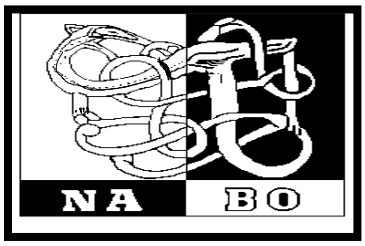

Preliminary Report of the Archaeofauna at Skálholt, Iceland

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Abstract
This report presents results of a preliminary analysis of the archaeofauna at the Episcopal farm of Skálholt, Arnessyslá, south Iceland. To date this archaeofauna is dominated by one context, unit 454. This report will present the preliminary analysis of this context as well as others analyzed in the past year. Unit 454 was part of Midden Test D (Group 383), and was excavated by Dr. Jim Woollett, Matthew Brown, and Kate Krivogorskaya during June and July of 2003. Further excavation of this context was conducted by George Hambrecht during June of 2004. Details of excavation and recovery methodologies employed, as well as descriptions and discussions regarding the complete stratigraphy of Midden Test D and other midden test pits undertaken at Skálholt in 2003 can be found in reports of field work by Woollett (2003) and Lucas (2004). This work was conducted as a midden sampling program, in conjunction with the FSI excavations of the 18th century phase of Skálholt. A total of 19,519 bone fragments were recovered from Context 454, representing roughly one third of the total number of bone fragments recovered from the entire site from 2003 to 2005. The remaining two thirds of the 2003 - 2005 assemblages are derived from a great number of contexts in the house and various midden tests, many of which contributed single bag bone samples. An analysis of faunal remains from these other contexts is on-going and the results for some of the completed contexts are presented in this report. Other completed contexts will be reported when their phasing is resolved, though they have been included in the overview of species present table (table 1). Total number of bone fragments analyzed from the Skálholt archaeofauna to date, presented in this report, is 34,623. All sediments were dry sieved through 4mm mesh to standardize recovery of bones following usual NABO recommendations.

Laboratory Methods
Analysis of the Skalholt collection was carried out at the Brooklyn College and Hunter College Zooarchaeology Laboratories and made use of extensive comparative skeletal collections at both laboratories and the holdings of the American Museum of Natural History. All fragments were identified as far as taxonomically possible (selected element approach not employed) but most mammal ribs, long bone shaft fragments, and vertebral fragments were assigned to "Large Terrestrial Mammal" (cattle-horse sized), "Medium terrestrial mammal" (sheep-goat-pig-large dog sized), and "small terrestrial mammal" (small dog-fox sized) categories. Only elements positively identifiable as *Ovis aries* were assigned to the "sheep" category, with all other sheep/goat elements being assigned to a general "*caprine*" category potentially including both sheep and goats. Following NABO Zooarchaeology Working Group recommendations and the established traditions of N Atlantic zooarchaeology we have made a simple identified fragment count (NISP) the basis for most quantitative presentation. Measurements (Mitoyo digimatic digital caliper) of fish bones follow Wheeler & Jones (1989), mammal metrics follow Von Den Dreisch (1976) and mammal

tooth eruption and wear recording follows Grant (1982). General presentation of domestic mammal age reconstruction follows Enghoff (2003). Digital records of all data collected were made following the 8th edition NABONE recording package (Microsoft Access database supplemented with specialized Excel spreadsheets, see discussion and downloadable version at www.geo.ed.ac.uk/nabo) and all digital records (including archival element by element bone records) and the bone samples are permanently curated at the National Museum of Iceland. CD R versions of this report and all archived data are also available on request from nabo@voicenet.com.

Butchery marks are numerous and variable on this assemblage. A large amount of measurements were also recorded. These aspects of the assemblage will not be addressed in this preliminary report, but will be addressed in later reports drawing on a larger portion of the whole archaeofauna.

Overview of Species Present

Scientific Names	*English Common Names*	*NISP Count*											
Site Unit		**454**	**1196**	**1090**	**1096**	**1217**	**1144**	**1034**	**1250**	**176**	**178**	**238**	**453**
Bos taurus dom.	cattle	887	22	56		25	23	7	9	8	10	16	2
Equus caballus	horse	3											
Canis familiaris	dog												
Sus scrofa	pig												
Ovis aries	sheep	27	28	22		18	5	6		9	1	5	
Capra Hircus	goat	1				2							
Ovis/ Capra sp. Indet.	caprine	118	113	115	23	46	18	10	15	40	31	21	
	Total domesticates	1036	163	193	23	91	46	23	24	57	42	42	2
Cetacea sp.	whale species	2											
Phocoena phocoena	harbor porpoise										1		
	fox species	2											
Anas platyrhynchos	Mallard Duck										4		
Larus canus	Common gull												
Fish sp to be determined		2203		40		145	60	11				1	
NISP total		3243	163	233	23	236	106	34	24	57	47	43	2
Large Terrestrial Mammal		894	55	215	15	84	65	8		13	9	8	9
Medium Terrestrial Mammal		94	208	182	21	96	66	21	16	24	46	30	1
Small Terrestrial Mammal		1											
Unidentified mammal fragment		15294	1714	901	901	772	437	422	246	1157	80		217
TNF total		19526	2140	1531	960	1188	674	485	286	1251	182	81	229

Scientific Names	*English Common Names*												
Site Unit		**458**	**459**	**467**	**471**	**566**	**611**	**633**	**750**	**860**	**954**	**967**	**992**
Bos taurus dom.	cattle	8	10	1		9	2	6	83	6	4	10	4
Equus caballus	horse												
Canis familiaris	dog								1				
Sus scrofa	pig												
Ovis aries	sheep				1	3		3			8		6
Capra Hircus	goat												
Ovis/ Capra sp. Indet.	caprine	7	2	1	2	10	4	70	13	13	28	16	30
	Total domesticates	15	12	2	3	22	6	79	97	19	40	26	40
Cetacea sp.	whale species												
Phocoena phocoena	harbor porpoise												
	fox species												
Anas platyrhynchos	Mallard Duck												
Larus canus	Common gull	1											
Fish sp to be determined		210	2										
NISP total		226	14	2	3	20	6	79	97	19	40	26	40
Large Terrestrial Mammal		20	25		2	20	1	14	8	3	14	7	4
Medium Terrestrial Mammal		10	11	4	1	13	1	6	1	3	89	15	25
Small Terrestrial Mammal											1		
Unidentified mammal fragment		1616	526	11	50	1427	1	278	115	188	267	611	130
TNF total		1872	576	17	56	1480	9	377	221	213	411	659	199

Table 1

All contexts contain common Icelandic domestic animals, especially sheep and cow. One notable aspect of all these contexts is the lack of fish bones found to date. Even with taphonomic issues considered this is an unusual situation in that fish, both fresh and dried, were a basic element of the Icelandic diet during the eighteenth century. Stockfish is mentioned within the written sources as being on the menu for the students of the school at Skálholt, so presumably fish was being consumed at the site. Most of the contexts recovered so far do seem to include domestic waste, so one would assume that a significant amount of fish bone would appear. The lack of fish needs to be investigated and will be in future reports.

The cetacea present in units 454 and 178 are both artifacts. The large cetacean elements in unit 454 are pieces of butcher block made out of a whale's vertebra, while the porpoise element in unit 178 is a part of a knife handle.

Unit 454

Unit 454 was recovered in 2003 by James Woolett and 2004 by George Hambrecht. This unit has proven to be exceptional in a few ways.

Domestic Mammals	**Count**
Cattle (Bos taurus)	887
Horse (Equus caballus)	3
Dog (Canis familiaris)	present
Sheep (Ovis aries)	27
Caprine (Sheep and Goat)	118
Total Caprines	145
total Domesticates	1035
Cetacea	2
Arctic Fox (Alopex lagopus)	2
Fish sp to be determined	2203
NISP total	3242
Large Terrestrial Mammal	888
Medium Terrestrial Mammal	94
Small Terrestrial Mammal	1
Unidentified mammal fragment	15,294
TNF total	19,519

Table 2

This assemblage does not fit the typical dairy survivorship profiles associated with North Atlantic farm economies. The majority of these cattle were slaughtered at their peak age for meat return, sometime before the second half of their third year of life. This assemblage seems to represent a high cost, and high value beef-cattle strategy rather than the more usual dairy pattern of peaks in mortality in very young and very old animals. This assemblage could also be the product of the culling of unproductive milk cows for meat. Yet the almost total absence of neonatal cow bones, as well as the few indicators of the presence of very old cows suggests that the meat strategy is a more likely explanation. A meat based strategy calls for large amounts of pasture land and winter fodder. It is a strategy that invests these assets towards a one-time meat return, as opposed to long-term dairy production. In the Icelandic context in any period such a strategy would be exceptional (McGovern, et al 2001). Archaeofauna from the 9th-11th c

contexts from Sveigakot and Hofstaðir in Mývatnssveit, and the 18th century from Finnbogastaðir in NW Iceland will be used for the purposes of comparison.

The cattle represented in this context seem to have been of a breed foreign to Iceland that must have been introduced from continental Europe. All the crania recovered from this context are polled. In all but two of these cases the cattle were naturally polled. In the other two cases the cattle were artificially polled. Cattle in Iceland from the Settlement Period through the Early Modern Period were of horned varieties. Naturally polled cattle were a rare genetic mutation that appear very infrequently in the archaeological record. The appearance of this different breed suggests that these cattle might have been part of an effort towards agricultural improvement on the part of the Bishops of Skalholt. The appearance of the artificially polled cattle suggests how the urge towards improvement went beyond pure economics and entered the realm of fashion and identity.

Context

Context 454 is a midden deposit broadly dated to the first half of the eighteenth century, at which time Skálholt was a large, proto-urban settlement and the diocesan headquarters for southern Iceland. The midden containing context 454 was, according to contemporary maps close to, and possibly associated with, a butcher's work shed. Butchery related artifacts such as a piece of whale bone butcher block and a possible whale bone knife handle were found in context 454. It is also located alongside the edge of a roadway that ran through a complex of outbuildings south of the Bishop's residence. The midden was formed through a series of dumps of refuse, ash and fill over the edge of the road. Context 454 was the only context in this midden associated with quantities of well-preserved, whole animal bones. It is an extremely dense midden deposit, with very little sediment present between the closely-packed and entangled bone fragments.

Because the edges of adjacent, thin peat ash deposits interdigitate with it, context 454 seems to represent an accretion of multiple dumps occurring over a fairly short time period.

Horses are represented by a whole metatarsus, which may represent raw material for craft work rather than meat waste, though there is also a molar and a fragment of a horse scapula. Dogs are represented by tooth marks on bones, and were certainly present on site despite the absence of their remains from this context. The tooth marks could also have been made by Arctic Fox which is present in the context. Birds are not present in the current sample. Species and element identifications for the fish elements are currently underway and will be presented in a later report.

SU 454 Taphonomy

A widely used meat utility measure (Binford 1976) attempts to evaluate the overall "modified general utility index (MGUI)", which provides a numerical score

for each bone element (including marrow and sinew values as well as attached muscle meat). While MGUI scores are not precise indicators of amount of associated meat and marrow, they can highlight major differences in the content of bone assemblages. Bone density can indicate the survivability of an assemblage through time. It can give an indication as to its representative utility, whether the bones being examined have survived well since burial or have been ravaged and are not a good representation of the original dump. Note that the 1st quartile is almost always going to be disproportionately larger due to the fact that cranial elements (which are within the 1st quartile) have a tendency to fracture and thus boost their proportion within the total assemblage.

The cattle bones of Unit 454 show good representation across density and MGUI quartiles (figure 1). These bones then have survived well from deposition to excavation.

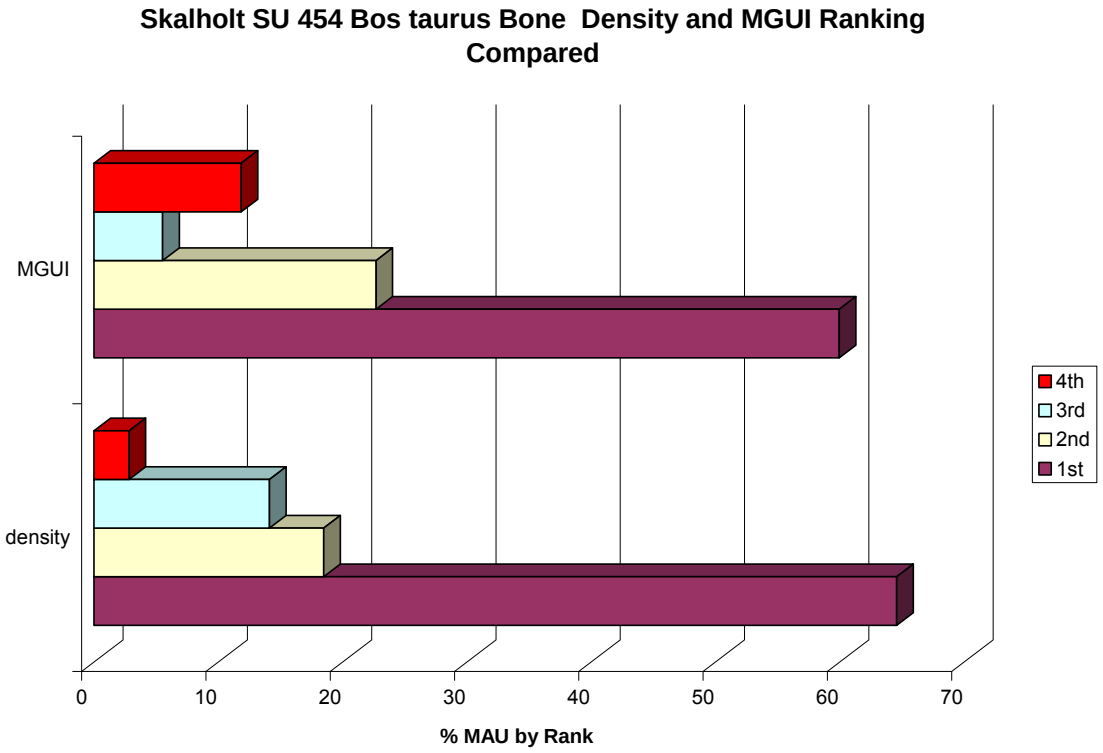

Figure 1

Caprine bones from unit 454 are less well spread out. The denser bones predominate (figure 2). Yet these figures are still not those of a ravaged collection and do indicate that the caprine bones are a fair representation of the original dump.

Both of these charts show that unit 454 is a good representation of the original dump that it came from. These bones are a good representation of the activities that resulted in them.

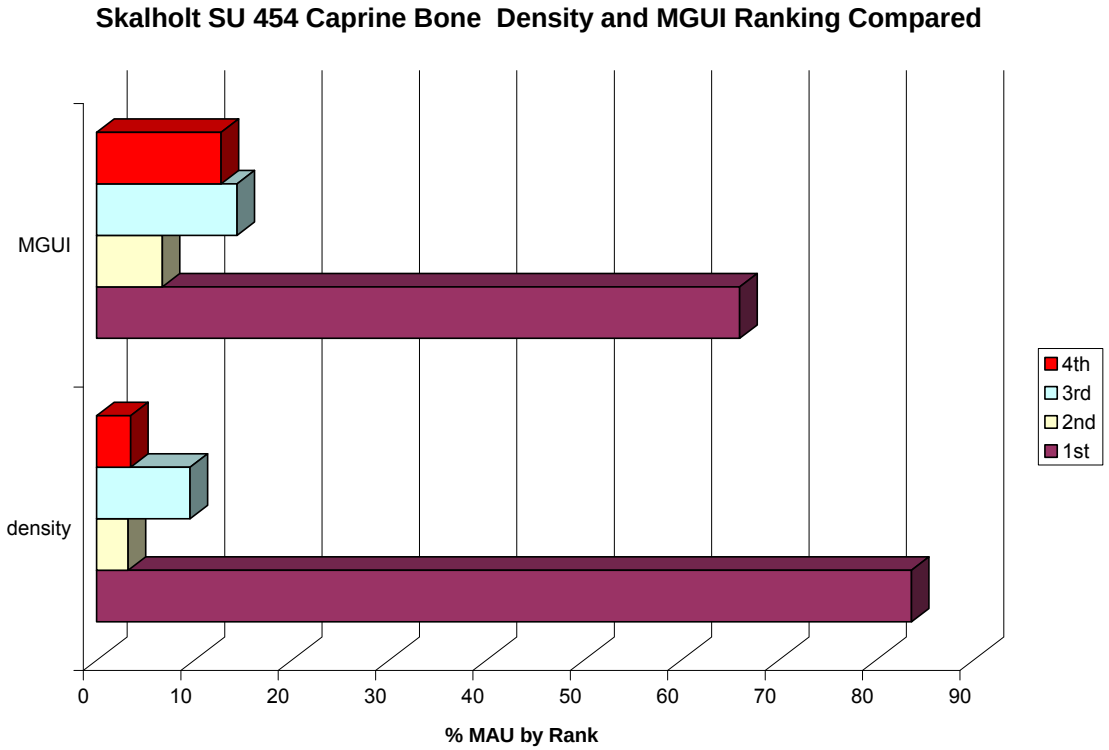

Figure 2

454 Domestic Mammals

Table 2 presents the count of fragments (NISP) and relative % of the domestic mammals. Cattle dominate the domestic mammal assemblage; no other currently known archaeofauna from Iceland has such a high percentage of cattle bone. Caprines together make up less than 15% of the deposit.

Table 2 Domestic Mammals	*% NISP*
Cattle (Bos taurus)	85.00
Horse (Equus caballus)	0.30
Dog (Canis familiaris)	
Sheep (Ovis aries)	4.00
Caprine (Sheep and Goat)	11.00
Total Caprines	15.00

Table 3

Of the unidentifiable mammal bones, LTM (large terrestrial mammals) make up a similar majority in proportion to MTM (medium terrestrial mammals) and STM (small terrestrial mammal) as cattle to caprines in the NISP. Considering that equids are represented by only three elements, and that the proportions between bos versus other mammals and LTM versus MTM (medium terrestrial mammal and STM (small terrestrial mammal) are similar it might not be too risky to associate LTM with cattle.

Finding cattle at a high status site such as Skálholt is not out of the ordinary, but to find an assemblage so totally dominated by cattle is. In comparison, archaeofaunal assemblages from the medieval farm sites of Sveigakot and Hofstaðir in the north of Iceland exhibit far higher numbers of caprines, with cattle routinely representing between 15-20% of the archaeofaunal assemblages in the early period after landnam, and then falling to 10-15% later in the early medieval period (McGovern et al 2001, Perdikaris et al 2004). The archaeofaunal assemblage from a lower ranking 18th century site in NW Iceland, Finnbogastaðir, has cattle making up roughly 10% of its assemblage (Edvardsson et al, 2004).

Element Distribution Bos taurus

The chart below (Figure 1) does not show skull fragments, because their high numbers and the possibility of multiple representations of the same individual tend to skew the element distribution chart (total number of cow skull elements is 182). Vertebral elements, excepting the axis and the atlas, are left out as they are not species identified, but LTM vertebral elements are present in significant numbers.

The element distribution for the cattle strongly suggests that these cattle were slaughtered onsite (Figure 3). Elements from across the whole cow are present. If the beef represented by this archaeofauna was being imported in from surrounding farms or regions, our element distribution would most likely contain a majority of heavy meat bearing bones, such as the femur and humerus. The long bones with heavier meat loads, such as the femur and humerus represent 29% of the identifiable cow bones, minus the skull fragments. Yet the rest of the assemblage does contain very low meat bearing elements such as phalanges and metapodials, whose presence does imply that many of these cows were slaughtered onsite.

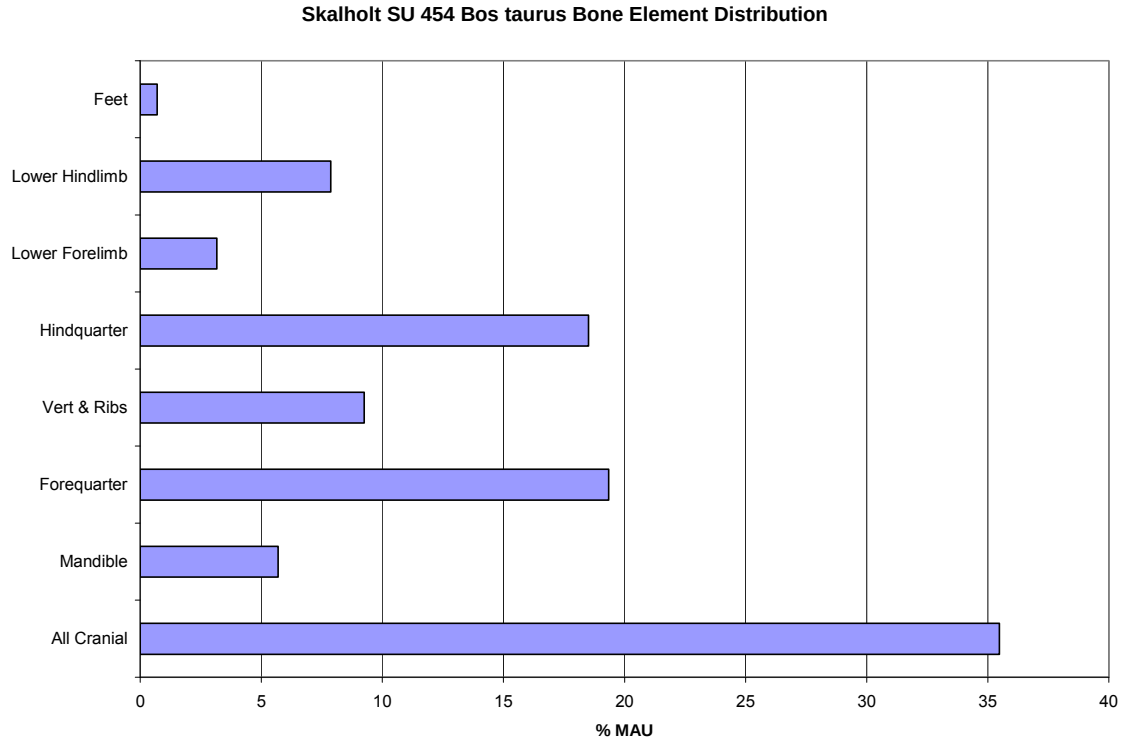

Figure 3

Mortality/Age Structure of Cattle

A number of approaches have been applied to archaeofaunal assemblages to determine the age at which animals were killed in an effort to reconstruct herding strategy (Payne 1974). The presence of newborn (neonatal) bones, tooth eruption and wear, and fusion state of long bones are all usually combined in an attempt to reconstruct the mortality profile (Enghoff 2003).

The cattle in the context 454 collection are almost all adults or older juveniles (table 3). Neonatal bones are barely represented in this assemblage but normally make up 20-40% of most Icelandic farm collections from all periods.

Table 3 – Adult/Juvenile and Neonatal Cow bones

Cattle Bones	# of bones	%
Adult & juv	887.00	99.66
Neonatal	3.00	0.34

Table 4

Tooth eruption patterns observed on both maxillary and mandibular cattle tooth rows, Figure 1, indicate that the majority came from young adult animals.

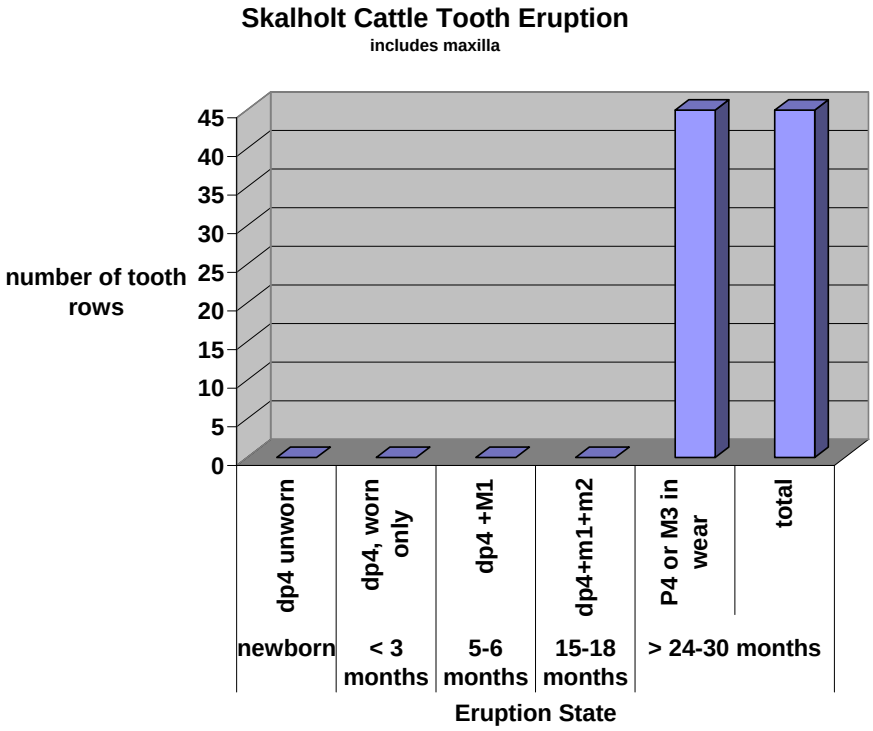

Figure 4

Figure 5 presents the wear state of the cattle maxillary third molar, erupting when the animal has become fully adult. The majority of these erupted third molars (M3) show very light to medium wear, suggesting that the majority of these animals were young adults rather than very old dairy cattle reaching the end of their useful lifespan.

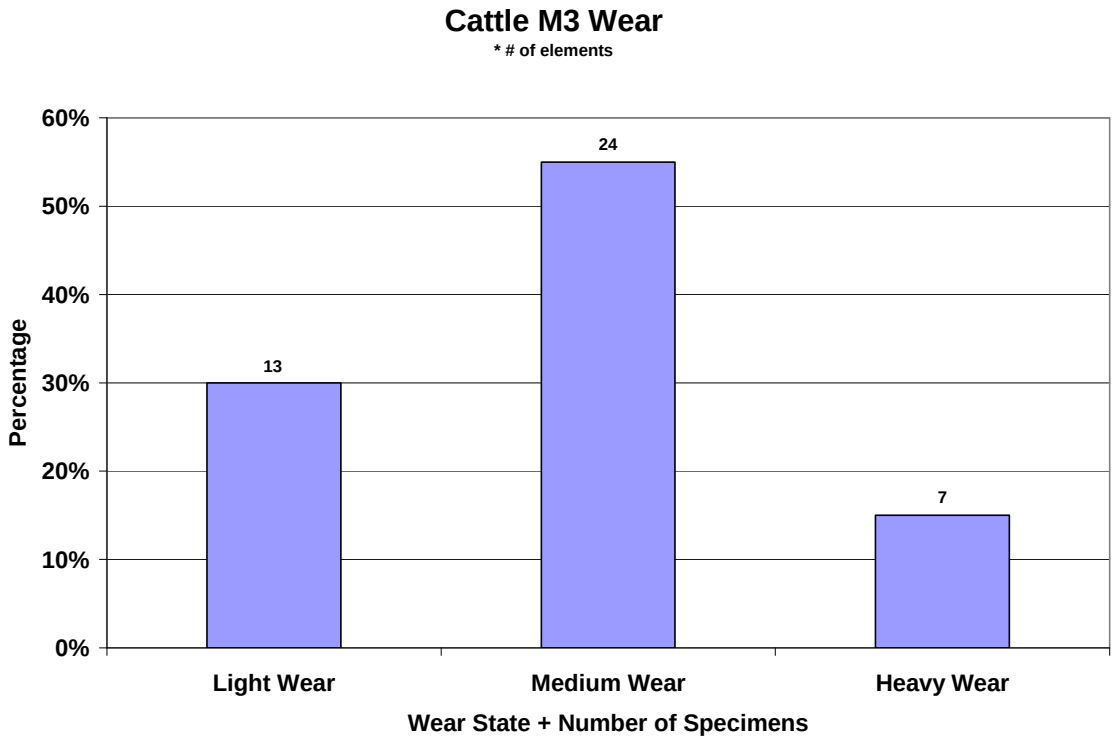

figure 5

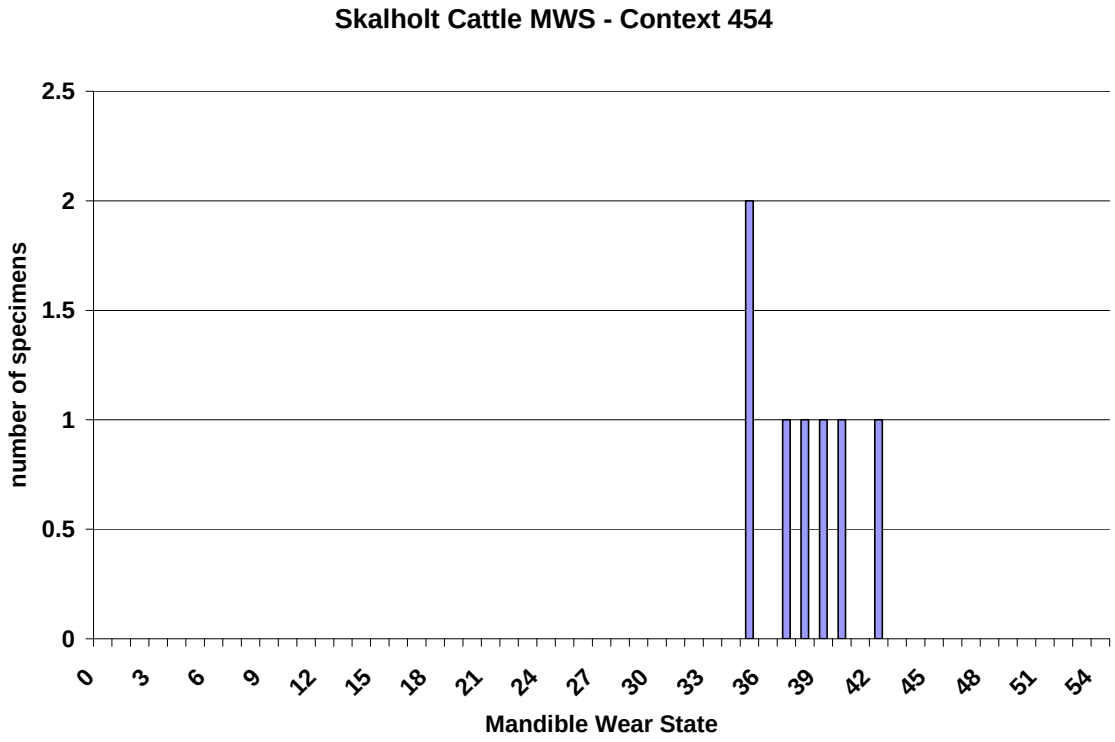

Figure 6

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Figure 6 presents the mandibular wear state for the available cattle jaws, making use of the Grant (1982) method, age estimates relative to tooth eruption and wear from Grigson (1982).

Light and medium wear account for roughly 84% of the sample of maxillary tooth rows (out of 44 samples). This strongly suggests that these cattle were slaughtered when they were three years old or older (Grigson, 1982). The significantly smaller number of M3 showing heavy wear suggests that there were few older animals, meaning older than 4-5 years, represented in this dump. The mandibles tell a similar story, suggesting that the majority of the cattle represented by unit 454 lived until sometime after their third year. Yet due to the much larger sample size of maxillary tooth rows, the M3 maxillary tooth wear data should be emphasized over the mandibular tooth wear data, with its much smaller sample size (7 mandibular tooth rows). Also, dental wear is a relative indicator of age. Different levels of erosion and pasture fertility can, for example, either inhibit or increase the levels of tooth wear in a cow. In order to lessen the "noise" from such possible variables the fusion state of selected long bones must be examined as well.

The fusion states of the cattle long bones reinforce the idea that these cattle lived beyond their third year, but not much longer than their fourth year (figure 7).

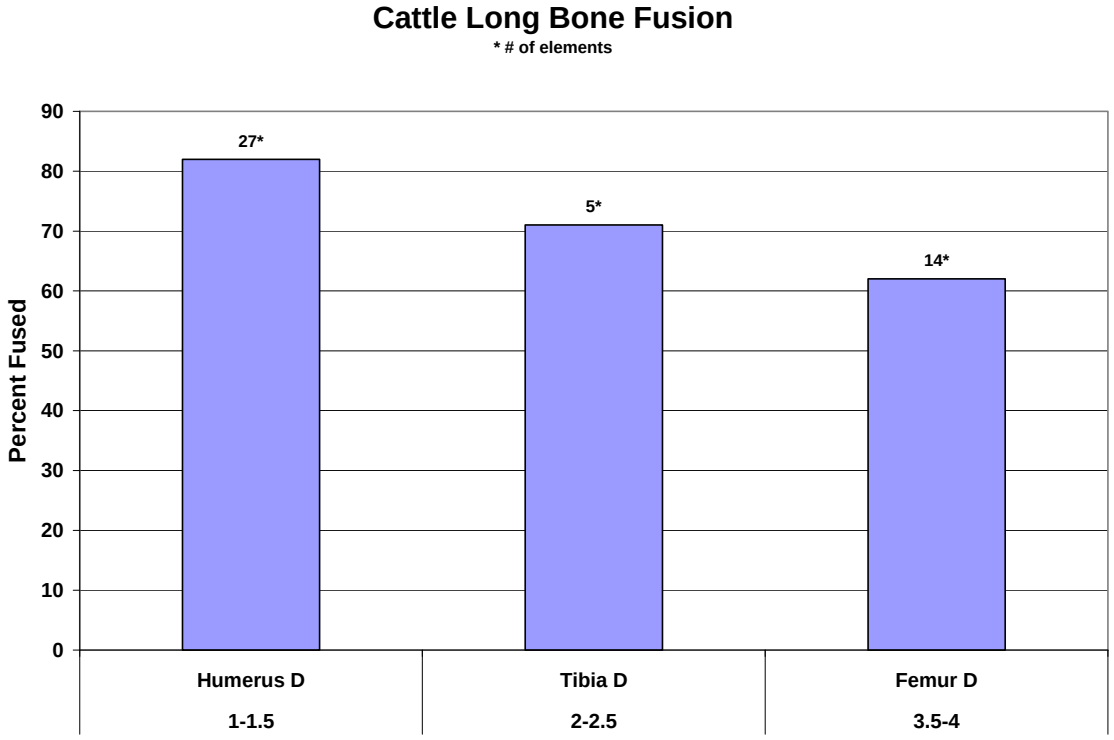
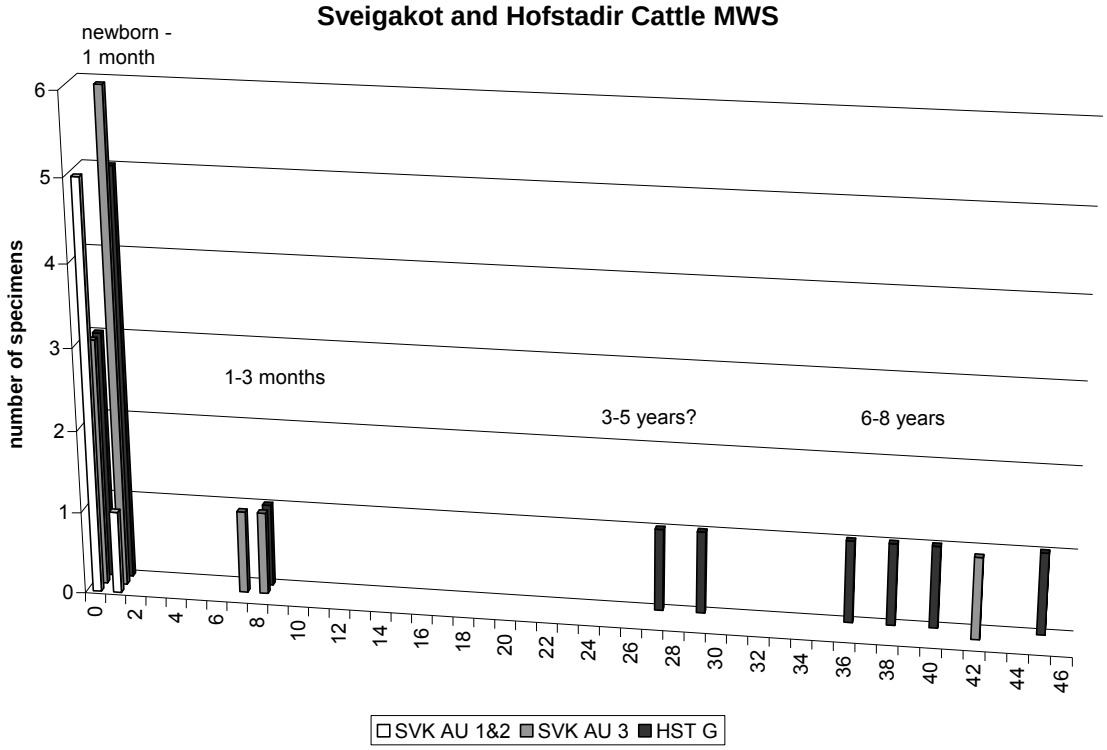


Figure 7

As can be seen from the above chart 38% of the cattle in this assemblage had unfused distal femurs by the time they were slaughtered. This fusion does not happen until sometime in the second half of their third year of life. 62% of the distal femoral ends are fused. This is the largest proportion of unfused long bones in this sample. Coupled with the tooth wear data this reinforces the idea that this assemblage is the product of a meat producing sector of Skálholt's economy. Slaughtering cattle in the second half of their third year would probably take them at or near the peak of their growth curve, before they could become effective milk producers but near the point where further feeding produced little or no increase in carcass size (Payne 1974). Dedicating valuable fodder towards the raising of full sized cattle is a high status investment. In a zooarchaeological assemblage from dairy economies of less wealthy, though by no means poor farms in Iceland, one finds a large amount of bones from neonates and then again from older animals, past their prime (McGovern, 2003). The older cows represented in the assemblage, such as the 62% fused distal femoral ends, and possibly the heavier wear on the maxillary M3's, could be the culling of less productive dairy cattle. Yet the long bone fusion and tooth wear data together point towards a meat producing husbandry strategy. For the purposes of contrast, the following examples from the site of early medieval sites of Hofstaðir and Sveigakot illustrate the dairy pattern well.



Data from McGovern 2003

In both these cases we see large scale culling of young cattle soon after birth, reserving available grazing for the adult dairy cattle (and their mother's milk for human consumption). At Hofstaðir, a relatively high status site, it seems that a small number of cattle were allowed some time to grow for greater meat productivity. In both cases we also see evidence of very old cattle, which were presumably females slaughtered after they had exceeded their prime milking years.

A Continental European Breed of Cattle?

All of the cattle crania (10 skull elements in which the horn core area was intact) recovered from context 454 are polled. 8 of these crania were naturally polled (figure 8), 2 were artificially polled. In one of the artificially polled examples infection set in after the removal of the horn (figure 9).

Figure 8

Figure 9
Settlement period and Medieval Icelandic cattle breeds were horned (reference?). Medieval Icelandic law defined a legal tradable cow as having horns (reference?).The appearance of polled cattle strongly suggest an early modern introduction of a European continental variety.

Discussion

Context 454 seems to represent the product of a meat producing sector of Skálholt's economy. The majority of the cattle represented were slaughtered at a prime age for meat procurement versus fodder investment, as we can see in the tooth wear data and the long bone fusion percentages. Those older cattle represented could have been unproductive milkers, or the product of herd population management culling. As context 454 is a relatively small sample, in comparison to the size of the site of Skálholt, it should be assumed that this midden only represents one small part of one sector of the Skálholt economy. As the context is indicative of a beef cattle producing profile, this assemblage might then be the product of the nearby butcher, or of some specialized beef processing or consuming sector of the Skálholt population. Coupled with this exceptional zooarchaeological profile is the presence of what looks like an introduced continental European breed of cattle. The Bishops of Skalholt were not only showing their wealth and power through their meat based cattle economy, but also through their desire to possess a different cattle breed than

the rest of the Icelanders. Considering the absence of these cattle in the contexts above 454 what we might be looking at is a failed experiment on the part of the Bishops of Skalholt. These cattle might have been an attempt at both starting a dedicated beef economy as well as an attempt to make the landscape of Skalholt look more "improved" in the 17th-18th century European sense of the word (McRae, 96). The presence of both the continental European cattle breed as well as what might be native Icelandic cattle physically altered to look more like this new polled breed bring up questions regarding Skálholt's place in Iceland's cultural landscape and its sense of its own identity.

Element Distribution SU 454 Caprines

The element distribution of the caprines in unit 454 also indicates that these animals were most likely slaughtered onsite (figure 10). Elements from every part of the body are present.

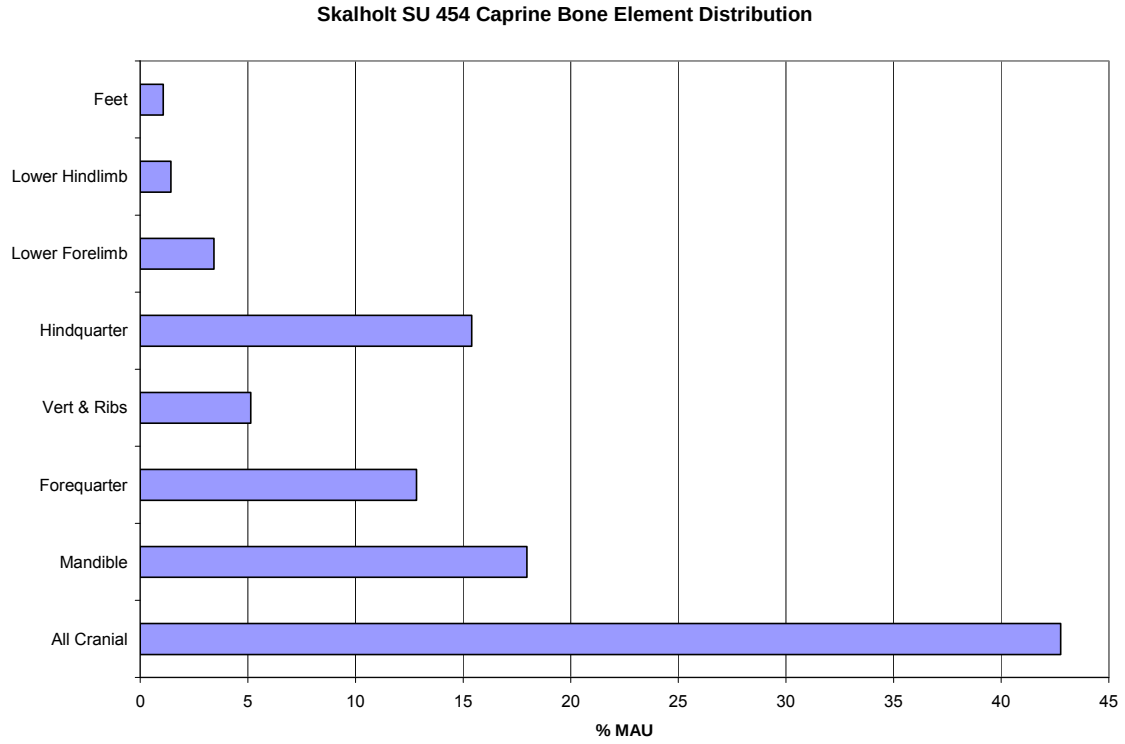


Figure 10

Mortality/Age Structure of Caprines

There is no meaningful bone fusion data for the caprines in this unit. Nor are there significant numbers of tooth wear and eruption data. Of the five mandibular/maxillary specimens with tooth rows intact all have their mature teeth, none have deciduous teeth. There are no neonatal or fetal caprine bones in this assemblage.

Larger numbers would be ideal for analysis but the complete lack of neonatal bones or deciduous teeth might indicate that these caprines were all mature animals. How many were old animals is hard to tell. Three of the mandibular and

maxillary specimens show tooth wear indicative of older animals. The remaining two have tooth wear representative of mature animals.

Discussion

The caprines of unit 454 are significant largely due to their small numbers relative to the cattle. As previously discussed caprines outnumber cattle in all other Icelandic archaeofaunal contexts. Other than their small numbers these caprines seem to be a combination of older and mature animals slaughtered for meat.

Other Midden Test D Contexts

Unit 459 lies directly below unit 454 while unit 453 lies directly above unit 454. Neither of these units produced large numbers of identifiable specimens yet their proportions do seem to mirror unit 454. Unit 459 has 83% cattle to 17% caprine. Although the total numbers are small this does compare favorably to the 85% cattle to 15% caprine in unit 454. Unit 453 has only two elements identifiable down to species level and both are cattle. The LTM elements are presumably cattle and the one MTM could likely be caprine. Again the numbers are very low but these proportions are similar to those of unit 454.

SU 459 NISP

Species	SumOfCount
BOS	10
OVCA	2
LTM	25
MTM	11
UNIM	526

SU 459 Species/Elements

Species	Bone	SumOfCount
BOS	MO	7
BOS	PMO	2
BOS	ULN	1
OVCA	MO	1
OVCA	PMO	1

SU 453 NISP

Species	SumOfCount
BOS	2
LTM	9
MTM	1
UNIM	217

SU 453 Species/Elements

Species	Bone	SumOfCount
BOS	IN	1
BOS	MO	1

The fact that in both the adjacent units to 454 there are similar proportions of cattle to sheep reinforces the impression that the activities that created unit 454

were not catastrophic. These adjacent units push at least some of the characteristics of unit 454 in to the time before and after the deposition of unit 454. Without more and better faunal elements from adjacent units we cannot claim the existence of a beef economy like that of unit 454 but units 453 and 459 do give a hint that these activities might have preceded and continued after unit 454.

Floor Layers

The following units are associated with floor layers within the structures of the Skálholt Bishop's household and the school.

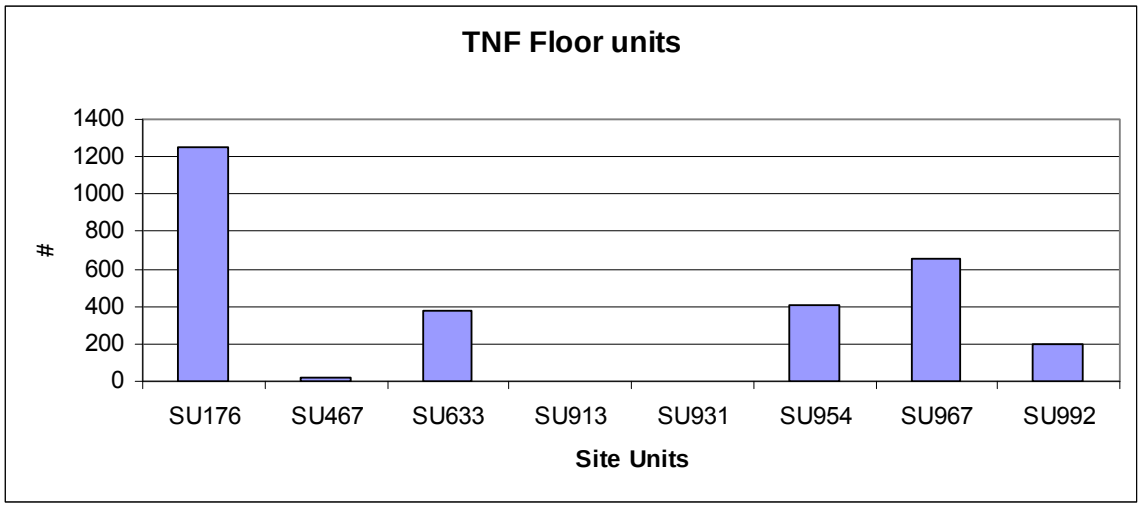


Figure11

There is no pattern between these floor units in terms of total number of fragments. There is a large amount of variability between these different floor layers (figure 11).

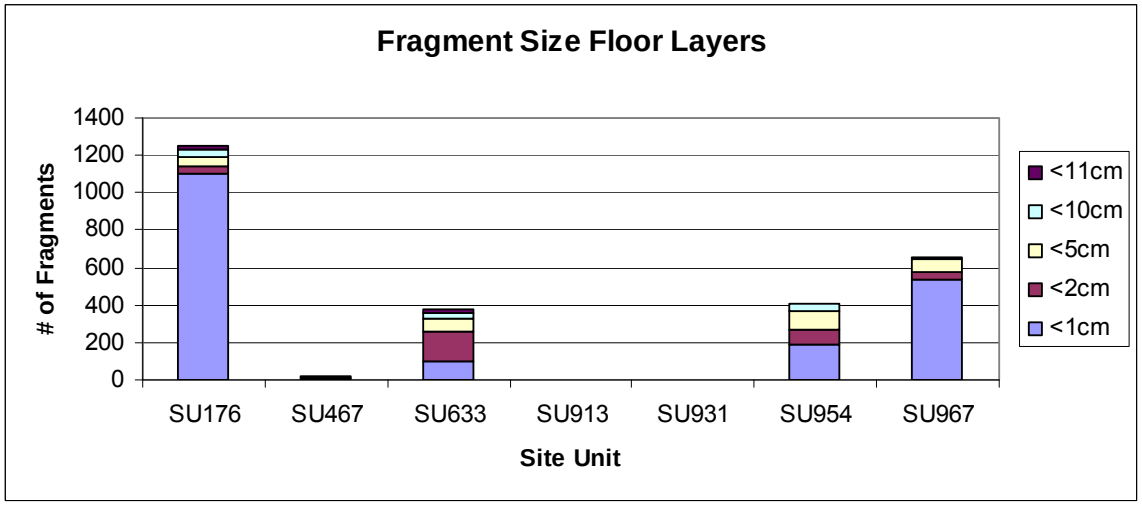


Figure 12

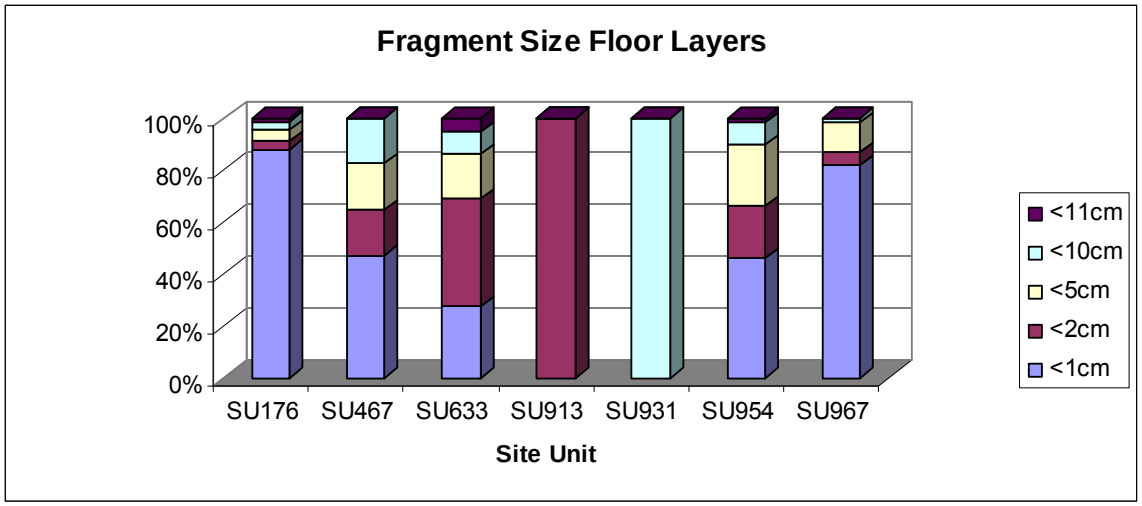


Figure 13

In terms of proportion of fragment size there is also great variability between different floor units (figures 12 + 13). Obviously this information needs to be seen in combination with the specific unit contexts and artifact data.

Site Units 1090/1144/1217

These three units are part of the midden excavation started by Birna Lárusdóttir in 2004. In 2005 this 2 by 5 meter trench to the NE of the main buildings and at the break of the slope, was excavated by George Hambrecht until the depth made further excavation no longer safe. After this a 1 by 3 meter trench was extended off of the western end of the original trench towards the main buildings.

Unit 1090 can be given a terminus post quem of 1758. This is due to a pipe stem found in Unit 1090 with the maker's mark "Severin Fersdew", who manufactured clay pipes in Christianshaven, Denmark, from 1758-1764. Units 1144 and 1217 lie beneath unit 1090.

Overview of Species Present

Scientific Names	*English Common Names*	*NISP Count*		
Site Unit		1090	1144	1217
Bos taurus	cattle	56	23	25
	ovca - caprines	115	18	46
Ovis aries	sheep	22	5	18
Capra hircus	goat	0	0	2

Table 5

These units exhibit the common Icelandic domestic animals, with the exception of goat which was very rare since the 12th century. The percentages of cattle are still high relative to caprines for Iceland. This probably reflects the high status/wealth of the site.

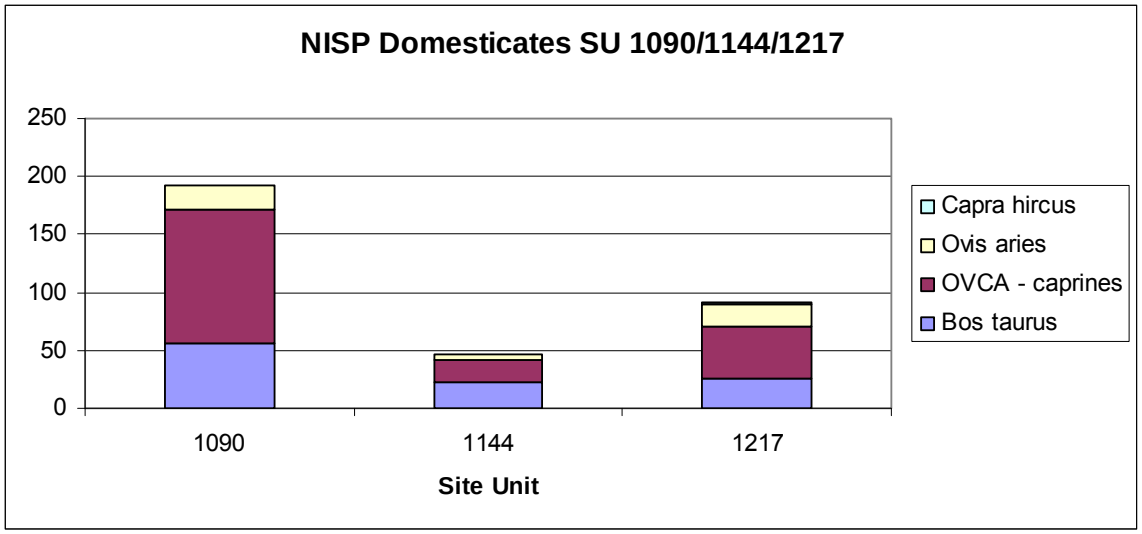


Figure 14

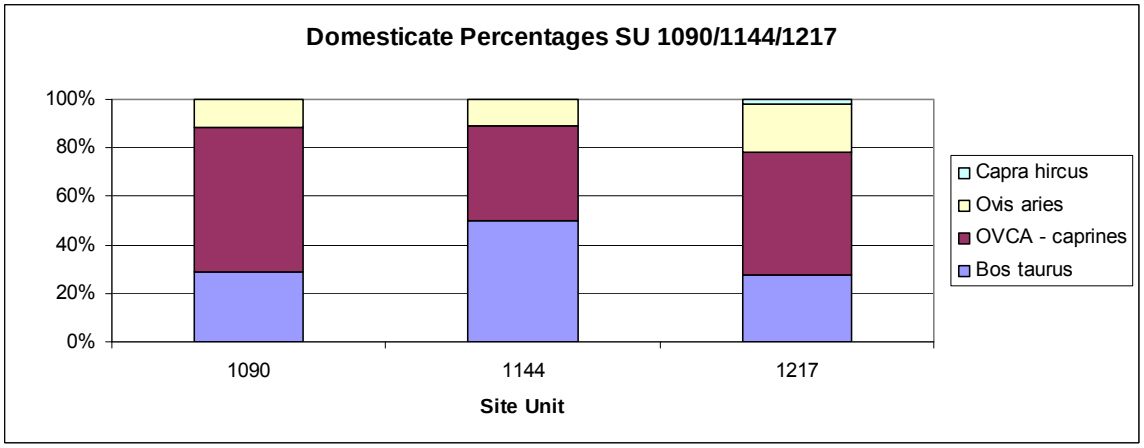


Figure 15

Mortality/Age Structure of Bos taurus

Unit 1090 contained three distal tibias, all of which were unfused. The distal end of a cow tibia fuses sometime in the first half of their second year of life. There are only 3 neonatal elements, roughly 5% of the bos elements. This is a far higher figure than that of unit 454 but still well below the norm (20-40%) for Icelandic archaeofauna. While these are not huge data sets they do suggest that the cattle in unit 1090 were a combination of mainly young but mature cattle slaughtered at prime beef age, like those of unit 454, and a few neonatal cattle slaughtered for herd population control ,milking maintenance, and veal production.

Unit 1144 contained only one cow neonatal element (4% of cattle elements) while unit 1217 contained 4 (16% of cattle elements). Unit 1144 contained one unfused whole humerus. The distal humerus does not fuse until sometime in the first half of the first year of a cow's life. Unit 1144 also contains one unfused whole humerus. These figures suggest that their might have been younger cattle being slaughtered in these units, but the numbers are too small to make definitive statements.

Caprines – SU 1090 + 1217

The Caprines from units 1090 and 1217 were slaughtered onsite as the element distribution indicates (figures 16+17). Elements from all parts of the carcass are apparent in unit 1090 and to a lesser extent in unit 1217. What is interesting here is the predominance of heavy meat bearing elements in both units. The hindquarter and forequarter carry the bulk of the meat on a sheep or goat and these are the areas most heavily represented. This dump of caprine bones was most likely the product of meat production for the Bishop's household, but one focused on the more valuable meat heavy areas of a sheep carcass.

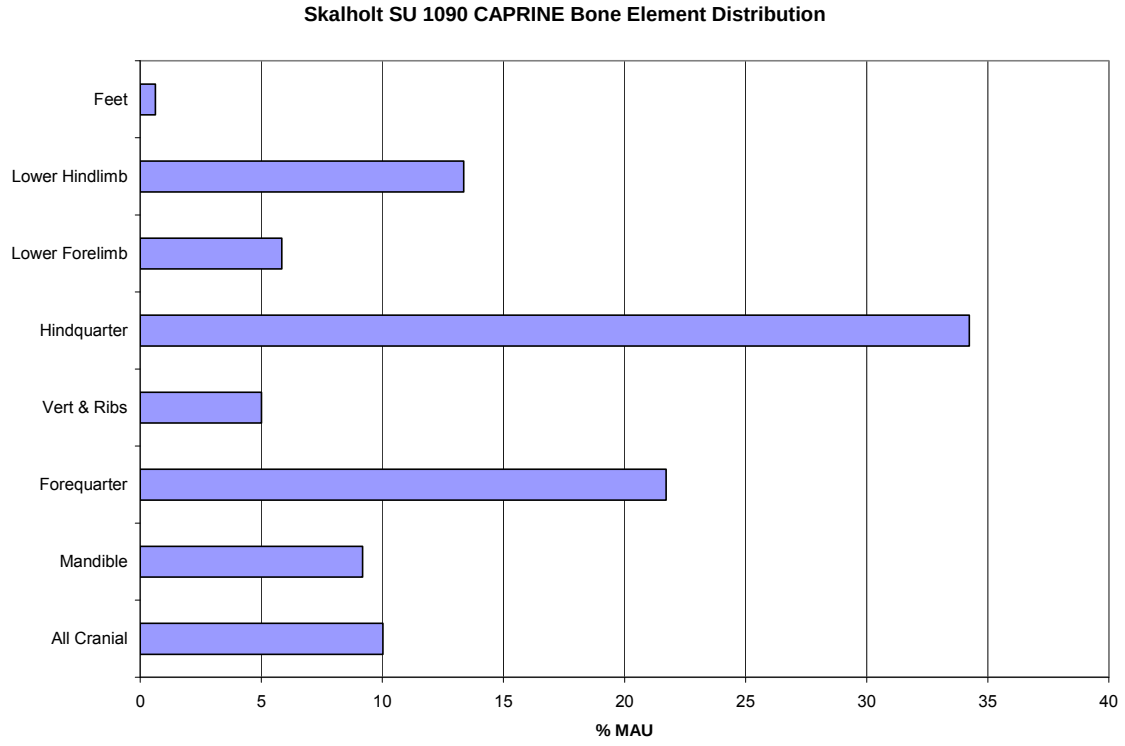


Figure 16

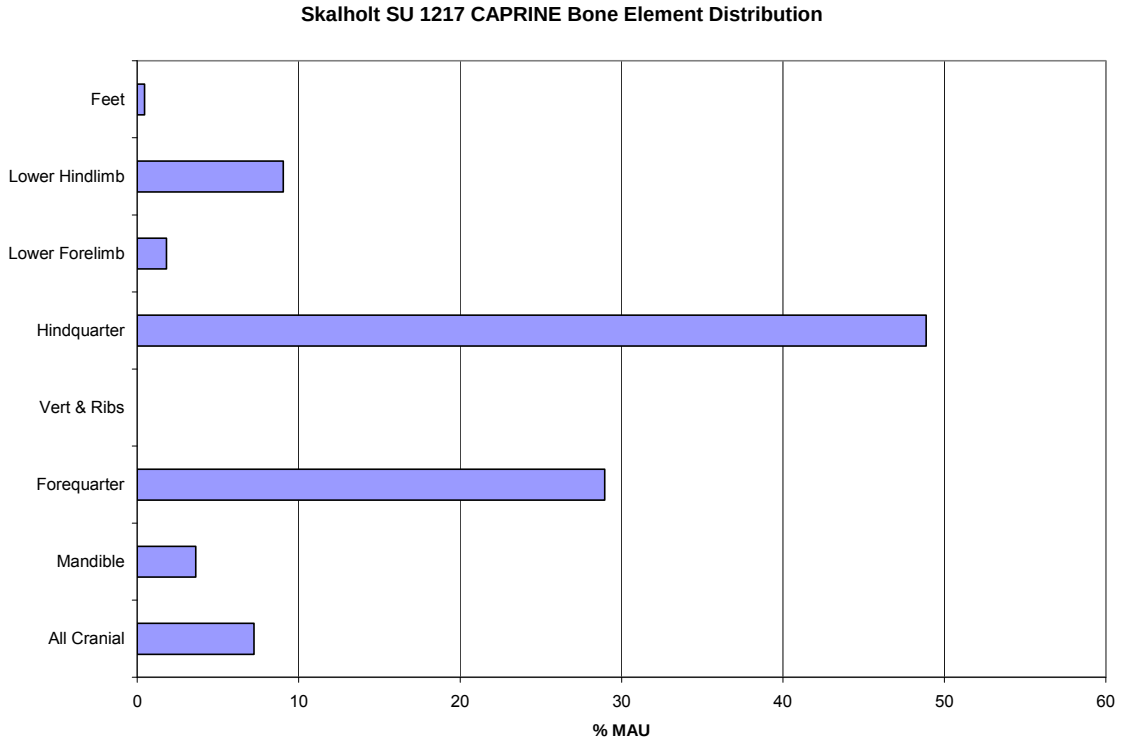


Figure 17

The MGUI quartile percentages for both units also reinforce this (figures 18+19). In both units the first MGUI quartile, those areas of the carcass with the greatest amount of meat, fat, sinew, and marrow are the dominant areas found in the assemblage. The density figures for these two units also indicate that both had good survivability and good reflections of the initial deposition.

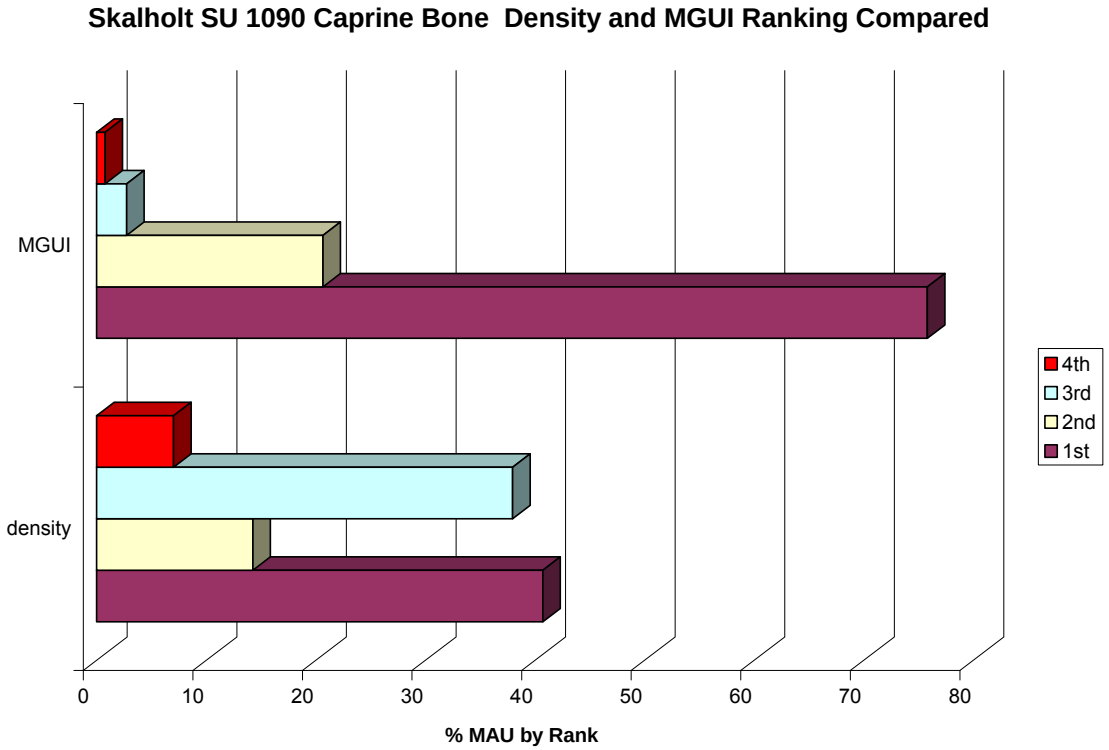


Figure 18

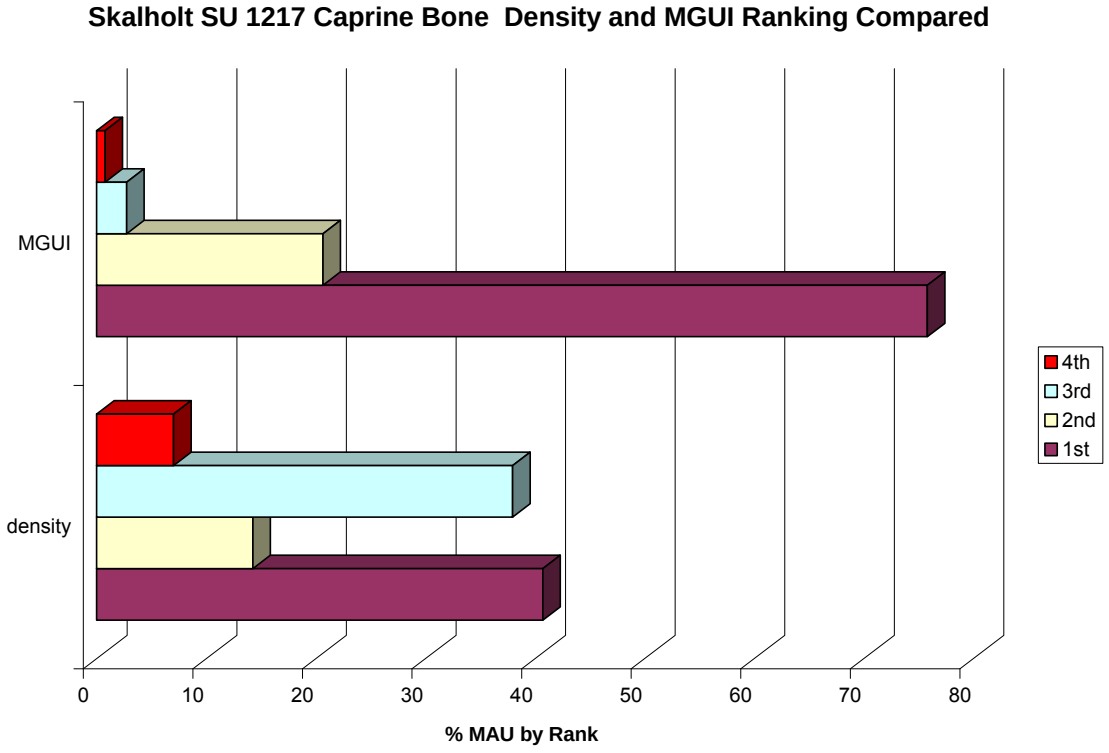


Figure 19

Mortality/Age Structure of SU 1090 and SU 1217 Caprines

Both units have very few neonatal bones. There are none in unit 1090 and only two in unit 1217.

In the case of unit 1090 bone there are 7 fused distal tibias and one in the process of fusion. Distal caprine tibias fuse after the second year of life. There is one unfused proximal tibia. Proximal caprine tibias fuse sometime after the second half of their fourth year of life. There is one distal fused radius. The distal radius does not fuse until after the fifth year of life. This data, though not from a very large data set suggests the majority of sheep in this unit were being slaughtered for meat between their second and fourth year of life, though there were also some older animals as well.

Unit 1217 shows a similar pattern. Both young 2-4 year old animals are present while animals over 5 years are also present.

The sheep in units 1090 and 1217 represent the needs for meat for the Bishop's household and not any herding strategy by the Skalholt farm. They do show that a variety of young to fully mature caprines were being used for mutton for the population of Skalholt. Coupled with the fact that the majority of elements represented in these units are from the most heavily meat bearing areas of a carcass we can again see a high value, and high production meat producing side of the mid 18th century Skalholt economy.

Conclusion

The taphonomic figures for unit 454 indicate that it is a faunal collection with a good survival rate from deposition to excavation. This helps to validate the exceptional nature of this unit. The analyses of the units below and on top of unit 454 have also potentially increased the temporal range of the activities that produced unit 454. This is important as it makes it less likely that unit 454 was a very short term, even catastrophic project.

The Floor layer data needs to be integrated into the larger analysis of the Bishop's household and this data is the first step in that direction.

The analysis of the trench started by Birna Lárusdóttir has initially revealed patterns of beef production somewhat similar to that of unit 454, especially in unit 1090. This emphasis on beef production is interesting to find outside of Midden Test Pit D as it can be given a good temporal range, the mid 18th century due to the pipe stem, and broadens the special and temporal range of this unique production pattern in early modern Iceland.

The cattle and sheep data from both Midden Test Pit D and the trench that produced units 1090, 1217, and 1144 continue to show a provisioning strategy for Skálholt that emphasizes the wealth of the Bishop. Both the high percentage

of cattle found so far and their mortality patterns plus the high frequency of young and mature sheep slaughtered for mutton make this clear.

Acknowledgments:

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