Archaeofauna from the Chieftain's Farm at Hrísbrú, 2001-2008

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During each year of the Mosfell Archaeological Project excavations at *Hrísbrú* from 2001 to 2008 faunal material was collected for identification and laboratory analysis. The samples were sorted, cataloged, and exported to the University of California Los Angeles where the analysis has now been completed and the finds returned to the Icelandic National Museum. This report incorporates all archaeofauna from all eight seasons of excavations in the three areas of the *Hrísbrú* site: *Kirkjuhóll* (Church Knoll- abbr. CK), *Hulduhóll* (Elfin Hill- abbr. EH), and *Tún* (Tun- abbr. TUN).[1] This report builds on a previous report by adding to the overall picture, the newly analyzed faunal material excavated in 2006 and 2008.

The general picture of the medieval subsistence economy of *Hrísbrú* from the faunal remains reveals a farmstead that depended primarily on domesticated animals, chiefly sheep and cattle, but pigs and possibly even rabbits were also kept at the farm (see Table 1 and Figures 1, 2, 3, 4).[2] The diet was supplemented by fish, shellfish and marine mammal resources. Fowling was also practiced but besides birds no other wild game was available to the Icelandic settlers.

Bone Preservation

Nearly the entire animal bone collection from *Hrísbrú* consists of calcined bone. The frequent rainfall and rapid percolation of water through the permeable soils at *Hrísbrú* create conditions unfavorable to bone preservation. Although the preservation conditions varied locally within all three excavation areas very little non-burned bone remained. Most of the preserved unburned bones were teeth and occasionally the maxillae and mandibles in which teeth were retained. In a few isolated areas rich in charcoal such as midden pit Feature 10 on Church Knoll, more unburned bone remained. On Church Knoll a series of human inhumations were uncovered. Most of these contained at least some remnants of the skeletons, although they were in poor condition. In a few cases the skeletons appear to have entirely disintegrated. The skeletal material remained more intact in secondary burials uncovered north and south of the chancel, most likely because the features included air pockets around the skeletal material insulating the bone from direct contact with the soil. The effect of these preservation issues on the faunal assemblage from *Hrísbrú* is that the collection is rather small and consists mostly of calcined bone fragments from hearth cleanings.

Sampling and Recovery Strategy at Hrísbrú

Sampling techniques in the *Hrísbrú* excavations utilized several different screen mesh sizes depending on the context or layer being excavated. At CK the layers were mostly screened over ¼-inch mesh. The soil surrounding the human burials was water-screened over 1/8-inch mesh. All fragments of faunal material were collected during the 2001 and 2002 seasons at CK. During the 2003-2005 seasons at CK non-inhumation

[1] Excluded from this report are dozens of mussel periostracum fragments recovered from the past years that have been analyzed at the University of Oregon. The results of this analysis will be included in the final faunal report from the *Hrísbrú* excavations.

[2] The figures in this appendix and the following appendices are found at the end of each appendix.

Common Name	Scientific Name	CK	EH	TUN	Grand Total
Atlantic Cod	*Gadus morhua*			2	2
cf. Cod	*cf. Gadidae*			122	122
Herring	*Clupea sp.*	12			12
Flatfish	*Pleuronectiformes*			3	3
Bony fish	*Teleostei*	9	83	250	342
Fish Total		**21**	**83**	**377**	**481**
Auk	*Alcidae* (medium to small)			12	12
Auk (cf. Auklet)	*Alcidae* (small)			19	19
Pink footed goose	*Anser brachyrhynchus*			9	9
Gull	*Larus sp.*	1			1
Bird				8	8
Bird Total		**1**		**48**	**49**
Sheep/Goat	*Ovis/Capra*	44	20	117	181
Sheep/Goat/Cow	*Ovis/Capra/Bos*	3		15	18
Cow	*Bos taurus*	11	1	202	214
Horse	*Equus caballus*			3	3
Horse/Cow	*Equus/Bos*			3	3
Pig	*Sus scrofa*	1	2	2	5
Rat	*Rattus sp.*			1	1
cf. Rabbit	*cf. Leporidae*	1			1
Small mammal		5			5
Land mammal		518	522	2803	3843
Land mammal Total		**583**	**545**	**3146**	**4274**
Walrus	*Odobenus rosmarus*			1	1
Whale	*Cetacea*	1		1	2
cf. Seal	*cf. Pinnipedia*			10	10
Marine mammal			11		11
cf. Marine mammal				3	3
Marine mammal total		**1**	**11**	**15**	**27**
Grand Total		**606**	**639**	**3586**	**4831**

Table 1. *Numbers of identified specimens (NISP) from* Hrísbrú *divided into rows of identified taxa and columns for each of the three excavation areas.*

layers were still screened with ¼-inch mesh, but the small faunal fragments that were only identifiable to the "land mammal" category were no longer collected from the large disturbed Stratum I layer. At Elfin Hill (EH), where a cremation was uncovered, the layers were all water-

screened over 1/8-inch mesh and all fragments regardless of size were collected. At the TUN site ¼ -inch mesh was used for all layers above the longhouse and all faunal material that remained in the screen was collected. Baulk soil samples were taken in 2006 and 2007 from each of the midden layers above the abandoned longhouse. All occupation layers associated with the house were excavated in 2008 and a minimum of 10 liters of each layer from each 1 x 1 m grid square was floated over 2 mm mesh screen for heavy fraction recovery.

Complete excavation of the inside of the longhouse in 2008 revealed the layout and organization of the internal space. The house offered extremely well-preserved floor deposits, allowing for stratigraphic excavation of 38 individual floor layers, revealing spatial and temporal differences in household activities. Each of these floor layers was excavated on a 1 meter sample grid and 100% of the soil was sifted through a flotation machine for maximum artifact and ecofact recovery. The 1 x 1 meter sample squares allow us to understand the distribution of the smallest finds across the floors, thus providing high-resolution data on varying activity areas within the house.

Laboratory Methods

On the arrival at the Cotsen Institute of Archaeology's Zooarchaeology Laboratory (CIOA-ZL) the vertebrate faunal remains from *Hrísbrú* were sorted by vertebrate class. The respective classes were analyzed in the CIOA-ZL by Wake and Zori. Determination of units of analysis was directed by specific groupings of excavation contexts described below. Data concerning cultural components, radiocarbon dates, temporal phases and rough chronology were defined by consultation of Mosfell Archaeological Project field reports. Contextual integrity was maintained at all times by recording specific project catalog numbers on each tag for each specimen examined.

Thomas Wake identified fish, bird and mammal remains from Hrísbrú with the assistance of Davide Zori. All mammal identifications were confirmed using the comparative osteological collection housed in the Cotsen Institute of Archaeology's Zooarchaeological Laboratory and the UCLA Department of Biology Dickey Natural History collections.

Each bone specimen was identified to the most discrete taxonomic level possible. More detailed taxonomic assignment (to species or genus) was usually limited to specimens with sufficient distinguishing features allowing rapid identification to the given level. The general identification and data recording methods are as follows.

Bones lacking discrete identifiable features were sorted into broad mammal size categories by class. Size categories are defined as follows: for mammals, very large represents cow size or greater, large represents sheep/goat size or greater, medium represents smaller than sheep/goat but larger than rabbit, and small represents rabbit or rat, very small represents mouse or smaller.

For each discretely identifiable bone a series of data were recorded including catalog number, complete provenience and screen size information, skeletal element, part of element, side, age, and modification (Grayson 1984; Lyman 2008; Reitz and Wing 2008). Data recorded regarding modification of bone specimens include evidence of burning, cut marks, gnaw marks, and indications of tool or other artifact manufacture. The bone was counted and weighed to the nearest 0.01 g using electronic scales.

Use of the NISP (Number of Identified Specimen) measure is the most effective way of quantifying a smaller sample of relatively poorly preserved faunal remains such as was found at the *Hrísbrú* site (Amorosi and McGovern 1995:184). By this method each fragment that can be

identified to a taxonomic level is counted individually. This quantification method is also the most widely used in previously analyzed collections from the North Atlantic, and is therefore employed in this report. In only a few contexts could a MNI (Minimum Number of Individuals) be established as exceeding one individual, making this quantification method almost meaningless. Nevertheless when the MNI exceeds one we note it in this report.

TUN

The faunal material from the TUN excavation area, including the longhouse and several midden layers dumped on top of it, showed the greatest taxonomical variety and the most precisely datable assemblage from the *Hrísbrú* site. Much of the material in this area, particularly the finds collected from the surface layers of the longhouse, can be associated directly with the occupation of the Viking Age longhouse. The deposits in this area were clearly stratified and, below the top few layers, had not been disturbed by natural post-depositional processes or human activity.

A clear Katla tephra layer from AD 1500 capped most of the deposits making the vast majority of the material firmly datable to the medieval period preceding the eruption. Layers of turf collapse from the walls and roof of the longhouse separate the layers associated with the longhouse from those dumped into the abandoned house, allowing for clear separation of the sampled material and a comparison of the food remains from the longhouse and post-longhouse occupation at the *Hrísbrú* site. The faunal finds are presented by their broad temporal and super-contextual association in Table 2 and the rooms of the longhouse in Table 3, while Tables 4 and 5 show the archaeofauna divided into individual contexts associated with longhouse and with the overlying midden layers respectively. The stratigraphic relationships of the TUN contexts are displayed in the Harris Matrix in Figure 6.

A total NISP of 3586 pieces of faunal material was recovered from the TUN area. 2994 pieces are associated with the longhouse occupation, 104 were found within the turf and stone layers from the collapsed longhouse, 424 derive from the midden layers pre-dating AD 1500, and 51 specimens have come from the top layers that post-date AD 1500. In the following discussion the faunal material from the TUN site is compared and divided according to these four temporal periods.

Faunal Material from the Longhouse Occupation Layers

The occupation layers inside the longhouse have been fully excavated and sampled on a 1 x 1 m grid to allow maximum resolution in the analysis of the finds. The information from these samples shows a considerable variation in the diet of the inhabitants of the longhouse (see Tables 2 and 3). Domesticated animals dominate the assemblage, but fragments of wild animal bones show that the inhabitants of the longhouse supplemented their diet through fishing, fowling, as well as scavenging of whales and possibly even rats. The burned bone found in occupation surfaces indicates that the inhabitants ate the common Norse staples of sheep, cow, fish (flat fish and cod), pig, and seal. Several bones exhibit visible modifications, including indications of butchering practices, rodent gnawing, and bone ornament manufacture.

The excavation methods and the large number of preserved floor layers make the Hrísbrú faunal collection from the longhouse a unique opportunity to study food refuse in its primary context. Most faunal remains derive from midden layers dumped outside of the house, but the Hrísbrú collection was deposited in the same building as the food was cooked and consumed. Although some of the material in these floor layers developed naturally as bones fell and ash settled on the floor, it seems likely to us that portions of these floor layers were purposefully

created with hearth waste. Ethnographically in Iceland, hearth material was used to "clean" floors, take away odors, and flatten walking surfaces (Milek 2006). Such actions appear likely in the Hrísbrú longhouse considering the calcined bone contents of floor layers in rooms of the house that did not have hearths. Only the central hall contained a hearth.

The analysis of the faunal material from the longhouse considers the separate rooms and divided spaces of the house. The floor layers clearly indicate house divisions, probably dividing walls, between the central hall, the eastern gable room, and the western gable room. Moreover, an "intermediary area" exists between the western gable room and the central hall, which is clearly in character and use from the two adjacent rooms. The final spatial unit analyzed separately for this study is the western doorway, consisting of an elongated entranceway leading to the south out of the western gable room. Other divisions in space existed, such as bench layers vs. floor layers in the central hall, individual pit features, and a particularly clear alcove in the eastern gable room, but for analytical clarity and to maintain significant sample sizes, we felt that analysis based on room division was most suitable. The central hall where the eating and cooking took place, included the largest number of finds as well as the greatest variation in species. However, the significance of the differences between the faunal assemblages from the various rooms should probably not be overemphasized since it seems likely that the burned faunal material probably all derives from the long-fire hearth in the central hall.

The layers from the longhouse occupation that produced faunal material include bench layers (C-11, 12, and 137), post hole fill (C-21, 62, 87, and 191), hearth contents (C- 18), fill of pit features (C-40, 1421, 146, 161, 162, 182, 184, 235) and floor layers (C-14, 19, 88, 94, 95, 115, 145, 147, 156, 157, 158, 163, 168, 183, 190, 192, 202, 203, 209, 214) (see Table 4). The fragmented and small size of the specimens in the collection from the longhouse means that the MNI (Minimum Number of Individuals) in the longhouse is no more than 1 for each species. The age of the animals was most often unclear. Nevertheless, five specimens of sheep/goat bone from the longhouse came from juvenile animals, while two juvenile cows could be discerned.

Common Name	Scientific Name	Longhouse	Post-1500	Pre-1500 Midden	Wall Collapse	Total
Atlantic cod	Gadus Morhua	1		1		2
cf. Cod	cf. Gadidae	122				122
Flat Fish	Pleuronectiformes	3				3
Bony Fish	Teleostei	241		9		250
Auk	*Alcidae* (medium to small)	12				12
Auk (cf. Auklet)	*Alcidae* (small)	18		1		19
Pink footed goose	*Anser brachyrhynchus*		9			9
Bird		7		1		8
Sheep/Goat	*Ovis/Capra*	64	4	38	2	108
Cow	*Bos taurus*	10	1	140	50	201
Sheep/Goat/Cow	*Ovis/Capra/Bos*	13		2		15
Horse/Cow	*Equus/Bos*	1	1	1		3

Horse	*Equus caballus*			3		3
Pig	*Sus scrofa*	1		1		2
Rat	*Rattus sp.*	1				1
Land mammal		2491	36	221	52	2800
Walrus	*Odobenus rosmarus*			1		1
Whale	*Cetacea*	1				1
cf. Seal	*cf. Pinnipedia*	8		2		10
cf. Marine mammal				3		3
Grand Total		**2994**	**51**	**424**	**104**	**3573**

Table 2. *Numbers of animal bones (NISP) found at the TUN site separated into larger super-context divisions. "Longhouse" finds are from surface layers and internal features in the Viking Age longhouse. The "Wall Collapse" group consists of finds from contexts of the collapsed turf and stone walls of the longhouse. The "Pre-1500 Midden" finds are from layers of secondarily deposited midden material dumped into the cavity of the abandoned longhouse from a nearby later medieval and as yet unidentified house. The "Pre-1500 Midden" layers pre-date the AD 1500 Katla tephra layer, while the layers included in the "Post-1500" group were found above the Katla tephra.*

We identified 367 examples of fish bone fragments from 15 different contexts and in all spatial units of the longhouse. A large sample of *Gadidae* (cod) bones was identified in layers C-40, 115, and 235, while three examples of *pleuronectiformes* (flat fish) have been identified from bench surface C-12 (see Table 4). Most of the fish bones could only be identified as *teleostei* (bony fish). The fill of two pit features (C-40 in the western gable room and C-235 in the central hall) contained a particularly dense concentration of fish bone. The surface layer on top of the southern bench (C-12) contained the most fish bones of any context in the house. Concentration of fish bones in the surface layers in the central hall suggest they were consumed in this area. The fish bones in the midden pit features were secondarily deposited in these locations.

One substantial whale bone piece and eight fragments of marine mammal (cf. seal) bone were found in the top floor layer in the central of the longhouse (C-19). Marine mammal was differentiated by closed marrow cavity and diagnostic cancellous tissue patterns. No other layers associated with the occupation of the longhouse contained examples of marine mammal bone.

Bird bones appeared in all the divisions of the house: contexts 11, 14, 18, and 235 in the central hall, contexts 168, 202 in the eastern gable room, context 115 in the western doorway, and context 40 in the western gable room. Bird bone appeared in the greatest variety of contexts in the central hall, including a bench surface, a floor layer, the central hearth, and a refuse pit. However, a large number of *Alcidae* (auk) bones came from a small floor layer in the eastern gable room of the longhouse (C-202; see Figure 8 and Table 4). This floor layer is almost certainly a single event dump and is the lowest floor layer in this part of the house. It is possible that all these alcidae bones are from a single animal that served a meal early in the history of the Hrísbrú longhouse and that the ashes from this meal were then used to even out the surface next to an adjacent post hole.

Land mammal bones (2581 specimens) made up the majority (86%) of the faunal assemblage from the deposits associated with the longhouse. Most of the bones were very small fragments, only identifiable as land mammal, however, sheep, cow, pig and rat bones were also

found. Almost half (1273) of bone fragments were found in the central hall of the longhouse. Sheep bones were found in all the rooms of the house and cow bones were unearthed in every room except the eastern gable room. A single pig canine was found in post hole fill (F-2007-83 in C-62) in the eastern gable room. A calcined rat tibia fragment appeared in the floor in the central hall, suggesting that the inhabitants might have eaten at least one rat. A single bone fragment from floor layer C-14 in the central hall showed rodent gnawing marks, further demonstrating the presence of rodent in the house.

Evidence of butchery practices in the Hrísbrú longhouse was found on five land mammal bones. The butchery practices included both slices and chops with iron tools. Three of the six bone fragments with butchery marks were parts of ribs. Three of the five came from floor layer C-95 in the intermediary area. One rib fragment from C-203 in the eastern gable room had a visible slice mark. One cow rib from C-95 showed several cut marks. Several cut marks can be seen on a 2nd distal phalanx of a cow from bench surface C-12. These cut marks were made at the top of the hoof at the edge of the fur-bearing part of the skin by the toes. An *Ardiadactyla* rib fragment from C-95 and a land mammal bone fragment from floor layer C-14 in the central hall both showed clear chop marks, distinguished by bone being pushed aside on either side of the mark from the force of the blow. Another bone fragment from C-95 featured several chop marks that could be either for marrow extraction or an attempt at tool creation.

A carved bone fastening ornament or pin head was identified in floor layer C-115 from the western doorway (Figure 9).

Common Name	Central Hall	East Room	Intermediary Area	West Doorway	West Room	Total
Atlantic Cod					1	1
cf. Cod	121			1		122
Flat Fish	3					3
Bony Fish	173	9	3	16	40	241
Fish Total	**297**	**9**	**3**	**17**	**41**	**367**
Auk (medium to small)		12				12
Auk (cf. Auklet)	2	10			6	18
Bird	5	1		1		7
Bird Total	**7**	**23**		**1**	**6**	**37**
Sheep/Goat	21	5	13	5	20	64
Sheep/Goat/Cow	6	1	1		5	13
Cow	6		1	2	1	10
Horse/Cow		1				1
Pig		1				1
Rat	1					1
Land Mammal	1239	206	242	258	546	2491
Land Mammal Total	**1273**	**214**	**257**	**265**	**572**	**2581**
Whale	1					1
cf. Seal	8					8
Marine Mammal Total	**9**					**9**
Grand Total	**1586**	**246**	**260**	**283**	**619**	**2994**

Table 3. *Numbers of identified animal bones (NISP) from the* Hrísbrú *longhouse divided into rows of identified taxa and columns for each of five spatial units within the house.*

Taxon/ Context	11	12	14	18	19	21	40	62	87	88	94	95	115	137	141	145	146
Atlantic Cod							1										
cf. Cod													1				
Flat Fish		3															
Bony Fish		156	8	6	2		33					2	16			1	4
Auk (medium to small)																	
Auk (small, cf. Auklet)				1			6										
Bird	1		1	1									1				
Sheep/Goat		2	8	2	1		13				2	9	5			2	3
Sheep/Goat/Cow	1		3	2			4			1		1					
Cow	1	3	2				1					1	2				
Horse/Cow																	
Pig								1									
Rat			1														
Land mammal	34	143	578	75	141	1	263	18	9		80	214	258	1	16	93	59
cf. Seal					8												
Whale					1												
Grand Total	**37**	**307**	**601**	**87**	**153**	**1**	**321**	**19**	**9**	**1**	**82**	**227**	**283**	**1**	**16**	**96**	**66**

Table 4 (part 1). *Number of identified specimens (NISP) in contexts associated with the habitation of the longhouse in TUN excavation area.*

Taxon/ Context	162	163	168	182	183	184	190	191	192	202	203	209	214	235	Total
Atlantic Cod															1
cf. Cod														121	122
Flat Fish															3
Bony Fish			1	3		1				5			3		241
Auk (medium to small)										12					12
Auk (small, cf. Auklet)			3							7				1	18
Bird			1											2	7
Sheep/Goat	1		1	3		4	5				2				64
Sheep/Goat/Cow	1														13
Cow															10
Horse/Cow											1				1
Pig															1
Rat															1
Land mammal	176	19	9	25	16	28	15	7	28	9	57	3	33	9	2491
cf. Seal															8
Whale															1
Grand Total	**178**	**19**	**15**	**31**	**16**	**33**	**20**	**7**	**28**	**33**	**60**	**3**	**36**	**133**	**2994**

Table 4 (part 2). *Number of identified specimens (NISP) in contexts associated with the habitation of the longhouse in TUN excavation area.*

Faunal Material from Medieval Midden Layers (Post-Longhouse, Pre-1500)

The midden layers that were dumped into the cavity of the abandoned longhouse by later medieval inhabitants of the *Hrísbrú* site yielded a stratified and temporally controllable sample of faunal bones that shed much light on the economy of post-longhouse medieval farm. Together these midden layers yielded 424 specimens. Just over half of these (221) were not distinguishable beyond the category of land mammal, but the other half of the collection showed significant variation in the diet of the medieval inhabitants of *Hrísbrú*. Cow bones outnumbered all other species, but fish, sheep, pig, horse, marine mammal, and wild fowl are also represented (see Table 4).[3]

Carbon dating of both marine and terrestrial carbon samples from several of the midden layers dumped into the cavity of the longhouse indicate that these midden layers date to a period around 100 years after the abandonment of the longhouse. This is a rough estimate at the moment that relies on the difference in the raw uncalibrated dates, as the carbon dates have were still being calibrated when this paper was written. The midden layers date mostly to the 12th century. This date indicates that the farmstead at Hrísbrú continued to be inhabited at least up through the 12th century. Although the exact location of the 12th century house in unknown, it must have been reasonable close since substantial kitchen trash was dumped into the old longhouse.

A comparison of the contents of the each of the individual midden layers shows that C-34 contained almost half (44%, 187 specimens) of the total counts of the recovered animal bone. C-34 was the last midden layer to be dumped in the ruins of the longhouse, and covers the entire eastern end of the longhouse cavity, sloping up the sides of the structure's collapsed walls. The midden contained a concentration of fire-cracked stones that were secondarily deposited in the longhouse cavity, probably from hearth cleaning activities at a nearby homestead. Midden layer C-34 contained burnt and degraded unburned bone including cow teeth and mandibles and mussel periostracum. One unidentifiable land mammal bone had clear cut marks. Context 34 also contained the most variation of the any of the midden layers, including cow, horse, sheep, cod, and bird (probably auklet). This layer was the only one of the midden layers to contain any bird bone and also the only layer with fish bone identifiable as cod. C-34 was the only layer to supply a MNI (minimum number of individuals) higher than 1, as it included bones from at least two cows (two right lower M1) and two sheep (two lower left M1).

[3] The faunal material discussed in this section includes all bone recovered during excavation and on-site sieving, but does not include the material collected for flotation. The heavy fractions from the floatation usually provide significant additional material, particularly small fragmented fish bone.

Taxon / Context	8	9	15	34	36	38	39	44	47	65	142	Midden Total
Atlantic Cod				1								1
Bony Fish	3			1			5					9
Auk (small, cf. Auklet)				1								1
Bird	1											1
Sheep/goat			3	30			4	1				38
Sheep/Goat/Cow		1	1									2
Cow		5		44	71	20						140
Horse/Cow				1								1
Horse				1			1	1				3
Pig								1				1
Land mammal	31	37	7	108		6	24		2	1	5	221
Walrus			1									1
cf. Seal	2											2
cf. Marine mammal	3											3
Grand Total	**40**	**43**	**12**	**187**	**71**	**26**	**34**	**3**	**2**	**1**	**5**	**424**

Table 5. *Number of identified specimens (NISP) in midden layers dumped inside the cavity of the abandoned longhouse in TUN excavation area.*

The lowest and oldest midden layers (C-8, 9, and 44), taken together, appear to have a faunal profile distinct from the rest of the midden layers. They contain the only pig bone (in C-44) and 5 of the 6 examples of marine mammal bone (C-8). Interestingly there is little diagnostic cow and sheep bone from these layers (see Table 5). There has been some discussion in Iceland about the presence of pigs after the initial settlement period, as they were less adaptable to the Icelandic environment after the forests had been cleared (Amorosi and McGovern 1994). Pigs are common on Icelandic sites from the 9th to the 11th centuries, but then grow increasingly rare in the 12th and 13th centuries (Edvardsson and McGovern 2005: 26). The one pig bone adds to this discussion, illustrating that pigs were still being kept and eaten after the abandonment of the longhouse sometime in the late 10th or early 11th century. The carbon dating of several of these midden layers which is currently being calibrated will provide a clearer temporal resolution than

is possible with the relative dating achievable with the stratigraphic relationships. It is possible that the absence of pig bone from any of the later midden layers indicates the cessation of pig husbandry sometime during the medieval period.

Although the midden layers are not contemporary and can be analyzed by themselves for changes over time, a comparison of these midden layers as a unit with the faunal material from the longhouse occupation layers provides broad-based suggestions about the similarities and differences between the Viking Age economy centered on the longhouse and the medieval economy that persisted at the *Hrísbrú* farm after the abandonment of the longhouse (see Table 2 and Figure 5). Among the clearest patterns from the comparison of these two periods is the greater number and higher percentage of fish bone found in the longhouse occupation layers. It is possible that some of this dramatic difference is a relic of the recovery methods in which we floated the floor layers over 2 mm mesh whereas only 10 liters of each midden layer was treated in this way and the rest was screened over ¼ inch mesh. Despite these variations in collection methods we believe that the difference is significant and could indicate a higher reliance on fish in the diet of the early settlers at *Hrísbrú*. This scenario could be supported by the much larger number of cow bones from the midden layers. The midden layers contained 140 cow bones whereas the longhouse layers, which yielded a much larger number of bones, have only yielded 10 identifiable cow bones. Depositional processes for the inside of a structure as opposed to a midden dumping area may, however, account for at least part of this discrepancy. The midden layers contained many more cow teeth sometimes attached to fragmented jaw bones. Cow teeth are diagnostically more recognizable than small fragmented limb bones, for example. The jaw bones and teeth were probably among the bones that were collected and discarded outside of the house, thus ending up more frequently in middens than trampled into floor deposits.

Faunal Material from Post-1500 Layers

Very little faunal material was recovered from the layers post-dating AD 1500 (see Table 2). In most areas the in situ Katla AD 1500 tephra was only a few centimeters below the topsoil and occasionally included in the sod roots. The most interesting archaeofauna finds from these top layers were several calcined elements of an adult pink-footed goose (*Anser brachyrhynchus*) that was recovered within the Katla tephra. Someone at *Hrísbrú* around AD 1500 had a meal of goose and discarded the burned remains in the still visible depression of the longhouse that had been abandoned for about 500 years.

Church Knoll (Kirkjuhóll)

The bone collection from the Church Knoll (CK) area was mostly uncovered as part of the large stratum of mixed soils (Stratum I) disturbed by the grave shafts for the human inhumations surrounding the medieval church as well as the later early modern structure constructed on top of this area. The small post-medieval building was itself very poorly preserved and it was only possible to identify two wall fragments. No clear layers could be associated with this building. The result, with a few exceptions addressed below, is a mixed and non-stratified collection of faunal material which can really only be treated as a whole with no temporal control.

Land mammal bones made up the vast majority of the faunal bone collection from CK with 551 identified pieces. 21 fish bone pieces and one bird bone fragment were also identified from CK. In contrast to the faunal material from the two other areas (EH and TUN), the CK material contained no identifiable examples of marine mammal.

A midden pit (Feature 10) found in 2001 to the southeast of the church contained the most plentiful and interesting material from CK. Feature 10 was a closed context midden pit with dense trash midden material containing the richest faunal assemblage found at CK. Feature 10 was a small midden pit stratigraphically beneath one of the burials (Feature 6). A small carbonized twig was carbon dated to a calibrated age of AD 900-990, making it almost certain that this pit was connected with the contemporary occupation of the longhouse located about 20 m to the north. The pit contents are therefore temporally related to the faunal material retrieved through preliminary sampling of the floor layers of the longhouse, rather than to the rest of the material from the CK area. Feature 10 contained 90 small fragments of unidentifiable land mammal, one pig bone, the proximal ischium (acetabulum) of what appears to be a rabbit (*leporidae*). Also within this feature were the ulnar carpal of a *Larus* sp. (gull, probably a herring gull), and 12 herring vertebrae, including one first vertebra. Only one of these fish bone vertebrae was calcined. The relatively good preservation of this feature must be explained by the alkalinity of the soil matrix that consisted almost exclusively of charcoal and ash. One worked and polished bone needle made from terrestrial mammal bone was also uncovered from Feature 10. This small feature then made up most of the variation in the faunal remains from CK, contributing the only bird bone and 12 of the 21 fish bone pieces. Feature 10 also accounted for the entire sample of identifiable pig and rabbit.

Outside of Feature 10, the rest of the faunal assemblage from CK consisted almost exclusively of non-identifiable land mammal and a few cow, sheep, and non-species specific fish bones fragments. No clear patterns of the distribution of this material could be determined.

Elfin Hill (Hulduhóll)

The main feature of the Elfin Hill excavation was a Viking Age human cremation grave or the at least the site of the cremation event. The site yielded several human skull fragments likely to be from the same individual showing clear evidence of exposure to high temperatures while the bone was still "green" (White 1999; Ubelaker 1978). The layer containing these skull fragments also contained large pieces of charcoal, burned earth, a large amount of ash, and a sample of burned faunal material. The layers above the cremation also contained the very common ambient burned bone that exists in the top layers of all the excavated areas at the *Hrísbrú* farm. A relatively large number of bones (639 fragments) were recovered from the excavation area because all deposits were waterscreened over 1/8 inch mesh. The EH archaeofaunal assemblage included a relatively high percentage of fish and marine mammal and a lower percentage of identifiable sheep/goat and cow bone, thus matching most closely the archaeofauna percentages found in the lower levels of the TUN site associated with the Viking Age longhouse.

The cremation layer at EH is a sealed context dated with multiple C-14 samples of native birch twigs to the late 10^{th} to early 11^{th} century (Byock et al. 2005). Caprine bones and at least one fish bone were found securely within the cremation layer. It is possible these few bones derive from animals included in the cremation rite. On the other hand it is also conceivable that the archaeofauna were food remains present at the site surface before the cremation took place and that they only became included within this layer during post-cremation processes such as the gathering together of the larger fragments of human bone.

As a whole, the faunal assemblage from EH consisted mostly of general land mammal bones. The EH excavation area was dominated by the category "land mammal," which makes up

over 80% of the sample (522 out of 639). Fish made up the second most common taxon with almost 13% (83 out of 639). Caprine bones represent 3% and marine mammal 1.7% of the EH assemblage. As noted, these percentages match most closely the faunal material recovered from the longhouse occupation layers. The affinity of the EH faunal material with the fauna from the longhouse makes sense since both assemblages date from the Viking period and represent the food remains from the same subsistence economy.

Discussion and Future Work

The archaeofauna from *Hrísbrú* illustrates a diversified subsistence economy that through the Viking and medieval periods, utilized terrestrial domesticates and fish, as well as marine mammals and birds. The inhabitants of *Hrísbrú*, as most other Norse settlers of the North Atlantic, relied mostly on the terrestrial domesticates they brought from Scandinavia. Sheep/goats and cow were the most important domesticate food source, but at least initially pigs would also have provided meat. A single find from the TUN site suggests that the Norse settlers may also have brought a few rabbits with them to Iceland. In the earliest period at *Hrísbrú*, represented best by the assemblage from the longhouse occupation layers, but also by a pit midden on CK and the lowest levels at EH, domesticated fauna was substantially supplemented by fish and to a lesser degree by hunting/scavenging marine mammals. Later in the medieval period the importance of fishing seems to have declined.

The faunal assemblage from *Hrísbrú* appears to be rather typical of the range of archaeofauna collection from other Viking Age and medieval Icelandic settlement sites. The variation in domesticated vs. wild fauna is very similar at most Icelandic sites (see Figures 7 and 8 for a comparison of wild and domesticated animals at Hrísbrú), but the percentages of identified taxa vary considerably and illustrate differences in local subsistence strategies. Sites in different regions often show localized stress on one or the other species (Amorosi 1989; Amorosi and McGovern 1994; Harrison et al 2004).

The material from the longhouse at *Hrísbrú* exhibits similar species variation as the assemblages recovered from other Viking Age house sites such as *Vatnsfjörður* (Edvardsson and McGovern 2005) and *Granastaðir* (Amorosi and McGovern 1994). Differences in percentages of identified species between the sites show a more intensive utilization of pig and horse meat at *Granastaðir*, a greater reliance on marine mammal at *Vatnsfjörður*, and a preference for fish at *Hrísbrú*. The explanation of a greater reliance on fish at *Hrísbrú* cannot be explained by proximity to the coast since *Vatnsfjörður* lies even closer to the sea. Furthermore, it is a common feature of Norse sites in Iceland and Greenland that even inland sites such as *Granastaðir* and far interior sites such as *Aðalbol* in *Hrafnkelsdalur* (Amorosi 1989) still have significant amounts of fish bones, showing connections with the coast.

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Appendix B Figures

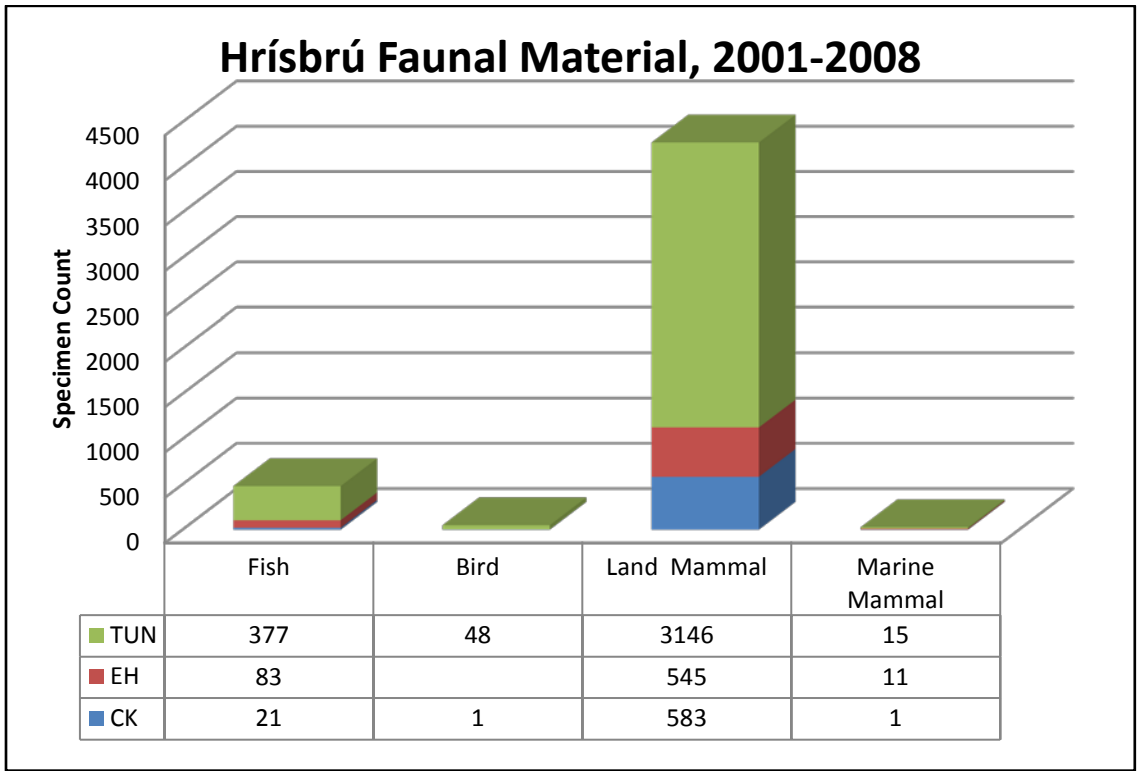


Figure 1. NISP of archaeofauna from the three excavation areas (TUN, EH, CK) divided in 4 broad taxonomic categories.

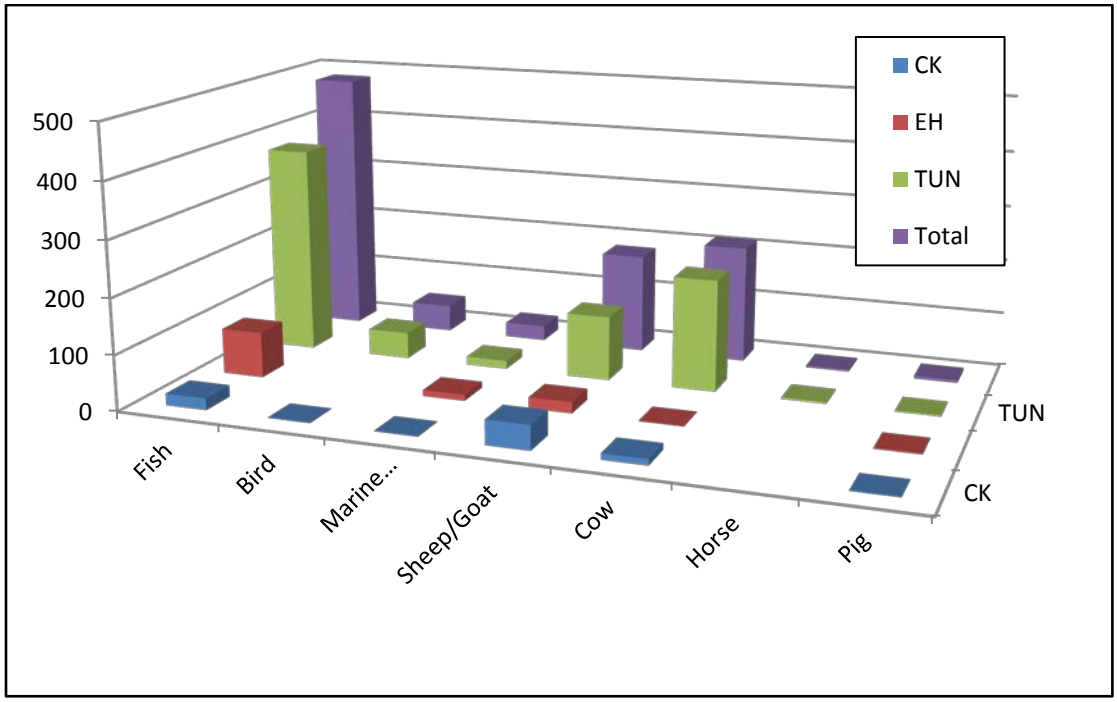


Figure 2. Number of identified specimens from the Church Knoll (CK), Elfin Hill (EH), and Tun (TUN) excvation areas.

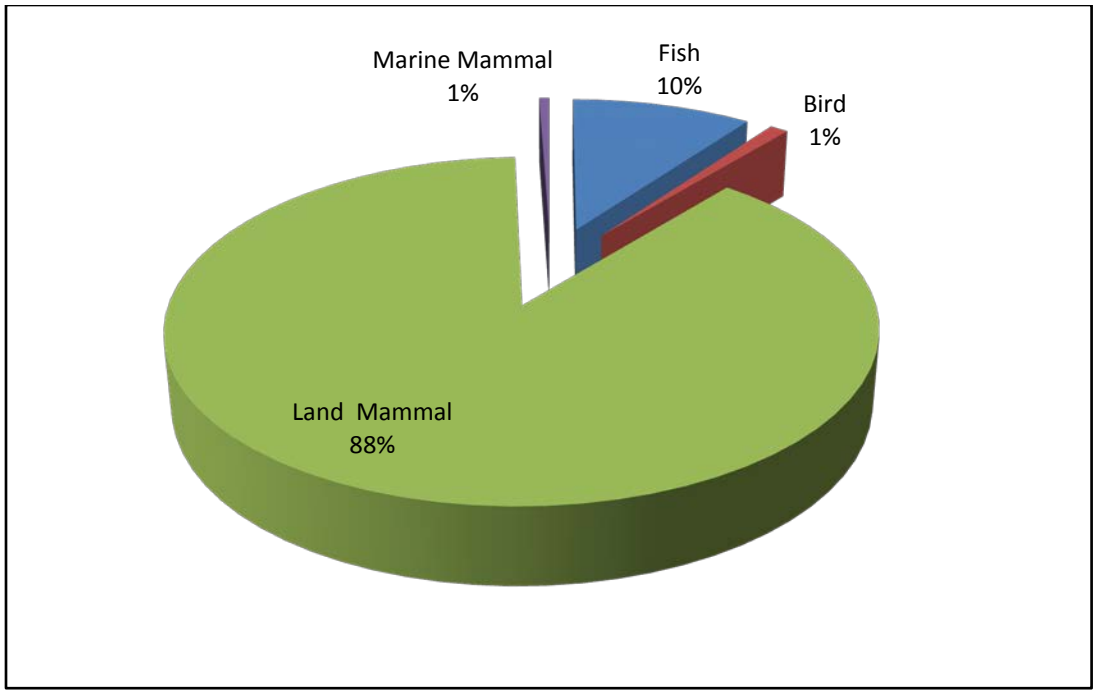


Figure 3. The percentage of all specimen counts from the *Hrísbrú* excavations divided into four major categories and showing the Hrísbrú inhabitants primary reliance on domesticated land mammals.

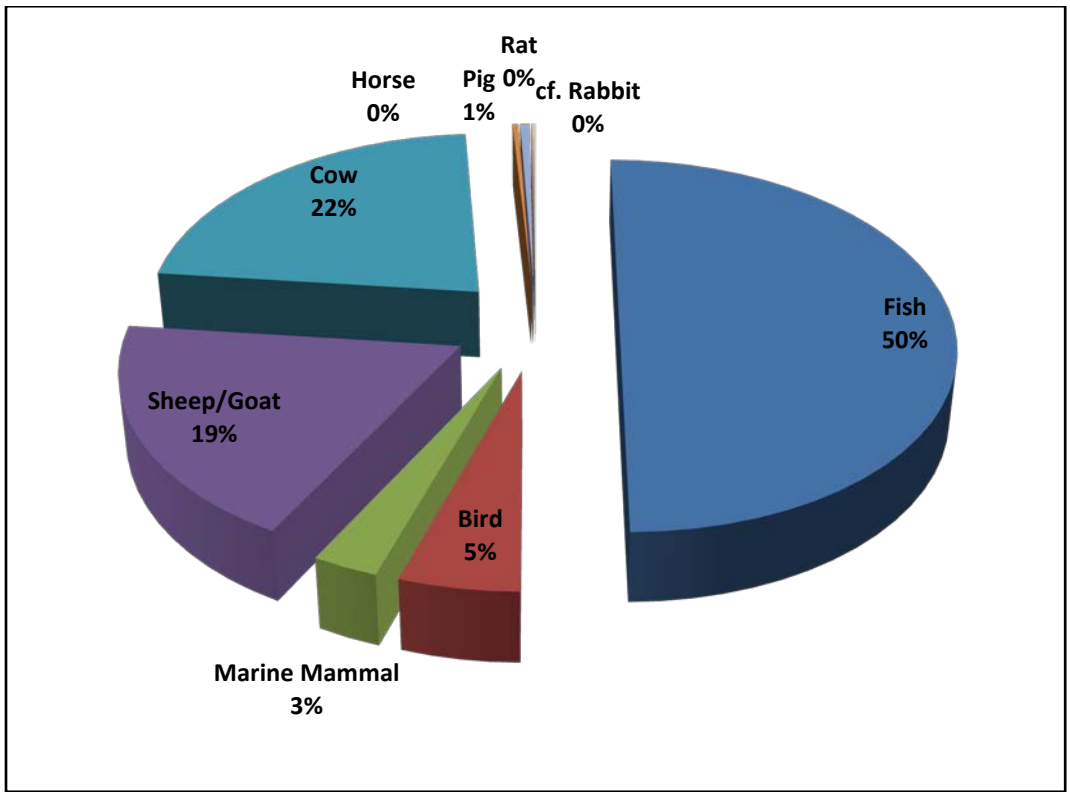


Figure 4. Percentages of the faunal collection represented by major specimen types, excluding finds that were identified as general "land mammal." Compare this chart with the chart in Figure 4, which includes bones recognizable only as "land mammal."

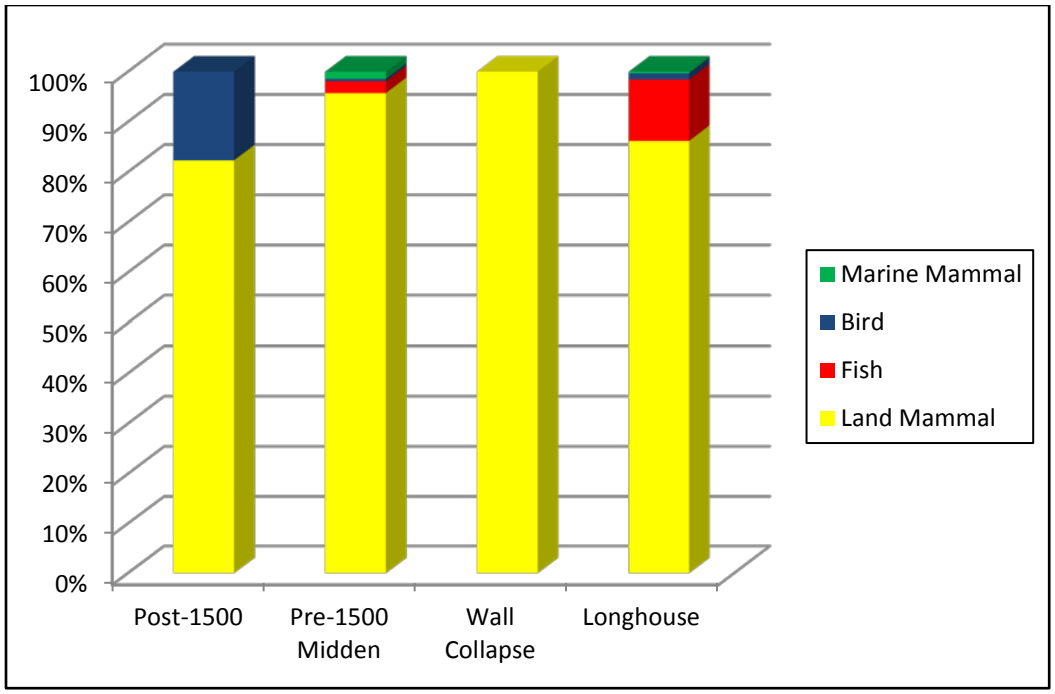
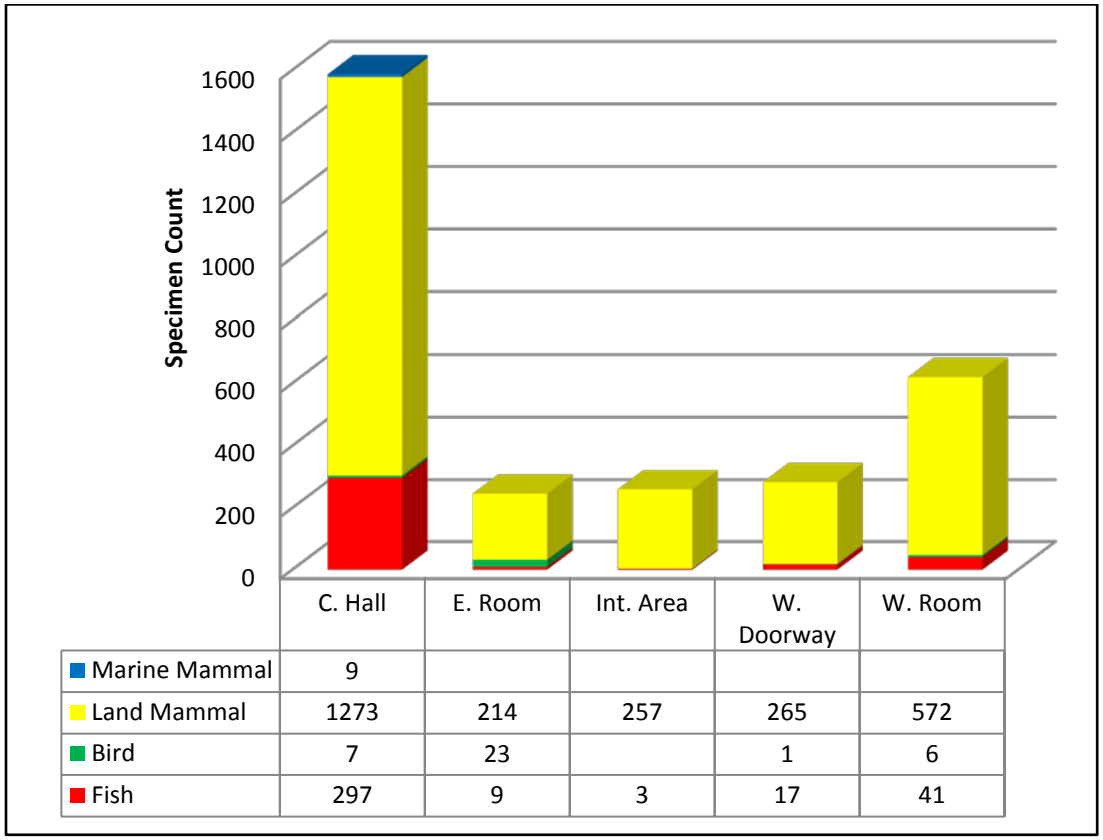


Figure 5. Comparison of the percentage of the assemblage from four broad periods of the TUN excavation area made up of marine mammal, bird, fish, and land mammal.



	C. Hall	E. Room	Int. Area	W. Doorway	W. Room
Marine Mammal	9				
Land Mammal	1273	214	257	265	572
Bird	7	23		1	6
Fish	297	9	3	17	41

Figure 6. NISP of marine mammal, land mammal, bird, and fish in separate spatial units of the longhouse.

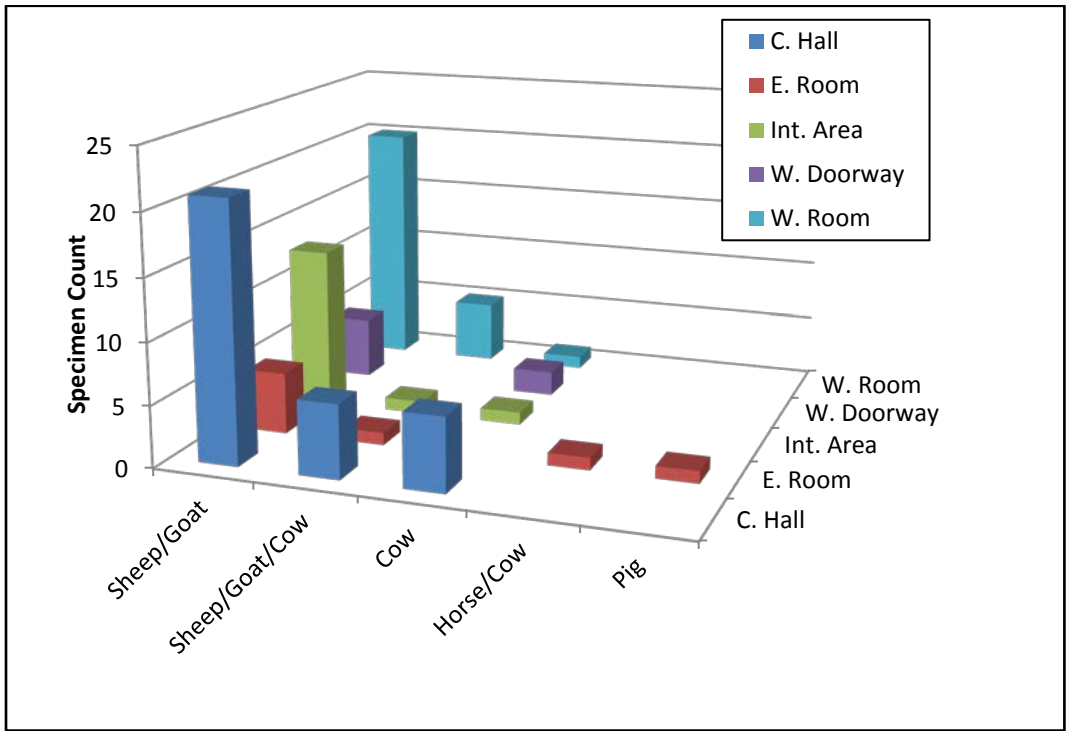


Figure 7. Comparison of the NISP of domesticated animal bones recovered from the separate spatial units of the longhouse.

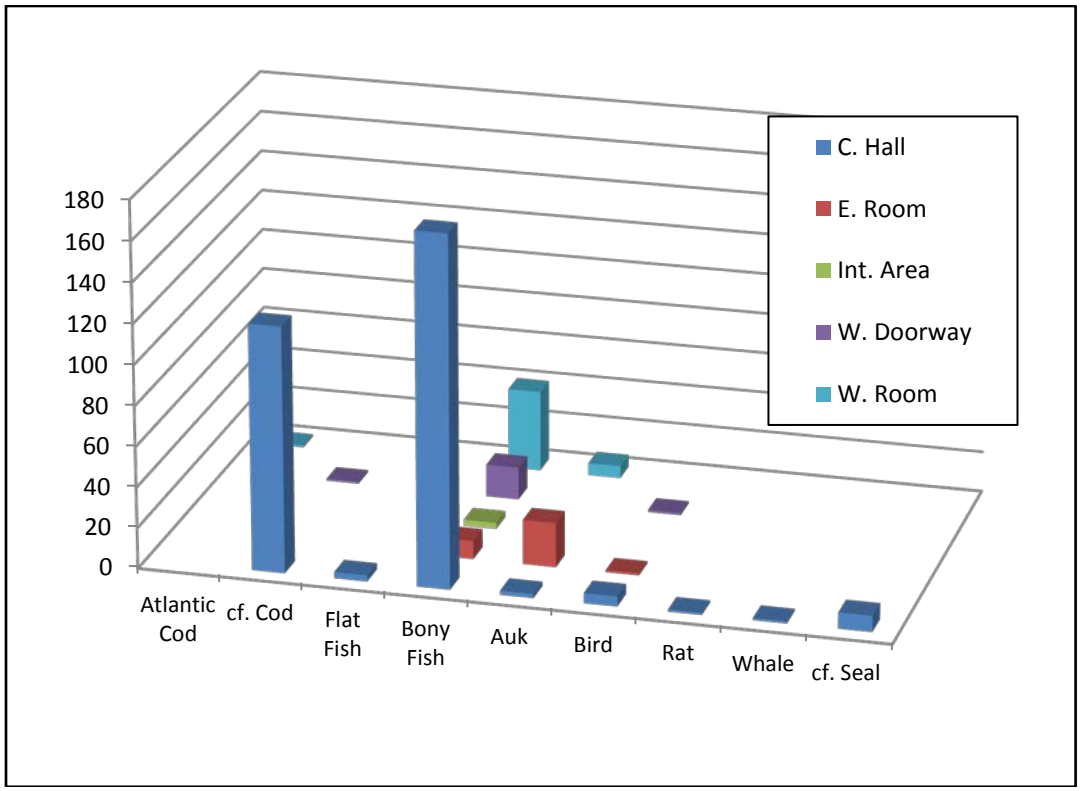


Figure 8. Comparative graph showing the NISP of wild animal bones recovered from the separate spatial units of the longhouse.

Figure 9.

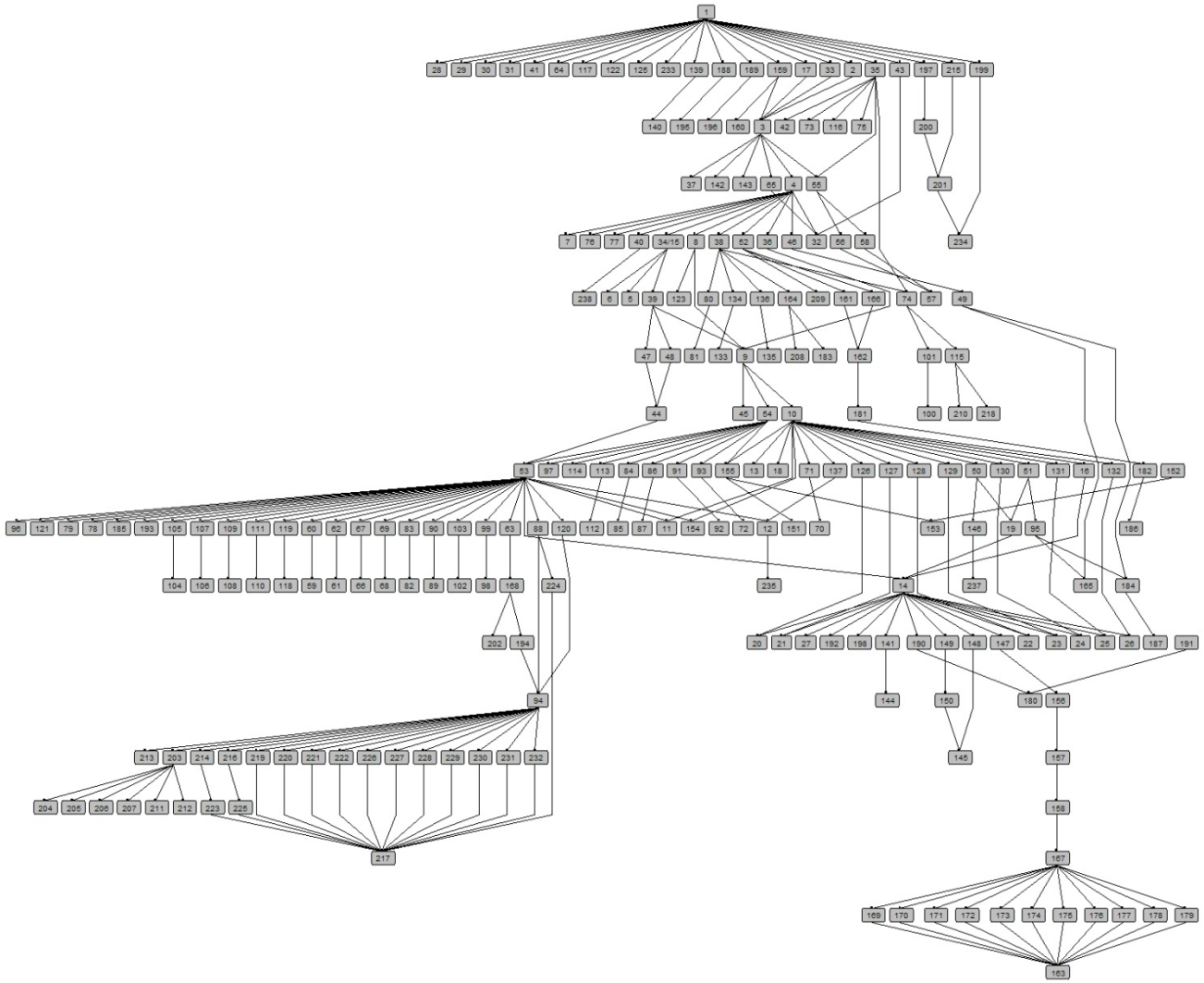


Figure 7. TUN Harris Matrix from 2008 representing stratigraphic relationships of excavated contexts mentioned in this report.

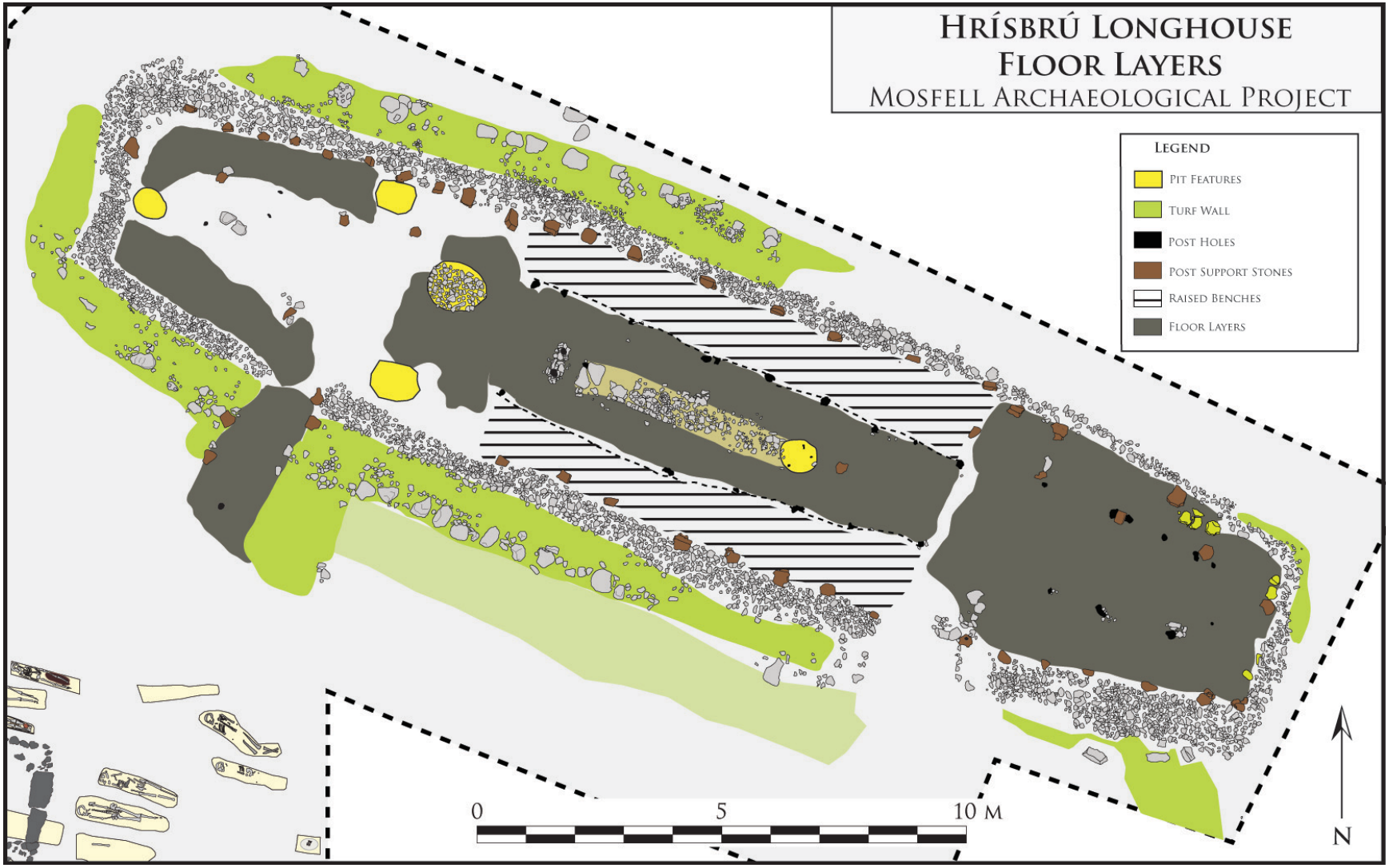


Figure 8. Hrísbrú longhouse with the extent of floor layers indicated and the location of pits shown.