

Early in the North - Utilization of Animal Resources in Northern Finland during Prehistory

Pirkko Ukkonen

Department of Geology, P.O. Box 64, FIN-00014 University of Helsinki, Finland,
pirkko.ukkonen@helsinki.fi

Animal bones from archaeological sites, the so called refuse faunas, can give valuable information about the economy of prehistoric peoples, provided problems connected with the burnt, fragmented material and the dating of the sites are understood and considered in the interpretation of the analyses. In this paper I present some methods and tools for reliable interpretation of the problematic bone material available in Finland. I discuss the composition of the refuse fauna in northern Finland, its variation in time and space and its affinities with the cultural phases, the character of hunting at different sites, and finally the treatment of the game at the sites. The final aim of the paper is to encourage archaeologists to use this data combined with other archaeological information, like artefacts and structures, in order to reach better understanding of the functions of the individual sites and the character of the hunter-gatherer communities in northern regions.

Key words: Northern Finland, burnt bone, refuse faunas, prehistory

Introduction

The history of the Finnish vertebrate fauna is still insufficiently known, despite of the recent research in mammalian (Ukkonen 2001) and avian (Mannermaa 2002, Mannermaa 2003) history. The reason for the limited research in this field is obvious: fossil remains are extremely scarce in Finland and so are the subfossil stray finds. Refuse faunas, bone remains from archaeological dwelling sites, offer, however, a useful, if not uncomplicated, source for studies concerning both faunal history and early human economy in Finland.

In connection with the interdisciplinary research project *Early in the North*, hosted by the Department of Archaeology of the University of Helsinki (more about the project, see Carpelan 1998), all available osteological

data gathered during archaeological excavations and surveys in Northern Finland was summarized.

The main task of the osteological analysis was to gain an understanding of the general living conditions of prehistoric people in Northern Finland, the resources available to them, and their hunting and fishing habits and preferences at different times and localities. A similar study was carried out earlier in southeast Finland (Ukkonen 1996).

A further goal of the project is a detailed faunal history study based on mammalian bone remains and radiocarbon dates of charcoal, tree remains, and ceramics in the immediate vicinity of the finds. Since only burnt bone survives in the acid soil typical of Finland, a direct radiocarbon dating of the bones has not been possible. A preliminary report of the zoological results has been given

in Ukkonen (1997). The results of the project have also been used in studies concerning the history of the wild reindeer in Finland (Rankama & Ukkonen 2001) and the history of seals in the northern Baltic (Ukkonen 2002).

In this report I present the material included in the study, the problems connected with it, and the main results from an archaeological point of view. I shall discuss the composition of the refuse fauna in northern Finland, its variation in time and space and its affinities with the cultural phases, the character of hunting at different sites, and finally the treatment of the game at the sites. The aim of the paper is to provide basic data about the sites, to point out problems, and to provide tools for further studies leading to a more comprehensive understanding of the function of settlement and character of the prehistoric economy.

Material and Methods

Material

The material consists of subfossil bone fragments recovered in connection with archaeological excavations and surveys of prehistoric occupation in the provinces Lapland and Oulu in Northern Finland until 1995. It consists of 216 samples; 161 samples from 98 localities contained identifiable fragments (Fig.1, App. 1). A total of 49 213 mammalian, bird and fish bone fragments have been determined. Most of the material has been collected and analysed earlier, only ca. 30 samples were analysed in connection with the present project. Some of the analyses have also been published earlier (Sohlström 1992; Ukkonen 1993).

This study is restricted to the Mesolithic (7000 - 4200 BC), Neolithic (4200-1300 BC), the Early Metal Period (1300 BC – AD 300), and the Iron Age (AD 300 – AD 1300) of Northern Finland; (Saarnisto & al. 1996). The Historic period (AD 1300/1650 onwards) (Saarnisto & al.1996) will be approached in a further study.

Most of the material is burnt and highly

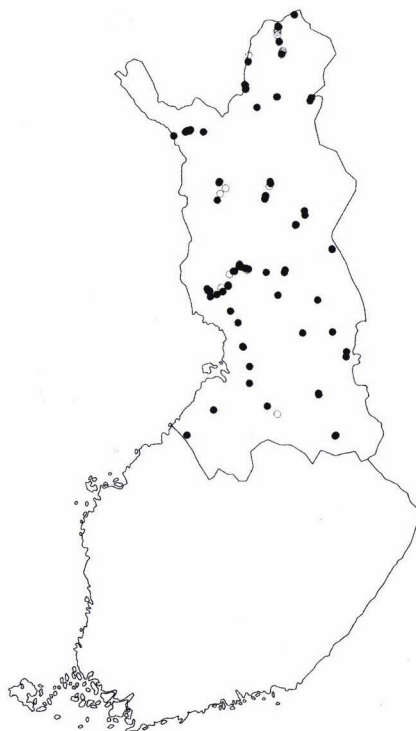


Fig. 1. Prehistoric occupation sites in Northern Finland with analysed refuse faunas. Dots = identified bone fragments, circles = no identified bone fragments.

fragmented. Only a few slightly burnt or unburnt bones are included. Bone artefacts are excluded from the study.

Identification

The bone fragments were analysed morphologically by comparing them with modern vertebrate skeletons using the collection of the Zoological Museum in Helsinki as reference material. The majority of the osteological analyses was carried out by the author, but a number of samples have been analysed earlier by other osteologists (App. 1). The work of the different osteologists is, in my opinion, relatively comparable, presenting the results in lists containing the identified skeletal parts, their number and the species concerned. There are, of course, individual differences in the methods of determination, mainly affecting the quantitative data.

Problems Connected with the Material

There are some general problems connected with the investigation of prehistoric sites. The most important ones are the dating of the sites and the taphonomy, preservation, fragmentation and identification of the bones. These set special requirements on the interpretation of the results.

The most serious problem is the dating of the sites. In coastal areas the settlement was typically of relatively short duration because of the retreating shoreline, but in the interior sites were often occupied repeatedly for longer or shorter periods. This means that different cultural remains are found mixed, which makes it difficult to separate the different settlement stages and the bone remains tied with them. This causes great difficulties when trying to compare hunting strategies during different cultural stages.

Refuse faunas give direct information about the hunting strategies and preferences of prehistoric people. However, hunting and butchering methods, tool making, dislocating of bones by scavengers, and the unequal preservation of bones of different species and of different skeletal parts, change the anatomical and species composition of the original bone material. Differences in excavation methods and, finally, problems connected with the osteological analysis result in data both qualitatively and quantitatively different from the original assemblage.

Bones are poorly preserved in the acid soil typical of Finland. Heating - cooking or burning - seems to improve their preservation considerably, which is why almost exclusively burnt bones are recovered in the excavations. In the soil, different parts of the skeleton and bones of different species do not have equal resistance to decomposition. Small, compact bones of the distal parts of the limbs of mammals are far more resistant than thin or spongiform bones like shoulder blades or vertebrae. Mammalian bones are preserved better than hollow avian bones.

The most serious problem in analysing

burnt bones arises from their fragmentation - the size of the pieces seldom exceeds one cm³. Because of this, only a fraction of the excavated bones can be determined. The identification quota is different for different parts of the skeleton and for different species and species groups.

Carpal and tarsal bones of mammals, as well as the articular epiphyses of long bones, are the parts of the skeleton easiest to identify because of their characteristic shapes. This has to be taken into account, when drawing conclusions about the treatment of the carcasses based on the skeletal parts included in the material.

Species such as beaver and Arctic hare leave characteristic fragments that can be determined unequivocally. The bones of some species groups, such as canids, mustelids, and especially seals, have also very characteristic shapes, but their determination as to species is difficult. This is why some higher taxa, like Phocidae (seals), Anatidae (anatid birds), *Gavia* sp. (loons), and Cyprinidae (cyprinid fish) are treated in the following analyses as "species".

Because of the problems connected with the taphonomy, preservation and identification of bones, neither the species composition nor their quantitative proportions in the data directly represent the original prey. The absence of a species from the data is not absolute proof for the absence of human utilization.

The same principle applies to the presence and absence of different skeletal parts, and should be considered when drawing conclusions about the treatment of the prey at the sites. Under certain circumstances the absence of particular skeletal parts may be significant. This is the case when for instance phalanges of elk or reindeer, which normally form the bulk of the identifiable material, are absent in an otherwise representative sample. As a rule, however, only the presence - not the absence - of specific parts of the skeleton should be regarded as evidence.

Quantitative methods

Because of the above problems, great caution is required when interpreting the data in quantitative terms. The numbers of excavated or identified bone fragments can by no means be interpreted as abundances of different species in the diet. They can, however, tell us something about the preferences of people in different areas or settlement stages in relation to each other (see also Ekman & Iregren 1984). The number of identified fragments was used this way in analysing the economy of prehistoric people during different cultural stages and in different environments. Further it was used to describe the diversity of the hunted game at different localities, and to some extent also to analyse the utilization of the carcasses.

The absolute number of sites was used in describing the commonness of different species in the material. Ekman & Iregren (1984) applied the same method using percentages in the burnt bone materials found at prehistoric dwelling sites in northern Sweden.

The Minimum Number of Individuals (MNI) has not proven to be a very useful method in describing Stone Age bone materials. Large species such as European elk and wild reindeer, have long bones which can be crushed into a lot of fragments, only a few of which have diagnostic features. For the larger game the minimum number of individuals is nearly always one, because it is difficult to find more than one fragment of exactly the same spot in a bone. Even for animals with shorter bones like beavers or seals the MNI clearly underestimates their number. Only in very large samples the MNI of these animals exceeds 2-4 individuals.

Radiocarbon dating

Until today, it has not been possible to use the radiocarbon method for dating burnt bone fragments from prehistoric sites, since burning eliminates all collagen in the bone. Recently, a new method for dating cremated bones has been developed by Lanting *et al.*

(2001). In this method the structural carbonate in the mineral fraction of the bone is used and no organic collagen is required. So far this method has not been systematically applied to Finnish material.

All dates of individual species mentioned in this paper are based on radiocarbon dates of charcoal, unburnt wood, and ceramics recovered from the immediate vicinity of the bone finds. The contexts of all dates were discussed with each excavation director in order to gain as reliable a data set as possible. The dates are given as uncalibrated values BP, but also as calibrated (calBC) values using the method described by Plicht (1993). The calibration was performed by Christian Carpelan from the University of Helsinki Institute for Cultural Studies, Dept. of Archaeology.

Results

Composition of the refuse fauna

Mammals

The species and other taxa identified in the analysed refuse faunas are displayed in Table 1, and their commonness based on the number of localities where their bones have been identified can be seen in Fig. 2. A list of species found at individual sites is found in App. 2. The most common terrestrial mammal species is the beaver (*Castor fiber*), which is present at two thirds of the sites. The next two species in order of commonness are the wild reindeer (*Rangifer tarandus*), and the European elk (*Alces alces*). The pine marten (*Martes martes*) is relatively common in the refuse faunas, but other carnivores, such as the red fox (*Vulpes vulpes*), the brown bear (*Ursus arctos*), and the otter (*Lutra lutra*) are relatively rare. Bones of the red squirrel (*Sciurus vulgaris*) are found at a few sites. The Arctic hare (*Lepus timidus*) is more common.

Some carnivores living today in Northern Finland, like the wolf (*Canis lupus*), the Arctic fox (*Alopex lagopus*), the wolverine (*Gulo gulo*) and the lynx (*Lynx lynx*) are totally

Table 1. Species and species groups found at prehistoric sites in the provinces Lappi and Oulu.

Species	Samples	Sites
Mammals		
<i>Canis familiaris</i> (domestic dog)	10	6
<i>Vulpes vulpes</i> (red fox)	8	5
<i>Ursus arctos</i> (brown bear)	13	11
<i>Lutra lutra</i> (otter)	2	2
<i>Martes martes</i> (pine marten)	26	19
Phocidae (seals)	64	35
<i>Alces alces</i> (European elk)	56	40
<i>Rangifer tarandus</i> (wild reindeer)	75	47
<i>Sciurus vulgaris</i> (red squirrel)	4	2
<i>Castor fiber</i> (beaver)	94	60
<i>Lepus lepus</i> (Arctic hare)	24	16
Birds		
<i>Gavia</i> sp. (loons)	5	5
<i>Podiceps</i> sp. (grebes)	1	1
<i>Cygnus cygnus</i> (whooper swan)	2	2
Anseriformes (other anatid birds)	21	14
<i>Anas platyrhynchos</i> (mallard)		
<i>Anas crecca</i> (teal)		
<i>Anas penelope</i> (European wigeon)		
<i>Aythya fuligula</i> (tufted duck)		
<i>Melanitta fusca</i> (velvet scoter)		
<i>Clangula hyemalis</i> (long-tailed duck)		
<i>Aquila/Haliaeetus</i> (eagles)	2	1
<i>Lagopus lagopus</i> (willow grouse)	11	11
<i>Tetrao urogallus</i> (capercaillie)	9	9
<i>Tetrao tetrix</i> (black grouse)	3	3
Fish		
<i>Esox lucius</i> (pike)	69	39
<i>Perca fluviatilis</i> (perch)	25	19
<i>Stizostedion lucioperca</i> (pike perch)	4	3
Cyprinidae (cyprinid fish)	31	20
Salmonidae (salmonid fish)	5	5

absent from the finds.

Seal bones appear frequently at coastal sites, but they occur also at dwelling sites located inland, for instance near the Ancient Lake Kolpene.

Birds

Bird bones are difficult to determine as to species - especially when the bones are fragmented and cannot be measured. In most cases, only higher taxa have been used in the analysis (Table 1, Fig. 2). The bulk of the bird material consists of anseriform and tetraonid species. The whooper swan (*Cygnus cygnus*) is easy to recognize due to its large size. The

determination of the other mentioned anseriform species, like the mallard (*Anas platyrhynchos*), the teal (*Anas crecca*), the tufted duck (*Aythya fuligula*), the velvet scoter (*Melanitta fusca*) and the long-tailed duck (*Clangula hyemalis*) is more uncertain. The tetraonid bird bones included the capercaillie (*Tetrao urogallus*), the black grouse (*Tetrao tetrix*), and the willow grouse (*Lagopus lagopus*). No bones of the arctic ptarmigan (*Lagopus mutus*) were determined. The material also contained some bones of eagles (*Aquila chrysaetos* /*Haliaeetus albicilla*), loons (*Gavia* sp.), and grebes (*Podiceps* sp.).

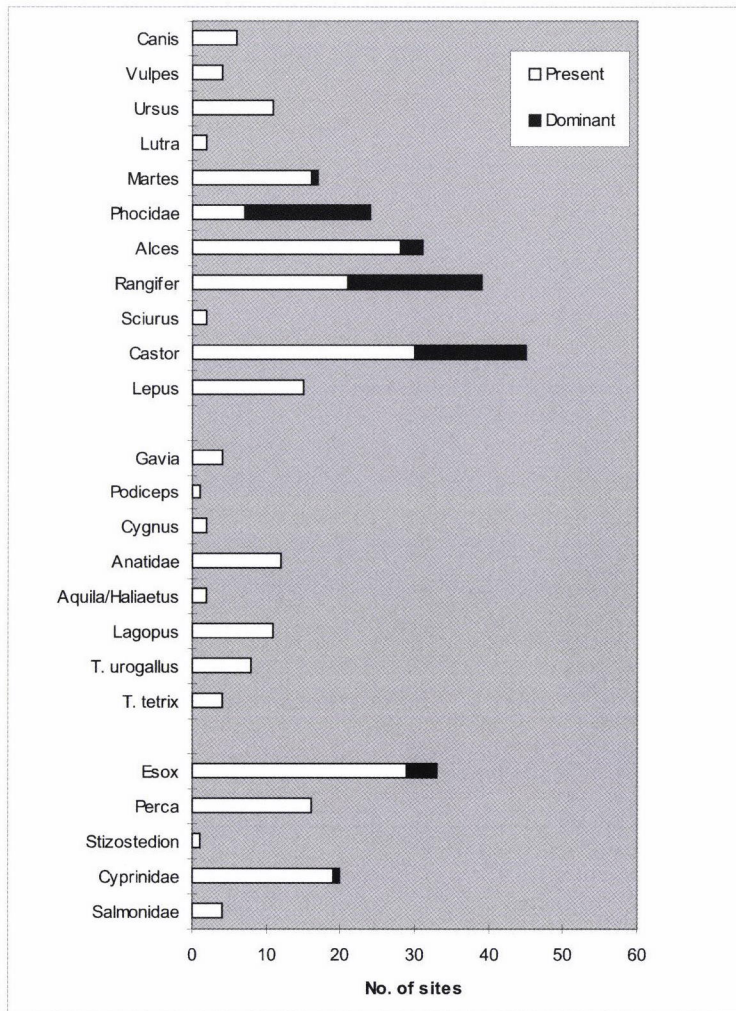


Fig. 2. Species and species groups identified in the analysed refuse faunas in Northern Finland, and their commonness based on the number of localities where their bones have been identified.

Fish

The most common fish in the refuse faunas from northern Finland is the pike (*Esox lucius*) (Fig. 2). The preservation of pike bones is very good, and they are easily determined, which affects directly their proportion of identified bone fragments. Cyprinid fish are often found in large quantities (up to 800 identified and 7000 unidentified fish fragments in Taivalkoski Tervaniemi!). The perch (*Perca fluviatilis*) is rather common in the material, but the pikeperch (*Stizostedion lucioperca*) is rare. Salmonid fish bones are scarce in the material. Whether this is due to the poor preservation

of the cartilaginous bones, fishing technology or other factors, is not known. Another, totally missing species worth to mention is the burbot (*Lota lota*).

Composition of the faunas in time and space

The history of individual species in northern Finland based on radiocarbon dates will be published elsewhere and will not be discussed here. However, the dates also reveal some features about the economy of prehistoric people that are of interest and

worth summarizing.

The oldest refuse fauna that can reliably be tied with an absolute date derives from Hyrynsalmi 16 Koppelsoniemi in the southeast part of the research area. Here four species, the European elk, the beaver, the Arctic hare, and the pike have all been found in contexts dated to 8260±30 BP (7450[7310]7120 calBC). This species combination can with good reason be called a typical Mesolithic one, since it appears regularly in the whole of Finland. In southern Finland the red fox is also added to this species combination.

A typical early Mesolithic phenomenon in the northernmost part of the research area is the total dominance of the wild reindeer. The oldest dates of this species have been recorded from Enontekiö 89 Museotontti (7750±120 BP; 6800[6600]6490 calB), Inari 13 Saamen museo (7600±90 BP; 6530[6440]6330 calBC), and Inari 14 Vuopaja N (7530±150; 6510[6370]6230 calBC). The European elk enriches the refuse fauna in Inari 13 Saamen museo at 7330±120 BP (6330[6190]6070 calBC) at the latest, and in Enontekiö 198 Suonttajoki W1 at 6940±120 BP (5550[5440]5340 calBC). The oldest dates for the beaver are 6850±110 BP (5840[5740]5650 calBC) in Inari 14 Vuopaja N, and 6380±110 BP (5450[5350]5220 calBC) in Enontekiö 17 Myllyjärämä. The brown bear does not appear in this area before the late

Mesolithic (Enontekiö 208 Valkeajärvi E (5820±150 BP; 4852[4677]4515 calBC).

The available radiocarbon data do not allow definite conclusions about the character of the Neolithic refuse faunas. The most interesting phenomenon concerning the Early Metal Period and the Iron Age is the appearance of the bones of salmonid fish in Inari 13 Vuopaja (2220±80 BP; 360[270]170 calBC) and Inari 13 Saamen museo (1230±100 BP; calAD 705[805]920).

Since all coastal sites (as well as some inland sites) contain seal bones, it is obvious that seals were the main game in coastal areas at all times during the prehistoric period. More detailed dates are given in Ukkonen (2002).

Refuse faunas, cultural phases, and environments

The question whether or not the hunting strategy and the human economy differed depending on the cultural phase of the settlement is, of course, of great interest. Because of the problems connected with the dating of the sites (see above), this question can only be answered after more detailed archaeological work resulting in precise analyses about the horizontal and vertical distribution of the finds at the studied sites. Analyses of this kind were not available at the

Table 2. Stone Age sites chosen for a cultural phase/environment analysis (see Fig. 3 and 4).

	Kuivaniemi	No. of identified fragments				Taivalkoski
		Simo	Tervola	Sodankylä		
Canidae	2	0	0	0	0	
<i>Vulpes vulpes</i>	13	1	0	0	0	
<i>Ursus arctos</i>	0	0	0	0	19	
<i>Lutra lutra</i>	10	0	0	0	0	
<i>Martes martes</i>	11	1	2	0	0	
<i>Alces alces</i>	24	7	0	4	287	
<i>Rangifer tarandus</i>	0	7	22	55	4	
<i>Castor fiber</i>	454	215	7	0	4	
<i>Sciurus vulgaris</i>	2	0	0	0	0	
<i>Lepus timidus</i>	32	1	2	0	0	
Phocidae	1915	1345	606	0	0	
Σ	2463	1577	639	59	314	

time of this research project. I have, however, chosen some Stone Age sites with relatively reliable dates for a pilot analysis (Table 2).

I first studied three dwelling sites (Kuivaniemi 3 Veskankangas, Simo 40 Tainiari, and Tervola 30 Törmävaara) located near estuaries but occupied during different chronological periods (Fig. 3). These sites represent the coastal Mesolithic, the Early Asbestos Ware (Ka 1), and the Typical Combed Ware (Ka 2), respectively. Mammals dominate the fauna at all three sites. In Kuivaniemi the proportion of fish is bigger than in the other sites. The mammalian refuse fauna is dominated at all three sites by seals, which is typical for coastal dwelling sites. In Tervola the number of identified beaver bone fragments is smaller than at the two other sites, and the material contains a relatively large number of reindeer bones. Still, there are no significant differences in the refuse faunas of the three dwelling sites.

For the next analysis I chose three Mesolithic sites (Kuivaniemi 3 Veskankangas, Sodankylä 30 Autiokenttä, and Taivakoski 37 Tervaniemi) located in different kinds of environments (Fig. 4). Kuivaniemi is a coastal site, while Sodankylä lay on a river bank, and Taivakoski at a lake shore. The proportions of mammals and fish are quite different at the three dwelling sites: the Taivakoski site is dominated by fish, while the other sites are dominated by mammals. The mammalian refuse fauna is dominated by different species at all three sites: in Kuivaniemi by seals, in

Sodankylä by reindeer, and in Taivakoski by European elk. There seem, thus, be significant differences in the refuse faunas of the three dwelling sites.

These results can only be regarded as preliminary. A significantly larger sample and more representative sites are needed before any definite conclusions can be drawn. For instance, the sample from Sodankylä is far too small for a reliable quantitative analysis. The results suggest, however, that the economy of the prehistoric peoples was determined by environmental conditions prevailing in the area.

Character of the hunting

The character of the hunting at different sites can be described with methods used in modern ecology to reveal the structure of communities. Such methods are, for instance, the number of species present in the refuse fauna, their number relative to the size of the sample, and so called diversity indices. Refuse faunas can also be characterized by the dominance of individual species.

Species richness

The number of animal species, or the species richness, found at the dwelling sites is one way to describe the diversity of the game hunted by prehistoric people at different localities. Sites with the highest numbers of game species are listed in Table 3. The species richness is highest at Kuivaniemi 3

Table 3. Prehistoric sites in Northern Finland with a large number of identified animal species. The number of identified bone fragments include higher taxa like Mammalia, Aves, and Teleostei.

Site	Species	Identified fragments
Kuivaniemi 3 Veskankangas	17	5812
Rovaniemi 340 Jokkavaara	17	2168
Kuhmo 14 Vasikkaniemi SW	12	9924
Rovaniemi 474 Sierijärvi Riitakanranta	12	2118
Rovaniemi 253 Kolpene	12	234
Ylikuiminki 28 Latokangas	11	2961
Ranua 37 Kultisalmi	10	580
Rovaniemi 469 Sierijärvi Kotijänkä	10	1453
Simo 40 Tainiari	10	2007

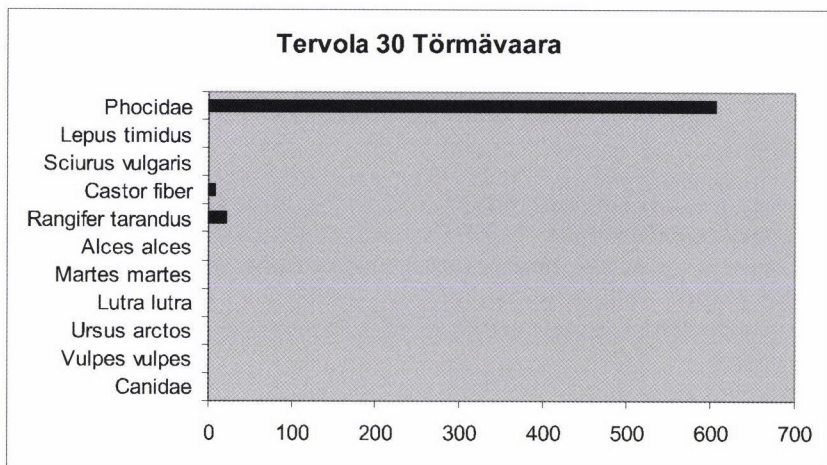
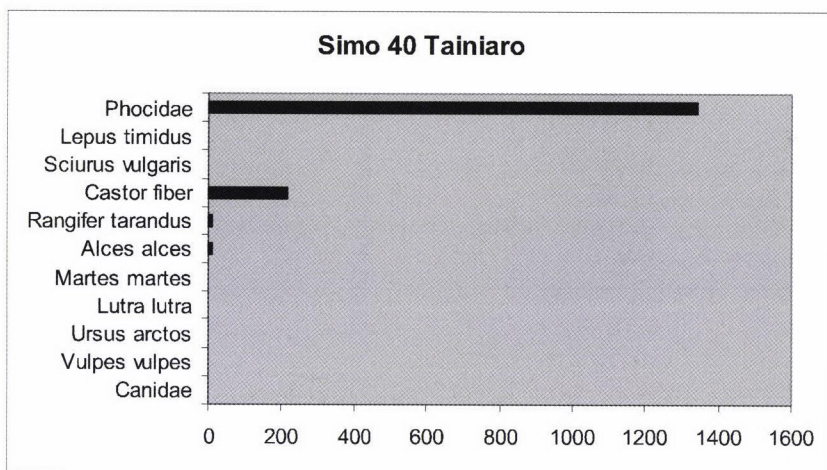
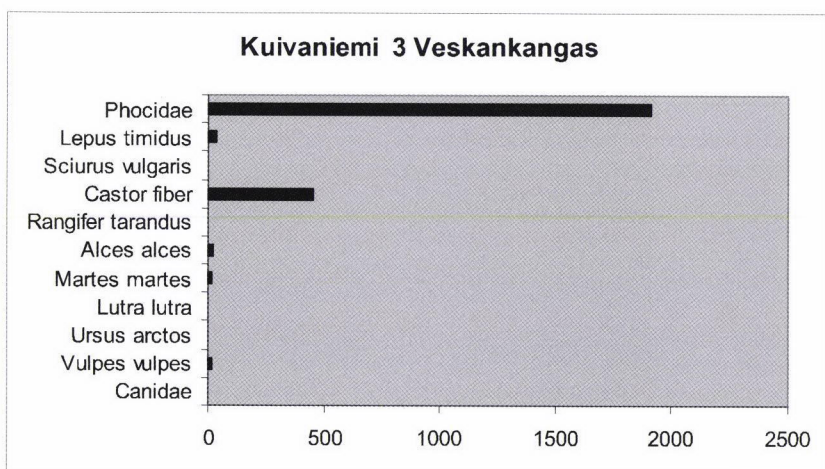


Fig. 3. Dwelling sites located near estuaries but occupied during different chronological periods. The sites represent the coastal Mesolithic, the Early Asbestos Ware (Ka 1), and the Typical Combed Ware (Ka 2), respectively. The bars represent the absolute number of identified bone fragments per species. Note the different scales.

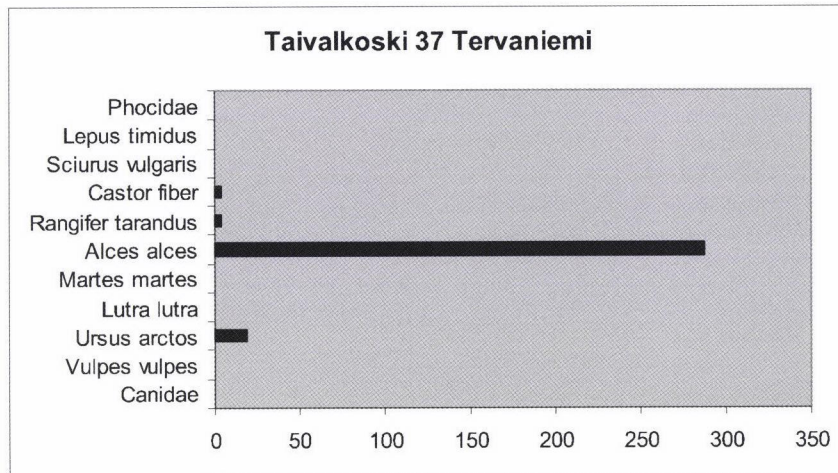
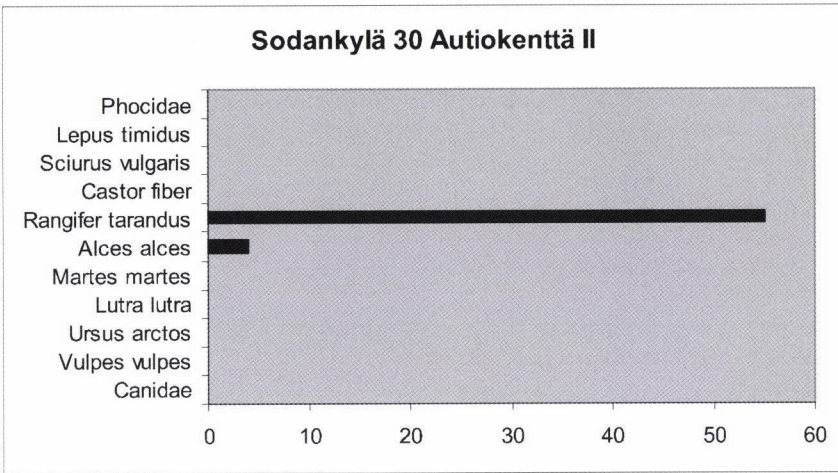
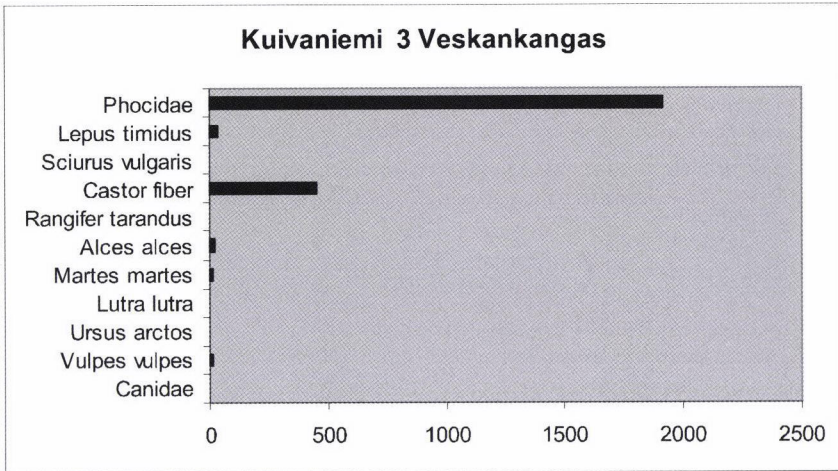


Fig. 4. Mesolithic sites located in different kinds of environments. Kuivaniemi is a coastal site, Sodankylä lay on a river bank, and Taivalkoski at a lake shore. The bars represent the absolute number of identified bone fragments per species. Note the different scales.

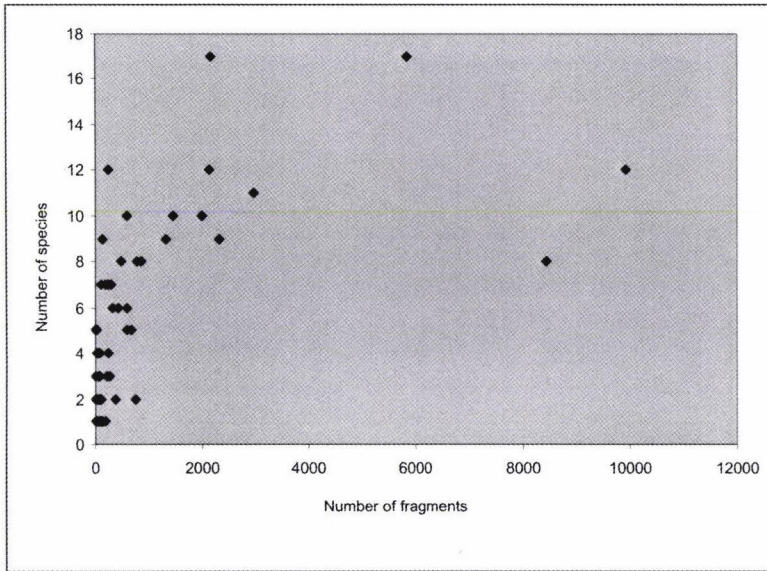


Fig. 5. The number of species present in the refuse faunas plotted against the number of identified bone fragments.

Veskankangas and Rovaniemi 340 Jokkavaara.

In a sample, the number of species is, however, always dependent on sample size. In Fig. 5 the number of species present is plotted against the number of identified bone fragments. Most of the samples fit well to the general curve, but some localities can be pointed out as outliers with significantly more - again Rovaniemi 340 Jokkavaara, and Kuivaniemi 3 Veskankangas - or less - Taivalkoski 37 Tervaniemi - species than expected. This can be interpreted as diverse and specialized hunting, respectively. At Taivalkoski the very low number of species in relation to the total number of identified bone fragments reflects the high proportion of fish in the sample.

Diversity

In a refuse fauna with several animal species, one species or species group can be so abundant that it dominates the whole fauna. In this case hunting at that locality cannot be described as diverse, but rather specialized. A simple measure of the character of the game that takes into account both the abundance patterns and the species richness is Simpson's diversity index. The index is calculated by determining for each species the proportion of individuals, biomass - or, in this case, bone fragments - that it contributes

to the total in the sample, i.e. the proportion is P_i for the i th species:

$$D = \frac{1}{\sum_{i=1}^s P_i^2}$$

where s is the total number of species in the sample. The value of the index depends on both the species richness and the evenness with which fragments are distributed among the species. Samples consisting of only one species, have an index of 1. The index increases both with the number of species and/or the evenness of their abundances. It is important to understand that this kind of indices are only figures describing samples in relation to each other. Sites with highest diversity indices are given in Table 4. This time, Rovaniemi 340 Jokkavaara and Kuivaniemi 3 Veskankangas are not among them. At Rovaniemi Jokkavaara the fauna is dominated by the beaver, and at Kuivaniemi by seals. Both sites have, however, rather high diversity indices: 2.56 and 2.27, respectively.

Dominance

In most samples one species or species group dominates clearly the refuse fauna (Fig.

Table 4. Prehistoric sites in Northern Finland with high diversity indices (Simpson's index D^*). The number of identified fragments do not include higher taxa like Mammalia, Aves, and Teleostei.

Site	D	Species	Identified fragments
Rovaniemi 253 Kolpene	3.67	12	222
Rovaniemi 135 Ylitalo/Toivola	3.57	5	10
Ylikiiminki 28 Latokangas	3.35	12	1026
Hyrnsalmi 16 Koppelsoniemi	3.27	6	537
Suomussalmi 25 Kalmosärkkä	3.25	6	203
Suomussalmi 53 Tormuan Särkkä	3.21	9	101
Ranua 37 Kultisalmi	3.11	10	324
Rovaniemi 277 Saarenkylä Piirittävaara	2.97	6	49
Inari 406 Nellimjoen suu	2.95	7	49

$$* D = \frac{1}{\sum_{i=1}^s P_i^2}$$

2). Based on this dominance, the sites can be coarsely divided into five categories (Table 5): sites with refuse faunas consisting totally or nearly totally of seal bones, sites dominated by seal but containing a variety of other species, sites dominated by reindeer, sites dominated by beaver, and sites dominated by fish. Besides these main categories there are some sites with other dominant species, like European elk and pine marten.

Sites with a refuse fauna dominated by seals have all rather low diversity indices, which support the idea of a specialized hunting. Kuivaniemi 3 Veskankangas and Rovaniemi 123 Ala-Korkalo are exceptions. In both localities the prey is more evenly divided between different species than in other seal dominated sites. The sample of Ala-Korkalo is very small and does not allow further interpretations. In Veskankangas the relatively high diversity is mainly due to the abundance of beaver and fish in the sample.

Reindeer dominated faunas have also low diversity indices. High values are found at Inari 14 Vuopaja N, and Inari 13 Saamen museo. These sites consist of different structures with different faunas, and a more detailed analysis of the individual samples from different functional structures could give a totally different picture. Typical species in reindeer dominated faunas are the European elk, the beaver, and the brown bear.

Some beaver dominated localities can be

described as specialized beaver hunting sites. These are Enontekiö 202 Majava SW, Taivalkoski 33 Atsinki 2, Savukoski 60 Akanjoensuunaro, and Pelkosenniemi 84 Säynäjäojan suu. All other sites have relatively high diversity values. An abundance of fish, especially the pike, is typical for beaver dominated faunas. All fish dominated localities can be described as non-specialized hunting sites, except perhaps Kuhmo 14 Vasikkaniemi, where a vast number of fish bones still wait to be analysed.

Sites dominated by other animal species are rare. Sodankylä 163 Matti-Vainaan Palo can be described as a specialized elk hunting site, but Kuhmo 134 Katerma Järvelä, Sodankylä 87 Kelukoski E, and Rovaniemi 254 Kolpene have too high diversity values to be specialized. The high abundance of pine marten at Inari 13 Vuopaja is hardly an artefact and can be interpreted as an unusually intensive fur game hunting - in spite of the fact that the MNI or Minimum Number of Individuals is as low as 2 (see chapter about quantitative methods).

Treatment of the carcasses

Analysis of the anatomic composition of the bone material can give direct information about the treatment of the carcasses at the site or at the kill site. This again tells something about why or for what purposes different

Table 5. Prehistoric dwelling sites divided into categories based on the dominance (more than 50% of identified bone fragments) of different species in the refuse faunas. Samples containing less than 10 fr. have been excluded. The number of identified fragments do not include higher taxa like Mammalia, Aves, and Teleostei. Species and species groups are listed in order of their abundance.

Site	D*	Identified fragments	Species and species groups
Seal dominated faunas:			
Kalajoki 12 Rautio Kivimaa	1	68	Phocidae
Rovaniemi 134 Vinnari	1	22	Phocidae
Rovaniemi 236 Jaatila Ojala	1	94	Phocidae
Tervola 40 Törmävaara	1	132	Phocidae
Tervola 47 Törmävaara	1	95	Phocidae
Tervola 100 Kolopetäjä	1	11	Phocidae
Tervola 116 Lapinniemi Myllyaho	1	18	Phocidae
Tervola 48 Törmävaara	1.02	268	Phocidae, <i>Lepus</i> , Tetraonidae
Tervola 49 Törmävaara	1.04	46	Phocidae, <i>Castor</i>
Tervola 107 Lapinniemi Kuokkamaa	1.19	24	Phocidae, <i>Castor</i> , <i>Esox</i>
Tervola 42 Törmävaara	1.26	88	Phocidae, Anatidae, <i>Esox</i>
Tervola 117 Koivu Tynnyripäri	1.26	51	Phocidae, <i>Castor</i>
Seal dominated faunas with a variety of other species:			
Yli-li 43 Kuuselankangas Kierikki	1.05	1334	Phocidae, <i>Rangifer</i> , <i>Esox</i> , <i>Podiceps</i> , <i>Martes</i> , <i>Castor</i> , <i>Gavia</i> , Cyprinidae
<i>Lepus</i> ,			
Tervola 30 Törmävaara	1.21	655	Phocidae, <i>Rangifer</i> , Anatidae, <i>Esox</i> , <i>Castor</i> , <i>Martes</i> , <i>Lepus</i> , Cyprinidae
Simo 40 Tainiario	1.38	1587	Phocidae, <i>Castor</i> , <i>Esox</i> , <i>Rangifer</i> , <i>Alces</i> , Anatidae, <i>Perca</i> , <i>Vulpes</i> , <i>Martes</i> , <i>Lepus</i>
Kuivaniemi 3 Veskankangas	2.26	4157	Phocidae, <i>Castor</i> , <i>Esox</i> , Cyprinidae, <i>Lepus</i> , <i>Alces</i> , <i>Perca</i> , <i>Vulpes</i> , <i>Martes</i> , Anatidae, <i>Lutra</i> , <i>Lagopus</i> , <i>Sciurus</i> , <i>Canis</i> , <i>Tetrao</i> , <i>Cygnus</i> , Salmonidae
Rovaniemi 123 Ala-Korkalo	2.71	15	Phocidae, <i>Esox</i> , <i>Castor</i> , <i>Alces</i>
Reindeer dominated faunas:			
Enontekiö 199 Suonttajoki W2	1	29	<i>Rangifer</i>
Enontekiö 200 Suonttajoki W3	1	28	<i>Rangifer</i>
Enontekiö 201 Majava	1	119	<i>Rangifer</i>
Enontekiö 204 Sahaniemi	1	29	<i>Rangifer</i>
Utsjoki 39 Kenesjärvi W Huvila	1	20	<i>Rangifer</i>
Enontekiö 89 Hetta Museotontti	1.01	686	<i>Rangifer</i> , <i>Lagopus</i> , <i>Martes</i> , <i>Castor</i> , <i>Esox</i>
Enontekiö 208 Valkeajärvi E	1.02	95	<i>Rangifer</i> , <i>Ursus</i>
Enontekiö 198 Suonttajoki W1	1.03	394	<i>Rangifer</i> , <i>Alces</i>
Inari 71 Lemmenjoki	1.21	41	<i>Rangifer</i> , <i>Castor</i>
Sodankylä 30 Autiokenttä II	1.22	61	<i>Rangifer</i> , <i>Alces</i> , Tetraonidae
Inari 37 Paatsjoen Luusua	1.23	59	<i>Rangifer</i> , Salmonidae, <i>Tetrao</i> , <i>Esox</i>
Enontekiö 210 Myllymaa 2	1.76	288	<i>Rangifer</i> , <i>Castor</i>
Enontekiö 114 Pekkalanvaara NE	1.77	155	<i>Rangifer</i> , <i>Ursus</i> , <i>Castor</i> , <i>Martes</i>
Salla 37 Kenttälampi	1.90	13	<i>Rangifer</i> , <i>Alces</i>
Enontekiö 73 Saamen museo	1.97	55	<i>Rangifer</i> , <i>Castor</i>
Inari 14 Vuopaja N	2.26	299	<i>Rangifer</i> , <i>Castor</i> , <i>Alces</i> , <i>Esox</i> , <i>Perca</i> , Anatidae
Inari 13 Saamen museo	2.48	1048	<i>Rangifer</i> , <i>Alces</i> , <i>Esox</i> , <i>Castor</i> , <i>Ursus</i> , <i>Perca</i> , <i>Lagopus</i> , Salmonidae, Cyprinidae

Beaver dominated faunas:

Enontekiö 202 Majava SW	1	41	<i>Castor</i>
Taivalkoski 33 Atsinki 2	1	242	<i>Castor</i>
Savukoski 60 Akanjoensuunaro	1	21	<i>Castor</i>
Pelkosenniemi 84 Säynäjäojan suu	1.14	15	<i>Castor, Alces</i>
Sodankylä 164 Matti-Vainaan Palo	1.36	90	<i>Castor, Alces</i>
Kittilä 71 Vanhainkoti	1.47	25	<i>Castor, Esox</i>
Kemijärvi 104 Neitilä 4	1.49	233	<i>Castor, Esox, Alces, Ursus, Perca, Rangifer, Gavia</i>
Enontekiö 206 Aittalahti	1.74	13	<i>Castor, Rangifer</i>
Sodankylä 60 Neulaniemi	2.01	199	<i>Castor, Alces, Rangifer</i>
Hyrnsalmi 18 Vonkka	2.14	46	<i>Castor, Esox, Cyprinidae, Rangifer</i>
Rovaniemi 469 Sierijärvi Kotijänkä	2.26	971	<i>Castor, Esox, Martes, Alces, Cyprinidae, Perca, Tetrao, Anatidae, Lutra, Lagopus, Lyrurus</i>
Suomussalmi 27 Kellolaisten tuli	2.35	103	<i>Castor, Esox, Cyprinidae, Alces, Martes, Rangifer, Ursus</i>
Enontekiö 17 Myllyjärämä	2.50	57	<i>Castor, Esox, Rangifer, Perca</i>
Rovaniemi 340 Jokkavaara	2.56	1258	<i>Castor, Alces, Phocidae, Esox, Vulpes, Cyprinidae, Rangifer, Anatidae, Ursus, Canis, Lyrurus, Lepus, Lagopus, Tetrao, Stizostedion, Aquila/Haliaëtus</i>
Rovaniemi 277 Piirittävaara	2.97	49	<i>Castor, Esox, Phocidae, Alces, Perca, Anatidae</i>
Suomussalmi 53 Tormuan Särkkä	3.21	101	<i>Castor, Esox, Cyprinidae, Rangifer, Alces, Canis, Ursus, Martes, Lepus</i>

Fish dominated faunas:

Rovaniemi 474 Riitakanranta	1.42	497	<i>Esox, Tetrao, Castor, Lepus, Rangifer, Martes, Cyprinidae, Sciurus, Perca, Lagopus, Phocidae, Alces</i>
Taivaloski 37 Tervaniemi	1.74	1158	<i>Cyprinidae, Alces, Ursus, Esox, Tetrao, Rangifer, Castor, Lagopus</i>
Posio 39 Kurikkikangas	1.97	366	<i>Esox, Rangifer, Perca, Martes, Cyprinidae, Lagopus, Castor, Lepus</i>
Kuhmo 14 Vasikkaniemi SW	2.52**	1459	<i>Esox, Cyprinidae, Perca, Castor, Alces, Rangifer, Canis, Vulpes, Anatidae, Lepus, Ursus, Gavia</i>
Inari 406 Nellimjoen suu S	2.95	49	<i>Esox, Perca, Castor, Alces, Lepus, Rangifer, Ursus</i>
Ranua 37 Kultisalmi	3.11	324	<i>Esox, Castor, Rangifer, Perca, Alces, Lagopus, Cyprinidae, Cygnus, Martes, Anatidae</i>
Hyrnsalmi 16 Koppeloniemi	3.27	537	<i>Esox, Cyprinidae, Castor, Alces, Canis, Lepus</i>
Ylikiminki 28 Latokangas	3.35	1026	<i>Esox, Phocidae, Lepus, Canis, Castor, Perca, Cyprinidae, Martes, Aquila/Haliaeetus, Anatidae, Lagopus, Tetrao</i>

Others:

Sodankylä 163 Matti-Vainaan Palo	1	39	<i>Alces</i>
Kuhmo 134 Katerma Järvelä	2.09	217	<i>Alces, Cyprinidae, Esox, Castor, Ursus</i>

Sodankylä 87 Kelukoski E	2.24	25	<i>Alces, Rangifer, Castor, Esox</i>
Rovaniemi 254 Kolpene	2.61	42	<i>Alces, Castor, Phocidae, Lyrurus</i>
Inari 13 Vuopaja	2.85	160	<i>Martes, Rangifer, Esox, Castor, Alces, Salmonidae, Gavia, Perca</i>
No clear dominance:			
Suomussalmi 25 Kalmosärkkä	3.25	203	<i>Castor, Cyprinidae, Esox, Martes, Alces, Rangifer</i>
Rovaniemi 135 Ylitalo Toivola	3.57	10	<i>Castor, Phocidae, Esox, Perca, Cyprinidae</i>
Rovaniemi 253 Kolpene	3.67	222	<i>Castor, Phocidae, Esox, Alces, Lyrurus, Lagopus, Lepus, Rangifer, Martes, Anatidae, Tetrao, Cyprinidae</i>
Utsjoki 1 Ala-Jalve	2.81	11	<i>Lepus, Rangifer, Alces, Martes</i>

$$* D = \frac{1}{\sum_{i=1}^s P_i^2}$$

* *The sample contained a vast number of fish bones, which could only be analysed partly. The diversity index is in this case misleading.

species were hunted. Moreover, it can help to reveal the character and function of the site itself.

Carnivores

In Ylikiiiminki 28 Latokangas an unusually large number of dog bones were found in the refuse fauna. The identified fragments were mainly phalanges (only one claw), but also other parts of the lower limb bones were abundant. Upper parts of limbs were totally missing, but one tooth fragment was determined as canine. The findings suggest that the meaty parts of the carcass as well as the fur were removed elsewhere. As regards red fox bones, two sites allow a further analysis: Kuivaniemi 3 Veskan kangas and Rovaniemi 340 Jokkavaara. In both places fragments of the upper parts of the limbs were present, but claws were missing.

Bones of the brown bear were found in larger numbers in Enontekiö 114 Pekkalansaara NE Tunturipolku, and Taivalkoski 37 Tervaniemi I. In Enontekiö nearly all of the fragments were of the lower parts of the limbs, such as metapods, carpal and tarsal bones, and phalanges. Since claws were totally absent, it is not likely that the fragments came from a bearskin, as in many other cases in the archaeological bone material. Moreover, a fragment of the axis

(cervical vertebra) was present in the material from Enontekiö. All this points to a situation, where the skull and the skin were removed elsewhere. In Inari 13 Saamen museo there were too few bear bone fragments to allow a reliable analysis, but the anatomical composition of the bones resembled that in Enontekiö. Here, too, claws were totally absent, but carpal and tarsal bones were present. In Taivalkoski the case was the opposite. Most of the fragments were claws, and the rest were other phalanges, metapods or small sesamoidal bones, and derived most likely from a bearskin.

Otter bones are rare in Northern Finland. In Kuivaniemi 3 Veskan kangas, however, the material contained otter phalanges and even one claw. The anatomical composition of the bones of pine marten could be analysed in the materials from Inari 13 Vuopaja, Rovaniemi 469 Sierijärvi Kotijänkä, Kuivaniemi 3 Veskan kangas, and Posio 39 Kuorikkikangas E. Claws were found only in Inari, but otherwise the samples contained parts of the whole skeleton, including jaws and teeth.

Seals

Five localities containing large amounts of seal bones were chosen for quantitative analysis. These were Rovaniemi 340 Jokkavaara, Tervola 30 Törmävaara, Simo 40 Tainiari, Kuivaniemi 3 Veskan kangas, and

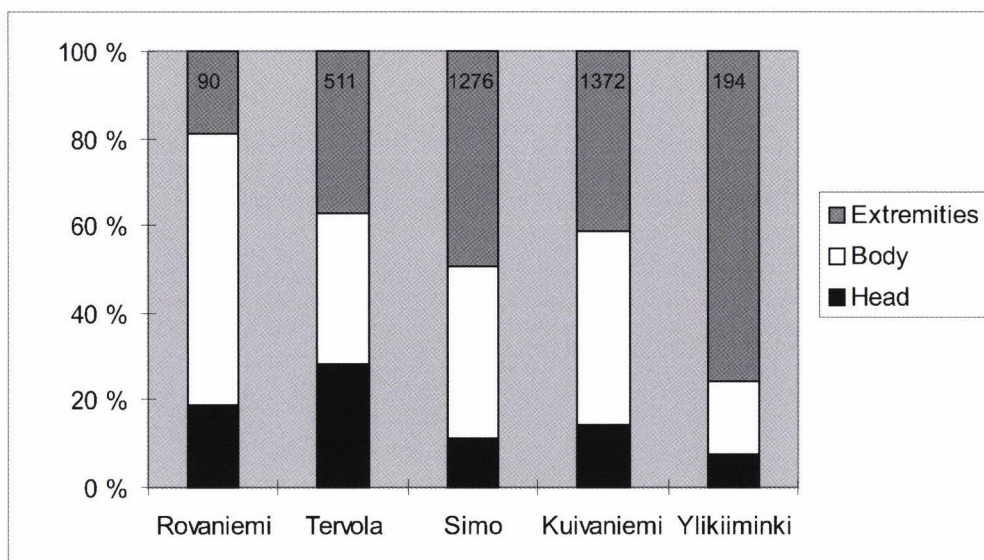


Fig. 6. The anatomic composition of seal bones identified from refuse faunas at five localities in Northern Finland. The absolute number of identified bone fragments is indicated.

Ylikiiminki 28 Latokangas. These localities are coastal dwelling sites with the exception of Rovaniemi, which was located near the Ancient Lake Kolpene.

At first sight all materials seem alike. It is typical for seal bone materials to contain all parts of the carcass from head to claws. However, a more detailed analysis reveals quite surprising differences (Fig. 6). In Ylikiiminki the dominance of the lower parts of the limbs is so striking that it certainly reflects circumstances at the site. It is obvious that the main part of the carcass - with meat and blubber - was treated elsewhere. In Rovaniemi the case is the opposite, if not as pronounced. In Tervola the high proportion of bones of the head region is somewhat strange, but otherwise the three materials, Tervola, Simo and Kuivaniemi represent a "typical" refuse fauna of a seal hunting site containing all parts of the carcass relatively evenly in proportion to their number in the original skeleton.

Cervids

It is extremely difficult to conclude butchering methods of large mammals from burnt, fragmented material. Fragments of large bones can normally not be determined,

resulting in a biased anatomical composition. As mentioned above, a total absence of small compact bones like phalanges or carpal and tarsal bones can, however, be interpreted as a treatment of the carcass elsewhere than at the dwelling site.

Four sites contained enough identified bone fragments of the European elk for quantitative analysis: Inari 13 Saamen museo, Rovaniemi 340 Jokkavaara, Taivalkoski 37 Tervaniemi I, and Kuhmo 134 Katerma Järvelä I (Fig. 7). The samples from Inari and Rovaniemi consisted of mainly phalanges, sesamoidal bones, metapods, and carpal and tarsal bones, which is the common anatomical composition of elk materials. In Taivalkoski one part of the site (NM 28128) contained only phalanges as well as an unusually high amount of rudimental metacarpals (II/V). These are long, thin and sharp bones that have certainly been used as ready-made tools. In the remaining samples (NM 28687, 28899) all parts of the skeleton were present in the material, including hoofs, pelvis, upper (meaty) parts of the limbs, and even small pieces of dental enamel. Here, complete carcasses were obviously present. In Kuhmo hoofs were totally missing in an otherwise representative sample, indicating the removal of the skin elsewhere.

All larger samples containing wild reindeer bones came from Inari and Enontekiö. I have chosen the two largest samples Enontekiö 89 Museotontti and Inari 13 Saamen museo, for further analysis (Fig. 8). I also chose two sites situated in central Lapland: Posio 39 Kuorikkikangas and Sodankylä 30 Autiokenttä II. In Inari and Enontekiö the anatomical composition of the material is typical for a big animal, containing a large number of phalanges and carpal and tarsal bones. The proportion of upper limb parts is, however, higher than is usual in the case of

the European elk. This is understandable since the reindeer is a smaller animal and its bones leave more identifiable fragments. The samples from Inari contain also fragments of antlers, teeth, vertebrae and hoofs. In Posio the hoofs are missing, but the sample is too small (47 fragments) to put too much weight on it. Otherwise the anatomical composition of the sample is normal for a large mammal. The same can be said about Sodankylä.

Rodents

The beaver was both common and

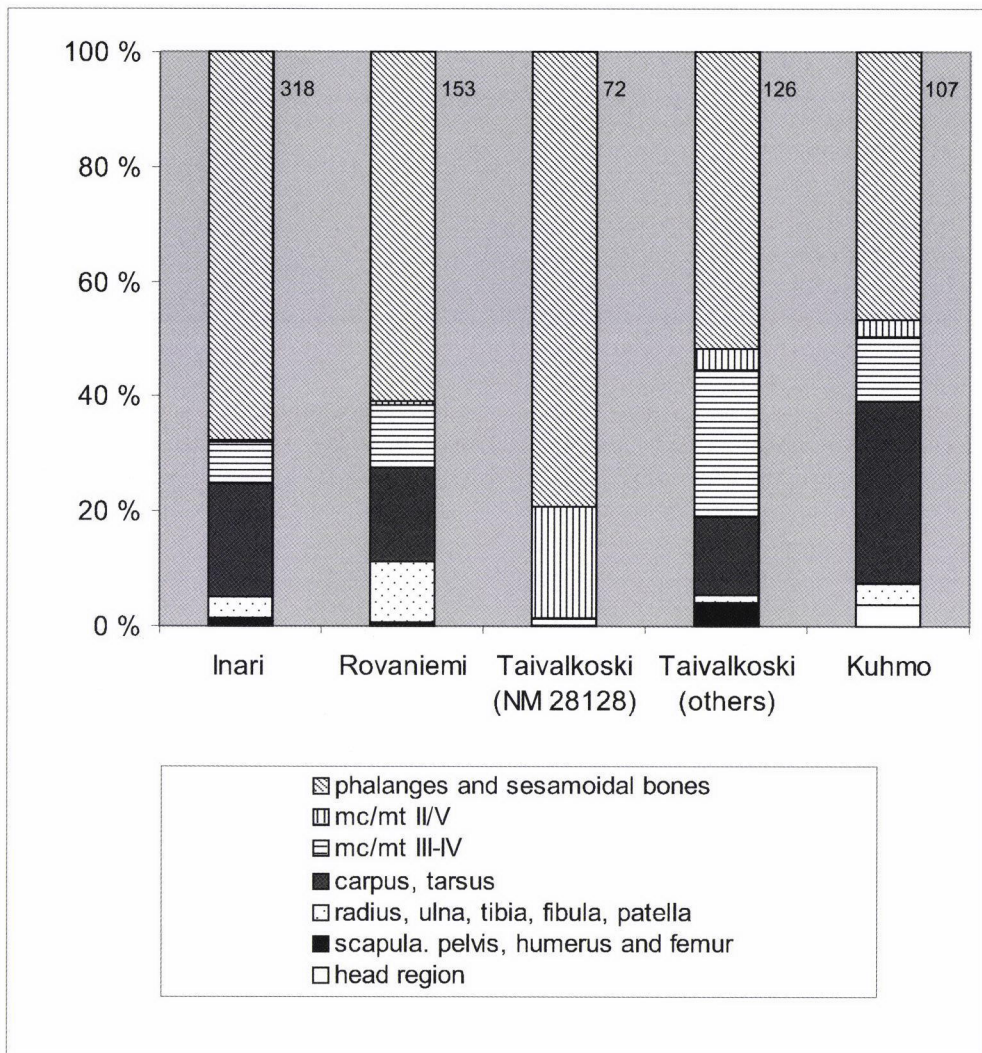


Fig. 7. The anatomic composition of elk bones identified from refuse faunas at four localities in Northern Finland. The absolute number of identified bone fragments is indicated.

abundant in the whole material. Largest samples were found in Rovaniemi 340 Jokkavaara, Rovaniemi 469 Sierijärvi Kotijänkä, Kuivaniemi 3 Veskan Kangas, and Taivalkoski 33 Atsinki (Fig. 9). All these refuse faunas except Kuivaniemi were dominated by the beaver.

All parts of the skeleton were present in these samples. The material contained fragments of the skull, teeth, shoulder blades and pelvic girdle, long limb bones, metapods, carpal and tarsal bones, phalanges including claws, as well as ribs and vertebrae. Beavers were definitely treated as whole carcasses at

the sites. Nevertheless, the beaver materials from the two sites in Rovaniemi had quite opposite anatomical compositions. In Jokkavaara bones from the head region and the main body of the animal were well represented, while the lower parts of the limbs were nearly totally absent. In Kotijänkä bones of extremities built the bulk of the material. The differences are difficult to interpret. Whether these two sites represent different beaver hunting strategies (fur, meat, musk), or just two ends of a gradient cannot be inferred from the bone material.

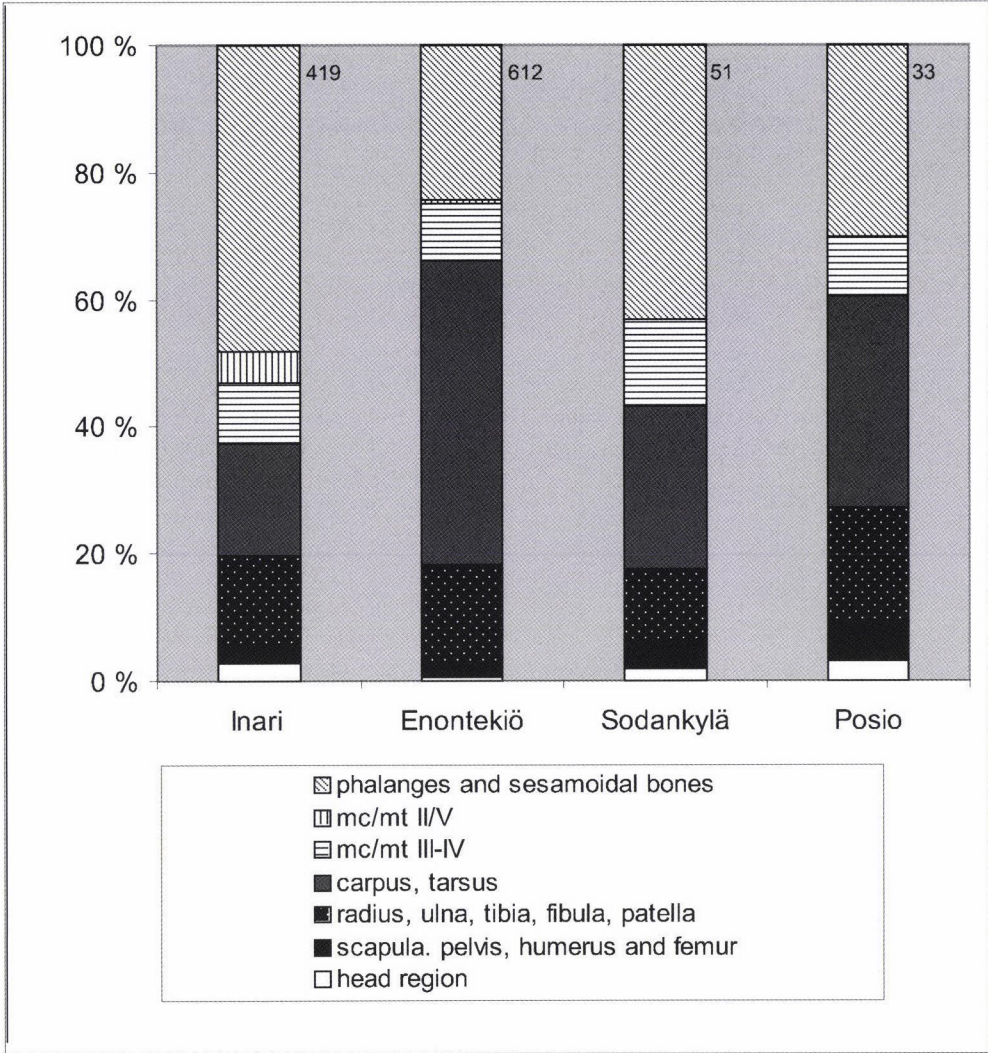


Fig. 8. The anatomic composition of reindeer bones identified from refuse faunas at four localities in Northern Finland. The absolute number of identified bone fragments is indicated.

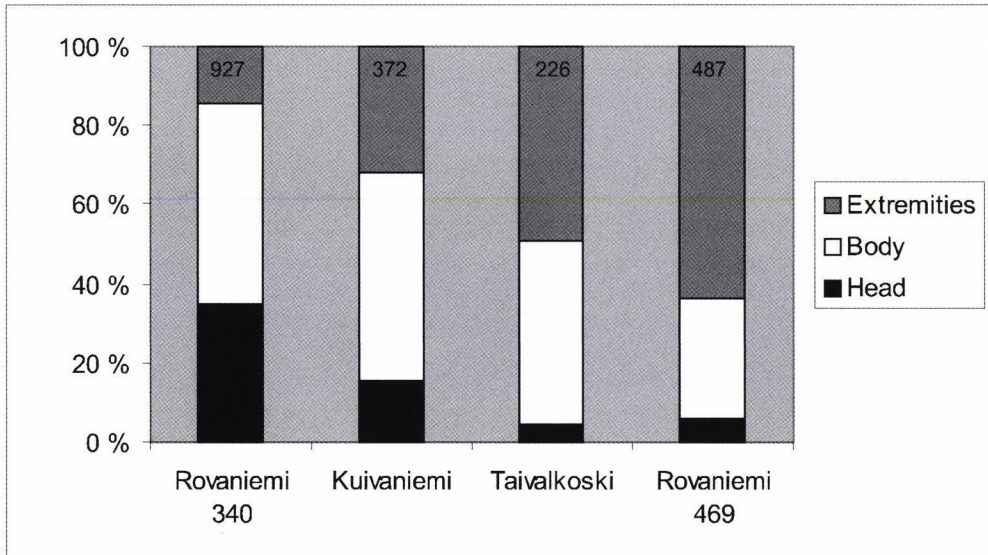


Fig. 9. The anatomic composition of beaver bones identified from refuse faunas at four localities in Northern Finland. The absolute number of identified bone fragments is indicated.

Hare

At the site Ylikiiminki 28 Latokangas hare bones were exceptionally abundant in the refuse fauna. There were fragments from all parts of the skeleton, including some claws. It seems unlikely that there had been any pre-handling of the carcasses. The same applies to Kuivaniemi 3 Veskan Kangas and Rovaniemi 474 Sierijärvi Riitakanranta.

Birds

Only one sample containing bones of the capercaillie, Rovaniemi 474 Sierijärvi Riitakanranta, contained more than 10 bone fragments. All identified bones were parts of the wings and legs. The black grouse bones from Rovaniemi 253 Kolpene were also limb bones. None of the sites contained enough fragments of willow grouse bones to allow any kind of conclusions.

The largest number of anatid bird bones was found at Kuivaniemi 3 Veskan Kangas. Here most of the identified fragments were wing bones. In Tervola 30 Törmävaara all identified bones derived from the wings. The number of fragments is too small for the result to be statistically significant, but the anatomical composition of the bones certainly suggests some kind of treatment

of the birds elsewhere. Bones of whooper swan, as well as loons and grebes were too few for further analyses.

Fish

All parts of fish skeletons were found at the sites, and there was nothing to indicate for example storage of dried fish, in which case bones of the head region would be missing. Where cyprinid fish were found in large concentrations the individuals were surprisingly small. How were these piles built? Small fish are normally eaten whole, without removing the rays or vertebrae, sometimes even the head. Do these piles represent fish the inhabitants ate or better - did not eat? Perhaps only large fish were taken, and small were thrown directly to refuse pits.

Discussion

The refuse faunas in Northern Finland contain nearly all large and medium sized mammals that were likely to be present in the area. Only the large carnivores wolf, wolverine and lynx are totally absent from the material. This phenomenon is typical for all prehistoric refuse faunas (Ukkonen 1996). The absence of

the smaller Arctic fox is more problematic. However, bones of the species are rare even in Stone Age dwelling sites in Northern Norway (Frafjord & Hufthammer 1993). This does not mean that all these species were absent from the area, but suggests that they were not commonly hunted by prehistoric people. This applies also to smaller carnivores, microtine rodents, small insectivores, and bats.

As to the variation of the game in time and space, the main conclusions based on the data are clear: Seals dominate in coastal areas during the whole prehistoric time. Seal hunting was highly specialized, although there were some exceptions (Kuivaniemi 3 Veskankangas, Rovaniemi 123 Ala-Korkalo). In the northernmost parts of the research area the wild reindeer was the main - or even the sole - game species during the early Mesolithic. Later, the refuse fauna was augmented by the European elk and the beaver. In the southeast parts of the research area the economy was based on a variety of species: the European elk, the beaver, the Arctic hare, small and large carnivores, birds and fish. A reliably dated typical early Mesolithic species combination (elk, beaver, hare, pike) can be found in Hyrynsalmi.

The results of the current study indicate that the character of the hunting is clearly related to the environment of the dwelling site. This means that the people in this area utilized their environments flexibly depending on the available resources. The environment, of course, is itself a function of time due to the land uplift, climatic variations, and the vegetation succession (Eronen 1997; Hicks & Hyvärinen 1997; Hyvärinen 1997).

The anatomical composition of the bone materials of individual species can reveal interesting features about the treatment of the carcasses at the sites - and along with that, about the character or function of these sites. This is the case for example with the exceptional seal bone material from Ylikiiminki. The quantitative methods applied here can only be used when the samples are very large, which is seldom the case. But even a qualitative analysis can be of interest, as in the case of the brown bear. Even a relatively small sample reveals

whether the bones are likely to derive from a bearskin or not, assuming skinning practices were the same as today. Halinen (1998) has also reported clear time and/or culture dependent differences in reindeer utilization in the Enontekiö region based on the anatomical composition of the bone materials.

Conclusions

The economy is an essential part of human culture. Many artefacts - tools, hunting and fishing equipment, vessels - can only be seen in relation to their use in providing the people the necessary food and clothing. The same certainly applies to at least part of the structures. This is why these three categories - artefacts, structures and refuse faunas - should not be studied separately, but in combination with each other and the environment. Only this way can the true character of the economy of the settlement and also the function of different artefacts and structures be revealed. This line of research has been followed by some Finnish archaeologists (Forstén 1972; Vikkula 1981; Siiriäinen 1981, 1982; Edgren 1982; Matiskainen 1989; Rankama 1996; Halinen 1998). The new data accumulated during the last few years would now allow more comprehensive studies in this field.

For these studies the osteological analyses can offer information about which animals were hunted and - in some cases - for what purposes. They can give an idea of the character of the hunting at different localities: whether it was highly specialized concentrating on one species, or diverse targeting a variety of species. Furthermore, they show differences in the treatment of the game at individual sites, which reflect their character and function. Certainly, combined with detailed archaeological analyses, the archaeozoological data can reveal new - and perhaps surprising - insight into the lives of the prehistoric peoples in Finland.

Acknowledgements

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App. 1. Prehistoric dwelling sites in Northern Finland included in the study. Analysts: AO = Arvo Ohtonen, HW = Herluf Winge, MF = Mikael Fortelius, PU = Pirkko Ukkonen, SF = Stella From, SN = Sirpa Nummela, TF = Tarja Formisto.

Site	NM	Excavator	Analyst
Enontekiö 17 Peltovuoma Myllyjärämä	23878	Kankaanpää 1987	SF
Enontekiö 73 Saamen museo	25690	Kankaanpää 1990	PU
Enontekiö 89 Hetta Museotontti	23877	Kankaanpää 1987	SF
Enontekiö 89 Hetta Museotontti	24464	Halinen 1988	SF, SN
Enontekiö 89 Hetta Museotontti	25256	Kankaanpää 1989	PU
Enontekiö 114 Pekkalanvaara	24561	Halinen 1988	PU
Enontekiö 114 Pekkalanvaara NE Tunturipolku	28751	Halinen 1993	PU
Enontekiö 198 Suonttajoki W1	26750	Halinen 1991	PU
Enontekiö 198 Suonttajoki W1	28752	Halinen 1993	PU
Enontekiö 199 Suonttajoki W2	26751	Halinen 1991	PU
Enontekiö 200 Suonttajoki W3	26752	Halinen 1991	PU
Enontekiö 201 Majava	26753	Halinen 1991	PU
Enontekiö 202 Majava SW	26754	Halinen 1991	PU
Enontekiö 204 Sahaniemi	26756	Halinen 1991	PU
Enontekiö 204 Sahaniemi	28753	Halinen 1993	PU
Enontekiö 206 Aittalahti	26758	Halinen 1991	PU
Enontekiö 206 Aittalahti 5a	28754	Halinen 1993	PU
Enontekiö 208 Valkeajärvi E	26760	Halinen 1991	PU
Enontekiö 210 Myllymaa 2	26762	Halinen 1991	PU
Enontekiö 210 Myllymaa 2	28755	Halinen 1993	PU
Enontekiö 217 Palojoensuu	26772	Halinen 1991	PU
Hyrnsalmi 16 Koppeloniemi	20634	Perkko 1979	MF
Hyrnsalmi 18 Vonkka II	15393	Huurre 1961	MF
Inari 13 Saamen museo	22443	Suominen 1984	PU
Inari 13 Saamen museo	24364	Arponen 1988	PU
Inari 13 Saamen museo	26611	Seppälä 1991	PU
Inari 13 Saamen museo	27205	Seppälä 1992	PU
Inari 13 Saamen museo	27808	Seppälä 1993	PU
Inari 13 Saamen museo	28364	Seppälä 1994	PU
Inari 13 Saamen museo (Saamelaismuseo)	19437	Torvinen 1974	PU
Inari 13 Saamen museo (Saamelaismuseo)	22220	Torvinen 1983	PU
Inari 13 Vuopaja	18244	Itkonen 1909/14	PU
Inari 13 Vuopaja	23716	Arponen 1987	PU
Inari 13 Vuopaja	24365	Arponen 1988	PU
Inari 13 Vuopaja	27809	Seppälä 1993	PU
Inari 13 Vuopaja	28365	Seppälä 1994	PU
Inari 14 Vuopaja N	27810	Seppälä 1993	PU
Inari 37 Paatsjoen Luusua	19428	Torvinen 1974	MF
Inari 37 Paatsjoen Luusua	19816	Torvinen 1975	MF
Inari 71 Lemmenjoki	14994	Arponen 1993	PU
Inari 370 Siuttavaara	24845	Oksala 1989	TF
Inari 406 Nellimjoen suu S	24376	Sohlström 1988	SF
Inari 643 Pahtusjärvi N	survey	Rankama 1990	PU
Kalajoki 12 Rautio Kivimaa	23381	Kotivuori 1986	SF
Kemijärvi 87 Haveri	15043	Carpelan 1960	MF
Kemijärvi 104 Neitilä 4	15671	Sarvas 1962	PU
Kemijärvi 104 Neitilä 4	16145	Sarvas 1963	PU
Kemijärvi 104 Neitilä 4	16553	Sarvas 1964	PU
Kittilä 71 Vanhainkoti	28555	Pesonen 1994	PU
Kittilä 85 Kurjenniva	28556	Pesonen 1994	PU
Kittilä 90 Kentänmaa	28559	Pesonen 1994	PU
Kuhmo 14 Vasikkaniemi SW	29136	Karjalainen 1995	PU

Kuhmo 134 Katerma Järvelä I	27024	Schulz 1991	FU
Kuhmo 134 Katerma Järvelä I	27295	Kontio 1992	FU
Kuivaniemi 3 Veskan Kangas	24423	Wallenius 1988	FU
Kuivaniemi 3 Veskan Kangas	24928	Wallenius 1989	FU
Kuivaniemi 3 Veskan Kangas	25800	Wallenius 1990	FU
Kuivaniemi 3 Veskan Kangas	26699	Wallenius 1991	FU
Kuivaniemi 3 Veskan Kangas	27365	Wallenius 1992	SN
Muhos 5 Pyhänsivu Honkala	3871	Appelgren 1900	HW
Pelkosenniemi 79 Kellonivat N	27319	Arponen-Halinen 1992	FU
Pelkosenniemi 84 Säynäjäojan suu S 2	27322	Arponen-Halinen 1992	FU
Pelkosenniemi 85 Säynäjäojan suu S 3	27323	Arponen-Halinen 1992	FU
Pelkosenniemi 86 Säynäjäojen mutka 1	27324	Arponen-Halinen 1992	FU
Pelkosenniemi 100 Säynäjäojen mutka 3	27328	Arponen-Halinen 1992	FU
Pelkosenniemi 102 Säynäjäojen suu SE	27330	Arponen-Halinen 1992	FU
Posio 39 Kuorikkikangas E	28917	Pesonen 1995	FU
Ranua 37 Kultisalmi	25927	Katiskoski 1990	FU
Ranua 37 Kultisalmi	26851	Katiskoski 1991	FU
Rovaniemen mlk 123 Siikaniemi III 1	14338	Paloniemi 1957	MF
Rovaniemen mlk 123 Siikaniemi III 1	14410	Sarkamo 1958	MF
Rovaniemen mlk 134 Vinnari 1	4278	Sarkamo 1957	MF
Rovaniemen mlk 135 Ylitalo/Toivola	14278	Sarkamo 1957	MF
Rovaniemen mlk 136 Ylitalo/Toivola	14278	Sarkamo 1957	MF
Rovaniemen mlk 138 Ylitalo/Maikkunen	14278	Sarkamo 1957	MF
Rovaniemen mlk 139 Ylitalo/Maikkunen	14709	Sarkamo 1958	MF
Rovaniemen mlk 236 Jaatila Ojala	24065	Kotivuori 1987	FU
Rovaniemen mlk 236 Jaatila Ojala	25585	Kotivuori 1988	FU
Rovaniemen mlk 277 Saarenkylä Piirittävaara	25334	Lavento 1989-90	FU
Rovaniemen mlk 287 Kilpelä	24615	Kotivuori 1988	FU
Rovaniemen mlk 340 Jokkavaara	21012	Torvinen 1980	FU
Rovaniemen mlk 340 Jokkavaara	21307	Torvinen 1981	FU
Rovaniemen mlk 340 Jokkavaara	21834	Torvinen 1982	FU
Rovaniemen mlk 340 Jokkavaara	25709	Tusa 1990	FU
Rovaniemen mlk 340 Jokkavaara	26610	Karjalainen 1991	FU
Rovaniemen mlk 469 Sierijärvi Kotijänkä	26780	Kotivuori 1991	FU
Rovaniemen mlk 474 Sierijärvi Riitakanranta	25374	Kotivuori 1990	FU
Rovaniemi 253 Kolpene	13985	Paloniemi 1956	FU
Rovaniemi 254 Kolpene	13768	Kopisto 1955	FU
Rovaniemi 337 Tapulinpelto	15502	Erä-Esko 1961	FU
Salla 67 Kenttälampi	28008	Karjalainen 1993	FU
Savukoski 58 Pattasniiva	27269	Arponen-Halinen 1992	FU
Savukoski 60 Akanjoensuunaro	27271	Arponen-Halinen 1992	FU
Simo 40 Tainiari	22398	Wallenius 1984	FU
Simo 40 Tainiari	24925	Wallenius 1989	FU
Simo 40 Tainiari	25797	Wallenius 1990	FU
Simo 40 Tainiari	26698	Wallenius 1991	FU
Sodankylä 30 Autiokenttä II	20585	Honkanen 1979	MF
Sodankylä 30 Autiokenttä II	20592	Torvinen 1979	MF
Sodankylä 60 Neulaniemi	27956	Sarkkinen 1993	FU
Sodankylä 60 Neulaniemi	28836	Katiskoski 1994	FU
Sodankylä 62 Kotamaa	27957	Sarkkinen 1993	FU
Sodankylä 87 Kelukoski E	28837	Katiskoski 1994	FU
Sodankylä 163 Matti-Vainaan Palo 1	27678	Halinen 1992	FU
Sodankylä 164 Matti-Vainaan Palo 2	27679	Halinen 1992	FU
Suomussalmi 25 Kalmosärkkä	14504	Huurre 1958	MF
Suomussalmi 25 Kalmosärkkä	14829	Huurre 1959	MF
Suomussalmi 25 Kalmosärkkä	14830	Huurre 1959	MF
Suomussalmi 27 Kelloisten tuli	14505	Huurre 1958	MF
Suomussalmi 27 Kelloisten tuli	14831	Huurre 1959	MF
Suomussalmi 53 Tormuan Särkkä	18322	Huurre 1970	MF
Säräisniemi (Valla 10) Nimisjärvi Niemelänmäki	4080	Mustonen-Heikel-Ailio 1900	HW
Taivalkoski 33 Atsinki 2	24443	Katiskoski 1988	FU
Taivalkoski 33 Atsinki 2	25271	Katiskoski 1989	FU

Taivalkoski 37 Tervaniemi	28128	Saukkonen 1993	FU
Taivalkoski 37 Tervaniemi I	28687	Raike 1994	FU
Taivalkoski 37 Tervaniemi I	28899	Raike 1995	FU
Tervola 30 Törmävaara	19008	Lönnberg 1972	FU
Tervola 30 Törmävaara	21599	Nieminen 1982	FU
Tervola 30 Törmävaara	22070	Nieminen 1983	SF,PU
Tervola 30 Törmävaara	22481	Nieminen 1984	SF,PU
Tervola 30 Törmävaara	23399	Schulz 1986	SF,PU
Tervola 30 Törmävaara	23816	Ruonavaara 1987	FU
Tervola 40 Törmävaara	19007	Lönnberg 1972	FU
Tervola 42 Törmävaara	19009	Lönnberg 1972	FU
Tervola 42 Törmävaara	19010	Lönnberg 1972	FU
Tervola 42 Törmävaara	20611	Ruonavaara 1979	FU
Tervola 47 Törmävaara	23403	Heikkinen 1986	FU
Tervola 48 Törmävaara	22911	Ruonavaara 1985	FU
Tervola 48 Törmävaara	23400	Heikkinen 1986	FU
Tervola 49 Törmävaara	20989	Ruonavaara 1980	FU
Tervola 49 Törmävaara	22073	Nieminen 1983	FU
Tervola 49 Törmävaara	22779	Kotivuori 1984	FU
Tervola 50 Törmävaara	23401	Heikkinen 1986	FU
Tervola 100 Kolopetäjä	23395	Kotivuori 1991	FU
Tervola 107 Lapinniemi Kuokkamaa	25565	Kotivuori 1988	FU
Tervola 110 Lapinniemi Veittonen	25566	Kotivuori 1989	FU
Tervola 115 Kannikko	24586	Kotivuori 1988	FU
Tervola 116 Lapinniemi Myllyaho	24587	Kotivuori 1988	FU
Tervola 117 Koivu Tynnyripäri	25567	Kotivuori 1989	FU
Tervola 118 Koivu Alakangas	24589	Kotivuori 1988	FU
Utsjoki 1 Ala-Jalve	21749	Siiriäinen 1978	TF
Utsjoki 1 Ala-Jalve	22488	Katiskoski 1984	TF
Utsjoki 1 Ala-Jalve	22897	Rankama 1985	TF
Utsjoki 1 Ala-Jalve	23306	Rankama 1986	TF
Utsjoki 1 Ala-Jalve	23808	Rankama 1986	TF
Utsjoki 19 Onnela	23075	Kankaanpää 1985	TF
Utsjoki 39 Kenesjärvi W Huvila	24396	Rankama 1988	TF
Utsjoki 39 Kenesjärvi W Huvila	24808	Rankama 1989	TF
Utsjoki 96 Mierasjärvi W	23373	Kotivuori 1986	TF
Utsjoki 104 Onnelan törmä	23894	Rankama 1987	TF
Utsjoki 153 Karigasniemi Tenonrinne	24812	Rankama 1989	TF
Utsjoki 180 Utsjoensuu	24814	Rankama 1989	TF
Vihanti 10 Pitkäsaari	3759	Appelgren 1900	HW
Yli-li 9 Kierikki	16554	Sarvas 1964	MF
Yli-li 43 Kuuselankangas Kierikki	28943	Katiskoski 1995	FU
Yli-li 43 Kuuselankangas Kierikki	28370	Sarkkinen 1994	AO
Yli-li 43 Kuuselankangas Kierikki	30665	Koivunen 1993-1994	AO
Ylikiiminki 28 Latokangas	23715	Mäki-Vuoti 1987	FU
Ylikiiminki 28 Latokangas	24377	Sarkkinen 1988	FU
Ylikiiminki 28 Latokangas	25731	Mäki-Vuoti 1990	FU

App. 2. Species and the number of identified bone fragments from refuse faunas at prehistoric dwelling sites in Northern Finland.

Site	No. Fr.	Nr. species	Canis	Vulpes	Ursus	Lutra	Martes	Phocidae	Alces	Rangifer	Castor	Sciurus	Lepus
Enontekiö 017 Peltovuoma Myllyjärämä	57	4								5	32		
Enontekiö 073 Saamen museo	55	2								31	24		
Enontekiö 089 Hetta Museotontti	686	5					1			681	1		
Enontekiö 114 Peikkalanvaara NE Tunturipolku	155	4			34		1			111	9		
Enontekiö 198 Suonttajoki W1	394	2							6	388			
Enontekiö 199 Suonttajoki W2	29	1								29			
Enontekiö 200 Suonttajoki W3	28	1								28			
Enontekiö 201 Majava	119	1								119			
Enontekiö 202 Majava SW	41	1									41		
Enontekiö 204 Sahaniemi	29	1								29			
Enontekiö 206 Aittalahti	13	2								4	9		
Enontekiö 208 Vaikeajärvi E	95	2			1					94			
Enontekiö 210 Myllymaa 2	288	2								197	91		
Hyyrynsalmi 016 Koppelonien	533	6	4						24		134		2
Hyyrynsalmi 018 Vonkka II	46	4								4	30		
Inari 013 Saamen museo (Saamelaimuseo)	1048	9			9				320	575	54		
Inari 013 Vuopaja	160	8					85		5	36	9		
Inari 014 Vuopaja N	299	6							24	181	78		
Inari 037 Paatsjoen Luusua	59	4								53			
Inari 071 Lemmenjoki	41	2								37	4		
Inari 406 Nellimjoen suu S	49	7			1				2	1	6		2
Kalajoki 012 Rautio Kivimaa	68	1						68					
Kemijärvi 104 Neittilä 4	233	7			2				18	1	189		
Kittilä 071 Vanhainkoti	25	2									20		
Kuhmo 014 Vasikkaniemi SW	1450	12	9	9	1				34	22	129		1
Kuhmo 134 Katerma Järvelä I	217	5			2				140		7		
Kuivaniemi 003 Veskan kangas	4156	17	1	21		10	21	2634	29		644	2	37
Pelkosenniemi 084 Säynjälöjan suu S 2	15	2							1		14		
Posio 039 Kuonikkikangas E	366	8					17			48	4		2
Puana 037 Kultisalmi	324	10					2		12	28	116		
Rovaniemen mlk 123 Ala-Korkalo Sikaniemi III 1	15	4						8	1		3		
Rovaniemen mlk 134 Vinnari	22	1						22					
Rovaniemen mlk 135 Yritalo/Toivola	10	5						3			4		
Rovaniemen mlk 236 Jaatila Ojala	94	1						94					
Rovaniemen mlk 277 Saarenkylä Piirittävaara	49	6						7	3		25		
Rovaniemen mlk 340 Jokkavaara	1256	16	2	17	3			182	224	6	727		1
Rovaniemen mlk 469 Sierjärvi Kotijänkä	971	11				3	21		19		552		
Rovaniemen mlk 474 Sierjärvi Riitakanranta	497	12					10	2	1	13	13	3	13
Rovaniemi 253 Kolpene	222	12					2	32	20	3	105		7
Rovaniemi 254 Kolpene	42	4						6	21		14		
Salla 067 Kenttälampi	13	2							5	8			
Savukoski 060 Aakarjoensuunaro	21	1									21		
Simo 040 Tainiara	1587	10		1			1	1333	7	7	215		1
Sodankylä 030 Autiokenttä II	61	3							5	55			
Sodankylä 060 Neulaniemi	199	3							34	33	132		
Sodankylä 087 Kelukoski E	25	4							14	9	1		
Sodankylä 163 Matti-Vainaan Palo 1	39	1							39				
Sodankylä 164 Matti-Vainaan Palo 2	90	2							14		76		
Suomussalmi 025 Kalmosärkkä	203	6					4		4	1	73		
Suomussalmi 027 Kelloisten tuli	103	7			1		2		4	1	61		
Suomussalmi 053 Tormuan Särkkä	100	9	1		1		1		1	8	48		1
Taivalkoski 033 Aitsinki 2	242	1									242		
Taivalkoski 037 Tervaniemi I	1158	8			19				285	4	4		
Tervola 030 Törmävaara	656	8					2	594		22	7		2
Tervola 040 Törmävaara	132	1						132					
Tervola 042 Törmävaara	88	3						78					
Tervola 047 Törmävaara	95	1						95					
Tervola 048 Törmävaara	268	3						266					1
Tervola 049 Törmävaara	46	2						45			1		
Tervola 100 Kolopetäjä	11	1						11					
Tervola 107 Lapinniemi Kuokkamaa	24	3						22			1		
Tervola 116 Lapinniemi Mlyyah	18	1						18					
Tervola 117 Koivu Tynnyripäri	51	2						45			6		
Utsjoki 001 Ala-Jalve	11	4					1		1	4			5
Utsjoki 039 Kenesjärvi W Huvila	20	1								20			
Yli-Ii 043 Kuuselankangas Kierikki	1334	9					4	1301		8	4		3
Ylikiminki 028 Latokangas	977	12	49					11	226		42		153

Site	Lagopus	T. urogallus	T. tetrix	Tetraonidae	Anatidae	Cygnus	Gavia	Podiceps	Aquila
Enontekiö 017 Peltovuoma Myllyjärämä									
Enontekiö 073 Saamen museo									
Enontekiö 089 Hetta Museotontti	2								
Enontekiö 114 Pekkalanvaara NE Tunturipolku									
Enontekiö 198 Suonttajoki W1									
Enontekiö 199 Suonttajoki W2									
Enontekiö 200 Suonttajoki W3									
Enontekiö 201 Majava									
Enontekiö 202 Majava SW									
Enontekiö 204 Sahaniemi									
Enontekiö 206 Aittalahti									
Enontekiö 208 Valkeajärvi E									
Enontekiö 210 Myllymaa 2									
Hyrnsalmi 016 Koppeliemi									
Hyrnsalmi 018 Vonkka II									
Inari 013 Saamen museo (Saamelaismuseum)	3								
Inari 013 Vuopaja							2		
Inari 014 Vuopaja N					1				
Inari 037 Paatsjoen Luusua		1							
Inari 071 Lemmenjoki									
Inari 406 Nellimjoen suu S									
Kalajoki 012 Rautio Kivimaa									
Kemijärvi 104 Neitilä 4							1		
Kittilä 071 Vanhainkoti									
Kuhmo 014 Vasikkaniemi SW					4		1		
Kuhmo 134 Katerma Järvelä I									
Kuivaniemi 003 Veskankangas	6	1			17	1			
Pelkosenniemi 084 Säynjälöjan suu S 2									
Posio 039 Kuorikkikangas E	7								
Ranua 037 Kultisalmi	5				1	3			
Rovaniemen mlk 123 Ala-Korkalo Siikaniemi III 1									
Rovaniemen mlk 134 Vinnari									
Rovaniemen mlk 135 Yitalo/Toivola									
Rovaniemen mlk 236 Jaatila Ojala									
Rovaniemen mlk 277 Saarenkylä Piirittävaara					1				
Rovaniemen mlk 340 Jokkavaara	1	1	2		4				1
Rovaniemen mlk 469 Sierjärvi Kotijärkä	1	4	1		4				
Rovaniemen mlk 474 Sierjärvi Riitikanranta	2	14							
Rovaniemi 253 Kolpene	9	1	16		2				
Rovaniemi 254 Kolpene			1						
Salla 067 Kenttälampi									
Savukoski 060 Akanjoensuunaro									
Simo 040 Tainiara					2				
Sodankylä 030 Autiokenttä II					1				
Sodankylä 060 Neulaniemi									
Sodankylä 087 Kelukoski E									
Sodankylä 163 Matti-Vainaan Palo 1									
Sodankylä 164 Matti-Vainaan Palo 2									
Suomussalmi 025 Kalmosärkkä									
Suomussalmi 027 Kellolaisten tuli									
Suomussalmi 053 Tormuan Särkkä									
Taivalkoski 033 Atsinki 2									
Taivalkoski 037 Tervaniemi I	2	5							
Tervola 030 Törmävaara					13				
Tervola 040 Törmävaara									
Tervola 042 Törmävaara					7				
Tervola 047 Törmävaara									
Tervola 048 Törmävaara				1					
Tervola 049 Törmävaara									
Tervola 100 Kolopetäjä									
Tervola 107 Lapinniemi Kuokkamaa									
Tervola 116 Lapinniemi Myllyaho									
Tervola 117 Koivu Tynnyripäri									
Utsjoki 001 Ala-Jalve									
Utsjoki 039 Kenesjärvi W Huvila									
Yli-Ii 043 Kuuselankangas Kierikki							1	5	
Ylikiminki 028 Latokangas	3	3			4				5

Appendix continues on the next page

Appendix 2 continues

Site	Esox	Perca	Stiz.	Cypr.	Salm.	Cat. Nr	Excavater	Ider	Reference	Analyser
Enontekiö 017 Peltovuoma Myllyjärämä	15	5				23878	Kankaanpää 1987	x	orig.	SF
Enontekiö 073 Saamen museo						25690	Kankaanpää 1990	x	orig.	PU
Enontekiö 089 Hetta Museotontti	1					25256	Kankaanpää 1989		orig.-pap.	PU
Enontekiö 114 Pekkalanvaara NE Tunturipolku						28751	Halinen 1993	x	orig.	PU
Enontekiö 198 Suonttajoki W1						28752	Halinen 1993	x	orig.	PU
Enontekiö 199 Suonttajoki W2						26751	Halinen 1991	x	orig.	PU
Enontekiö 200 Suonttajoki W3						26752	Halinen 1991	x	orig.	PU
Enontekiö 201 Majava						26753	Halinen 1991	x	orig.	PU
Enontekiö 202 Majava SW						26754	Halinen 1991	x	orig.	PU
Enontekiö 204 Sahaniemi						28753	Halinen 1993	x	orig.	PU
Enontekiö 206 Aittalahti						26758	Halinen 1991	x	orig.	PU
Enontekiö 208 Valkeajärvi E						26760	Halinen 1991	x	orig.	PU
Enontekiö 210 Myllymaa 2						28755	Halinen 1993	x	orig.	PU
Hyrnsalmi 016 Koppelonieni	194			179		20634	Perkko 1979	x	orig.	MF
Hyrnsalmi 018 Vonkka II	6			6		15393	Huurre 1961	x	orig.	MF
Inari 013 Saamen museo (Saamelaismuseum)	76	7		1	3	22220	Torvinen 1983	x	orig.	PU
Inari 013 Vuopaja	18	1			4	28365	Seppälä 1994	x	orig.	PU
Inari 014 Vuopaja N	12	3				27810	Seppälä 1993	x	orig.	PU
Inari 037 Paatsjoen Luusua	1				4	19428	Torvinen 1974	x	orig.	MF
Inari 071 Lemmenjoki						14994	Arponen 1993	x	orig.	PU
Inari 406 Nellimjoen suu S	25	12				24376	Sohlström 1988	x	Sohlström 1992/MV	SF
Kalajoki 012 Rautio Kivimaa						23381	Kotivuori 1986	x	orig.	SF
Kemijärvi 104 Neittilä 4	20	2				16553	Sarvas 1964	x	orig.	PU
Kittilä 071 Vanhainkoti	5									
Kuhmo 014 Vasikkaniemi SW	868	190		191		29136	Karjalainen 1995	x	orig.	PU
Kuhmo 134 Katerma Järvelä I	18			50		27295	Kontio 1992	x	orig.	PU
Kuivaniemi 003 Veskan Kangas	491	24		217	1	27365	Wallenius 1992	x	yhteenveto-MV	SN
Pelkosenniemi 084 Säynjäljojan suu S 2						27322	Arponen-Halinen 1992			
Posio 039 Kuorikkikangas E	254	26		8		28917	Pesonen 1995	x	orig.	PU
Ranua 037 Kultisalmi	138	15		4		26851	Katiskoski 1991	x	orig.	PU
Rovaniemen mlk 123 Ala-Korkalo Siikaniemi Illi 1	3					14410	Sarkamo 1958	x	orig.	MF
Rovaniemen mlk 134 Vinnari						14278	Sarkamo 1957	x	orig.	MF
Rovaniemen mlk 135 Ylitalo/Toivola	1	1		1		14278	Sarkamo 1957		orig.	PU
Rovaniemen mlk 236 Jaattila Ojala						25585	Kotivuori 1988	x	orig.	PU
Rovaniemen mlk 277 Saarenkylä Piirittävaara	11	2				25334	Lavento 1989-90	x	orig.-pap.	PU
Rovaniemen mlk 340 Jokkavaara	79		1	7		26610	Karjalainen 1991	x	orig.	PU
Rovaniemen mlk 469 Sierijärvi Kotijänkä	334	13		19		26780	Kotivuori 1991	x	orig.	PU
Rovaniemen mlk 474 Sierijärvi Riitakaranta	415	3		8		25374	Kotivuori 1990	x	orig.	PU
Rovaniemi 253 Kolpene	24			1		13985	Paloniemi 1956	x	orig.	PU
Rovaniemi 254 Kolpene						13768	Kopisto 1955	x	orig.	PU
Salla 067 Kenttälampi						28008	Karjalainen 1993	x	orig.	PU
Savukoski 060 Akanjoensuunaro						27271	Arponen-Halinen 1992			
Simo 040 Tainiario	18	2				26698	Wallenius 1991	x	orig.	PU
Sodankylä 030 Autiokenttä II						20592	Torvinen 1979	x	orig.	MF
Sodankylä 060 Neulaniemi						28836	Katiskoski 1994	x	orig.	PU
Sodankylä 087 Ketukoski E	1					28837	Katiskoski 1994	x	orig.	PU
Sodankylä 163 Matti-Vainaan Palo 1						27678	Halinen 1992	x	orig.	PU
Sodankylä 164 Matti-Vainaan Palo 2						27679	Halinen 1992	x	orig.	PU
Suomussalmi 025 Kalmosärkkä	59			62		14830	Huurre 1959	x	orig.	MF
Suomussalmi 027 Kellolaisten tuli	27			7		14831	Huurre 1959	x	orig.	MF
Suomussalmi 053 Tormuan Särkkä	20			20		18322	Huurre 1970	x	orig.	MF
Taivalkoski 033 Atsinki 2						25271	Katiskoski 1989	x	orig.-pap.	PU
Taivalkoski 037 Tervaniemi I	10			829		28687	Raike 1994	x	orig.	PU
Tervola 030 Törmävaara	13			2		23816	Ruonavaara 1987	x	orig.	PU
Tervola 040 Törmävaara						19007	Lönnberg 1972	x	orig.	PU
Tervola 042 Törmävaara	3					20611	Ruonavaara 1979	x	orig.	PU
Tervola 047 Törmävaara						23403	Heikkinen 1986	x	orig.	PU
Tervola 048 Törmävaara						23400	Heikkinen 1986	x	orig.	PU
Tervola 049 Törmävaara						22779	Kotivuori 1984	x	orig.	PU
Tervola 100 Kolopetäjä						23395	Kotivuori 1991	x	orig.	PU
Tervola 107 Lapinniemi Kuokkamaa	1					25565	Kotivuori 1988	x	orig.	PU
Tervola 116 Lapinniemi Myllyaho						24587	Kotivuori 1988	x	orig.	PU
Tervola 117 Koivu Tynnyripäri						25567	Kotivuori 1989	x	orig.	PU
Utsjoki 001 Ala-Jalve						23808	Rankama 1986		puuttuu	TF
Utsjoki 039 Kenesjärvi W Huvila						24808	Rankama 1989		puuttuu	TF
Yli-Ii 043 Kuuselankangas Kierikki	7			1			Koivuonen 1993-1994	x	orig.	AO
Ylikiminki 028 Latokangas	484	28		18		25731	Mäki-Vuoti 1990	x	orig.	PU