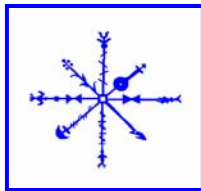


**Preliminary Assessment Report of the Archaeofauna
from KNK 203 (E 74), a Norse Farm in the Eastern
Settlement, Greenland**

Konrad Smiarowski, Albina Palsdottir, Thomas H. McGovern
CUNY Northern Science & Education Center
Doctoral Program in Anthropology
City University of New York

*CUNY Northern Science
and Education Center*



NORSEC

CUNY Doctoral Program in Anthropology
Hunter College Bioarchaeology Laboratory
Brooklyn College Zooarchaeology Laboratory

NORSEC ZOOARCHAEOLOGY LABORATORY REPORT No.39

March 23rd 2007
Contact: nabo@voicenet.com

Summary: This is an interim working report of analysis in progress on the animal bone collection (archaeofauna) from the Norse farm E74 KNK 203 excavated in the summer of 2006 ahead of flooding by hydroelectric dam construction. The archaeofauna is still under study, and this report presents only a partial overview of the collection. However, a number of observations can be made at this stage:

- The collection has been subject to severe attrition from freeze-thaw cycling and repeated flooding and drying. Only the most dense bone elements survive, and even teeth are badly preserved in some contexts.
- While the conditions of preservation will limit the comparative value of the E74 archaeofauna and will probably make a detailed context by context analysis impractical, the collection does have considerable value as a fully sieved archaeofauna from a small inland farm. With care, some broad conclusions about economy can probably be reasonably made.
- These include:
 - Seals were of major importance in all phases at E74, despite its inland location. As in other E Settlement archaeofauna, harp seals and hooded seals are the most common, but a few harbor seal bones have been identified.
 - Walrus bones (both post-canine teeth and maxilla fragments from tusk extraction) are present in the E74 collection, probably indicating participation by household members in the distant arctic Norðursetur hunt.
 - Sea birds (murre or guillemot) were also consumed at E74, further re-enforcing the marine connections of this inland farm.
 - Cattle bone is present, but sheep and goat seem to have been substantially more important at the site. This is a pattern duplicated on other smaller farms known from prior excavations. While smaller farms were apparently more reliant upon sheep and goat herding, they were not complete specialists, and kept a full range of domestic stock.

Discussion

Recovery and Excavation: The 2006 rescue project followed standard NABO bone recovery protocols (stratigraphic excavation, complete sieving through 4 mm mesh dry sieve with substantial whole soil samples retained for flotation) and zooarchaeologist Konrad Smiarowski was a member of the field crew and was able to assist in bone recovery at both E74 and E29N (Brattahlið/Qassiarsuk) in 2006. The field recovery of bone and other ecofacts was thus directly comparable between the two Greenlandic sites and with NABO excavations in Iceland and the Faroe Islands.

Laboratory Methods: analysis of the collection was carried out at the Hunter College Zooarchaeology Laboratory and made use of extensive comparative skeletal collections of the lab 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 land 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. Seal bones are likewise identifiable to species level only on a restricted range of elements (following NABO draft sea mammal guide, currently distributed as part of the FISHBONE 2.1 package). This creates a substantial “phocid species” category comparable to the “caprine” category (which incorporates ribs, small cranial fragments, unidentifiable long bone elements and vertebrae). On some elements it is possible to distinguish “large seals” (either hooded *Cystophora cristata* or bearded *Erignathus barbatus*) from the three smaller species (common/harbor seals *Phoca vitulina*, harp seals *Phoca groenlandica*, and ringed seals *Phoca hispida*). Most cetacean (whale) bone is highly fragmented and probably often represents craft debris, but it has been occasionally possible to distinguish bones of great (usually baleen) whales (“large cetacean”) from the bones of smaller whales (probably narwhal or beluga) or porpoise (“small cetacean”). Murre and Guillemot are not distinguishable on most bones and are presented together as *Uria species*. The data presentation thus attempts to reasonably reflect the different levels accuracy possible in osteological identification, but creates some pooled categories at different taxonomic levels, which require some care in comparisons. Following NABO Zooarchaeology Working Group recommendations and the established traditions of N Atlantic zooarchaeology we have made a simple fragment count (NISP) the basis for most quantitative presentation. Measurements (Mitoyo digimatic digital caliper, to nearest mm) follow Von Den Dreisch (1976), mammal tooth eruption and wear recording follows Grant (1982) and general presentation 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 will be permanently curated at the Greenland National Museum and Archives with full copies at the Zoological Museum of the University of Copenhagen. CD R versions of this report and all archived data are also available on request from nabo@voicenet.com.

Taphonomy & Preservation: Zooarchaeology is constrained by the survival of its basic evidence- animal bones and teeth. Acid soils (below about 6.0 pH) are the most common cause of poor bone preservation, but the average soil pH at KNK 203 E74 was around 6.25-6.5 which should have provided favorable conditions for bone preservation. However, in the field excavators encountered much unrecoverable “bone mush”, and most of the bone brought back for analysis shows heavy exfoliation damage to compact surfaces, as the compact surface of

the bone peels away in sheets. The major agent of attrition seems to be alternate wetting and drying combined with the extreme freeze-thaw cycles typical of the low arctic. As the excavators noted, the farm site was apparently subject to periodic inundation by the nearby stream, and this seems to have had a heavy impact on bone preservation. The surviving collection is strongly biased towards the densest and most compact bones in the skeleton and even sheep and cattle teeth are generally heavily damaged. In zooarchaeological terms, the E74 archaeofauna has all the characteristics of a “ravaged” bone assemblage: taphonomic attrition has had a major role in shaping the characteristics of the collection, obscuring patterns resulting from past human and animal behavior. One indicator of differential degree of attrition is the proportion of teeth to softer bones in an archaeofauna. Table 1 compares the 2006 E74 archaeofauna and the 2005-06 collection from E29N (excavated by the same crews), and illustrates the far higher relative percentage of teeth in the ravaged E74 collection.

Table 1 Teeth as % of Collection

	<i>E74</i>	<i>E29N</i>
% teeth	43.82	10.51

While many cultural factors can determine the relative proportions of burnt and un-burnt bone in an archaeofauna (hearth type, room function, disposal customs), bone that has been strongly burnt (blackened or white calcined) is far more resistant to most forms of post-depositional attrition than unburnt bone. Where severe attrition from either chemical or mechanical causes takes place, an archaeofauna tends to be reduced to tooth enamel and strongly burned bone fragments (Lyman 1996, Grayson 1984).

Table 2 compares the percentages of different degrees of burning on the bone fragments recorded thus far from E74 and E29N. While burnt bone makes up around 5% of the ca. 15,000 bone fragments from E29N, burnt bones make up around 16% of the 7,000 bone fragments thus far recorded from E74. While analysis continues, these figures may serve to illustrate the differences in the taphonomic signatures of the two collections.

Table 2 Burnt Bone	<i>E74</i>		<i>E29N</i>	
	count	%	count	%
Scorched	14	0.19	0	0
Blackened	30	0.41	24	0.16
White calcined	1,120	15.37	683	4.68
total all bone	7,289	15.97	14,608	4.84

Note that while the E74 collection has a disproportionate amount of teeth and burnt bone, the majority of bone fragments recovered were neither. Conditions of preservation were certainly significantly worse than at E29N, but the E74 collection is not a totally ravaged archaeofauna reduced to tooth fragments and

calcined bone. While the severe attrition suffered at E74 greatly constrains the types of analyses that can be done on the collection and limits the conclusions that can be drawn from its study, enough remains to allow some general observations to be made. Note again that this is an in-progress interim report and the final report will certainly modify statements made here.

Preliminary Patterning in Species Presence and Abundance

Table 3 presents the current list of species present in the E74 archaeofauna, with a partial and incomplete quantification provided to give some impression of relative abundance of major taxa present. Figure 1 presents a preliminary overview of the whole collection lumped together.

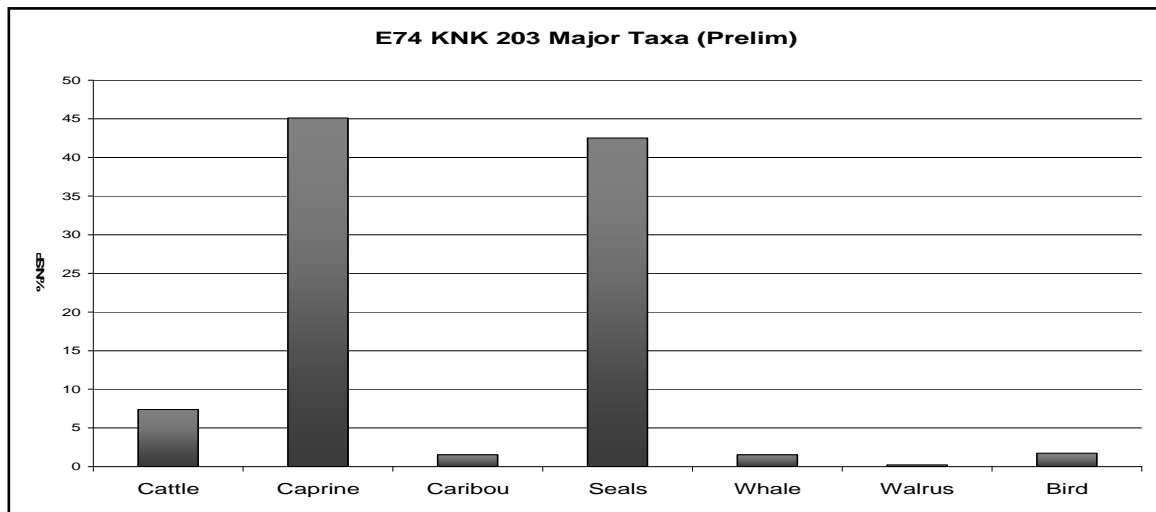


Figure 1: the current total E74 archaeofauna. Note the substantial number of seal bones present.

CONTEXT	[2]	[12]	[17]	[22]	[23]	[25]	[26]	[28]	[32]	[36]	[40]	[55]	[56]	[60]	TOTAL
AREA	A/B	A	B	A	A	B	A	A	A	A	B	B	A	A	
Domestic Mammals															
Cattle	4		14	1	2		1				11		1		34
Dog (X= tooth marks)			x		x						x				
Goat												1			1
Sheep					1	1				1	3				6
Caprine			66	2	14	6	4		3	22	82	1		1	201
Wild Mammals															
Caribou			3		1							3			7
Harp seal			7		1							2			10
Harbor seal			2												2
Hooded seal			2												2
Seal sp.	12		76	1	20	4	1		3	11	49	1		4	182

Walrus						1									1
Porpoise/Beluga size						1	1								2
Whale sp	3		1	1											5
Birds															
Guillemot or Murre									2						2
Bird sp.						1				1	4				6
total NISP	16	3	173	5	40	12	6	0	8	35	155	2	1	5	461
Large Terrestrial Mammal															
Mammal	13	3	32		8	1			10	5	2	3			77
Medium Terrestrial Mammal	3	30	10		4	1	3			12	13	18		1	95
Unidentified Mammal	26	1	4241		6	51		3	9	111	2167	39	2		6656
total TNF	58	37	4456	5	58	65	9	3	27	163	2337	62	3	6	7289

Table 3 Preliminary working list of contexts and taxa identified as of March 23rd 2007. NISP= Number of Identified Specimens, TNF= total number of bone fragments counted. Note the very high proportion of unidentified fragments in this collection, an additional indicator of a ravaged archaeofauna. The larger contexts are all from midden area B.

While it is probably best to regard Table 3 as an incomplete list of species present, it does reveal some patterns probably tied to the farm economy rather than post-depositional attrition. Note that seal bones are present throughout, and in the larger contexts they make up between a third and a half of the identified fragments. Despite the inland location of the farm, the E74 archaeofauna follows patterns observed in older collections from the inland Vatnahverfi (Veboek 1992). Caprines (sheep and goats, both are present) are more common than cattle bones (despite the greater resistance of larger species to attrition) and the approximate 6 : 1 ratio of caprine to cattle holds even if only tooth fragments are compared. Caribou bones are present in small numbers on site, again following While it does not show on the present table, walrus maxillary fragments left over from tusk extraction and the peg-like post-canines used for local craft work are present in the E74 archaeofauna (see Roesdahl 2005, Arneborg 2000), and additional *Uria* sp. Alcid sea birds are also present (see Gotfredsen 1997). As in most Eastern Settlement collections, both species of migratory seals (harp *Phoca groenlandica* and hooded *Cystophora cristata*) are well represented, and it may be possible to use the dense auditory bulla (which can be identified to species level) to derive a proportional measure when the analysis is complete. As usual, the whale bone fragments are hard to interpret as they may well represent artifacts or craft waste rather than food debris (Enghoff 2003).

The overall impression at this stage of analysis is of a small farm with a relatively diverse economy including herding of domestic stock (cattle as well as caprines), making extensive use of marine resources (seals, whale, sea birds), and at least occasionally participating in the distant Norðursetur hunt.

Acknowledgements

The authors would like to gratefully acknowledge the generous financial support of the, CUNY Northern Science & Education Center, National Geographic Society Committee for Research & Exploration, the UK Leverhulme Trust, and grants (0527732, 0732327, 0352596, 0234383) from the US National Science Foundation, Office of Polar Programs (Arctic Social Sciences Program), Archaeology Program, International Polar Year Program, and Human and Social Dimensions of Global Change Program, as well as the Icelandic Millennium Fund. We would also like to thank the excellent team of Greenlandic, Danish, Icelandic, Faroese, Polish, and US crew members who worked so hard to excavate these collections under remarkably challenging conditions.

This report is a product of the North Atlantic Biocultural Organization (NABO) and the International Polar Year 2007-10.

References

Arneborg, Jette

2000 Greenland and Europe, in *Vikings: the North Atlantic Saga*, W.W. Fitzhugh & E.I. Ward eds. Pp 281-284. Washington and London; Smithsonian Institution Press.

Degerbøl, Magnus

1934 Animal Bones from the Norse ruins at Brattahlíð, *Meddelelser om Grønland* 88:149-155.

1941 The Osseous material from Austmannadal and Tungmeralik, *Meddelelser om Grønland* 89:345-354.

Driesch, A von den. 1976. *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Peabody Museum Bulletin 1, Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Massachusetts

Enghoff, I. B.

2003. Hunting, fishing, and animal husbandry at the Farm Beneath the Sand, Western Greenland: an archaeozoological analysis of a Norse farm in the Western Settlement, *Meddelelser om Grønland Man & Society* 28. Copenhagen

Gotfredsen, Anne Birgitte

1997 Sea bird exploitation on coastal Inuit sites, west and southwest Greenland, *International Journal of Osteoarchaeology* 7(4) 271-286.

Grant, Annie 1982. The use of tooth wear as a guide to the age of domestic ungulates, in B. Wilson, C. Grigson, and S. Payne (eds.) *Ageing and Sexing Animal Bones from Archaeological Sites*, BAR British Series 109 pp 91-108. Oxford.

Grayson, D. K. 1984. *Quantitative Zooarchaeology*. Academic press, Orlando

Lyman , R.L. 1996, *Taphonomy*, Cambridge U.P.

Mainland, Ingrid & Paul Halstead

2005 The economics of sheep and goat husbandry in Norse Greenland, *Arctic Anthropology* 42 (1):103-120.

McGovern, T.H.

1992 Zooarchaeology of the Vatnahverfi, in: C.L.Vebaek, *Vatnahverfi ,Meddelelser om Grønland Man & Society*, 17:93-107.

McGovern, T.H., G.F. Bigelow T. Amorosi, J.

Woolett & S.Perdikaris

1993 Animal bones from E17a Narsaq, in: C.L.Vebaek Narsaq- A Norse Landnama Farm *Meddelelser om Grønland Man & Society*, 18

McGovern, Thomas H. & Albina Palsdóttir

2006 Preliminary Report of a Medieval Norse Archaeofauna from Brattahlið North Farm (KNK 2629), Qassiarsuk, Greenland, *NORSEC Laboratory report No. 34*, on file NKA Nuuk & SILA Center.

Roesdahl, Else

2005 Walrus Ivory- demand, supply, workshops, and Greenland, in: Andras Mortensen and Simun Arge (eds.) *Viking and Norse in the North Atlantic: Select Papers from the Proceedings of the 14th Viking Congress, Tórshavn 2001*. *Annales Societatis Scientarium Faeroensis XLIV*, Tóshavn Faroe Islands, pp 182-192.

Vebaek C.L.

1992, *Vatnahverfi ,Meddelelser om Grønland Man & Society*, 17.

1993 Narsaq- A Norse Landnama Farm. *Meddelelser om Grønland Man & Society*, 18

Vibe, Christian

1967 Arctic animals in relation to climatic fluctuations. *Meddelelser om Grønland* 170(5).