

# 12 Osteological material from the Stone Age and Early Metal Period sites in Karelian Isthmus and Ladoga Karelia

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## Abstract

Subfossil refuse fauna has been collected from the Stone Age and Early Metal Period sites in Ceded Karelia ever since the early 20<sup>th</sup> century. In this article all the faunal assemblages analysed up to 2004 from the area are presented. Most of the presented assemblages derive from the excavations carried out during the first decades of the 20<sup>th</sup> century, and the fact that the early excavators often concentrated on collecting the biggest and best preserved bone fragments brings bias to the data. Only four of the analyzed sites have been excavated in the 21<sup>st</sup> century, but already these show the influence of the different excavation methods used almost hundred years apart. The recently excavated assemblages are more often dominated by small bone fragments like fish bones. Seal remains dominate most of the analyzed assemblages both on the shores of the Lake Ladoga and the Gulf of Finland, and only a few sites differ from this picture.

## 12.1 Introduction

Burnt animal bones have been collected from the Stone Age and Early Metal Period sites in the Karelian Isthmus and Ladoga Karelia for almost a hundred years. The earliest collected

bone assemblages are all quite small in number compared to the other find material from the excavations of the time and also much later collected refuse faunas. However, the osteological material from Ceded Karelia has not yet been compiled. The aim of this paper is to redress this deficiency.

During the last thirty years, an increasing amount of attention has been paid to the refuse fauna of prehistoric dwelling sites in Finland. Subfossil refuse fauna from archaeological contexts can often provide a lot of information about the ecology and economy of prehistoric societies. The method of osteological analysis has a long history in archaeological research. The first osteological analyses in Finland were carried out in the early 20<sup>th</sup> century by the Danish zoologist Herluf Winge (Ailio 1909a). More systematic and thorough analyses of the prehistoric bone materials began in the 1970's (e.g. Forstén 1972; Rauhala 1977; Kokkonen 1978). The first analyses of the burnt bone material from the Karelian Isthmus were performed by Mikael Fortelius in 1980 (a–c).

Altogether 15 osteological analyses have been carried out from 13 prehistoric dwelling sites in the Karelian Isthmus and in Ladoga Karelia (Fortelius 1980a–c; Mannermaa 2003; Puttonen 2003; 2004a&b; Takala 2004: 156). There are also a number of unburnt elk and

swan bone artefacts belonging to the so-called 'Antrea Net Find' that was excavated in 1914, but they are excluded from this study because of the special character of this find (Pälsi 1920; Carpelan 1999: 160; Huurre 2003: 172–173; Mannermaa 2003: 39; see also Carpelan 2008, this volume).

This study summarises all available osteological data from archaeological excavations in the Karelian Isthmus and in Ladoga Karelia up to 2004. Only a few small osteological assemblages from the area collected in the early 20<sup>th</sup> century excavations have not been analysed (for example Säkijärvi Ravi). All studied sites date mainly to the Stone Age and Early Metal Period.

## 12.2 Methods

The studied material consists of burnt animal bone fragments that have been analysed by the author (Puttonen 2003; 2004a&b), Mikael Fortelius (1980a–c), Kristiina Mannermaa (2003) and Pirkko Ukkonen (see Takala 2004). The material has been collected at excavations of Stone Age and Early Metal Period dwelling sites in the Karelian Isthmus and in Ladoga Karelia. Almost all the excavations were conducted in the early 20<sup>th</sup> century. Only the materials from Kurkijoki (Ru. Kurkiëki) and Heinjoki (Ru. Veščevo) are from recent excavations conducted in 2003 (Nordqvist & Seitsonen 2004; Takala 2004: 154–156). The material consists of 15 analyses from 13 sites and altogether 1425 identified bone fragments (Appendix A[12] after this article).

The fragments were analysed by comparing them with modern vertebrate skeletons using the collections of the Finnish Museum of Natural History. It is rather difficult to analyse subfossil bone material from the Stone Age sites in the studied area, because this material is usually burnt

and badly fragmented. The bone material in the studied area is also poorly preserved because of the acidity of the soil. However, heating (cooking or burning) improves the preservation of bones, as the organic material burns away leaving the inorganic material shrunk and condensed. The shrinking and deformation of bones complicates their identification. (e.g. Fortelius 1981: 11; Ukkonen 1992: 20; 2001: 12–13.)

Mammals can often be determined to species, but sometimes only the species group is identifiable. Fish bones have been more problematic to analyse and were often defined only as fish (Teleostei). This has been partly due to a lack of proper reference collections. Nowadays the reference collection of the Finnish Museum of Natural History has improved significantly.

Taphonomical factors have to be taken into account in the study of archaeological bone materials. The refuse fauna represents only species exploited by man. The bones of different species are preserved in different ways, depending on circumstances. The preservation of a bone depends not only on external factors like geology and climate, but also on the structure and the size of the bone. According to Fortelius (1981) a relative abundance of medium-sized species in a set of osteological material can be partly due to their relatively good preservation. Rather small, compact bones, like the carpal, metacarpal, phalangeal, tarsal or metatarsal bones of medium-sized mammals, are most likely to be preserved well (Fortelius 1981; Lyman & Fox 1989: 294). For example, seal and beaver have plenty of these kinds of bones. Fortelius also suggests that the more small and compact identified bones there are in the material, the more heterogeneously the material is preserved, and the more species with many of these bones in their skeletons are emphasised. (Fortelius 1981: 14–15.) That is why their relative occurrence does not necessarily correspond with their orig-



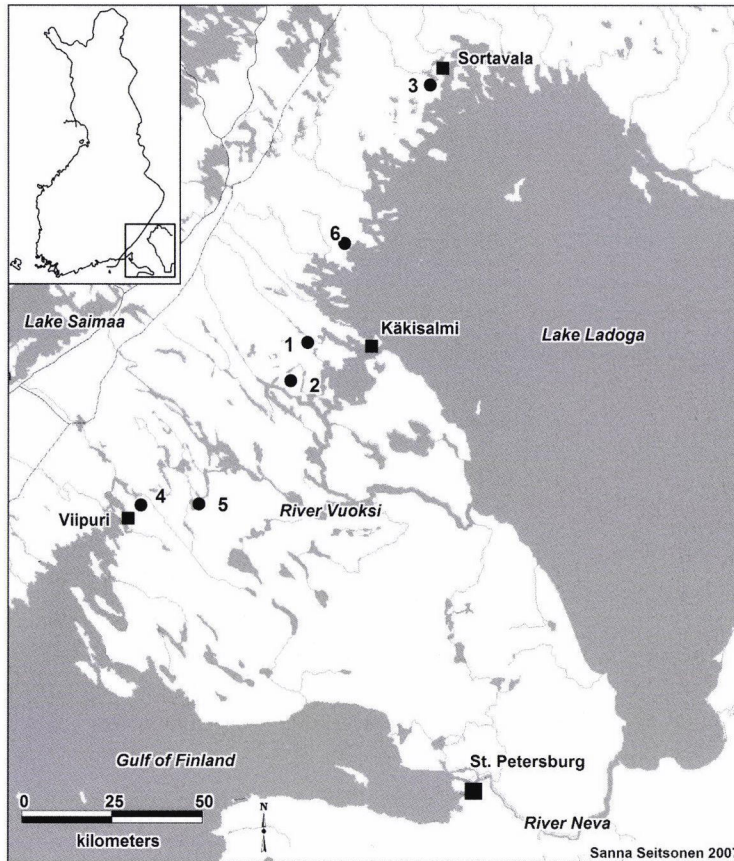


Figure 12.1 Sites included in the study. 1 – Kaukola 18 Kyöstälänharju, 20 Tiitunmäki Kallionvieri and 25 Lavamäki; 2 – Räisälä 18 Pitkäjärvi; 3 – Sortavala Otsoinen; 4 – Viipuri Häyrynmäki and Selänkangas; 5 – Heinjoki Valklampi 1 and 2; 6 – Kurkijoki 33 Vätikkä Kylliäisenlahti W-2 and Kurkijoki 35 Vätikkä Lahdenryhmä. (Map: S. Seitsonen)

inal importance in the economy and subsistence of the population using the dwelling site. Also cutting up the prey can affect the quality of the prehistoric refuse fauna. One more factor that affects the composition of the osteological material is the methodology used in excavation. (e.g. Fortelius 1981; Ukkonen 1996.) Also the level of experience of the osteologist may affect the results of the analysis. This has to be kept in mind during the examination of any osteological materials. In this article, all calculations about the osteological material are based on the number of identified bone fragments.

### 12.3 Sites

Almost all sites included in the study have been excavated in the early 20<sup>th</sup> century. Because of the rough excavation methods used almost a hundred years ago, neither the dating nor the context information of the bones is clear. The date of individual bones cannot be ascertained. Many of the sites include material from different periods, not only from the Stone Age. Only four of the studied sites have been excavated recently: Kurkijoki 33 Vätikkä Kylliäisenlahti W-2, Kurkijoki 35 Vätikkä Lahdenryhmä (Gerasimov 2003; Nordqvist & Seitsonen 2004) as well as Heinjoki Valklampi 1 and 2 (Takala 2003a&b; 2004: 154–156). The rest of the sites were excavated in the early 20<sup>th</sup> century. These sites include Heikki Teräväisen rantapelto,

2762.



Figure 12.2 Rougher methods of excavating, younger and older locals shoveling at Julius Ailio's excavations in Riukjärvi area in the summer 1908. (Photo: J. Ailio 1908, National Board of Antiquities)

Heikki Teräväisen ja Pekko Iivosen rantapellot, Simo Iivosen nummi (all these three 'subsites' belong to the larger site Kaukola 18 Kyöstälänharju) and Tiitunmäki (Kaukola 20 Tiitunmäki Kallionvieri) in Kaukola Riukjärvi; Lavamäen pelto (Kaukola 25 Lavamäki) in Kaukola Piiskunsalmi; Räisälä 18 Virtelä Pitkäjärvi; Sortavala Otsoinen; Viipuri Häyrynmäki and Viipuri Kärstilä Selänkangas. (Pälsi 1915a: 39–70; 1918; Europaeus 1921; Huurre 2003; Seitsonen 2004: 19.) (Figs. 12.1 and 12.2)

All studied dwelling sites are dated mainly to the Stone Age according to the ceramic and stone artefact finds. Some of the sites have been settled already during the Mesolithic, and settlement continued at the sites of Lake Riukjärvi (Ru. ozero Uzlovoe) in Kaukola (Ru. Sevast'janovo) and Häyrynmäki in Viipuri (Ru. Vyborg) also after the Stone Age (Huurre 2003:

154–157). The only sites that are located on the shore of the Baltic Sea are Viipuri Häyrynmäki and Viipuri Kärstilä Selänkangas. Heinjoki Valklampi 1 and 2 are the only sites dated solely to the Early Mesolithic. They have been located on an island between the Gulf of Finland and Lake Ladoga (Fi. Laatokka, Ru. Ladožskoe ozero) (Takala 2004: 154–156). The other sites are located in the Lake Ladoga water system. All the sites in the Lake Ladoga area are located approximately 20–25 m above the sea level (Europaeus 1921; Huurre 2003: 156; Nordqvist & Seitsonen 2004), which is a typical elevation for the Stone Age dwelling sites in the area.

The dating of the sites is complicated, because there are no radiocarbon dates from the sites, except for the newly excavated sites in Heinjoki and Kurkijoki. In the Karelian Isthmus, shoreline displacement is problematic for



dating the sites, because the water level of Lake Ladoga has remained the same at an accuracy of a couple of metres for thousands of years (Saarnisto 2003: 57; see also Saarnisto 2008, this volume).

### 12.3.1 Kaukola Riukjärvi and Piiskunsalmi

Riukjärvi is situated about 5 km north-west of the church of Kaukola. The area that was settled during the Stone Age and the Early Metal Period used to be part of an ancient bay of Lake Ladoga, even though nowadays there is only a small lake in the area. The lake level remained more or less the same throughout the whole Stone Age until the outbreak of the River Neva (Ru. reka Neva) c. 1350 BC<sup>1</sup> (3350 BP) (Huurre 2003: 203).

There are several excavated dwelling sites in the Riukjärvi area. The bone material excavated at four of these sites has been analysed (Heikki Teräväisen rantapello, Heikki Teräväisen ja Pekko Iivosen rantapellot, Simo Iivosen nummi and Tiitunmäki). In the analyses made by Mikael Fortelius (1980a), 49 bone fragments were identified to species. All the excavations were conducted during the years 1908–1912 by Sakari Pälsi and Julius Ailio (Fig. 12.2). Among the other finds, Typical Combed Ware seems to dominate in all the Riukjärvi sites. However, some later ceramic types have also been found, for example Textile-impressed Ware belonging to the Early Metal Period. (Pälsi 1915a: 39–70; Lavento 2001.)

Also the finds at the site of Kaukola 25 Piiskunsalmi Lavamäen pelto concentrate on the Stone Age. Most of the ceramics are Typical Combed Ware, but also both Early and Late Combed Ware have been found. There are also some chronologically younger finds from the site. They include Textile-impressed Ware and a straight-based flint point from the Early Metal Period, as well as some finds from the Iron Age and later periods. (Lavento 2001: 252–253.) 32

bone fragments from the site were identified to species by Fortelius (1980a).

### 12.3.2 Räisälä Pitkäjärvi

The dwelling site of Räisälä 18 Virtelä Pitkäjärvi is situated in the former municipality of Räisälä, about 12 km north-west of the municipal centre. The site is situated on a shore terrace approximately 21 m asl (Huurre 2003: 156). It has been situated at the bayhead of Lake Ladoga during the Stone Age. Sakari Pälsi excavated the site in 1915 (Fig. 12.6). His excavation was of particular importance, because during the fieldwork he improved old and developed new documentation and excavation methods (Pälsi 1915b; 1918). His methodology also affected the development of a more careful observation and find collection strategy. Pälsi measured many of the finds exactly at their find contexts and collected even the smallest pieces observed. (e.g. Seitsonen 2006.) The Pitkäjärvi site has been settled at least during the whole Neolithic period. There has probably been habitation also during the Mesolithic. The ceramic types from the site are Early Combed Ware, Typical Combed Ware and Asbestos Ware. (Pälsi 1915a; Huurre 2003.) At least two, possibly even three different phases of habitation can clearly be identified at the site. A total of 165 bone fragments from the site were identified to species by the author with help of Kristiina Mannermaa (Puttonen 2003).

### 12.3.3 Sortavala Otsoinen

The site of Sortavala Otsoinen was excavated by Aarne Europaeus (after 1930 Äyräpää) in 1921. It is the only one of the studied sites that is not situated in the Karelian Isthmus, but in the Ladoga Karelia. It is located on the north-western shore of Lake Ladoga, about 10–12 km to the south-west of Sortavala (Ru. Sortavala), on the north-eastern shore of Lake Lavijärvi (Ru. ozero Lavijarvi). The raised shoreline where the

site lies is approximately 24.5 m asl and during the Stone Age the site has been located on an island that was 1.5 km long. (Europaeus 1921.) The ceramic finds at the site consist of Pitted Ware and Typical and Late Combed Ware. Other datable finds from the site include e.g. a work axe of the Corded Ware culture. (Huurre 2003: 156.) Mikael Fortelius (1980b) identified 84 bone fragments to species.

#### 12.3.4 Viipuri Häyrynmäki and Kärstilä Selänkangas

The dwelling site of Viipuri Häyrynmäki is situated about 6 km north-east of the centre of Viipuri, on the narrow Selänkangas heath that runs from north-west to south-east. The height of the esker in the research area is approximately 21 m asl. An area of more than 8000 m<sup>2</sup> was excavated during 1909–1912 by Julius Ailio (1909b) and Kaarlo Soikkeli (1909, 1910, 1912). Even today, this remains the largest areas ever excavated in Finland. The area appears to have been inhabited through the entire Stone Age and also later. The earliest finds represent the time of the Suomusjärvi culture, when the place was only a small island at the mouth of the strait between Lake Ladoga and the Gulf of Finland. (Huurre 2003: 181; see also Seitsonen 2004: figure 3.)

The ceramic types at the site include all phases of the Combed Ware (styles 1, 2 and 3), which indicates a long term, continuous or recurring use of the area. Ceramic sherds collected from the excavation include almost 70 000 fragments, indicating that hundreds of pots must have been used at the site during the Neolithic. (Kopisto 1967: 18.) According to the finds, different settlement phases took place at different elevations on the slope. The earliest sites lie higher than the younger ones which indicate that the habitation has followed the regressive shoreline (Huurre 2003: 181). Even though some fragments of Textile-impressed

Ware have been found at the site, it seems that the settlement during the Early Metal Period has been limited and temporary compared to the Stone Age (Lavento 2003: 260). A total of 901 bone fragments from the site were identified to species, most of which (789 fragments) were seal.

According to the analysis carried out by Fortelius, the bone material from the nearby Viipuri Kärstilä Selänkangas site consists of six identified bone fragments, all of which are seal (Fortelius 1980c). Most of the ceramics from the site are Early Combed Ware (Huurre 2003: 156).

#### 12.3.5 Heinjoki Valklampi 1 and 2

The sites of Heinjoki Valklampi 1 and 2 are situated about 1 km south of Heinjoki Vetokallio, which used to be a threshold between the waters of Lake Ladoga and the Gulf of Finland during the Stone Age. Both sites lie on an ancient shoreline terrace at about 25 m asl, approximately 250 m apart. The excavations were conducted by the Lahti City Museum in co-operation with the Institute for the History of Material Culture, Russian Academy of Sciences. Altogether 18 test pits of one square meter were dug at both sites. Both sites are dated to the Mesolithic Stone Age. The radiocarbon dating was carried out on burnt bone. Valklampi 1 was dated to 8765±65 BP (Hela-743) (7960–7680 calBC)<sup>2</sup> and Valklampi 2 to 8720±70 BP (Hela-744) (7830–7600 calBC). (Takala 2003a&b; 2004: 154–155.)

The osteological analyses of the find assemblages were carried out by Pirkko Ukkonen and published by Hannu Takala (2004) in his doctoral dissertation. The material of Valklampi 1 consists of 28 identified bone fragments and Valklampi 2 has only five identified fragments (Takala 2004: 154–156).



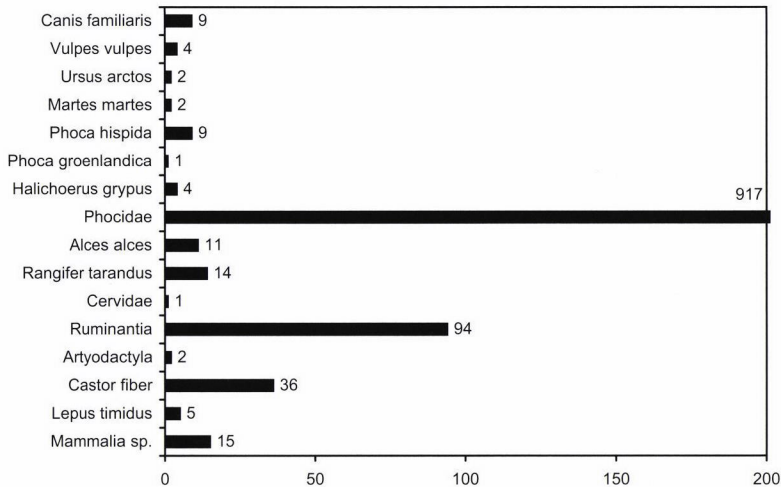


Figure 12.3 The numbers of the identified bone fragments of mammalian species and species groups in the refuse faunas in the Karelian Isthmus and Ladoga Karelia.

### 12.3.6 Kurkijoki 33 Vätikkä Kylläisenlahti W-2 and Kurkijoki 35 Vätikkä Lahdenryhmä

The two dwelling sites at Vätikkä (Ru. Vjatikkja) in Kurkijoki were excavated in 2003 by D. V. Gerasimov, S. V. Bel'skij, K. Nordqvist and O. Seitsonen. The sites are situated at the bottom of a wide ancient bay on a terrace at c. 25 m asl. One test trench of 1 x 3 m was opened at both sites. (Gerasimov 2003; Nordqvist & Seitsonen 2004.)

At the dwelling site of Kylläisenlahti W-2 the test trench was situated in front of a row of three dwelling depressions, in the 'front yard' of the central depression. The site probably has three different habitation phases. The finds from the earliest phase, which dates to the Mesolithic (6400±600 BP [LE-6928]) (6000–6400 calBC) (see Seitsonen & Gerasimov 2008, this volume), consist of flint artefacts, quartz, and burnt bone. The second occupation phase included undecorated, rough-tempered Combed Ware, possibly Early Combed Ware, quartz and flint artefacts, and burnt bone. Finds from the last phase consisted of undecorated Asbestos Ware, quartz, flint flakes and artefacts, and burnt bone. Dwelling depressions found at the site most probably date to this period. (Gerasi-

mov 2003; Nordqvist & Seitsonen 2004; Seitsonen & Gerasimov 2008, this volume.) A total of 24 bone fragments of the osteological material were identified to species by the author (Puttonen 2004a).

The dwelling site of Lahdenryhmä is situated about 300 m north-east of the previous site. The site lies on the same terrace as Kylläisenlahti W-2, next to some recent sand pits. There seem to have been at least three occupation phases also at this site. The last phase was represented by a thin grey charcoal layer, finds from which consisted of Neolithic pottery, probably Late Combed Ware, burnt bone and quartz (2230±30 BP [LE-6930]) (300–200 calBC) (see Seitsonen & Gerasimov 2008, this volume). Below this layer was an earlier reddish brown layer which yielded roughly tempered pottery, possibly Early Combed Ware, quartz and flint flakes, two stone tool preforms and burnt bone. Also one large quartz blade end-scraper was found from the lower deposit. Besides the blade scraper, also a radiocarbon dating from a pit feature indicates that the site may also have had a Mesolithic occupation phase (7900±80 BP [LE-6929]) (6840–6640 calBC) (see Seitsonen & Gerasimov 2008, this volume). (Gerasimov

2003; Nordqvist & Seitsonen 2004.) A total of 143 bone fragments of the osteological material were identified to species by the author (Puttonen 2004b).

## 12.4 Osteological material

Not very much osteological material is available from the Karelian Isthmus and Ladoga Karelia. The whole material is burnt and therefore relatively fragmented and poorly preserved. It covers 24 different species, including two human bone fragments. Mammal bone fragments form the categorical majority of the whole material. The composition of the refuse fauna from different sites varies significantly depending mostly on the excavation methods used, but also on the dating and function of the sites.

### 12.4.1 Mammals

#### 12.4.1.1 Seals (Phocidae)

Seal remains formed the majority of the refuse fauna, over 60 percent of the entire studied material. They were found at all the sites except Kurkijoki 33 Kylläisenlahti W-2 and Kaukola Simo Iivosen nummi (part of a larger site Kaukola 18 Kyöstälänharju). Seal bones are extremely difficult to identify to species. However, there are some characteristic features in some parts of their skeletons that can be used to separate different seal species even in burnt material (Ukkonen 2002: 5–6). Most of the seal fragments were not identified to species, but some fragments of harp seal (*Phoca groenlandica*), ringed seal (*Phoca hispida*) and grey seal (*Halichoerus grypus*) were recognised in the material (Fortelius 1980a–c) (Fig. 12.3, Table 12.1).

Ringed seal arrived in the Baltic Sea from the Atlantic most likely through the Närkesund, a strait in Central Sweden, already during the Yoldia Sea stage c. 9500–8700 BC

(11500–10700 BP). As for other seal species, this passage has probably been too low to allow them to spread to the Baltic Sea before the beginning of the Litorina stage, 7500 BC (9500 BP). (Forsten & Alhonen 1975: 146; Ukkonen 2002; Storå 2001; Saarnisto 2003: 51.)

It is not known for certain when the ringed seal entered Lake Ladoga. During the Yoldia stage, a broad connection existed between the Lake Ladoga and the Baltic Sea. This connection may still have existed during the *Ancylus* transgression, c. 8700–8100 BC (10700–10100 BP). (Saarnisto 2003: 51–52.) Seals may have entered Lake Ladoga and re-entered the Baltic basin at any time during this period, and also later during the Litorina stage (Ukkonen 2002: 3).

The harp seal, which no longer inhabits the Baltic Sea, did not enter the Baltic Sea until the Danish Straits opened. The earliest date (5890 BP) for the harp seal from the northern Baltic has been made by dating a stray find from the southern coast of the Gulf of Bothnia. (Ukkonen 2001: 27.)

Grey seal is very rare in the subfossil refuse faunas in the Baltic. The species probably immigrated to the Baltic basin also through the Danish Strait at the beginning of the Litorina stage, although an earlier appearance of the species during the Yoldia stage is also possible (e.g. Lepiksaar 1986; Storå 2001; Ukkonen 2001; 2002).

According to Ukkonen (2002), Finnish prehistoric sites with seal remains seem to concentrate on the coastline of 6500 BP and on the contemporaneous islands. All sites with ringed seal or harp seal remains lie on or below the 7500 BP coastlines. The earliest dated subfossil stray find of seal remains in Finland and in the Karelian Isthmus is ringed seal (9500 BP). Harp seal and grey seal remains appear in the coastal finds c. 6000–5000 BP. (Ukkonen 2002: 12–13.)

The only identified grey seal and harp seal fragments in the material from Karelian Isth-



Species or species groups	Number of fragments	Number of sites
<i>Canis familiaris</i>	9	1
<i>Vulpes vulpes</i>	4	2
<i>Ursus arctos</i>	2	1
<i>Martes martes</i>	2	1
<i>Phoca hispida</i>	9	4
<i>Phoca groenlandica</i>	1	1
<i>Halichoerus grypus</i>	4	1
Phocidae	917	11
<i>Alces alces</i>	11	4
<i>Rangifer tarandus</i>	14	2
<i>Castor fiber</i>	36	6
<i>Lepus timidus</i>	5	3
<i>Gavia arctica</i>	1	1
<i>Gavia stellata</i>	1	1
<i>Gavia</i> sp.	2	2
<i>Podiceps cristatus</i> / <i>Podiceps griseigena</i>	1	1
<i>Anas crecca</i> / <i>Anas querquedula</i>	1	1
<i>Mergus</i> sp./ <i>Melanitta</i> sp.	1	1
Anatidae	3	1
<i>Lagopus lagopus</i>	1	1
<i>Esox lucius</i>	53	7
<i>Coregonus</i> sp.	2	2
Salmonidae	3	2
<i>Perca fluviatilis</i>	20	4
<i>Sander lucioperca</i>	5	3
Cyprinidae	27	5

Table 12.1 Species and species groups identified in the materials from the studies sites.

mus are from the site of Viipuri Häyrynmäki, which is situated on the coast of the Baltic Sea. Ringed seal was identified in a larger sample of materials; Kaukola Tiitunmäki, Kurkijoki Lahdenryhmä, Sortavala Otsoinen and Viipuri Häyrynmäki (Appendix A[12]).

#### 12.4.1.2 Carnivores (Carnivora)

Among the terrestrial carnivores, bones of dog (*Canis familiaris*), red fox (*Vulpes vulpes*), brown bear (*Ursus arctos*) and pine marten (*Martes martes*) were identified. The small amount of carnivores among the bone material probably indicates a naturally small population

of these species (Ukkonen 1996: 67). Carnivores have also been considered as very important fur animals, which means that only the skin might have been brought to the dwelling site. This might also partly explain the small number of bone fragments. (Mökkönen 2000: 26.)

Dog and red fox are sometimes difficult to distinguish from each other in burnt and fragmented material. The material from four sites included bones that were impossible to identify to species as either dog or red fox. However, nine certain fragments of dog were identified in the material from Viipuri Häyrynmäki and red fox was identified in two sets of material, Räisälä

Pitkäjärvi and Viipuri Häyrynmäki (Appendix A[12]).

Pine marten bones were found only at the Räisälä Pitkäjärvi site. Brown bear finds were represented in the study area only by two fragments which were identified in the material of Viipuri Häyrynmäki.

#### 12.4.1.3 Cervids (Cervidae)

According to the osteological material, the European elk (*Alces alces*) and wild reindeer (*Rangifer tarandus*) have been hunted among other mammals in the Karelian Isthmus during the Stone Age. Elk remains were found at five sites and reindeer at two sites.

The dating of the appearance of the reindeer in the Karelian Isthmus and in Finland is not completely clear. Various hypotheses have been presented. However, lately Tuija Rankama and Pirkko Ukkonen (2001) have examined more closely the history of wild reindeer in Finland. Probably the oldest reindeer bones in the area have been found at the cemetery of Olenij Ostrov (En. Reindeer Island) in Lake Onega (Fi. Ääninen, Ru. Onežskoe ozero) in the Karelian Republic (see also Hakala 1997: 71–72). G. A. Pankrušev dated the cemetery to the Mesolithic Stone Age in the 1970's. If the date of the Olenij Ostrov cemetery can be used to indicate the arrival of reindeer in Finland, it has taken place not later than 7500 BP (for the dating of Olenij Ostrov see Carpelan 1999: 151–153). In south-eastern and central Finland, most of the prehistoric reindeer remains have been found

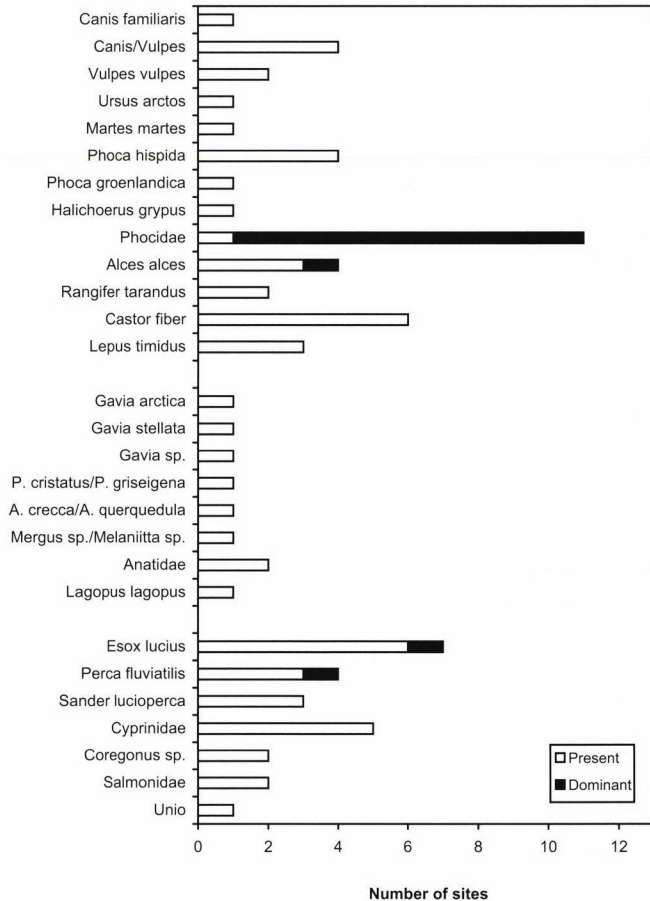


Figure 12.4 The commonness of different species and species groups identified in the materials from Karelian Isthmus and Ladoga Karelia.

in Neolithic contexts. No reindeer bones have been found at Mesolithic sites in this area. (Rankama & Ukkonen 2001: 136–140.) Also all the reindeer bones from the Karelian Isthmus are from sites dated later than Mesolithic. The reindeer finds of the Karelian Isthmus and Ladoga Karelia have probably been forest reindeer (*Rangifer tarandus fennicus*), because the environment in the Karelian Isthmus with its birch and pine forests would not have been very suitable for mountain reindeer (*Rangifer tarandus tarandus*), which usually live in the Arctic



tundra. These two species are not possible to be distinguished from each other on the basis of burnt bones. (Ukkonen 1993: 259.)

#### 12.4.1.4 Rodents (Rodentia) and hares (Lagomorpha)

The material from Karelian Isthmus and Ladoga Karelia included only one rodent species, the beaver (*Castor fiber*). It is the most common terrestrial mammal in Stone Age refuse faunas in Finland (Ukkonen 1993). Beaver remains were found at six sites (Fig. 12.4).

Beaver has been hunted because of its valuable fur, tasty meat, and glandular secretion, which has been used as perfume and medicine at least during historical times (Huurre 1998; 2003). The European beaver, which arrived in Finland obviously already during the Preboreal chronozone (10000–9000 BP), became extinct in the 19<sup>th</sup> century due to intense hunting. The present Finnish population (both *Castor fiber* and *Castor canadensis*) was introduced in the 1930's. (e.g. Lahti 1983: 119; Ukkonen 1996: 72.)

No bones of red squirrel (*Sciurus vulgaris*) were found in the materials. This may be partly due to the old excavation methods. Screening was not very common in the early 20<sup>th</sup> century, and it is usually necessary in order to find and collect the tiny squirrel bones. However, no squirrel bones were found in the material from the later excavations either.

Altogether four hare bone fragments were found at three separate sites. The two hare species living in the area, Arctic hare (*Lepus timidus*) and European hare (*Lepus europaeus*), are almost impossible to distinguish in burnt, fragmented material. All hare bones in the material belong most probably to the Arctic hare, because European hare arrived in Northern Europe obviously much later than Arctic hare. In Estonia, the earliest datings of the species are as late as 100–50 BP. In Denmark, the subfos-

sil remains of European hare are much older and dated to as early as 5000 BP. (Aarnio 1983: 182; Lepiksaar 1986; Aaris-Sørensen 1988; Ukkonen 1996: 72–73.)

#### 12.4.2 Birds (Aves)

The osteological material concerning bird remains from the Karelian Isthmus and Ladoga Karelia is quite small in number. According to Ukkonen (1996), bird remains are not very common in the prehistoric bone assemblages. Kristiina Mannermaa has recently reanalysed the bird bone assemblages of the Viipuri Häyrynmäki and Sortavala Otsoinen sites. As a result of these analyses, she was able to identify new bird species in the Stone Age refuse faunas of the area. (Mannermaa 2003: 38–39.) Altogether only 21 bird bone fragments were found at five sites.

One fragment from Kurkijoki 35 Vätikkä Lahdenryhmä was defined as black-throated diver (*Gavia arctica*). The identified fragment was a part of a beak. (Puttonen 2004b.) Red-throated diver (*Gavia stellata*) was identified in the material from Viipuri Häyrynmäki (Mannermaa 2003: 38–39). Both species are migrants, and during the peak of the spring migration there may be hundreds or even thousands of black-throated divers simultaneously at the same place (e.g. Keith & Gooders 1981: 321–322), which makes the species well suited for hunting. One fragment from Sortavala Otsoinen was identified as red-necked grebe or great crested grebe (*Podiceps cristatus/Podiceps griseigena*); these are also migratory species (e.g. Keith & Gooders 1981: 320–322). Also one fragment of willow grouse (*Lagopus lagopus*) was identified in the material from Sortavala Otsoinen (Mannermaa 2003: 38–39).

The rest of the identified bird bone fragments belong to anatids (Anatidae), and only two of them were defined more precisely. One fragment belonged to either teal or garganey (*Anas crecca/Anas querquedula*) and another

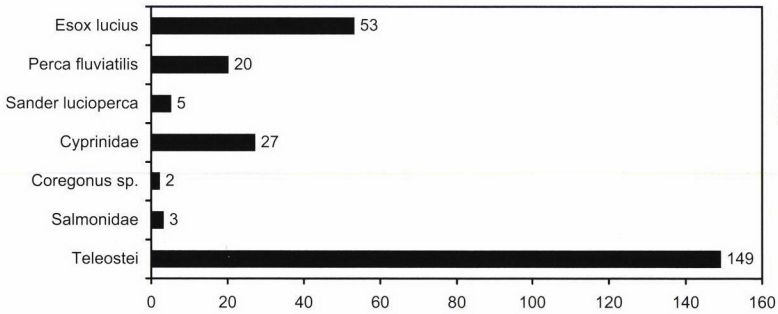


Figure 12.5 The numbers of identified bone fragments of different fish species and species group in the refuse faunas of the study area.

to smew, red-breasted merganser, goosander or some scoter species (*Mergus* sp./*Melanitta* sp.). (Mannermaa 2003: 38–39.) All anatid species mentioned above are also migrants (e.g. Keith & Gooders 1981: 371, 374, 388–390). Eleven bone fragments could not be classified specifically according to any species groups and were only defined as bird bones (Appendix A[12]).

#### 12.4.3 Fish (Pisces)

A large amount of fish remains is usually found at Stone Age dwelling sites (Huurre 1998: 175). For example, in the Lake Saimaa area fish remains are very common and form the majority of the entire refuse fauna (Ukkonen 1996: 74; Mökkönen 2001: 4). This indicates that fishing has been of great importance in the subsistence of societies at least at inland dwelling sites during the Stone Age. In the material from the Karelian Isthmus, fish remains are most probably not fully represented because of the rough excavation methods used in the early 20<sup>th</sup> century.

Fish remains were found at nine sites. Pike (*Esox lucius*) is the most common of the identified species. It was found at seven sites, 53 fragments altogether. This might be due to the relatively good preservation of pike bones, especially the jaw bone, which is also easy to recognise (Fortelius 1981: 13). Perch (*Perca fluviatilis*) was represented with 20 fragments from four sites and pikeperch (*Sander lucioperca*) with five fragments from three sites. Cyprinid

fish (Cyprinidae), with 27 fragments, were not identified to species. Only three fragments were identified as Salmonid fish (Salmonidae). They were found at two different sites. White fish (*Coregonus* sp.) was identified in two assemblages. The rest of the fish bones (149 fragments) were not identified to species, but determined as fish (Teleostei) (Fig. 12.5).

## 12.5 Discussion

Due to the excavation methods used in the early 20<sup>th</sup> century, the find contexts of most of the faunal remains are unclear (Figs. 12.2 and 12.6). Therefore the usefulness of the results may not be optimal for comparing the relative frequencies of the faunal species. In spite of this, the results provide an indicative picture of the general situation concerning the utilization of different species during the Stone Age and Early Metal Period.

According to the currently analysed osteological material, seal has been the most significant hunted mammal group in the subsistence of the Stone Age societies in the Karelian Isthmus and in Ladoga Karelia. Seal bone fragments represent the majority of the refuse fauna at almost all the prehistoric sites in the area; the dominant species at different dwelling sites can be seen in Figure 12.4. At the dwelling sites in Viipuri, seal bone fragments formed nearly 87 % of the identified fragments. Even if the quantity





Figure 12.6 An example of the excavation technique used by Sakari Pälsi at the Räisälä 18 Pitkäjärvi site in 1915: the soil is incised as thin layers to recover the finds. (Photo: S. Pälsi 1915, National Board of Antiquities)

of seal bones was partly due to taphonomical factors, their large number indicates the relative importance of seal hunting (Appendix A[12]).

All identified dog remains belong to the material from Viipuri Häyrynmäki. Ylimaunu (2000) has suggested that dog could have been used in winter seal hunting already during the Stone Age, because without their keen sense of smell, the winter nests with the ringed seal cubs are quite difficult to find. (Ylimaunu 2000: 76–77). The topography of Viipuri Häyrynmäki and the archaeological data from the site both support the idea that in its earliest phase the site might have been a logistical seal hunting site. In the Lake Ladoga water system, nearly 30 % of the identified bone fragments at the prehistoric sites are seal. Seal hunting seems to have been of great importance also in this area.

All identified reindeer bone fragments are from the sites in the Räisälä and Kaukola area.

It might be significant that there are almost no cervid bones from the sites in the vicinity of Viipuri. The function of these sites on the coast of the Baltic Sea might explain this discrepancy.

The sites in Heinjoki are the only sites in this study dated solely to the Mesolithic. Also there, seal remains form the majority (37.5 %) of the entire refuse fauna. Only one possible elk bone fragment was identified in the material.

Fish remains in the Karelian Isthmus and in Ladoga Karelia are not as abundant as they usually are in Finnish Stone Age refuse faunas. Recently excavated sites are richer in fish bones than sites excavated earlier, which is probably due to improved excavation techniques (Fig. 12.5, also Figs. 12.2 and 12.6). This can also be seen in the recently excavated assemblages from Kurkijoki and Heinjoki. They contain more fish bones than all the other sites together.

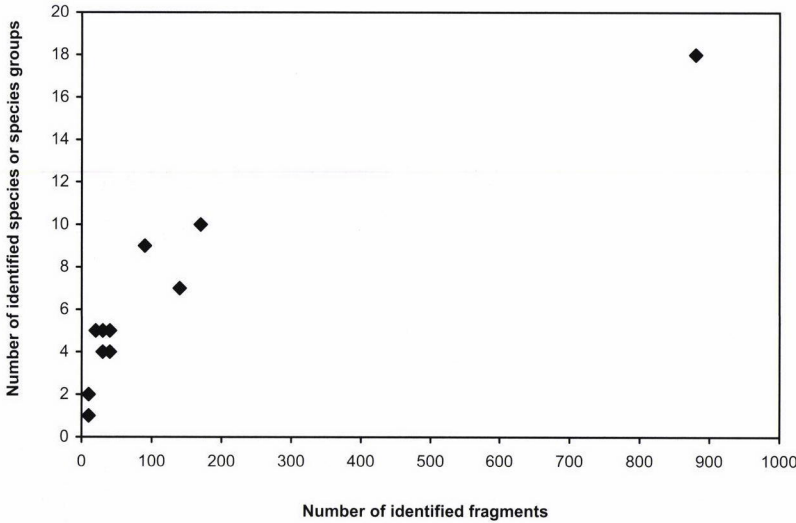


Figure 12.7 The numbers of different species in the refuse faunas plotted against the total number of identified bone fragments.

The osteological material from the Karelian Isthmus and Ladoga Karelia also included one burnt human finger bone. It was found in Kaukola at the site of Heikki Teräväisen rantapelto (part of Kaukola 18 Kyöstälänharju site). It is not certain whether this bone belongs to a Stone Age or Early Metal Period context. One unburnt fragment of human bone was also identified in the material from Viipuri Häyrynmäki, but as it was not burnt, it does not necessarily belong to a prehistoric context. Human bones are extremely rare at Stone Age dwelling sites (Huurre 1998: 267, 329).

Some differences can be seen in the osteological data from the Karelian Isthmus and Ladoga Karelia compared to the results from nearby areas. For example, in the material from the ancient Lake Saimaa area, fish remains form over 70 % of the entire refuse fauna and seal bone fragments only less than 1 % (Mökkönen 2000). In the bone material from three dwelling sites of Besov Nos on the eastern coast of Lake Onega, cervids form nearly 50 % of the refuse fauna. Seal remains represent 21 %. (Lobanova 1995.)

All calculations about the relative proportions of different species mentioned above have been made based on the numbers of identified fragments. However, when the osteological material

is burnt and fragmented, one should be careful in making any far-reaching conclusions about anything else but the variety of the species utilized at the dwelling site. Carrying out regional comparisons using percentual shares can be misleading, especially when the materials are small and excavated during different periods using different methods. Also the soil at the sites varies and therefore affects the preservation of bones. One should preferably examine the materials in the context of separate sites instead of performing wider regional comparisons. For example, the number of identified fragments could be proportioned to the volume of the excavated area.

The abundance of different species at a dwelling site seems to be comparable with the number of identified bone fragments found at the site. In Figure 12.7, the number of identified species is plotted against the total number of identified bone fragments found at the dwelling sites in the Karelian Isthmus and in Ladoga Karelia. In other words the larger the material, the more species and species groups are usually identified. (e.g. Lyman 1982: 359; Mannermaa 2004: 36; Ukkonen 2004: 113.)



## 12.6 Conclusion

The studied osteological material represents refuse fauna typical for Stone Age dwelling sites in Finland. The results in this article are based on the situation in the end of the 2003, after which more osteological materials from Karelian Isthmus and Ladoga Karelia have been excavated and analysed.

On the basis of this material, subsistence in the whole area of the Karelian Isthmus and Ladoga Karelia seems to have been more or less concentrated in seal hunting. The lack of some species like otter and squirrel and the relatively small amount of fish remains can be explained to some extent by the small number of analysed materials, the small number of identified fragments, and rough excavation methods. As a result of this, the usefulness of the results may not be optimal for comparing relative frequencies of different species. However, the results give an indicative picture of the general situation concerning the utilization of different species during the Stone Age and Early Metal Period in the area.

When studying burnt and fragmented osteological materials, one should be careful in making far reaching conclusions about anything else but the variety of species utilized at the dwelling site. Regional comparisons should not be carried out in too straightforward a manner, especially when the assemblages are small and excavated during different periods with different methods.

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## Endnotes

- 1 All the datings of geological and hydrological events are given as calendar years and follow the ones given by Saarnisto (2008, this volume).
- 2 Radiocarbon dates calibrated using the OxCal v. 3.10 (Bronk Ramsey 2005).



## Appendix A[12].

**Results of the osteological analyses.** List of the sites, catalogue numbers (NM), authors and the dates of the excavation reports, dating (A = Mesolithic Stone Age, a = Neolithic Stone Age, b = Early Metal Period), analysing osteologist (MF = Mikael Fortelius, KM = Kristiina Mannermaa, SP = Sanna Puttonen, PU = Pirkko Ukkonen) and the numbers of the fragments of different species.

Site	NM	Report	Dating	Analysis
Heinjoki Valklampi 1	-	Takala 2003a	A	PU
Heinjoki Valklampi 2	-	Takala 2003b	A	PU
Kaukola Heikki Teräväisen ja Pekko Iivosen rantapelto	5963	Pälsi 1911b	ab	MF
Kaukola Heikki Teräväisen rantapelto	5963	Pälsi 1911b	ab	MF
Kaukola Simo Iivosen nummi	5963	Pälsi 1911b	a	MF
Kaukola Tiitunmäki	5963	Pälsi 1911a	ab	MF
Kaukola Ville Pessin Lavamäenpelto	5963	Pälsi 1911b	a	MF
Kurkijoki 33 Vätikkä Kylläisenlahti W-2	-	Gerasimov 2003	a	SP
Kurkijoki 35 Vätikkä Lahdenryhmä	-	Gerasimov 2003	a	SP
Räisälä Pitkäjärvi	6939	Pälsi 1915b	Aa	SP
Sortavala Otsoinen	7898	Europaeus 1921	a	MF & KM
Viipuri Häyrymäki	5427	Ailio 1909b	Aab	MF
Viipuri Häyrymäki	5428	Soikkeli 1909	Aab	MF & KM
Viipuri Häyrymäki	5620	Soikkeli 1910	Aab	MF & KM
Viipuri Kärskilä Selänkangas	6114	Soikkeli 1912	a	MF

(1 = *Canis familiaris*, 2 = *Canis/Vulpes*, 3 = *Vulpes vulpes*, 4 = *Ursus arctos*, 5 = *Martes martes*, 6 = *Phoca hispida*, 7 = *Phoca groenlandica*, 8 = *Halichoerus grypus*, 9 = Phocidae, 10 = *Alces alces*, 11 = *Rangifer tarandus*, 12 = Cervidae, 13 = Cervidae cf. *Alces alces*, 14 = Bovidae, 15 = *Ovis aries/Capra hircus*, 16 = Ruminantia, 17 = Artiodactyla, 18 = *Castor fiber*, 19 = *Lepus timidus*, 20 = Mammalia cf. *Canis familiaris*, 21 = Mammalia sp., 22 = *Gavia arctica*, 23 = *Gavia stellata*, 24 = *Gavia* sp., 25 = *Podiceps cristatus/Podiceps griseigena*, 26 = *Anas crecca/Anas querquedula*, 27 = *Mergus* sp./*Melanitta* sp., 28 = Anatidae, 29 = *Lagopus lagopus*, 30 = Aves, 31 = *Esox lucius*, 32 = *Perca fluviatilis*, 33 = *Sander lucioperca*, 34 = Cyprinidae, 35 = *Coregonus* sp., 36 = Salmonidae cf. *coregonus* sp., 37 = Salmonidae, 38 = Teleostei cf. Cyprinidae, 39 = Teleostei cf. Salmonidae, 40 = Teleostei, 41 = Unio, 42 = total amount of identified animal bone fragments, 43 = *Homo sapiens*)

Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43			
Heinjoki Valklampi 1									9				1								6												3	6						3		28				
Heinjoki Valklampi 2									3											1		1																						5		
Kaukola Heikki Teräväisen ja Pekko Iivosen rantapelto									18		1				1															1		3													24	
Kaukola Heikki Teräväisen rantapelto		1							9	1									1																						1		13	1		
Kaukola Simo Iivosen nummi											3								1																										4	
Kaukola Tiitunmäki						1			3													2																				1		7		
Kaukola Ville Pessin Lavamäen- pelto		1							25										2													1			1								2		32	
Kurkijoki 33 Vätikkä Kylläisenlahti W-2																															2	1	8				1						12		24	
Kurkijoki 35 Vätikkä Lah- denryhmä						1			4												1	2	1							1	12	5			7	1			1	1	105		142			
Räisälä Pitkäjärvi		1	1		2				18	3	13						94		6	2		3										13			4							5		165		
Sortavala Otsoinen						3			62										2			1				1			1	1	1	2	6		1			2				4		87		
Viipuri Häyrymäki									102					5																		1		1	3							3		115		
Viipuri Häyrymäki	9	3	1	1		3			511	1									13	1				1	1				1	2	15			5		1					7		576	1		
Viipuri Häyrymäki			2	1		1	1	4	146	3		1						2	11	1						1	1	1	4	5	1		1									7		194		
Viipuri Kärstilä Selänkangas									7																																				7	
	9	6	4	2	2	9	1	4	917	11	14	1	1	5	1	94	2	36	5	1	15	1	1	1	1	1	1	1	3	1	11	53	20	5	27	2	1	2	1	1	149	1	1423	2		