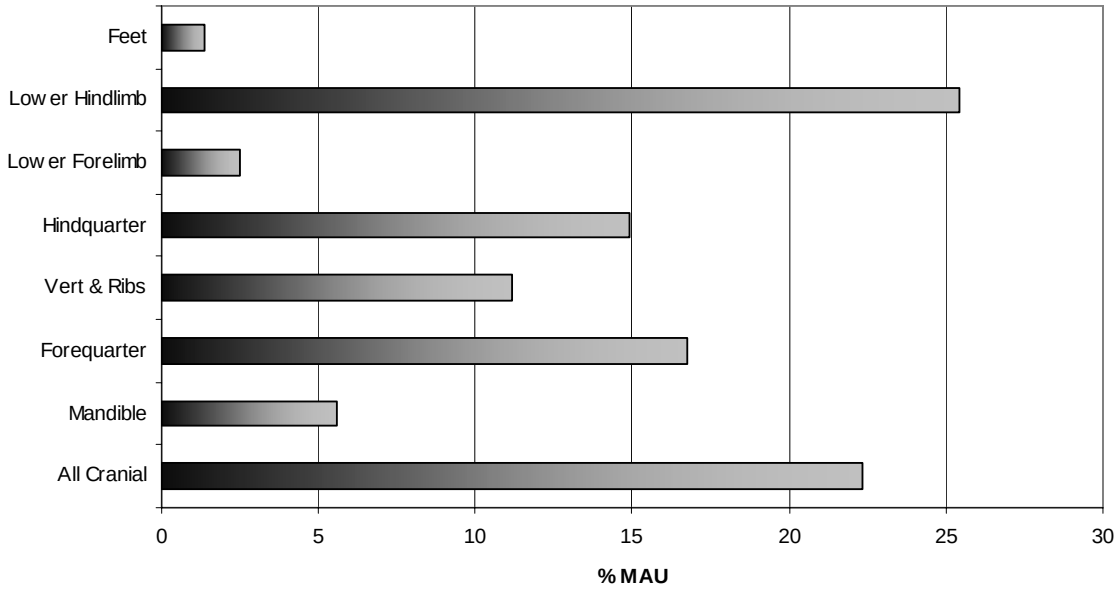
Figure 9: Caprine Bone Element Distribution



Horse

The frequency of horse bone in the collection is unusually high. Three complete or nearly complete horse skulls were found, one adult female, one adult male with an impact fracture on the frontal region (Figure 7) and one unfused skull of a young horse.

Figure 10: Horse Bone Element Distribution

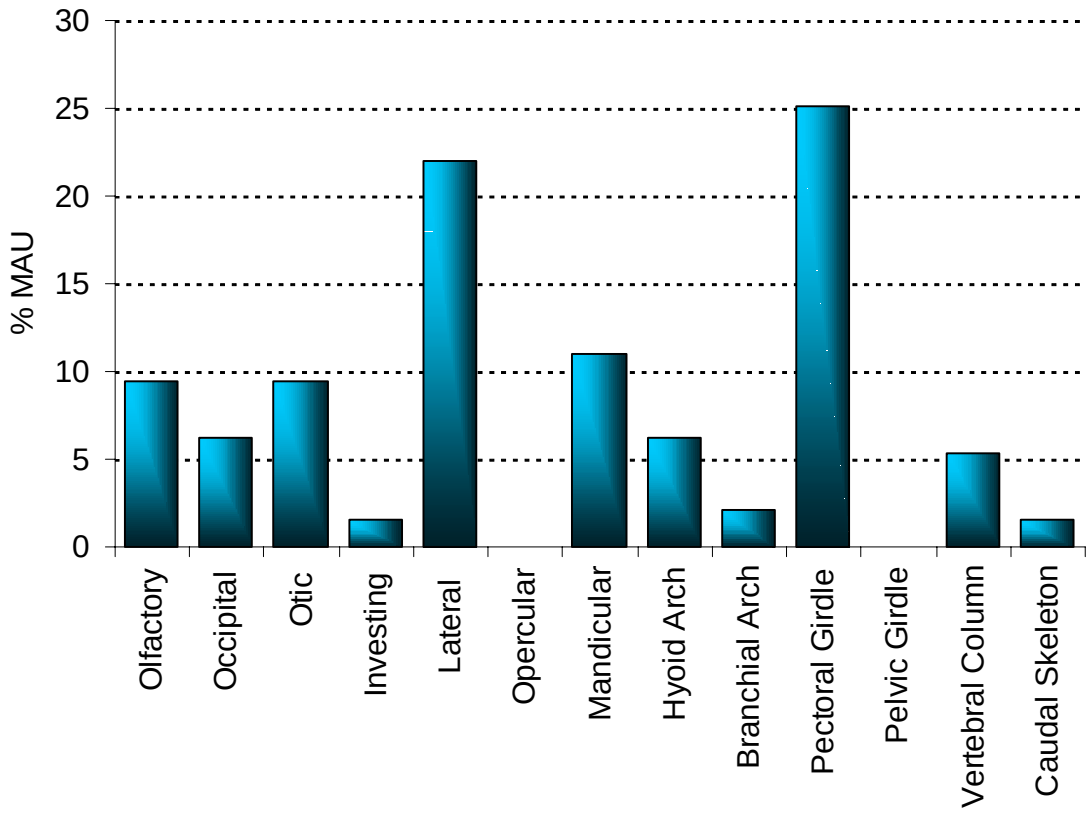


It is likely that the site of the monastery was used to bury horse carcasses after it was in ruins but context information has not yet been checked for this. Except for the skull with the impact fracture and one innominate/acetabulum that had been chopped, most likely long after the animal's death, none of the 67 horse bones had any butchery marks and therefore it is unlikely that they were being slaughtered for meat.

Fish Element Frequency

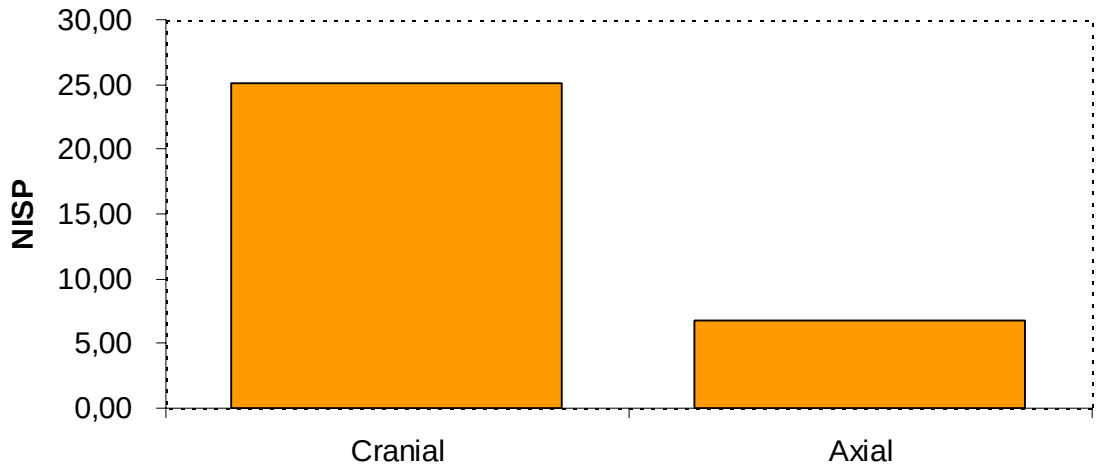
All the gadid bones recovered (cod, haddock, ling and saithe) have been added together for the element distribution due to the small sample size (N= 81). When more fish bones have been analyzed separate element distribution charts will be made for each species.

Figure 11: Gadid element distribution



The mere presence of cranial elements seen in Figure 11 is very different from that seen at other inland sites such the farms around Mývatn where there are hardly any cranial elements present as all the marine fish came to the area after having being processed as dried fish.

Figure 12: NISP of cranial and axial elements for gadids



The ratio of cranial and axial elements shown in Figure 12 is somewhat puzzling. One would expect a higher ratio of axial elements which is an indicator of dried fish at an inland site like Skriðuklaustur. However here there are more bones present from fish heads than bodies in the collection. Perhaps the presence of cranial elements indicates the consumption of fresh fish at the monastery, but fresh fish would be a high status product in a medieval inland site like Skriðuklaustur.

At this time it seems likely that this is bias due to the small sample size but this should become clearer when more bones have been analyzed. Therefore no firm conclusions can be drawn from the gadid element distribution at this time other than that whole fish were imported to the site.

Aging

The age group neonatal is used to describe unfused and roughly textured bones from animals younger than 3-4 months while fetal refers to animals 1-2 weeks or younger (NABO 2004:9).

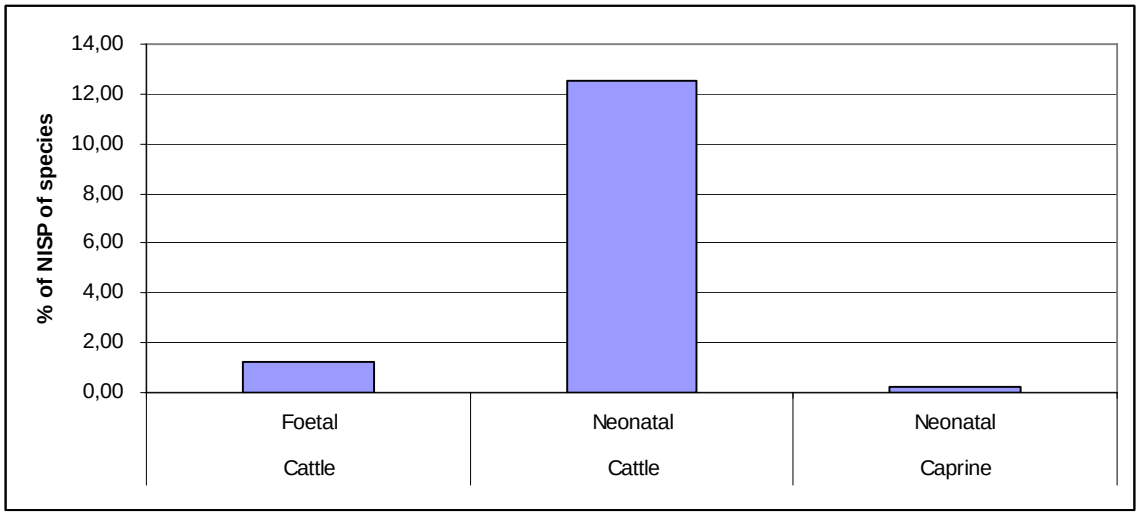
The presence of neonatal cattle bones can indicate the presence of a dairy farm and local farming. As shown in Table 11 the number of neonatal and fetal bones in the Skriðuklaustur 2002 collection is very low which does suggest that farming did not take place directly on the site of the monastery.

Table 11: Age distribution of cattle and caprine bones

Species	*Age group*	*Count*
Cattle		69
Cattle	Fetal	1
Cattle	Neonatal	10
Total cattle		80
Caprine		397
Caprine	Neonatal	1
Total cattle		398

Figure 13 below shows the ratio of neonatal and fetal bones for cattle and caprines. The lower ratio of neonatal caprine bones is to be expected.

Figure 13: Ratio of fetal and neonatal bones for cattle and caprines



Conclusion

The Skriðuklaustur 2002 bone collection is in many ways unique and interesting. The many different marine species present at the site indicate that the monastery had a very wide catchment area and good connections with the sea side.

A new butchery technique is observed in the Skriðuklaustur collection, mono-perforation of caprine metapodials rather than just the usual bi-perforation.

The Skriðuklaustur monastery was not an ordinary farm but a high status site and this can be seen in the archaeofauna in several different aspects. The element distribution of cattle indicates outside provisioning and that the monastery took the meatiest parts of the animal. The presence of cranial elements of fish demonstrates that fresh fish was consumed at the monastery rather than merely dried fish as is usually found on inland sites. This pattern is undoubtedly connected to the importance of religious fasting at the monastery.

The small dog bones found in the archaeofauna indicate that similar to other medieval high status sites in Iceland the Skriðuklaustur monastery displayed its importance wealth and status with pet dogs as well as in other material aspects.

Acknowledgements

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