

Hearths in the coastal areas of northernmost Sweden, from the period AD 800 to 1950

Lars Liedgren¹, Ingela Bergman¹, Per H. Ramqvist^{1,2} & Greger Hörnberg¹

¹ Institute for Sub-Arctic Landscape Research (INSARC), Silvermuseet, Box 10, S-93831 Arjeplog, Sweden (Corresponding author: lars.liedgren@silvermuseet.se).

² Dept. of Historical, Philosophical and Religious studies, Umeå University, SE-901 87 Umeå, Sweden.

Abstract: This paper presents a study of the chronological setting of hearths registered in FMIS (digital register containing records of all known ancient monuments in Sweden) in the provinces of Västerbotten and Norrbotten, Northern Sweden. A total of c. 1500 hearths are known in the area, mainly situated north of the river Skellefteälven. Within a study area of 107 x 94 km, 32 hearths were randomly selected for excavation, each site embracing 1-14 hearths. The sites were scanned using a metal detector and nearly all artifacts found were from the period AD 1600-1900. ¹⁴C-datings of charcoal and burned bones corroborated that most hearths were used during this period, with a large number dating to the 19th and 20th centuries. Many hearths contained bones from mature reindeer, indicating that the hearths were related to reindeer herding. We suggest that most hearths are related to nomadic Sami reindeer herders using coastal areas for winter pasture, possibly resulting from the breakdown of the “*lappskatteländ*” (taxation lands) system and an increase in reindeer numbers.

Key words: hearth; Sami; ¹⁴C-datings; reindeer; artifact; Västerbotten; Norrbotten.

Rangifer, 36, (1), 2016: 25-50

DOI [10.7557/2.36.1.3767](https://doi.org/10.7557/2.36.1.3767)

Introduction

In the coastal areas of northern Sweden (the counties of Västerbotten and Norrbotten) sedentary agrarian farms established by the 14th century at the latest. In AD 1543 there were around 2300 farms (taxation units) in these areas (Nordlander, 1905). The economy included hunting and extensive lake fishing in the interior (*träskfiskan*) and in rivers close to and far away from the farms and at sea (Westin, 1953; Fahlgren, 1963, 1970:156pp; Nordberg, 1965; Bergman & Ramqvist, 2016). These coastal societies were divided into parishes which generally stretched 100-120 km (and as far as

260 km in the Torne river valley) towards the Lappland border (*lappmarksgränsen*) which was poorly defined at this time.

West of this border the Sami reindeer herders had their land, known as Lappland (mentioned as early as AD 1340 in a letter by King Magnus Eriksson). The Lappland border was finally defined as late as AD 1766 (André, 1998:59). The agrarian colonization of Lappland, including establishment of sedentary farms, began during the second part of the 17th century in the south (Norstedt, 2011; Göthe, 1929) and somewhat later further north (Bylund 1956).

Numerous remains related to reindeer herding, mostly hearths, occur all over Lappland. The hearths consist of a stone lining and on the inside, in many cases, a packing of stones. They were intended to contain a fire inside a tent or a permanent building, and were constructed in such a way that the fire did not spread on the ground. This source of heat was used to warm the living space, to cook food and to give light (Liedgren & Östlund, 2011; Östlund *et al.*, 2013).

Today, our knowledge of stone-lined hearths west of the Lappland border is relatively extensive (Edbom *et al.*, 2001; Hedman, 2003; Liedgren & Hedman, 2005; Liedgren *et al.*, 2007; Bergman, *et al.*, 2013). They date back to at least the late Iron Age (AD 700-800) onwards, in both the alpine and boreal areas of the region (Storli, 1994; Mulk, 1994; Hedman, 2003; Liedgren *et al.*, 2007; Hedman & Olsen, 2009; Bergman *et al.*, 2013; Hedman *et al.*, 2015). Single hearths or hearths in rows from the late Iron Age are found in locations suggesting that people utilized the landscape during different seasons in accordance with the needs of the reindeer – an animal of central importance (Aronsson, 1991; Bergman, 1991; Hedman, 2003). The time when the reindeer was domesticated in Sweden has been intensely debated (for a general review on the debate see Sommerseth, 2011). This is not an entirely straightforward issue, as Ingold (1980) and Lundmark (1998) have recognized a clear difference between “*rennomadism*”, i.e. living on the surplus provided by tame reindeer herds, and merely owing some tame reindeer.

During the late 19th and the beginning of the 20th century both forest Sami and mountain Sami used the Bothnian coast in the wintertime for grazing their animals on the heathlands. The mountain Sami groups travelled as far west as the Norwegian border and beyond in the spring, and all the way down to the Bothnian Bay in late autumn in a cyclical man-

ner (Manker, 1953). Today, the coastal area is still used by reindeer herders during the winter. However, knowledge of the utilization of the coastal areas for reindeer herding before the late 19th century is poor, and only a few hearths have been excavated so far. Thus the objective of the present study was to assess whether the historical records outlined above can be supported by the archaeological record further back in time. For this purpose we have focused on hearths found east of the Lappland border and addressed the following specific questions.

- 1) To what extent were coastal hearths connected to reindeer herding?
- 2) Are the registered hearths only a manifestation of late usage (post-18th century) of the coast for reindeer grazing?
- 3) Are there any signs that hearths were used during the snow-free period?

In addition to addressing these questions we also discuss correlations between the spatial distribution of hearths and geographical place names associated with Sami groups.

The archaeological setting

The National Heritage Board (NHB) in Sweden started landscape inventories for ancient monuments in 1938. The surveys were connected to the production of economic maps (Hyenstrand, 1978). In the province of Västerbotten and Norrbotten surveys were started in the 1950s (Jensen, 1997). During this period the focus was mainly on stone settings, cairns, ruins related to seal hunting (*tomtningar*) and labyrinths (stone linings forming a spiral towards a center point, commonly associated with sea fishing), and to some extent on historically known Sami settlement places in coastal areas (Thålin, 1962). These inventories were mostly based on old records and information collected from local people. Later more systematic searches were conducted during the 1980s and 1990s (Persson, 1985; Klang, 1986). In-

ventories were mostly conducted during the summer by archaeology students, each student having a certain area to cover during a set time frame. Every site was described and the location was plotted on an aerial photo map. All monuments were checked by an experienced archae-

ologist (*platsledare*) to guarantee quality. All of this material is now digitalized and presented in FMIS (in English ASIS = Ancient Sites Information System). Figure 1 displays the areas that were surveyed during 1980-1995. The map shows that most areas up to 50 km from

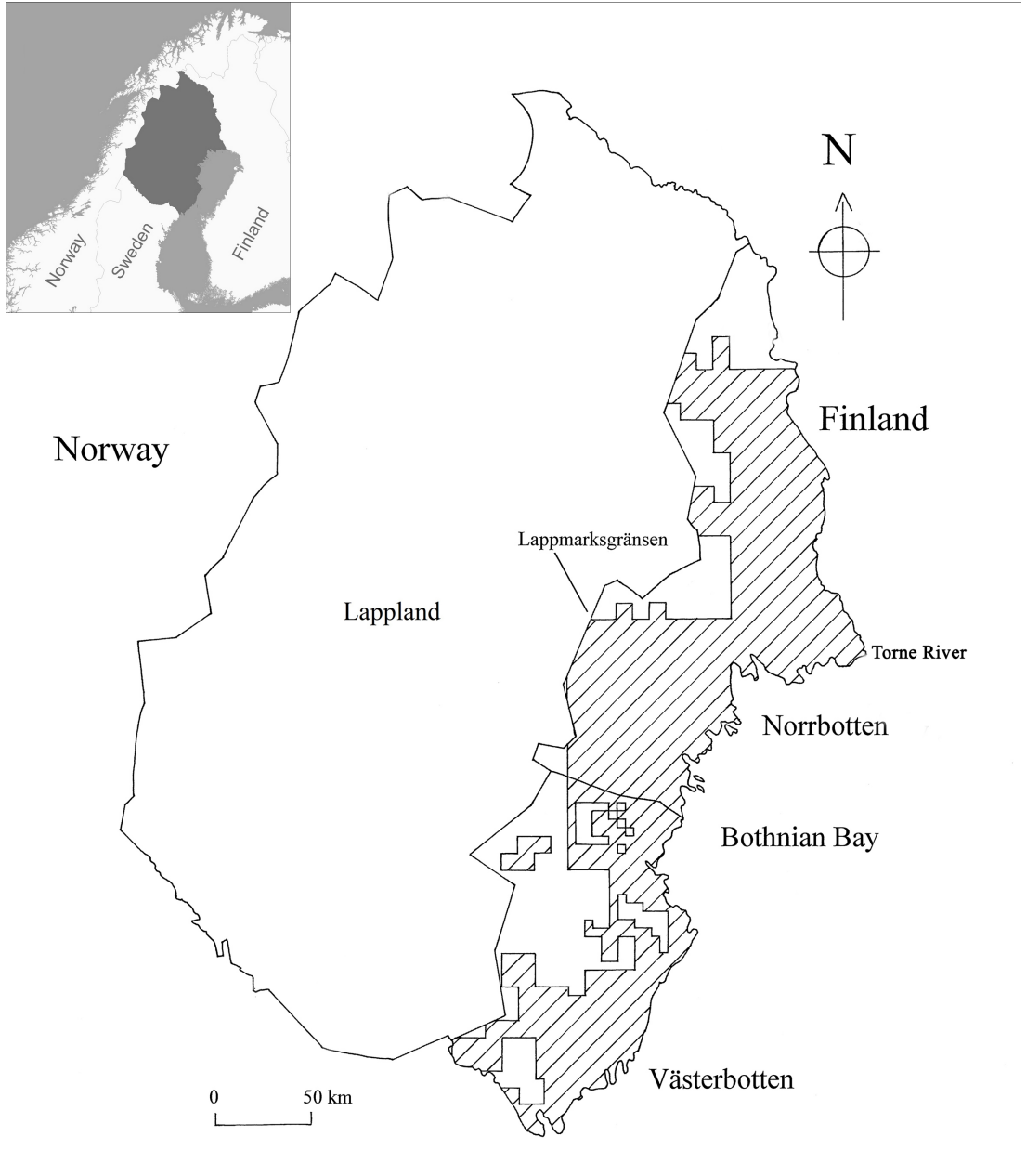


Figure 1. Survey of ancient monuments in the coastal areas of the county of Norrbotten and Västerbotten, made later than 1979 (based on Jensen 1997).

the coast-line have been inventoried, and in the Torne River valley coverage extends up to 200 km inland. The most and best covered areas are situated in the county of Norrbotten.

The FMIS-register also includes a number of features generally connected to reindeer herding such as: remnants of Sami settlement sites (*visten*), huts (*kåtor*), reindeer fences and corrals (*gårdor*). Occasionally, information acquired from oral tradition, maps and old records was registered. Despite the somewhat uneven coverage of the landscape, the register offers a relatively accurate picture of the dispersion of features that might have been connected to reindeer herding during the 19th century and earlier. About 1500 hearths (which are protected by Swedish law) had been registered in the counties of Västerbotten and Norrbotten by 2012. The numbers of hearths per site vary from one to more than 10. A few hearths had been excavated in this area prior to the excavations reported here, some of which yielded artifacts datable to the 18th and 19th centuries. In addition, a silver buckle dated to the medieval period has been found close to one hearth in Gråträsk in Piteå parish (Fossum, 2003).

Method

Sampling strategy and field investigations

Our objective was to obtain an unbiased view of the coastal hearths, thus we chose to focus on a randomly selected sample, of sufficient size for statistical analysis of the hearths spatial and temporal distributions. The northern part of Västerbotten and the southern part of Norrbotten seem to have most hearths and were therefore probably frequently used over a long period of time (see Figure 2). This area is also fairly well documented by surveys.

A rectangular area covering roughly 107 x 94 km (NE-SV) was laid out to define the study area. This area was further divided into four zones, each covering about 27 x 94 km in size (see Figure 3) in order to detect possible differ-

ences along an east-west gradient. There are 96 to 341 hearths in each of these zones and about 1000 in total.

The elevation ranges from sea level in zone 1 to over 600 m above sea level (a.s.l.) in zone 4, and the highest marine limit stretches from southwest to northeast in zone 2 and 3 at ca 230 m a.s.l (Berglund, 2012; Näslund, 2015). The soils are mainly sediments along the river valleys, and morainic till dominates at higher elevations (www.sgu.se). All rivers have their source areas in the western forests except for the Pite River that starts further west in the Scandinavian Mountains. Further, all zones are located in the boreal forest where Scots pine (*Pinus sylvestris*), dwarf shrubs (*Calluna vulgaris*, *Empetrum nigrum* and *Vaccinium vitis-idaea*) and reindeer lichen (*Cladonia* species) dominate dry sediment soils, while mixed forests of Scots pine, Norway spruce (*Picea abies*), dwarf shrubs (*Vaccinium myrtillus* and *V. uliginosum*) and feather mosses (*Pleurozium schreberi* and *Hylocomium splendens*) characterize mesic sites (Engelmark & Hytterborn, 1999).

We randomly selected eight hearths in each zone; the minimum required for detecting statistically significant differences among hearths in different zones (see Zar, 2010), as follows. The number of hearths in each zone was divided by eight which gave a sampling interval. A random starting number was attributed based on the total number of hearths in each zone. From these two numbers eight excavation objects could be selected in each zone. Thus, 32 hearths were randomly selected in total, 3.2 % of all hearths in the study area or 2 % of all known hearths in the coastal areas of Västerbotten and Norrbotten. Due to problems during field work (locating some hearths proved difficult) five initially selected hearths had to be replaced by random resampling. In three cases the selected hearths proved to be natural features, and in these cases the closest hearths on the respective sites were excavated and dated.

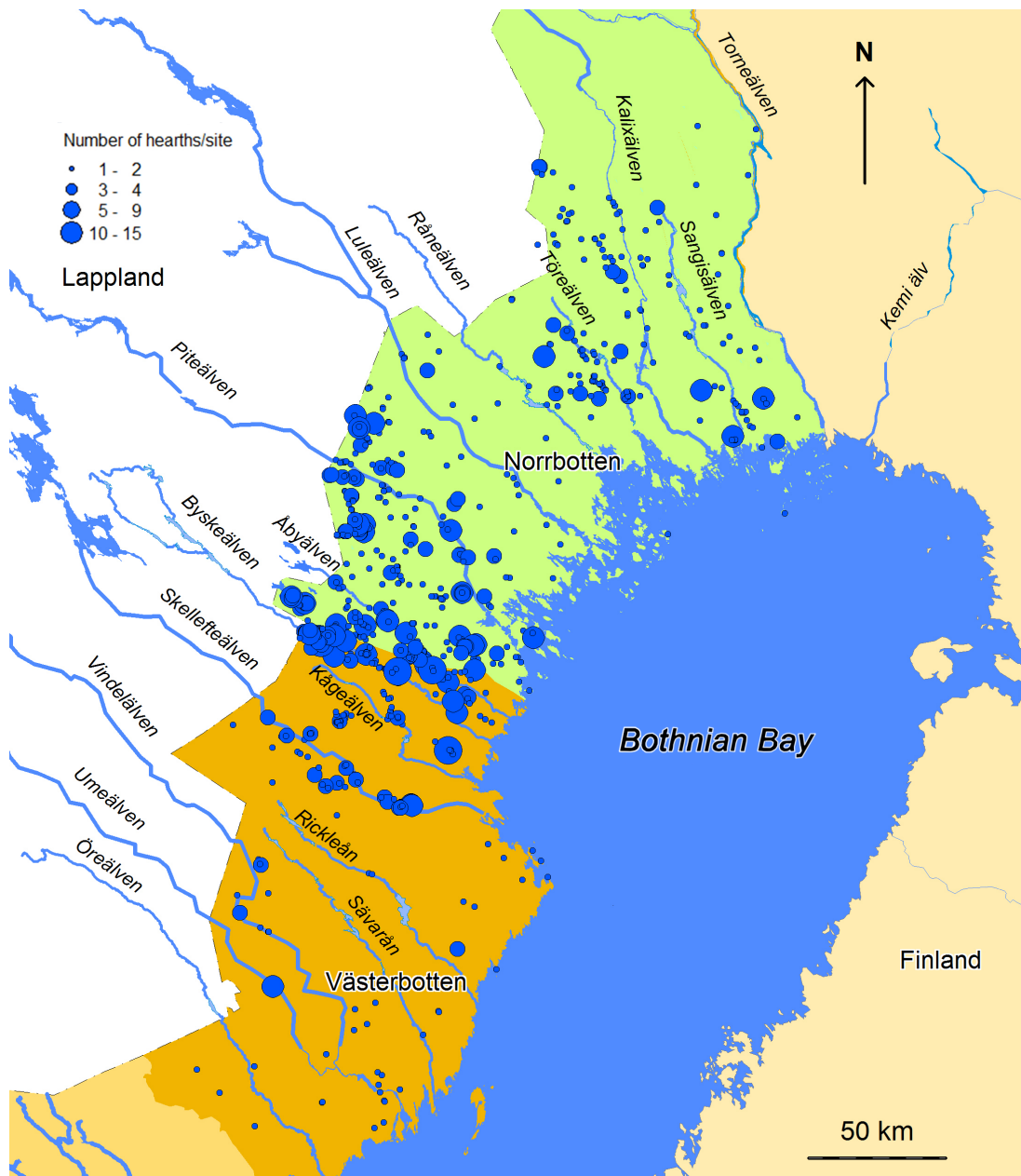


Figure 2. Distribution of hearth sites classified as ancient monuments in FMIS in the coastal areas of the county of Västerbotten and Norrbotten.

During our field work 18 previously unregistered hearths were found.

All 32 sites (Figure 4) were mapped using measuring tapes or GPS. All hearths at each of the sites were described, and measured and

tested with an earth probe for stone packings and red burned soil. Only half of each selected hearth was excavated (Liedgren, 2013 a-c; 2014). All excavated material was sieved (mesh size 3 mm). Samples of charcoal were collected

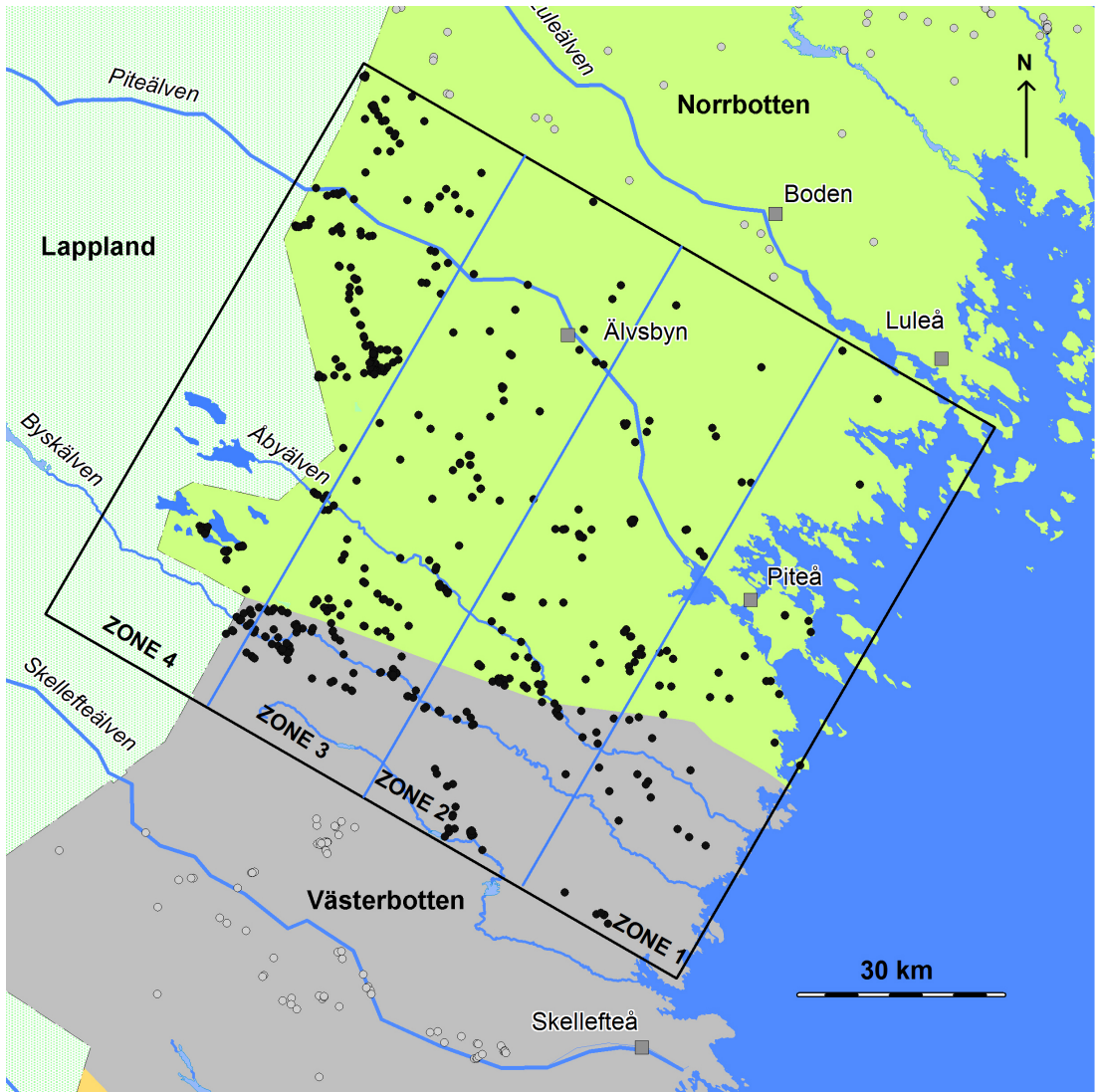


Figure 3. Study area divided into four rectangular zones, i.e. 27 x 94 km in size. Dark dots mark hearth sites.

for ^{14}C -dating, mostly from close to the rim of the constructions. This part of a hearth normally contains more charred wood than the central part because wood in the center is usually completely consumed by the fire, leaving only ash. All bone fragments (mostly retained by the sieve) were also collected. In one case, as detected bone fragments were very small, nearly all material from the hearth was scrutinized under a magnifying glass in the laboratory.

The area within a radius of 10-15 m around all hearths on each site (32 sites, containing 112 hearths in total), was scanned with a metal detector and all metal responses were checked. Each artifact found was photographed and mapped. During this process some burned and unburned bones were found.

Bone fragments were cleaned and subjected to osteological analysis. Generally, c. 1 g samples of undetermined bones found in the sieve

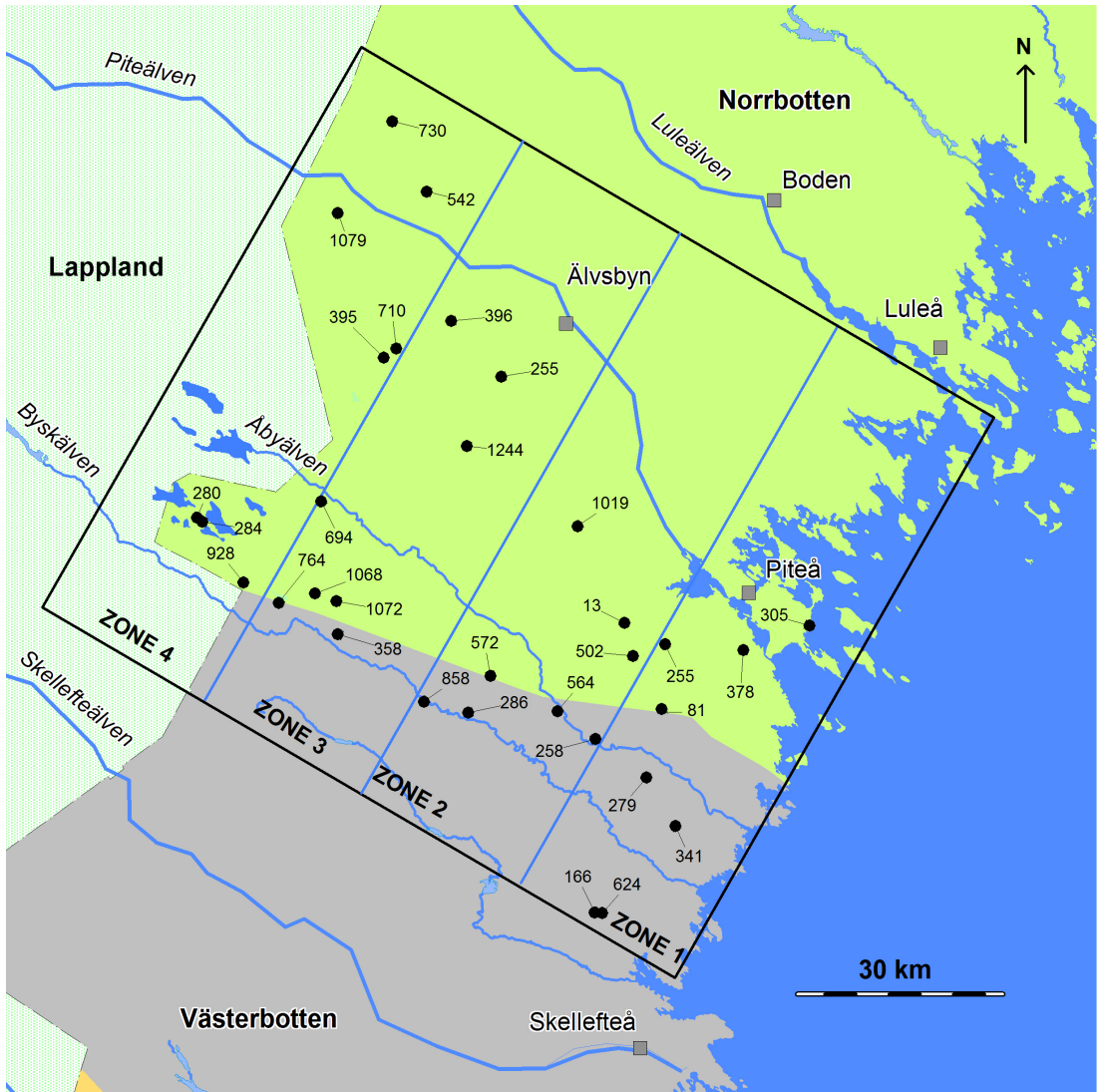


Figure 4. Excavated hearths in the study area, zones 1-4.

were used for ^{14}C -dating. The use of bones for dating poses several problems that were raised by Lanting *et al.* (2001) and have been heavily discussed since then (see, for example, Van Strydonck *et al.*, 2009; Van Strydonck *et al.*, 2010; Zazzo *et al.*, 2009; Hüls *et al.*, 2010; Olsen *et al.*, 2013; Taylor & Yosef 2014; Philippsen 2015; Ekholm 2015). However, the soils in the boreal study area are mostly podzols, which are acidic and do not contain dissolved carbonates,

thus minimizing one potential source of errors. Furthermore, we used only hard and compact bones from extremities to minimize potential problems arising from impurities leaching into the bones. The bones present in hearths in our study area probably originated from boiled meat from terrestrial animals. Traditionally all bones were chopped through, to gain access to the marrow, using an ax. When chopping the bones splinters popped away and some landed

in the fire. These pieces were probably free from meat. However, most of the bones were probably disposed of outside the living quarters when the meal was finished. Based on the red color of soils beneath the hearths a large share of them have probably been fired many times and/or maintained for long times at temperatures up to 700-800 C° (Liedgren *et al.*, 2016). Thus, many bone fragments probably reached high temperatures in the middle, and lower temperatures towards the stone lining. We chose as large fragments as possible (mean number: 3.1) to minimize amounts of impurities in the samples originating from, for example, the fuel.

Charcoal samples collected for dating were cleaned with a scalpel and only hard pieces were selected for analysis. Each of these pieces was split into two parts, one of which was dated while the other was used to determine the tree species it originated from. Both charcoal and bone samples were dated when the hearths contained enough bone and charred wood material for such analysis to assess correlations between the dates, and utility of the two materials for dating. Like bone, charred wood poses some dating problems, partly because old pine wood was frequently used as fuel and partly because charcoal is produced during forest fires.

Results

Most sites were located on or in the vicinity of heathland, but many were also situated close to lakes or mires. Hearth numbers at each site varied from one to 14. The investigations showed that out of 113 hearths in total on the 32 chosen sites, 67 % were oval, 20 % were rounded and 13 % had other forms. Their mean length and width were 1.20 m and 0.95 m, respectively. About 75 % of the hearths had stone packings. Eleven sites included damaged hearths or damaged areas around hearths, mostly due to soil scarification carried out for planting trees.

On most sites, metal objects were found using the metal detector. These artifacts were

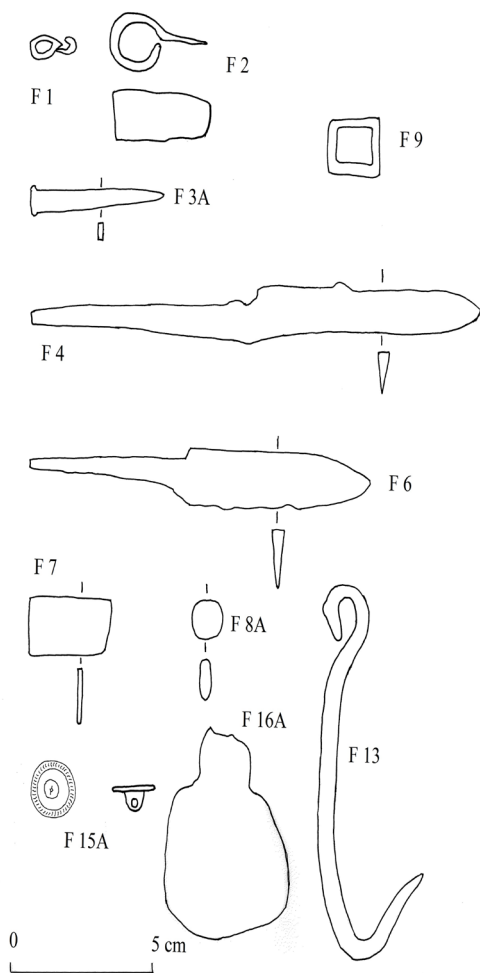


Figure 5. Selection of metal artifacts found in connection with hearths on site NHB 694: F 1 iron eyelet; F 2 iron fragment; F 3A flat iron nail; F 4 and 6 iron knives; F 7 iron fragment; F 8A flattened rounded lead bullet; F 9 iron buckle; F 13 iron hook for hanging kettles; F 15A ornamental bronze button; F 16A sheet of bronze (from bronze kettle?).

mostly of utility items, such as knives, iron needles, thimbles, buttons, iron nails and lead bullets (see Table 1 and Figure 5). Most of the artifacts were found within a few meters of the hearths. Artifacts from 17 sites can be fairly accurately dated to the historical period between the 17th and 19th centuries (see Table 1). Ten copper and silver coins were found on five sites, issued between 1832 and 1888.

Excavated hearths

Of the 32 excavated hearths, 61 % were oval, some 32 % were round or rounded and 7 % had other forms. Their mean length and width was 1.17 m and 0.98 m, respectively. Around 90 % of the hearths had a stonepacking, of varying prominence (Figures 6-7), and the rest only had stone linings (Figure 8). Most constructions had a brown/-dark brown hearth fill, but in some only charcoal was found. About 70 % contained small patches to well-defined areas of red burnt soil in the bottom, some of which were bowl shaped. Red soil beneath a hearth surface usually indicates strong heat, and thus use in winter (Liedgren *et al.*, 2016).

Only 10 hearths contained materials other than burned and unburned bones, and six contained only charred wood (see Table 1). The artifacts found were: an iron awl, porcelain, pieces from glass bottles (sometimes partly melted), lead, a piece of a chalk pipe, a whet stone, and



Figure 6. Rounded hearth with a pronounced stone packing from area 3, NHB 358:5. Bones from the hearth are ^{14}C -dated to the period AD 1480-1660. Artifacts found in the hearth show that it can not be older than the 17th century.

metal (tin and bronze) plates. Flint was found in only two cases. The artifacts from within the hearths are thus sparse and give few overall indications of the hearths' ages.



Figure 7. Rounded hearth with a packing of flat stones, from area 2 NHB 564. Bones in the hearth are dated to the period AD 1670-1940. Artifacts connected to the site suggest the latter part of the 19th century.



Figure 8. Rounded hearth without stone packing from area 1, NHB 166:10. Bones in the hearth are dated to the period AD 1660-1950. Artifacts found on the site suggest the 19th century.

Osteological analysis

Fragments of bones were found in 27 hearths (see Table 2). Burned bones were detected in 24 hearths and bones with little or no signs of burning in seven. Most bones came from hearths in zones 1 and 3. Reindeer bones were identified in 20 hearths, mostly from animals' extremities, but trunk, rib and hip bones were also identified (Vretemark, 2012; 2014). All bones came from adult reindeer except for one juvenile that was 6-12 months old when

slaughtered. Fish bones were identified in only two hearths one of which contained nearly 12 000 fragments in total, including substantial numbers pike, perch, whitefish, vendace and carp (Vretemark, 2014). Three hearths contained bones from birds, and in one of these goose and black grouse/grouse bones were identified. Two hearths, located within 15 km from the coast, contained sheep/goat bones.

¹⁴C-datings

In total 50 datings were obtained from charcoal (n=31) and burned bone (n=19) samples (see Table 3). Of the dated charcoal pieces, 87 % (n=27) are from pine and 6 % (n=2) from spruce (Danielsson, 2014).). Dates obtained for 14 of these charcoal samples (from all four zones) are in the period AD 810-1670: six from the Middle Ages or earlier, and eight from the late Middle Ages up to AD 1670. The earliest dates are both for samples from zone 4 (NHB 280 and 284). However, there was no significant difference ($P < 0.05$) in mean charcoal ¹⁴C-dates between zones, and the only significant difference in this respect was that dated bones from zone 3 were significantly older than bones from zone 1 (two-sample t-test, $0.02 < P < 0.05$: mean dates \pm SE, 328 ± 62 and 112 ± 14 , respectively).

Nineteen dates were obtained from heated, mostly undetermined bones, to meet the weight requirements for datings. However, most of the bones were probably from reindeer. Five bone datings are in the period AD 1280-1660, all for bones from zone 3; the rest are from later periods.

Datings of both charcoal and burned bone samples were obtained for 18 hearths. As shown in Table 3, according to t-tests nine pairs of the dates do not significantly differ (at the $P < 0.05$ level), and eight do significantly differ. One pair (from hearth NHB 166) could not be tested. Seven of eight dates from charred wood are older than dates obtained for the bone ma-

terial and the other is younger. The mean value of the seven datings (¹⁴C age) from charred wood is 210 years older than the mean date for the bones. The difference between charcoal and bone datings is illustrated in Figure 9. It should also be noted that the overall mean date for charred wood samples is c. 90 years older than the mean date for the bone samples.

Discussion

Most excavated hearths were oval and many had stone packings, in some cases constructed with larger flat stones and in other cases with rounded stones. Some of the hearths did not have any pronounced stone lining, with just a layer of stones in evidence. Some of these features are closely related to hearths typical of the interior area, but not all. For example, up to a third of the excavated hearths were rounded, which is a type seldom found in Lappland (Hedman, 2003:133pp).

Most of the excavated hearths contained bones. Nearly all of the bones from mammals have been identified as coming from reindeer strongly suggesting that people connected to reindeer used the hearths. They may have been reindeer herders or hunters of wild reindeer (Fahlgren, 1963:163pp; 1970:160p; Ekman, 1983:8pp; Lundström, 2008:72p). According to Ekman (1983:13) the wild reindeer seems to have been hunted to extinction in all coastal areas of the country apart from the Torne river valley during the 18th century.

Almost all the mammalian bones also came from mature adult reindeer, and have been splintered, probably for consumption of bone marrow. Several artifacts, such as forks (to take up meat from a kettle) and hooks for kettles, indicate that the meat was boiled. In some cases there is evidence (osteological or from finds of cast lead bullets and pieces of lead) of hunting, trapping and/or fishing. The large number of reindeer bones shows that meat from this animal was the main food, suggesting that many

Age; bone vs charcoal

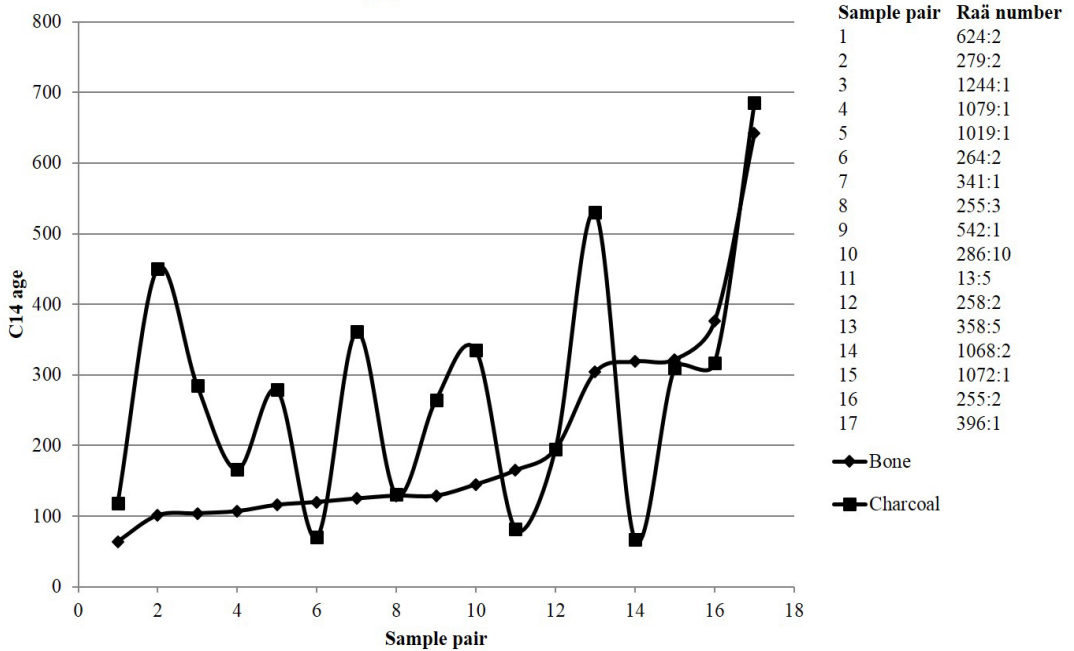


Figure 9. Pairs of bone and charcoal dates. The datings are arranged with a start in the latest bone dating with its counterpart made on charcoal.

of the excavated hearths were used by Sami as boiled reindeer meat formed a large part of the traditional diet of the Sami in Lapland (von Düben, 1977:134pp; Drake, 1979:136pp; Högström, 1980:116pp; Graan, 1983; Rheen, 1983; Törnæus, 1983; Hedman, 2003).

The artifacts found in and around the hearths are mostly pieces of domestic items that were used in every day life. We did not find any fire steels and just a few pieces of flint, possibly because in some cases matches were used to start fires (the use of matches in Sweden started in the middle of the 19th century).

Most sites are located in the vicinity of heath lands, suggesting occupation during winter when the reindeer traditionally feed on lichens. This hypothesis is corroborated by the distinct red burnt soil found under many hearths (c. half of all excavated hearths) indicating strong heat (Liedgren *et al.*, 2016). In some cases these hearths must have been heavily fired, possibly continuously for several days and probably

during very cold weather. Six hearths, in zone 1, had red burned soil as deep as 17-22 cm below the hearth surface.

Evidence of residence during the summer is rare. However, the goose bones from one hearth (NHB 358:5, zone 3) indicate spring or summer use (Vretemark, 2014), and constructions at one site (NHB 81, zone 1) also indicate summer occupation. At this particular site a hut ruin, traces of a building for storing food and a small cellar were found (see Figure 10). This kind of small cellar could be used for storing milk during summer and autumn. At the same site some hearths lie so close to each other that they can be interpreted as smoke hearths, used to generate smoke to protect the reindeer from insects and facilitate gathering of the animals for milking.

Most artifacts, found in and around the hearths, cannot be dated with any accuracy. However, one single item discovered might be older than the 17th century (NHB 624), while

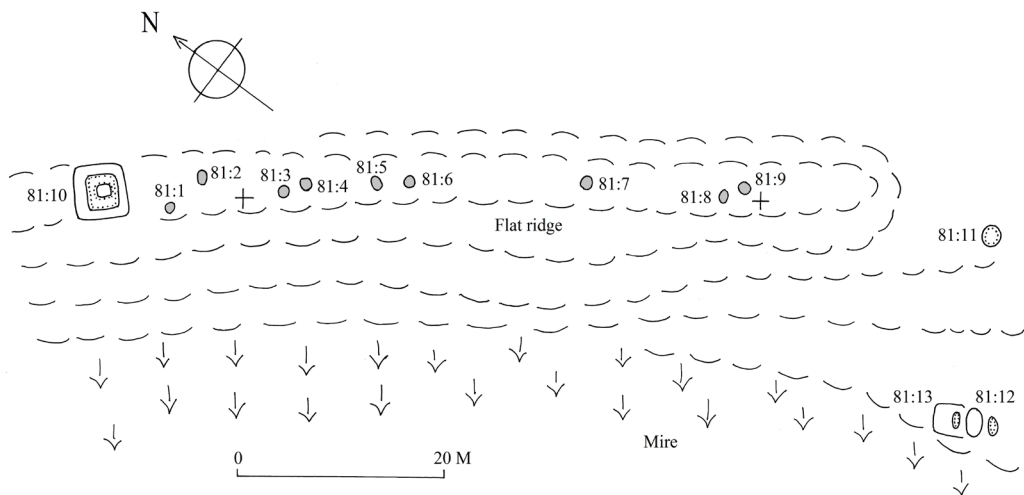


Figure 10. NHB 81 Hortlax parish: 81:1-9 hearths, 81:10 hut ruin, 81:11 pit, 81:12 cellar, 81:13 place for a storage building.

the few coins found indicate usage during the latter part of the 19th century.

Many ¹⁴C-dates show a wide range due to the calibration curve or the “Suess effect” (Taylor & Bar-Yosef, 2014:62pp). Fourteen of the charcoal datings are in the period AD 810-1670, but only five bone datings are in the period AD 1280-1660, all for samples from zone 3. The earliest bone dates were for samples from a hearth that had a packing of flat stones, and substantial amounts of dark smearable soil mixed with soot, charcoal and thousands of small burned fish bones (NHB 396). This hearth may have been connected to lake fishing (*träskfiske*) by the coastal farmers in the late Middle Ages (Berggren, 1995; Bergman, 2014). However, the oldest mean ages were obtained for the samples from zones 3 and 4 (331 and 347 years, respectively; more than 100 years older than mean dates for samples from zones 1 and 2). Similarly, although the mean datings of charcoal samples from the four zones did not significantly differ, dated bones from zone 3 were older than dated bones from zone 1 (too few were found in zone 4 to test). The

datings of bones from zone 3 and the two very old charcoal datings from zone 4 suggest that these areas were the earliest to be used. It is possible that dates for some of the bones were slightly too old due to contamination with old wood.

It is not surprising that charred wood and burnt bones give divergent results. The preferred wood for fuel in the coniferous forest was dry pine, which traditionally came from naturally seasoned trees that were abundant in olden times, especially in the interior parts of Norrland (see Siitonen 2001; Josefsson *et al.*, 2010). Accordingly, we obtained older dates for c. 40 % of the charcoal pieces we analyzed than for dated bones from the same hearth. However, a later dating was obtained for charred wood than for bone samples from one hearth (NHB 1068:2), possibly due to later use or perhaps later forest fires (see Drobyshev *et al.*, 2015). Thirteen hearths could only be dated with charcoal. Although some of the early charcoal datings could be correct, the data are insufficiently accurate for us to claim this with confidence.

The historical record

The purpose of this chapter is to give a historical background against which the archaeological results could be valued. Several sources can be used to describe the development in Lapland and in the coastal areas during the 16th to 19th centuries: Landskapshandlingar (Västerbottens handlingar och Norrlands lappmarker), cameral records, judicial records, cadastral maps and also place names. Information about the northern part of Sweden is also given by clergymen (such as Graan, 1671; Rheen, 1671; Lundius, 1675; Högström, 1747) working in the area and by various travelers who also published their experiences (such as Linné, 1732; Outhier, 1742; Hülphers, 1758).

During the Medieval period private ownership of reindeer developed in Lapland and specific areas started to be used by family groups (Bergman *et al.*, 2013). In historical times, from the late 16th century, these areas became known as “*lappskatteland*” (taxation lands), and the families had to pay taxes to the Swedish state for their land. The historical development of this fiscal institution has been thoroughly investigated (Holmbäck, 1922; Hultblad, 1968; Lundmark, 2006). The “lands” were constructed in such a way that they included enough resources to meet most needs of each family (Josefsson *et al.*, 2009). The Sami communities in the interior were divided into two main groups: forest Sami and mountain Sami. The mountain Sami groups were heavily committed to reindeer herding and lived mostly from the production of meat and milk products from tame reindeer (Lundius, 1983:11; Rheen, 1983:19p). The forest Sami relied mostly on fishing and hunting, and had relatively few reindeer (Rheen, 1983:20; Graan, 1983:36). For example, at the beginning of the 17th century the forest Sami in southern Lapland only had about 15 reindeer per family, so most of their subsistence came from sources other than tame reindeer (Norstedt, 2011:37).

In 1614 complaints were raised against tax pressure on the holders of tax lands. Some families had difficulties supporting their livelihoods and had to start a new life among the farmers by the coast (Lundmark 1998:39). In addition, numbers of reindeer gradually increased in Lapland, due (according to Lundmark) to a shift from taxation on fur and hides (in the 16th century) to taxation of food products at the beginning of the 17th century. This could have led to intensified hunting for wild reindeer, which became rare, and an increase in numbers of tame reindeer. With time the “lands” became too small to support each herd (Lundmark 2006:193). The “*lappskatteland*” system started to break down during the 18th and 19th centuries, beginning in the north (Holmbäck 1922; Lundmark 2006), mainly because each family tried to maximize their herds (Ingold 1980:78; Kvist 1989:162). A key requirement for every herd was access to winter pastures, which became increasingly limited. Thus, the reindeer herders looked for other areas for pasture during the winter. They were not allowed to use the land east of the Lapland border for pasture until the latter part of the 18th century (according to Lundström 2008:70), when the Lapland border was fixed (1766). From 1770 onwards the Sami were allowed to use the forest owned by the Swedish state (during hard winters), but not privately owned areas (André 1998:59p). New laws, introduced in 1886 and 1898, enabled nomadic Sami to use the coastal areas during October to April without paying any compensation to landowners (Holmbäck 1922:65, SFS 1886:38, SFS 1898:66).

Evidence of a movement of Sami groups, from the interior to the coast, in Västerbotten and Norrbotten can be detected in the historical records (mainly from zone 1) from the 17th century onwards (Lundström 2001:151). During the 18th century Sami groups were noticed in the coastal areas in Hälsingland up to Torne river (de la Motrayes 1988:188; Outh-

ier 1982:28; Linné 2003:12p, Lundström 2008:84; Hülphers 1978:127).

During 1730s several Sami were contracted as farmhands and maids in Skellefteå parish (Lundström, 2001:151) and during the latter part of the 18th century there were relatively large Sami settlements in the western part of Skellefteå parish (Lundström, 2008:51p, 84). During the second half of 18th century there was a significant increase in numbers of Sami living in the Luleå area (Nordberg, 1965:84). In this area, as in other places, the Sami generally lived in the outskirts of the villages (Nordberg, 1965:87). During the 19th century the number Sami living in the coastal areas multiplied in Norrbotten and Västerbotten. For example, the number in Skellefteå roughly doubled, from about 50 to 100, between the year 1800 and 1850 (André, 1998:67) and in Luleå there were more than 150 Sami in 1820 (Nordberg, 1965:83).

Place names provide numerous examples of name elements connected to the Sami population in the coastal areas. The prefix *Lapp-* (Sami-) is widely used in names of places scattered across the whole of Norrland, but most commonly east of the Lappland border, from Medelpad up to Sangisälven (Figure 11).

Names with the prefix *Lapp-* (Sami) are documented as early as the 16th century on cadastral maps, for example “Lappviken”, which was a small village in Lövänger recorded in 1543. Several “Lappviken” can be found on cadastral maps from the first half of the 18th century, from Lövänger to Luleå parishes. Several records of this kind also indicate that Sami groups had huts in the coastal areas: “Lappkåtamyran” (1661, Skellefteå parish), “Lappkåtagårde” (1661, Burträsk parish), “Lappkåtamyran” (1803, Skellefteå parish) and “Lappkåtasjön” (1822, Bygdeå parish). There are more than 600 names with the prefix *Lapp-* in the province of Västerbotten and Norrbotten in the present database for place names (LMV). Most

of these are combinations of the prefix *Lapp-* and the name of a geographical feature, such as heath, lake, river, mountain or mire (see also Bergman, 2010:175, fig. 1). Some also combines the prefix *Lapp-* and the name of some type of building. This category is dominated by the combination *Lapp-* and *-kåta* (hut). In the county of Västerbotten there are 82 such places and 19 in Norrbotten. These names can refer to permanent timber framed huts, probably of forest Sami origin.

Interestingly, the distribution of place names with the prefix *Lapp-* does not correspond to the distribution of known hearths in the same areas. This initially suggests that the distribution of hearths may be incorrect. However, many places with *Lapp-* names are (for example) known in Medelpad (Figure 11), but only one to two hearths of the types that were excavated in Västerbotten and Norrbotten, all others are connected to Stone and Bronze Age sites. Thus, the hearths in Västerbotten and Norrbotten may generally be connected with nomadic reindeer herders who lived in tents. In contrast, many names with the prefix *Lapp-* were presumably associated with Sami groups that settled in the coastal areas working (perhaps as craftsmen), or practicing a kind of reindeer management that has left few or different traces.

As shown above the movement of Sami towards the coast can be understood by the changes in the conditions for reindeer herding in the interior, which resulted in using the coast for grazing but also in people searching work and subsistence in the coastal areas.

Conclusions

This study provides a well-founded view of the locations, construction and chronology of hearths in the study area, and the types of artifacts found in their vicinity. Fewer hearths appear to have been constructed in the area south of the river Skellefteälven than further north in the counties of Västerbotten and Norrbotten.

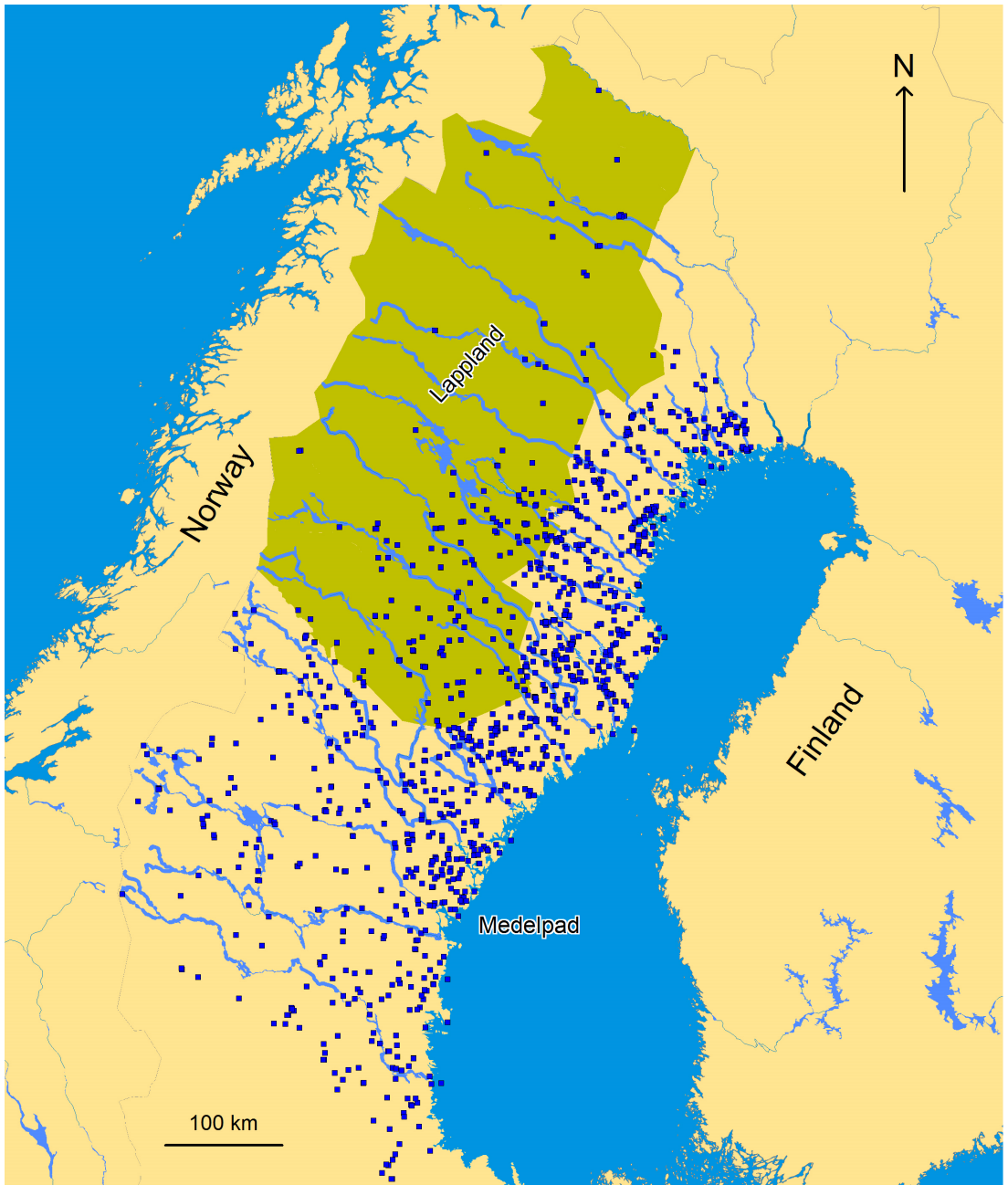


Figure 11. Distribution of place names with the prefix *Lapp-* (Sami) in Västerbotten and Norrbotten. Data from LMV.

Artifacts and bone material excavated from the hearths and their surroundings clearly suggest that most of the coastal hearths have been used in connection with reindeer herding.

The ^{14}C -dates suggest that the earliest

hearths, situated in the western part, may be as old as the Middle Ages, but most of them seem to have been used during the 18th and 19th centuries. There are only a few indications, in the archaeological material, that the coastal

area was used for reindeer herding during the summer. The dates mainly support connections between the increase in herd size, breakdown of the “*lappskatteländ*” system and use of the coastal area for winter pasture at around the time when most of the hearths were used.

A consequence of larger herds was that fewer families could live on reindeer herding, so some were marginalized and had to seek their fortune in the coastal areas among the farming communities (Nordberg, 1965:82pp; André, 1998; Lundström, 2008:339pp). Some place names dating back as early as the 16th century imply Sami presence from Late Medieval times. The prefix *Lapp-* is common in place names from Medelpad in the south to the river Sangisälven in Norrbotten, but hearths are scarce in the south. This indicates that in most cases the prefix emanate from the presence of Sami groups that were settled but not involved in nomadic life. The background of these people, in Västerbotten and Norrbotten, is still obscure and requires further study. Knowledge of Sami presence in coastal areas during the Medieval period and earlier, is also weak and calls for further investigations.

Funding and acknowledgement

This study was supported financially by the Bank of Sweden Tercentenary Foundation. We wish to thank Sees-editing Ltd for improving the language.

Abbreviations

FMIS Fornsök (Digital register containing records of all known ancient monuments in Sweden). (www.fmis.raa.se).

LMV Lantmäteriverket (The Swedish National Land Survey).

NHB Riksantikvarieämbetet (Swedish National Heritage Board).

SFS Svensk författningssamling (The Swedish Code of Statutes, Official Swedish government publication containing all current laws).

SGU Sveriges Geologiska Undersökning (Geological Survey of Sweden) (www.sgu.se).

SOU Statens offentliga utredningar (Swedish Government Official Reports).

References

- André, P.** 1998. Samer i Skellefteå socken 1700-1850. *Kulturkonfrontation i Lappmarken. Sex essäer om mötet mellan samer och svenskar*. Kulturens frontlinjer. Skrifter från forskningsprogrammet Kulturgräns Norr. Ed. Sköld, P. & Kram, K. pp. 53-70.
- Aronsson, K.-Å.** 1991. *Forest reindeer herding A.D. 1-1800. An archaeological and palaeoecological study in northern Sweden*. Archaeology and Environment 10. Dissertation. Umeå University, Sweden.
- Berggren, Å.** 1995. Fisket i Piteå. 1. *Från medeltid till tidigt 1900-tal*. Piteå museum, Sweden.
- Berglund, M.** 2012. The highest postglacial shore levels and glacio-isostatic uplift patterns in northern Sweden. *Geografiska Annaler: Series A, Physical Geography*, 94: 321-337. <http://dx.doi.org/10.1111/j.1468-0459.2011.00443.x>
- Bergman, I.** 1991. Spatial structures in Saami cultural landscapes. In: *Readings in Saami History, Culture and Language II*. Ed. Kvist, R. Center for Arctic Cultural Research.

- Miscellaneous Publications. Numb. 12: 59-68.
- Bergman, I.** 2010. Finnar, lappar, renar och bönder. Om medeltida befolkningsgrupper och näringar avspeglade i ortnamn i Bottenvikens kusttrakter. – *Arkeologi i norr* 12: 167-191.
- Bergman, I.** 2014. Kulturarv, landskap och identitetsprocesser. – *Arkeologi i norr* 14:67-69.
- Bergman, I., Zackrisson, O. & Liedgren, L.** 2013. From Hunting to Herding: Land Use, Ecosystem Processes, and Social Transformation among Sami AD 800-1500. – *Arctic Anthropology* 50: 25-39. <http://dx.doi.org/10.3368/aa.50.2.25>
- Bergman, I. & Ramqvist, P. H.** 2016. Farmer fishermen: Interior lake fishing among coastal communities in Northern Sweden. Manuscript.
- Bylund, E.** 1956. *Koloniseringen av Pite lappmark t.o.m. år 1867*. Geographica 30, Uppsala, Sweden.
- Danielsson, E.** 2014. *Vedartsanalyser på material från Väster- och Norrbotten inom projektet Recalling the Past*. Vedlab, rapport 1470. Sweden.
- De la Motrayes, A.** 1988 [1918]. *Seigneur A. de la Motrayes resor 1711-1725*. Facsimilie. Redidiva, Stockholm, Sweden.
- Drake, S.** 1977 [1918]. *Västerbottenslapparna under förra hälften av 1800-talet*. Facsimilie. Två förläggare Bokförlag, Umeå, Sweden.
- Drobyshev, I., Bergeron, Y., Linderholm, H. W., Granström, A. & Niklasson, M.** 2015. A 700-year record of large fire years in northern Scandinavia shows large variability and increased frequency during the 1800s. – *Journal of Quaternary Science* 2015: 211-221. <http://dx.doi.org/10.1002/jqs.2765>
- Edbom, G., Liedgren, L. & Hedman, S.-D.** 2001. Från Treriksroset till Råker – fornminnesinventering i Norrbottens inlands- och fjällområde, 1996-2000. – *Norrbotten* 2001: 72-110.
- Eckholm, T.** 2015. A cross check of radiocarbon dates from Stone Age sites in northern Sweden. *Fornvännen* 110: 227-240.
- Ekman, S.** 1983 [1910]. *Norrlands jakt och fiske*. Facsimilie. Två förläggare Bokförlag, Umeå, Sweden.
- Engelmark, O. & Hytterborn, H.** 1999. Coniferous forests. In: Rydin, H., Snoeijs, P. and Diekmann, M. (eds), Swedish plant geography. *Acta Phytogeographica Suecica* 84: 55-74.
- Fahlgren, K.** 1963. Jakt och fiske. In: *Bygdeå sockens historia*. Red. Karl Fahlgren. Pp. 160-183. Umeå. Bokförlaget Botnia, Sweden.
- Fahlgren, K.** 1970. *Umeå sockens historia*. Umeå kommun, Umeå, Sweden.
- Fossum, B.** 2003. *Rapport arkeologisk forskningsundersökning av samiska härdar och boplatser vid Raä 1453, 738, 739, 300 och 737, Gråträsk, Piteå sn, Lappland, 2002*. Rapport UMARK 31. Umeå universitet, Sweden.
- Graan, O.** 1983 [1671]. Relation Eller En Fulkomblig Beskrifning om Lapparnas Ursprung, så wähl som om heela dheras Lefwernes Förehållande. *Berättelser om samerna i 1600-talets Sverige*. Kungl. Skytteanska Samfundets Handlingar nr 27. Umeå. Facsimilie after: Bidrag till kännedom om de svenska landsmålen ock svenskt folkliv XVII. 2. 1899. Kungl. Skytteanska Samfundet, Umeå, Sweden.
- Göthe, G.** 1929. *Om Umeå lappmarks svenska kolonisation: från mitten av 1500-talet till omkr. 1750*. Dissertation. Almqvist & Wiksells Boktryckeri AB, Uppsala, Sweden.
- Hedman, S.-D.** 2003. *Boplatser och offerplatser. Ekonomisk strategi och boplatzmönster bland skogssamer 700-1600 AD*. Dissertation, Studia Archaeologica Universitatis Umensis 17, Umeå University, Sweden.
- Hedman, S.-D. & Olsen, B.** 2009. Transition and order. A study of Sámi rectangular hearths in Pasvik, Arctic Norway. – *Fennos-*

candia Archaeologica XXVI: 3-22.

- Hedman, S.-D., Olsen, B. & Vretemark, M.** 2015. Hunters, herders and hearths: interpreting new results from hearth row sites in Pasvik, Arctic Norway. – *Rangifer* 35(1): 1-24. <http://dx.doi.org/10.7557/2.35.1.3334>
- Holmbäck, Å.** 1922. *Om lappskatteinstitutet och dess historiska utveckling*. SOU 1922:10. Sweden.
- Hülphers, A. A.** 1978 [1758]. *Dagbok öfver en Resa genom Norrland 1758*. LTs förlag, Stockholm, Sweden.
- Hüls, C.M., Erlenkeuser, H., Nadeau, M.-J., Grootes, P.M. & Andersen, N.** 2010. Experimental study on the origin of cremated bone apatite carbon. – *Radiocarbon*, vol. 52:2-3; 587-599.
- Hultblad, F.** 1968 Övergången från nomadism till agrar bosättning i Jokkmokks socken. – *Acta Laponica* XIV. Stockholm, Sweden.
- Hyenstrand, Å.** 1978. Fornminnesinventering, kulturmiljövärd och arkeologisk samhällsforskning. *Fornvännen* 73; 69-74.
- Högström, P.** 1980 [1747]. *Beskrifning öfver Sveriges lapmarker 1747*. Facsimilie. Två Förläggare Bokförlag, Umeå, Sweden.
- Ingold, T.** 1980. *Hunters, Pastoralists and Ranchers. Reindeer Economies and their Transformations*. Cambridge University Press, Cambridge, England. <http://dx.doi.org/10.1017/CBO9780511558047>
- Jensen, R.** 1997. *Fornminnesinventeringen – nuläge och kompletteringsbehov. En riksöversikt*. Riksantikvarieämbetet, Stockholm, Sweden.
- Josefsson, T., Bergman, I. & Östlund, L.** 2009. Quantifying Saami settlement and movement patterns in Northern Sweden 1700-1900. In: *Pristine Forest Landscapes as Ecological References. Human Land use and Ecosystem Change in Boreal Fennoscandia*. Doctoral Thesis No. 2009:77. SLU, Faculty of Forest Sciences, Umeå University, Sweden.
- Josefsson, T., Olsson, J. & Östlund, L.** 2010. Linking forest history and conservation efforts: Long-term impact of low-intensity timber harvest on forest structure and wood-inhabiting fungi in northern Sweden. – *Biological Conservation* 143; 1803-1811. <http://dx.doi.org/10.1016/j.biocon.2010.04.035>
- Klang, L.** 1986. Det förhistoriska landskapet i östra Norrbotten. *Arkeologi i Sverige* 1986. Pp. 147-189. Riksantikvarieämbetet, Sweden.
- Kvist, R.** 1989. Rennomadismens dynamik. Rennomadismen och befolkningsutvecklingen i Tuorpon och Sirkas 1760-1860. In: *Rennomadismens dilemma. Det rennomadiska samhällets förändring i Tuorpon och Sirkas 1760-1860*. Dissertation. Umeå University, Sweden.
- Lanting, J.N., Aerts-Bijma, A.T. & van der Plicht, J.** 2001. Dating of cremated bone. – *Radiocarbon* 43:2A, 249-254.
- Liedgren, L.** 2013a. *Arkeologiska undersökningar av fyra härdar i Byske sn, Skellefteå kommun, Västerbotten, 2012*. Rapport 61, Silvermuseet. Arjeplog, Sweden.
- Liedgren, L.** 2013b. *Arkeologiska undersökningar av nio härdar inom Piteå, Hortlax samt Älvsby socknar, Norrbottens län, 2012*. Rapport 62, Silvermuseet. Arjeplog, Sweden.
- Liedgren, L.** 2013c. *Arkeologiska undersökningar av sex härdar i Jörn och Byske socknar, Skellefteå kommun, Västerbotten, 2013*. Rapport 64, Silvermuseet. Arjeplog, Sweden.
- Liedgren, L.** 2014. *Arkeologiska undersökningar av 13 härdar inom Piteå, Hortlax samt Älvsby socknar, Piteå och Älvsby kommuner, Norrbottens län, 2013*. Rapport 65, Silvermuseet. Arjeplog, Sweden.
- Liedgren, L. & Hedman, S.-D.** 2005. *Utvärdering av fornminnesinventeringen, 1984-2002 och projektet Skog och Historia, 2000-2004, i Norrbotten*. Rapport 43 Silvermuseet, Arjeplog, Sweden.
- Liedgren, L., Bergman, I., Hörnberg, G.,**

- Zackrisson, O., Hellberg, E., Östlund, L. & DeLuca, T. H.** 2007. Radiocarbon dating of prehistoric hearths in alpine northern Sweden: problems and possibilities. – *Journal of Archaeological Science* 34; 1276-1288. <http://dx.doi.org/10.1016/j.jas.2006.10.018>
- Liedgren, L. & Östlund, L.** 2011. Heat, smoke and fuel consumption in a high mountain *ställo*-hut, northern Sweden – Experimental burning of fresh birch wood during winter. – *Journal of Archaeological Science* 38; 903-912. <http://dx.doi.org/10.1016/j.jas.2010.11.020>
- Liedgren, L., Östlund, L. Magnusson, T. & Hörnberg, G.** 2016. *Heat and soil colours beneath hearths in northern Sweden*. Unpublished manuscript.
- Linné, C.** 2003 [1732]. *Iter Lapponicum. Lappländska resan 1732*. Kungl. Skytteanska samfundet, Umeå, Sweden.
- Lundius, N.** 1983 [c. 1675]. *Descriptio Lapponie. Berättelser om samerna i 1600-talets Sverige*. Kungl. Skytteanska Samfundets Handlingar nr 27. Facsimilie after: Bidrag till kännedom om de svenska landsmålen ock svenskt folkliv XVII:5. 1905. Kungl. Skytteanska Samfundet, Umeå, Sweden.
- Lundmark, L.** 1998. *Så länge vi har våra marker. Samerna och staten under sexhundra år*. Rabén Prisma, Falun, Sweden.
- Lundmark, L.** 2006. *Samernas skatteland i Norr- och Västerbotten under 300 år*. Rättshistoriska studier. Institutet för rättshistorisk forskning. Rönnells Antikvariat AB, Stockholm, Sweden.
- Lundström, U.** 2001. *Bönder och gårdar i Skellefteå socken 1539-1650*. Kulturens frontlinjer. Skrifter från forskningsprogrammet Kulturgräns Norr 3. Umeå Universitet, Sweden.
- Lundström, U.** 2008. *Människor och miljöer i Skelleftebygden under 1800-talet*. Del 1. Kulturens frontlinjer. Skrifter från forskningsprogrammet Kulturgräns Norr. Skellefteå Museum, Skellefteå, Sweden.
- Manker, E.** 1953. *The Nomadism of the Swedish Mountain Lapps*. Acta Lapponica VII. Hugo Gebers Förlag, Stockholm, Sweden.
- Mulk, I.-M.** 1994. *Sirkas – ett samiskt fångst-samhälle i förändring Kr. f. – 1600 e. Kr*. Studia Archaeologica Universitatis Umensis 6. Dissertation. Umeå University, Sweden.
- Nordberg, A.** 1965. *Luleå sockens historia I. En gammal norrbottensbygd*. Anteckningar till Luleå sockens historia. Norrbottens museum, Luleå, Sweden.
- Nordlander, J.** 1905. 1543 Jordha Boocken wthaaft Westhrabotnen. *Norrländska samlingar* 6:271-362. Almqvist & Wiksell, Uppsala, Sweden.
- Norstedt, G.** 2011. *Lappskattelanden på Geddas karta. Umeå lappmark från 1671 till 1900-talets början*. Thalassa förlag, Umeå, Sweden.
- Näslund, T.** 2014. *Rekonstruktion av högsta kustlinjen med en digital höjdmmodell (DEM)*. Examensarbete i geovetenskap/naturgeografi, EMG, Umeå Universitet, Umeå.
- Olsen, J., Heinemeier, J., Hornstrup, K. M., Bennike, P. & Thrane, H.** 2013. “Old wood” effect in radiocarbon dating of prehistoric cremated bones. – *Journal of Archaeological Science* 40; 30-34. <http://dx.doi.org/10.1016/j.jas.2012.05.034>
- Outhier, R.** 1982 [1742]. *Journal från en resa i Norden år 1736-1737*. Den franska gradmätningsexpeditionen i Tornedalen 1736-1737. Tornedalica, Luleå, Sweden.
- Persson, A.** 1985. Flera fornlämningar – om Riksantikvarieämbetets senaste fornminnesinventering i Skelleftebygden. *Skellefteå Museums Meddelanden* XLVII, 1985; 124-141.
- Philippson, B.** 2015. Hard water and old food. The freshwater reservoir effect in radiocarbon dating of food residues on pottery. – *Documenta Praehistorica* XLII; 159-170. <http://dx.doi.org/10.4312/dp.42.10>

- Rheen, S.** 1983 [1671]. En kortt Relation om Lapparnes Lefwarne och Sedher, wijdskiepellsser, sampt i många Stycken Grofwe wildfarellsser. *Berättelser om samerna i 1600-talets Sverige*. Kungl. Skytteanska Samfundets Handlingar nr 27. Facsimilie after: Bidrag till kännedom om de svenska landsmälen ock svenskt folkliw XVII:1. 1897. Kungl. Skytteanska Samfundet, Umeå, Sweden.
- Siitonen, J.** 2001. Forest management, coarse woody debris and saproxylic organisms: Fennoscandian boreal forests as an example. – *Ecological Bulletins* 49; 11-41.
- Sommerseth, I.** 2011. Archaeology and the debate on the transition from reindeer hunting to pastoralism. – *Rangifer* 31:1; 111-127. <http://dx.doi.org/10.7557/2.31.1.2033>
- Storli, I.** 1994. "Stallo"-boplassene, spor etter de første fjellsamer? The Institute for Comparative Research In Human Culture Oslo. Serie B: Skrifter XC. Novus forlag, Oslo, Norway.
- Taylor, R. E., & Bar-Yosef, O.** 2014. *Radiocarbon dating*. Second ed. Left Coast Press Inc., Walnut Creek, USA.
- Tornaues, J.** 1983 [c.1660]. Berättelse om Lapmarckerna och Deras Tillstånd. *Berättelser om samerna i 1600-talets Sverige*. Kungl. Skytteanska Samfundets Handlingar nr 27. Facsimilie after: Bidrag till kännedom om de svenska landsmälen ock svenskt folkliw XVII:3. 1900. Kungl. Skytteanska Samfundet, Umeå, Sweden.
- Thålin, H.** 1962. De fasta fornlämningarna i Västerbottens kustland. *Västerbotten* 1962; 61-84.
- Van Strydonck, M., Boudin, M. & De Mulder G.** 2009. ¹⁴C dating of cremated bones: the issue of sample contamination. – *Radiocarbon*, 51:2; 553-568.
- Van Strydonck, M., Boudin, M. & De Mulder, G.** 2010. The carbon origin of structural carbonate in bone apatite of cremated bones. – *Radiocarbon*, 52:2-3; 578-586.
- Westin, J. G.** 1953. Bygden växer. Bebyggelse och näringsliv i Skellefteå storsocken under de sista fyra hundra åren. In: *Skellefteå sockens historia I*. 1953:309-430. Almqvist & Wiksells Boktryckeri AB, Uppsala, Sweden.
- von Düben, G.** 1977 [1873]. *Lappland och lapparne företrädesvis de svenske*. Facsimilie 2:nd edition. Gidlunds, Östervåla, Sweden.
- Vretemark, M.** 2012. *Osteologisk analys av djurben i Norrbottens kustland, Piteå, Älvsbyn och Byske socknar*. Rapport, Västergötlands museum. Västergötlands Museum, Skara, Sweden.
- Vretemark, M.** 2014. *Osteologisk analys av djurben från härdar i Västerbotten och Norrbotten*. Rapport, Västergötlands museum. Skara. Västergötlands Museum.
- Zar, J. H.** 2010. *Biostatistical Analysis*. Fifth edition. Prentice Hall Inc., London, England.
- Zazzo, A., Saliège, J.-F., Person, A. & Boucher, H.** 2009. Radiocarbon dating of calcined bones: where does the carbon come from? – *Radiocarbon*, vol. 51:2; 601-611.
- Östlund, L., Liedgren, L. & Josefsson, T.** 2013. Surviving the Winter in Northern Forests: an Experimental Study of Fuelwood Consumption and Living Space in a Sami Tent Hut. – *Arctic, Antarctic, and Alpine Research* 45; 372-382. <http://dx.doi.org/10.1657/1938-4246-45.3.372>

*Manuscript recieved 4 April 2016
revision accepted 18 July 2016
manuscript published 1 August 2016*

Abstract in Swedish/Sammanfattning: Artikeln fokuserar på datering av härdar som registrerats i kustområdet inom landskapet Västerbotten och Norrbotten (i Riksantikvarieämbetets digitala fornlämningsregister, FMIS). Registret innehåller ca 1500 härdlämningar som klassats som fornlämningar. Härdarna har till största delen registrerats norr om Skellefteälven. Ett undersökningssområde omfattande en yta av 107 x 94 km har 32 härdar valts ut slumpmässigt för arkeologisk undersökning. Inom de 32 lokalerna finns totalt 113 härdar. Området kring alla dessa har undersökts med metalldetektor. Nästan alla artefakter som påträffades med metalldetektor kan dateras till perioden 1600-1900. Detsamma gäller de artefakter som påträffades i härdarna vid utgrävningarna. 50 ¹⁴C-dateringar gjordes på kol och på ben påträffade i härdarna. När det var möjligt gjordes dateringar på kol och ben från samma härd. Dateringarna visar allmänt att huvudparten av härdarna har använts under 1700- och 1800-talet. Många härdar innehöll ben från renar, nästan alla från vuxna renar. Förhållandet antyder att härdarna använts inom ramen för renskötsel. Författarna föreslår att de flesta härdarna byggts av nomadiserande renskötare som använt kustområdet under vintern och att orsaken till att man utnyttjat kusten ligger i nedmonteringen av lappskatteländen och ett stigande antal renar inom Lappland.

Appendix

Table 1. Artifacts found using metal detector on studied sites and artifacts found in excavated hearths.

County	Parish	Zone	NHB-number	Hearths per site	Artifacts found on site	Artifacts and bones in excavated hearths	Dating of artifacts found on site	Dating of artifacts found in excavated hearth
Vb	Byske	1	166:10	14	Coin (1852), iron nails, thimble, iron knife, part of an iron knife	Burned bones	19 th Century	?
Vb	Byske	1	279:2	3	Nothing	Burned bones, wet stone?, flint	?	?
Vb	Byske	1	341:1	2	Sheet of bronze on wood, iron fragment	Burned and unburned bones	?	?
Vb	Byske	1	624:2	1	Triangular pewter ornament, iron fragment, iron nail	Burned bones, pieces of green glass	?	18 th to 19 th Century
Vb	Hortlax	1	81:3	9	Iron nails, horseshoe nail, iron fork for boiled meat, bronze cape for a knife sheath, thimble, iron hook for a kettle, part of a cast iron kettle	Burned bones	18 th to 19 th Century	?
Nb	Hortlax	1	255:3	5	Thimble, iron knife, iron needle	Burned bones	18 th to 19 th Century	?
Nb	Hortlax	1	378:1	2	Horseshoe nail, iron padlock	Burned bones	18 th to 19 th Century	?
Nb	Piteå	1	305:3	5	Small iron knife	Only charcoal	?	?
Vb	Byske	2	258:2	6	Piece of iron chain, casted round lead bullets, iron knife, bronze buttons, coin (undated)	Burned bones	17 th to 19 th Century	?
Vb	Byske	2	564:2	3	Iron screw, coin (Oscar II), thimble, iron needle, silver coin (Oscar II 1867), fragment of lead, iron wire	Burned bones, a piece of medicine flask?, pieces of a chalk pipe	18 th to 19 th Century	18 th to 19 th Century
Vb	Jörn	2	286:10	11	Iron nails, iron knives, iron sheet, unburned bones, ornate bronze sheet, iron needle	Burned bones	18 th to 19 th Century	18 th to 19 th Century
Vb	Jörn	2	858:1	1	Iron fragment	Burned bones, fragment of bronze sheets	?	?
Nb	Piteå	2	13:5	6	Three coins (1876, 1881, 1888), iron needle, iron knives, lead	Burned bones, porcelain, glass	19 th Century	19 th Century
Vb	Piteå	2	502:1	1	Cast round lead bullet	Only charcoal	17 th to 19 th Century	?
Vb	Piteå	2	572:2	3	Three bronze buttons, horseshoe nail, iron fragment	Burned bone	19 th Century	?
Nb	Piteå	2	1019:1	1	Cast round lead bullet, horseshoe nail, iron nails, iron sheets	Burned bones	17 th to 19 th Century	?
Vb	Jörn	3	358:5	3	Iron padlock, iron fragments, iron fork for boiled meat, bronze sheet	Burned bones, lead, pieces of a chalk pipe	18 th to 19 th Century	17 th to 18 th Century
Vb	Jörn	3	764:1	2	Nothing	Only charcoal	?	?
Nb	Piteå	3	694:3	5	Burned bones, unburned bones, iron eyelet for a Sami jacket (<i>kolt</i>), cast round lead bullets, iron nails, iron sheets, piece of a bronze buckle, glass, iron hook for a kettle, bronze button, bronze sheet (for a kettle?)	Only charcoal	17 th to 19 th Century	?
Nb	Piteå	3	1068:2	4	Bronze sheet	Burned bones	?	?
Nb	Piteå	3	1072:1	1	Nothing	Burned bones	?	?

Table 1 continued.

County	Parish	Zone	NHB-number	Hearths per site	Artifacts found on site	Artifacts and bones in excavated hearths	Dating of artifacts found on site	Dating of artifacts found in excavated hearth
Nb	Piteå	3	1244:1	1	A big piece of lead, iron nail	Burned bones, iron awl	17 th to 19 th Century	?
Nb	Älvsbyn	3	255:2	3	Iron nails, iron needle, iron eyelet for a Sami jacket (<i>kolt</i>), bronze button	Burned and unburned bones	18 th to 19 th Century	?
Nb	Älvsbyn	3	396:1	1	Iron rods	Burned bones, iron nails	?	?
Nb	Piteå	4	280:3	1	Nothing	Only charcoal	?	?
Nb	Piteå	4	284:3	6	Nothing	Burned bones and flint	?	?
Nb	Piteå	4	928:1	1	Iron nails	Only charcoal	?	?
Nb	Älvsbyn	4	395:1	5	Nothing	Burnt bone	?	?
Nb	Älvsbyn	4	542:1	2	Iron mould (<i>kultång</i>) for round lead bullets	Burned bones and glass fragment	17 th to 19 th Century	
Nb	Älvsbyn	4	710:1	1	Nothing	Antler, burned bones and a small thin sheet,	?	?
Nb	Älvsbyn	4	730:1	1	Nothing	Burned bones	?	?
Nb	ÄlvsbyN	4	1079:1	3	Three silver coins (1832-1855)	Burned bones	19 th Century	?

Table 2. Osteological determinations of bones found in excavated hearths.

County	Parish	Zone	NHB number	Reindeer	Sheep/goat	Black grouse/grouse	Goose	Bird	Vole	Pike	Perch	Whitefish	Vendace	Carpfish	Undet.
Vb	Byske	1	166:10	10	3	-	-	-	-	-	-	-	-	-	102
Vb	Byske	1	279:2	52	1	-	-	-	-	-	-	-	-	-	332
Vb	Byske	1	341:1	12	-	-	-	-	-	-	-	-	-	-	9
Vb	Byske	1	624:1	10	-	-	-	-	-	-	-	-	-	-	101
Nb	Hortlax	1	255:3	7	-	-	-	-	-	-	-	-	-	-	125
Nb	Piteå	1	378:1	-	-	-	-	-	-	-	-	-	-	-	4
Nb	Hortlax	1	81:3	-	-	-	-	-	-	-	-	-	-	-	4
Vb	Byske	2	258	8	-	-	-	-	-	-	-	-	-	-	22
Vb	Byske	2	564:2	3	-	-	-	-	-	-	-	-	-	-	61
Vb	Jörn	2	286:10	15	-	-	-	-	-	-	-	-	-	-	37
Vb	Jörn	2	858:1	-	-	-	-	-	-	-	-	-	-	-	1
Nb	Piteå	2	13:5	29	-	-	-	-	-	-	-	-	-	-	175
Nb	Piteå	2	572:2	-	-	-	-	-	-	-	-	-	-	-	1
Vb	Jörn	3	358:5	10	-	4	1	5	-	-	-	-	-	-	62
Nb	Piteå	3	694:3*	14	-	-	-	-	-	-	-	-	-	-	27
Nb	Piteå	3	1019:1	9	-	-	-	-	-	-	-	-	-	-	134
Nb	Piteå	3	1068:2	11	-	-	-	-	-	-	-	-	-	-	98
Nb	Piteå	3	1072	-	-	-	-	-	-	-	-	-	-	-	45
Nb	Älvsbyn	3	255:2	3	-	-	-	-	-	-	-	-	-	-	45
Nb	Älvsbyn	3	396:1	3	-	-	-	2	2	202	5	4	136	93	11 864
Nb	Piteå	4	284:3	-	-	-	-	-	-	-	1	-	-	-	5
Nb	Piteå	4	1244:1	4	-	-	-	-	-	-	-	-	-	-	77
Nb	Älvsbyn	4	395:1	-	-	-	-	-	-	-	-	-	-	-	1
Nb	Älvsbyn	4	542:1	3	-	-	-	2	-	-	-	-	-	-	141
Nb	Älvsbyn	4	710:1	2	-	-	-	-	-	-	-	-	-	-	10
Nb	Älvsbyn	4	1079:1	13	-	-	-	-	-	-	-	-	-	-	80
Nb	Älvsbyn	4	730:1	3	-	-	-	-	-	-	-	-	-	-	-
Sum:				221	4	4	1	9	2	202	6	4	136	93	13 563
Sum of all fragm:															14 245

*Analyzed bones found around other hearts on the site.

Table 3. AMS-datings made by the Ångström Laboratory in Uppsala, Sweden. Datings made on charred wood and bones from excavated hearths.

County	Parish	Zone	NHB-numb.	Ua-numb.	Wood, species	Bones	¹⁴ C age	1 sdv ±	C ¹³	Calibrated age AD, 2 sdv
Vb	Byske	1	166:10	46216		X	140	30	-26.6	1660-1950 ³
Vb	Byske	1	166:10	48572	Birch				-25.3	Too young ³
Vb	Byske	1	279:2	46217		X	101	30	-16.3	1680-1940 ¹
Vb	Byske	1	279:2	48573	Pine		450	30	-25.7	1410-1480 ¹
Vb	Byske	1	341:1	46218		X	125	30	-12.1	1670-1940 ¹
Vb	Byske	1	341:1	48574	Pine		361	30	-25.3	1440-1640 ¹
Vb	Byske	1	624:2	46219		X	64	30	-12.9	1690-1920 ²
Vb	Byske	1	624:2	48575	Pine		118	30	-24.8	1680-1940 ²
Vb	Hortlax	1	81:3	48599	Pine		85	30	-27.0	1680-1930
Nb	Hortlax	1	255:3	46207		X	129	30	-22.6	1670-1950 ²
Nb	Hortlax	1	255:3	48569	Spruce		131	32	-26.1	1670-1950 ²
Nb	Hortlax	1	378:1	46210	Pine		297	30	-25.1	1480-1660
Nb	Piteå	1	305:3	46209	Pine		184	30	-26.1	1650-1950
Vb	Byske	2	258:2	48576		X	195	30	-15.8	1640-1960 ²
Vb	Byske	2	258:2	48605	Pine		195	30	25.4	1640-1960 ²
Vb	Byske	2	564:2	48577		X	120	30	-17.4	1670-1940 ²
Vb	Byske	2	564:2	48604	Pine		70	30	-25.1	1690-1930 ²
Vb	Jörn	2	286:10	49014		X	145	30	-13.4	1660-1950 ¹
Vb	Jörn	2	286:10	48600	Pine		335	30	-27.5	1470-1650 ¹
Vb	Jörn	2	858:1	48603	Undet.		895	30	-26.1	1030-1220
Nb	Piteå	2	13:5	48581		X	165	32	-24.5	1660-1960 ²
Vb	Piteå	2	13:5	48591	Pine		82	31	-25.4	1680-1930 ²
Vb	Piteå	2	502:1	48593	Pine		156	31	-26.7	1660-1960
Vb	Piteå	2	572:2	48594	Pine		15	30	-24.9	1690-1960
Nb	Piteå	2	1019:1	48583		X	116	31	-19.7	1680-1940 ¹
Nb	Piteå	2	1019:1	48595	Pine		279	31	-26.0	1490-1800 ¹
Vb	Jörn	3	358:5	48578		X	304	30	-16.8	1480-1660 ¹
Vb	Jörn	3	358:5	48601	Pine		530	30	-25.0	1310-1440 ¹
Vb	Jörn	3	764:1	48602	Pine		150	30	-25.2	1660-1960
Nb	Piteå	3	694:3 ⁴	48582		X	226	31	-19.0	1630-1960
Nb	Piteå	3	1068:2	48584		X	319	32	-24.8	1480-1650 ^{1*}
Nb	Piteå	3	1068:2	48596	Pine		67	32	-24.9	1690-1930 ¹
Nb	Piteå	3	1072:1	48585		X	322	32	-25.4	1470-1650 ²
Nb	Piteå	3	1072:1	48597	Pine		310	32	-25.7	1480-1650 ²
Nb	Piteå sn	3	1244:1	48586		X	104	32	-15.4	1680-1940 ¹
Nb	Piteå sn	3	1244:1	48598	Pine		285	30	-25.3	1490-1670 ¹
Nb	Älvsbyn	3	255:2	48579		X	376	31	-26.2	1440-1640 ²
Nb	Älvsbyn	3	255:2	48588	Pine		317	30	-25.8	1480-1650 ²
Nb	Älvsbyn	3	396:1	48580		X	642	32	-18.4	1280-1400 ²
Nb	Älvsbyn	3	396:1	48589	Pine		685	30	-27.3	1260-1390 ²
Nb	Piteå	4	280:3	48592	Pine		1097	45	-23.9	810-1030
Nb	Piteå	4	284:3	46208	Pine		636	30	-26.7	1280-1400
Nb	Piteå	4	928:1	46211	Spruce		262	30	-23.5	1510-1960
Nb	Älvsbyn	4	395:1	46212	Pine		190	30	-22.7	1640-1960

Table 3 continued.

County	Parish	Zone	NHB- numb.	Ua-numb.	Wood, species	Bones	¹⁴ C age	1 sdv ±	C ¹³	Calibrated age AD, 2 sdv
Nb	Älvsbyn	4	542:1	46213		X	129	30	-16.6	1670-1950 ¹
Nb	Älvsbyn	4	542:1	48570	Pine		265	30	-26.1	1510-1960 ¹
Nb	Älvsbyn	4	710:1	46214	Pine		313	30	-24.4	1480-1650
Nb	Älvsbyn	4	730:1	48590	Pine		305	30	-27.8	1480-1650
Nb	Älvsbyn	4	1079:1	46215		X	107	30	-15.8	1680-1940 ²
Nb	Älvsbyn	4	1079:1	48571	Pine		166	30	-26.0	1660-1960 ²

¹ t-test (95%) show that datings made on charcoal and bones are not statistically the same.

^{1*} t-test (95%) show that datings made on bones are not statistically the same and that charcoal gives a later date.

² t-test (95%) show that datings made on charcoal and bones are statistically the same.

³ Data not possible to test.

⁴ Analyzed bones from NHB 694:6 on the same site.