

# Fencing the forest: early use of barrier fences in Sami reindeer husbandry

**Gudrun Norstedt<sup>1</sup>, Anna-Maria Rautio<sup>2</sup> & Lars Östlund<sup>1</sup>**

<sup>1</sup> Department of Forest Ecology and Management, Swedish University of Agricultural Sciences, SE-901 83 Umeå, Sweden (Corresponding author: [gudrun.norstedt@slu.se](mailto:gudrun.norstedt@slu.se)).

<sup>2</sup> Museum of Forestry, Box 176, SE-921 23 Lycksele, Sweden.

*Abstract:* Barrier fences are generally not considered to have been used in Sami reindeer husbandry in Sweden before the early 20th century. As a rule, they are thought to have been introduced with the transition from intensive to extensive herding that is assumed to have taken place at this time. However, in this study, we show that barrier fences were widely used in Gällivare, Jokkmokk and Arjeplog Municipalities from the mid-18th century onwards, especially in the forests. Until the early 20th century, these fences were built of local materials, mainly whole trees and boulders, and we therefore call them whole-tree fences. Some of the barrier fences were used during periods of loose supervision by herders who otherwise practised intensive methods, while others were built in a context of extensive herding, large herds and conflicts over land use. Extensive reindeer herding was thus practised in the area much earlier than usually presumed, and it overlapped with intensive herding in both time and space.

**Key words:** boreal forest; cultural remains; dendrochronology; fence; reindeer husbandry; Sami.

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## Introduction

The reindeer kept by the Sami of northern Fennoscandia may seem to roam freely through the landscape, but in reality, their freedom is largely restricted by fences. These permanent barriers can extend for hundreds of kilometers along borders between nations and reindeer herding communities, along railroads and along other lines that the reindeer are not supposed to cross. Fences are also used for enclosures or corrals where the animals are rounded up for calf marking, slaughter, separation of mixed

herds, loading into trucks for long-distance transports, supplementary feeding, and other kinds of handling. The history of fence use in reindeer husbandry is largely unknown. According to some authors, the Sami's reindeer were formerly so tame that fences were unnecessary (Turi, 1917: 11; Ruong, 1945: 162; Manker, 1947: 83; Skum, 1955: 69; Marek, 1992: 136; Ryd, 1999: 2). Nevertheless, there are abundant notions of the use of pens, primarily for milking but also for other purposes.

These pens were rather small, more or less circular wooden enclosures, which were especially common in the boreal forest (Schefferus, 1673; von Düben, 1873; Tanner, 1929: 202; Pirak, 1933: 41; Ullenius, 1937: 124; Ruong, 1945: 177; Itkonen, 1948: 148; Manker, 1968: 200) but which were sometimes also used in the sub-alpine birch forest (Ruong, 1945: 173; Pettersson, 1979: 120-122). Above the tree line, pens were built of stone (Paulaharju, 1927: 141-142; Kuhmunen, 2000: 27). In addition to the circular pens, there are occasional notions of linear barriers intended to restrict or guide the reindeer's movements, both wooden fences in the boreal forest (Högström, 1747: 79; Drake, 1918: 40) and stone walls on the tundra (Ryd, 1999: 2). Nevertheless, according to all the sources that we have found, barriers were much rarer in the reindeer herders' landscape before the 20th century.

The changing use of fences is generally explained by a changing degree of human control over the herd, especially through the transition from intensive to extensive reindeer herding (Hultblad, 1936: 30-33; Ruong, 1937: 31; Manker, 1944: 208; Ruong, 1945: 173-176; Skum, 1955: 32; Bergstrand & Spik, 1998: 18; Ryd, 1999: 2). Intensive herding means that the movements of the reindeer herd are almost constantly controlled by man, whereas extensive herding means less control, at least during some part of the year, and usually larger herds (Tomasson, 1918: 78-93; Whitaker, 1955: 26; Hultblad, 1968: 136-140; Beach, 1981: 34-36; Ruong, 1982: 64-70; Konstantinov, 2010; Vuojala-Magga *et al.*, 2011). In the Swedish part of Sápmi (the Sami home land), an additional difference between the two systems has been a focus on milk production in intensive herding and on meat production in extensive herding (Tomasson, 1918: 92; Hultblad, 1936; Beach, 1981: 42-43; Ruong, 1982: 67). The transition from the former to the latter is usually assumed to have taken place during the

first half of the 20th century in most of Sweden (Manker, 1947: 87; Ruong, 1964: 42; Hultblad, 1968: 128; SOU 2006: 14, p. 94).

The transition from intensive to extensive herding has commonly been attributed to the influence of reindeer herders from the North Sami area (Hultblad, 1936: 29; Manker, 1944: 208; Rönnow, 1944: 45; Ruong, 1982: 68; Bergstrand & Spik, 1998: 18). These herders were forced to migrate southwards with their families as the result of a border agreement between Sweden and Norway in 1919. For example, Arjeplog Municipality received about 20 North Sami families during 1919-1924 (Lantto, 2000: 134). These families had practised extensive reindeer herding for a long time and continued to do so in their new environment (Manker, 1947: 87). One of the consequences of their arrival was an increased use of fences. The North Sami practice of installing corrals for the sorting of herds became the rule also among the local Sami (Hultblad, 1936: 32; Manker, 1944: 208; Ruong, 1945: 176; Beach, 1981: 410). Furthermore, the newcomers sometimes built barrier fences to prevent their reindeer from returning to the north (Manker, 1944: 208).

Although the arrival of North Sami reindeer herders undoubtedly affected the local communities, it is questionable whether they were the ones who introduced extensive herding. This has been pointed out by a couple of researchers, who have described the transition from intensive to extensive herding as a lengthy and complex process with many variations (Hultblad, 1968: 139; Beach, 1981: 46-49; Helle & Jaakkola, 2008). It is equally questionable whether the North Sami herders were the ones who introduced barrier fences. The relevance of these questions was brought out when researchers in 2005 discovered the remains of a very long wooden fence, appearing to be far more than a century old, in the boreal forest of Tjieggelvas Nature Reserve in Arjeplog Mu-



Figure 1. Elevated and therefore well preserved fence parts in Tjieggelvas Nature Reserve. The total height of the fence is here about 1.1 m.

nicipality (Figure 1) (Josefsson *et al.*, 2010b). Since several parts of the fence were severely decayed and difficult to follow, the purpose of the fence was not obvious. Later, similar fences have been found in other parts of the Tjieggelvas Nature Reserve, adding up to a total of at least 2,500 m (Figure 3). The construction of such long wooden fences must have demanded much effort and time, which implies that they served an important purpose. We believe that their existence challenges the common views that barrier fences are connected to extensive herding, and that this kind of herding was introduced in the early 20th century. Either the fences were also used in intensive herding, or extensive herding was practised in the area much earlier than previously thought, or maybe both.

The aim of this study is to clarify why and when fences were built through the forest, what role they played in reindeer husbandry at the time, and what they can tell us about the developments of reindeer husbandry. The first part of the study consists of a detailed field investigation of some of the known fence remains, including dating. The second part is an extensive search of primary sources from the time when the fences were built, as well as of ethnographic literature. The third part is a field survey of other examples of comparable fences. Through the combination of field data and archival finds, we advance possible explanations for the installation of barrier fences in the boreal forest before 1920, and discuss their relation to intensive and extensive reindeer herding.

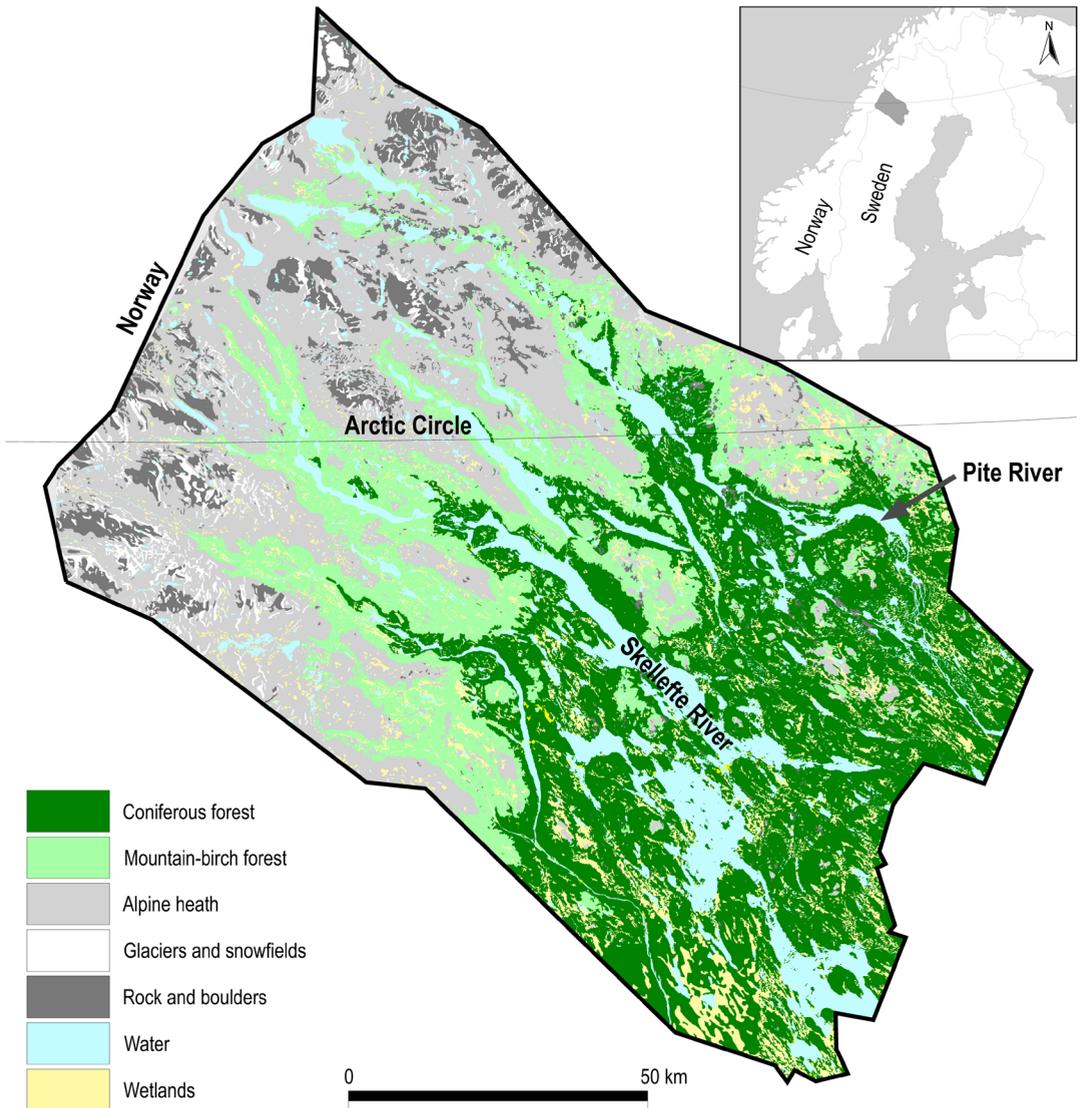


Figure 2. Main land cover in Arjeplog Municipality in northern Sweden. Our field study took place in the coniferous forests of the Pite River valley. © Lantmäteriet.

## Material and methods

### Study area

Field studies were done in the Pite River valley in the northeastern part of Arjeplog Municipality in northern Sweden (Figure 2). The area is located around the Arctic Circle ( $66^{\circ} 33' 38''$  N) at  $17-18^{\circ}$ E, about 450 m a.s.l., where the vegetation is dominated by boreal forests of Scots

pine (*Pinus sylvestris* L.). Altitudes rise steadily to the northwest, and at about 550 m a.s.l., the coniferous forests give way to subalpine forests of mountain birch (*Betula pubescens* ssp. *czerepanovii* [N.I. Orlova] Hämet-Ahti). Above 700 m a.s.l., alpine heaths take over. Isolated from the high mountains (1000-1600 m a.s.l.) that form the border to Norway, there are some

mountains further east that peak around 700–900 m a.s.l. and that present the same zonation. These ‘low alpine mountains’ (sw. *lågfall*) are thus surrounded by forest. The geography and vegetation of Arjeplog Municipality is described in detail by Rönnow (1944).

Fishing, hunting, and reindeer husbandry performed by the indigenous Sami were the dominant subsistence modes of the study area well into the 19th century. Gathering of wild plants, especially harvest of Scots pine inner bark as a food resource, made an important contribution (Rautio, 2014). Almost no settlements were established before 1840 (Bylund, 1956, plate 1), and the settled population has always been scarce. Until the end of the 19th century, the area was divided among the Sami in household territories, often called taxation lands or taxlands (sw. *lapps katteland*) (Holmbäck, 1922). The Sami were also organized in larger communities (sw. *lappbyar*), of which two were present in this part of the Pite River valley. The Norrvästerbyn or Mávas community had the traditional rights to the western, alpine part, whereas the Luokta community was in control of the eastern, boreal forest part (Holmbäck, 1922: 20). Our study was performed on the land of the Luokta community. In 1927, the two communities merged to form Luokta-Mávas sameby (‘Sami community’, in reality a reindeer herding community), and at the same time, the easternmost part was separated to form Ståkke skogssameby (‘forest Sami community’) (SOU 1936: 23, p. 154).

### *Case study of fence remains*

Given the lack of basic information on forest fences, we started with a detailed case study of the previously discovered fence system in Tjieggelvas Nature Reserve (66°32'N, 17°47'E). The reserve is a protected forest area without any known history of commercial logging. We chose to study the southernmost part of the fence system, located between Lake

Mun̄kajávrrre and Gáldaksavon in the Pite River, a distance of 1230 m (Figure 3). Following the remains, we used a measuring-tape to measure the distances between each point where the direction of the fence changed, and estimated the bearings with a hand-held compass. Construction details were briefly described and in many cases photographed. We measured the basal circumference of trunks that had been felled by axe if they were not too degraded.

To date the construction, four wood samples from the fence were taken with handsaw or increment borer (Ø 12 mm). These samples were used to determine the approximate year of death of each tree through dendrochronological cross-dating. To improve the visibility of tree rings, the surface of each sample was polished with a belt sander. Distances between tree rings were measured with a LINTAB™ 5 measuring station with 10 µm resolution, and the resulting ring sequences were compared to master chronologies using TSAP-Win™ software and statistics (version 0.59). A local master chronology from the Tjieggelvas area was used primarily, and it was supplemented by two chronologies from Lycksele (64°N, 18°E) and Torneträsk (68°N, 19°E). Since the outermost layers of the logs and stumps were eroded, only an approximate dating was possible.

### *Searches for other fences*

To understand whether the fences of Tjieggelvas Natures Reserve are unique or rather examples of a more widespread practice, an extensive search of primary sources and ethnographic literature was conducted. The most important primary source consisted of transcribed court records from 1798–1860, the period when the fence was built according to the dendrochronological dating. Since these records contain information on Sami land use, we assumed that they could contribute to our understanding of the context of fence building and possibly also reveal the existence of other fences. In order



Figure 3. The fence system (in red) so far known northeast of Lake Tjieggelvas crosses land areas between several larger and smaller lakes. The fences are located in a relatively flat but rough area known as Mattme, where boulders abound and the vegetation is dominated by boreal pine forest. Immediately to the east of the fences, the terrain rises towards the Árvesduottar massif with subalpine birch forest and alpine heath. © Lantmäteriet.

to gain a broader perspective in both time and space, we also went through two extensive documentations made by the Swedish State in the early 20th century. The first was an inquiry undertaken among reindeer herders in 1912-1913 to gather information for the ongoing negotiations with Norway regarding transboundary reindeer herding (Montell *et al.*, 1913; SOU 2006: 14, pp. 216-225). The second documentation consisted of protocols from meetings held with the Sami population in 1920-1921 by the 'Sami committee of 1919' (sw. '1919 års lappkommitté'), whose purpose was to secure the conditions of Sami reindeer herding (Sami committee 1920-1921; SOU 2006: 14, p. 226). One of the questions treated was the existence of barrier fences (sw. *spärrstängsel* or *spärrgården*), a subject that was also covered in the committee's final report (SOU 1923: 51).

On the basis of our findings in the written sources, we searched for fences in two areas further downstream in the Pite River watershed. The first area was located between the Lakes Ieggelatj, Tjåktjajávrrre and Vátjamjávrrre (66°14'N, 18°29'E), and the other one between Luovvaluokta Bay in the Pite River and Lake Gállájávrrre (66°21'N, 18°10'E). In contrast to Tjieggelvas Nature Reserve, these areas have been thoroughly logged since the early 20th century (Andersson *et al.*, 2005). When fences were found, we followed them to the ends and registered positions of remains with a hand-held gps device while describing construction elements in notes and with photographs.

## Results and discussion

### *Detailed description of fence remains*

The fence between Muŋkajávrrre and Gáldak-savon in Tjieggelvas Nature Reserve consisted of three parts (called A, B and C), separated by one larger and one smaller lake (Figure 4). From the south to the north, parts A, B and C were 567, 263, and 120 m, respectively, adding

up to a total of 950 m of fence constructions.

The fence was exclusively built of material that was abundant in the area, i.e., wood of Scots pine (*Pinus sylvestris*) and boulders. No metal parts were detected. Since the wood was in various stages of decay, it was not always obvious what the construction had originally looked like. Nevertheless, we noted that this fence was not built by repeating a few regular elements but rather by finding ad hoc solutions. These solutions could be grouped into a few basic construction elements: *sections*, *joints* and *stabilizers*. The *section* was the main part, the horizontal component. Sections were connected through *joints*, where the direction of the fence usually changed. Here and there, perpendicular *stabilizers* had been inserted, mostly in sections but sometimes in joints. These basic construction elements are described in more detail in the following.

*Sections* consisted almost exclusively of pine trunks, although a few boulders were large enough to act as sections in themselves (indeed, even the two lakes between parts A, B and C could be seen as sections, but they have been excluded from this analysis). No trunks had been split, and many branches remained attached. As a rule, the basic structure of each section was an entire tree, in many cases a windthrow with roots included. The length of each section thus usually equalled a tree length. Sections were between 2.10 and 21.20 m long, on average 6.40 m. However, the longest sections were generally in poor condition or even completely vanished, and we therefore suspect that these measurements include two or more tree lengths. Even so, the mean section length was considerably shorter than the mean height of the largest trees recorded nearby, which is 13.7 m (Josefsson *et al.*, 2010b). Only four sections exceeded this length. Apart from large, intact windthrows, the sections also included thinner trees that had been felled by axe. The basal diameter of the felled trees varied between



Figure 4. The three parts of the fence between Lake Muņkajávrrre and Gáldaksavon (a part of the Pite River). Two unnamed lakes form part of the fence. Since the direction changes at almost every joint, the fence winds through the forest. There were three openings where no log remains could be found, two in part A (5.6 m and 3.2 m wide) and one in part B (6.4 m wide). © Lantmäteriet.

0.08 and 0.29 m (mean 0.16 m). Since the outermost layers of the trunks may have been eroded, the original width was probably underestimated. On the other hand, we did not know at what height the trunks had been felled and therefore could not calculate the diameter at breast height, which is normally less than the diameter at the base. Assuming these counteracting factors to be equal, the felled trees were thinner than the mean for pine trees measured nearby, which was 0.20 m at breast height (Josefsson *et al.*, 2010b). In other words, both length and width measurements indicate that the trees included in the fence sections were relatively small compared to the surrounding

trees, and we therefore suggest that the builders had chosen trees that were not too heavy to handle.

The number of trunks stacked on top of each other in each section was difficult to assess due to decay, but usually seemed to have been between two and six. At irregular intervals, there were various kinds of supports under the trunks (Figure 5). Many of the supports were pine roots that had been chopped off and turned upside down. More rarely, a tree top with a suitable branch had been used. Boulders also served as supports, and in these cases, the horizontal trunks had sometimes been notched in order to rest smoothly.



Figure 5. Fence construction details. Upper left, a support consisting of a boulder. The trunk has been notched with an axe. Lower left, a support made from the top part of a pine tree with a suitable branch. In this case, the support also functioned as a lateral stabilizer. To the right, the highest fence part, measuring in total 1.5 m. The stump has been cut in the middle of a scar from an old bark-peeling, a very common cultural remain in the forests of Tjieggelvas, where pine bark formerly was an important staple food for the Sami. Next to the stump, the pine roots turned upside down once served as support for the trunk that now lies on the ground.

The highest fence section that was preserved was 1.5 m and consisted of a 0.23 m thick trunk resting on top of a stump cut at 1.22 m height (Figure 5, right). However, since no other parts of the fence reached this height, even in the best preserved sections, we estimated an original height of about 1.1 m to be more likely (compare Figure 1). With such a height, they would have been more or less covered by snow in winter and could not have been of much use during that season.

*Joints* between sections had been constructed in various ways. We classified them into three main types, although many of them were in fact combinations. The most common kind of joint had been constructed by stacking the trunk ends of two sections crosswise in an interlocking way, as a rule without notching (Figure 6,

upper image). There was almost always an angle between the joining sections, on average 151°. Some of the crosswise joints were placed on a boulder, while others were in contact with the ground and thus very susceptible to rot. Many joints that were now reduced to wood piles had probably been constructed in this way. About half of the joints would then have been of the crosswise trunk type.

The second most common joint was based on a boulder without crosswise stacking of wood. In this case, one trunk of each joining section rested on the top of the boulder (Figure 6, lower left). Below the boulder, supplementary horizontal trunks had been placed on some other kind of support, usually the root part of a pine turned upside down. About one third of the joints were of the boulder type.



Figure 6. The three main types of joints. Upper photo, crosswise trunk type. Lower left, boulder type. Lower right, rooted stump type.

The third and least common type of joint was based on a stump still rooted in the ground, usually with a V-shaped notch in the surface where a horizontal trunk had been placed (Figure 6, lower right). The stumps had been cut at quite variable heights, between 0.3 and 1.2 m, the highest one being an outlier since the second highest was 0.75 m. As a rule, the higher stumps were accompanied by lower supports of other kinds, just as with the boulders. About 10 % of the joints were of the rooted stump type.

In addition to the sections and the joints, perpendicular *stabilizers* had been inserted in the fence and set against the ground in order to stabilize the construction laterally (Figure

7). Stabilizers were usually found at joints, but sometimes along the sections. Many stabilizers simultaneously functioned as supports (Figure 5, lower left).

Four samples of wood included in the fence construction were taken for dating. Two samples from part A and one from part C were from trees with a normal growth pattern all the way to the surface, which indicates that they were alive when they were cut for the building of the fence. In contrast, the fourth sample, from part B, had very narrow year rings in the outer part, which is typical of a tree dying from natural causes. We therefore think that it was already dead when it was used. Dendrochronological dating showed that the three first-men-

tioned trees had died during the period 1828-1835, and the fourth one around 1791. Although the datings seem to indicate that the fence was built over a couple of years, this is not certain, since the dating is approximate due to erosion of the outermost wood layers. We therefore suggest that the fence between Muşkajávrrre and Gáldaksavon was built in 1835 or shortly after.

#### *Fences found by Lake Ieggelatj*

One of the court records included a protocol from 1814, concerning the borders of the Stáhkke taxation land, where three fences were mentioned (CR 1815b). Two of these fences were located west of Lake Ieggelatj and one between Ieggelatj and the Pite River. More than a century later, decaying remains of wooden fences were noticed in this area, more specifically between Lakes Ieggelatj, Tjáktjajávrrre and Vátjamjávrrre (Manker, 1968: 86).



Figure 7. A stabilizer, made from a trunk inserted at a right angle to one of the joints.

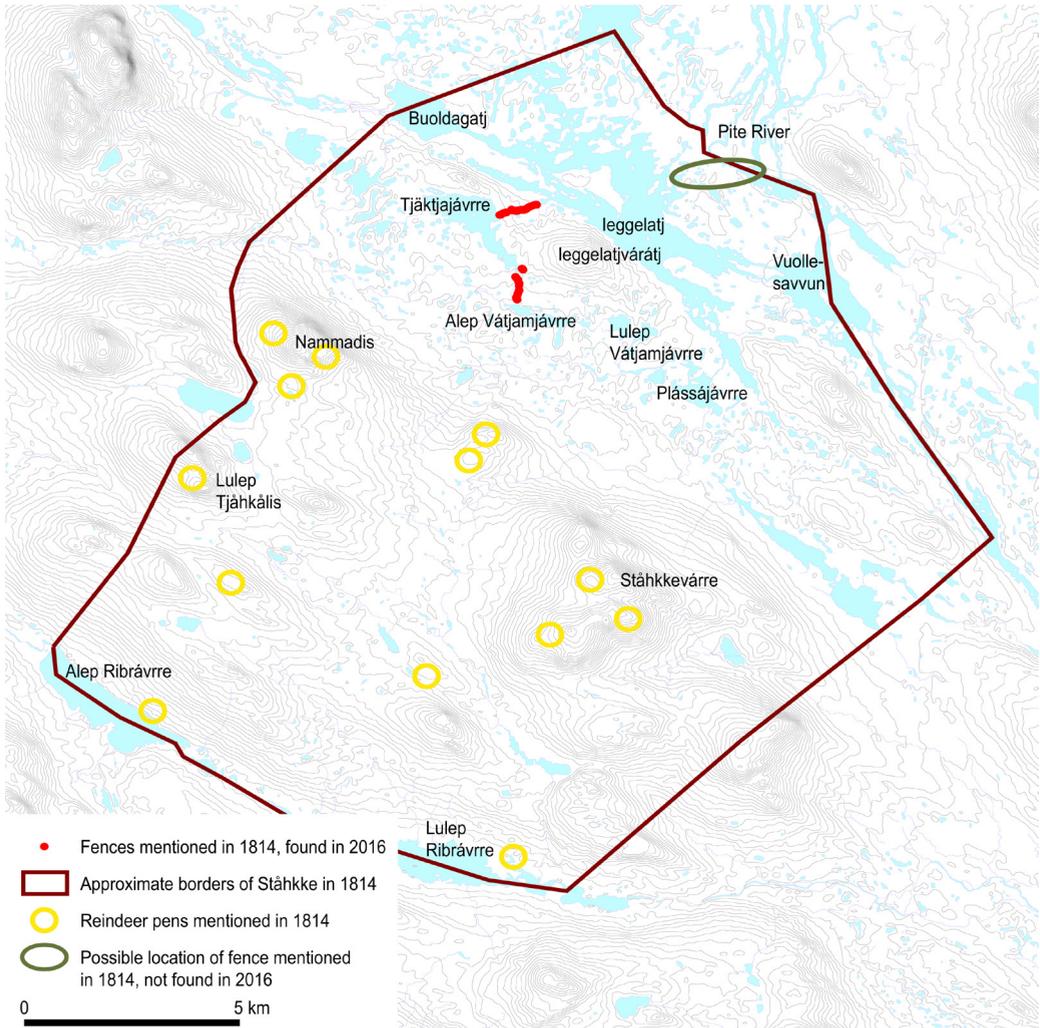


Figure 8. The fences that we found by Lake Ieggelatj were first mentioned in a protocol from 1814 concerning the definition of the borders of the Ståhkke taxation land in the Luokta Sami community (CR 1815b). One of the discovered fences went between Lakes Ieggelatj and Tjåktjåvvrre (ca 1000 m, including a 60 m lake), the other between Lakes Tjåktjåvvrre and Alep Våtjamjåvvrre (ca 700 m). These two fences were separated by about 1500 m of water in Lake Tjåktjåvvrre. A third fence was mentioned in the protocol as going from Ieggelatj to the Pite River, but we could not find that part. As defined in the protocol, the Ståhkke land extended over approximately 30 000 hectares. In the south, it included a couple of low alpine mountains with summits over 700 m a.s.l. On and around those mountains, there were 13 reindeer pens that have been tentatively marked on the map. Such a large number of pens is typical of intensive reindeer husbandry focused on milking (Ruong 1944: 94). The northern part of the Ståhkke land was characterized by a couple of large lakes and the Pite River, which also forms the northeastern border. The main fishing lakes mentioned in the protocol were Ieggelatj, Buoldagatj, and Vuollesavvun. By Lake Tjåktjåvvrre we found the remains of a fishing hut and a boat. © Lantmäteriet.

Since this is an area where heavy machines have been used for logging and possibly also soil scarification (Andersson *et al.*, 2005), we feared that any fence remains would have been destroyed. However, when we searched the areas between the abovementioned lakes, we soon discovered decaying fence remains that we could track from shore to shore (Figure 8). We also searched between Ieggelatj and the Pite River but found nothing there.

The fence remains by Lake Ieggelatj were as a rule more decomposed than the ones of Tjieggelvas, but many details were nonetheless visible (Figure 9). The sections included whole trunks of Scots pine trees, sometimes with roots, sometimes felled with an axe. The supports very often consisted of uprooted pine stumps that had been placed upside down or sometimes on the side. These supports caught the eye and revealed the presence of the fence even where the horizontal parts were in severe decay. Where the trunks of the sections still remained, we often found that they were supported by wood that had been worked with an axe. Boulders were also used as supports, but more rarely than in Tjieggelvas, where boulders are more abundant. Nowhere did we find any metal parts. As far as we could see, the fences by Lake Ieggelatj were of the same type as the ones in Tjieggelvas.

### *Records of other fences*

When we searched through the sources, we found that the fences by Lakes Tjieggelvas and Ieggelatj were far from unique. The oldest record, from 1747, probably concerned Gällivare parish, since that was where the author was living and working. According to his text, some wealthy Sami enclosed their lands with fences that were up to four or five ‘*mil*’ long and very expensive, but useful both summer and winter (Högström, 1747: 79). The length of these fences is ambiguous, since a Swedish *mil* could be either 5 or 10 km at the time (Hülphers,

1922: 128). In the early 19th century, a couple of fences were mentioned in court records from Arjeplog (Figure 10) and another one from between Lakes Bielnejávrrre and Noarvejávrrre in Jokkmokk (Hultblad, 1968: 427). From 1841, there is an ethnographic account telling that very long fences had been built between lakes and rivers in Gällivare parish (Drake, 1918: 40). Since the latter text contains some information on fence construction, we will return to it in the following section.

In the early 20th century, the Swedish State undertook inquiries among the reindeer herding population about, among other things, the existence of barrier fences. According to the herders, there were no such fences in use in 1913 in our study area (Mávas and Luokta communities), but a couple of barriers had recently been built further southwest (Semisjaur and Njarg communities) (Montell *et al.*, 1913). In 1921, the situation was the same (Sami committee 1920-1921). The latter source also obtains information of barrier fences in use by Tjåktjajákka River and Lake Gágirjávri in Gällivare Municipality, as well as a fence in decay around Mount Jiervas in Jokkmokk Municipality. In summary, we have found records of the use of wooden barrier fences in Gällivare, Jokkmokk and Arjeplog Municipalities during the period 1747-1921. All fences recorded in Arjeplog are presented in Figure 10 and briefly described in the captions.

### *Comparisons with fences described in literature*

Although the fences that we have explored have been in use over a long time and over a vast area, they have received very little attention from ethnographers and archaeologists. The fence that we studied in Tjieggelvas is registered in the Archaeological Sites and Monuments database of the Swedish National Heritage Board (Arjeplog 3247-3249). Only two other records of similar fences concerning the area of reindeer husbandry seem to be included in the database.



Figure 9. Fence remains by the eastern shore of lake Tjäktjäjävrr. The pine root parts are full of tar and very resistant to rot.

They are from further south, from the province of Jämtland (Offerdal 13) and from northern Ångermanland (Björna 273).

The fence type that we have described cannot be found in the handbook of old enclosures and fences edited by the Swedish National Heritage Board (Gustafsson, 2002). Nor does it fit in with any of the ones known to have been in use among the Sami of Arjeplog Municipality before the arrival of the North Sami in the 1920s: the *log fence* (sw. *timmerhage*) and the

*palisade fence* (sw. *palissadhage*) (Ruong, 1945: 177-178) (Figure 11). The log fence was the construction type used for milking pens in the boreal forest (Ruong, 1945: 128-130). It consisted of thin logs or roundpoles, placed horizontally and stacked crosswise (Manker, 1968: 200-204; Sommarström & Westman, 1997: 23). This fence type is very similar to the North American worm fence which has, in fact, been proposed to be of Finnish and ultimately of Sami origin (Jordan, 1995). The other type, the

palisade fence, was the construction type used above the coniferous tree line for milking pens, later also for sorting corrals (Rönnow, 1944: 70; Ruong, 1945: 178; Pettersson, 1979: 120-122; Marek, 1992: 140-141, 160). Palisade fences were made of logs of mountain birch, leaning side by side in a vertical position towards a horizontal support (Manker, 1944: 208). Neither of these two fence types resembles the fences that we have described.

However, there is a third fence type that has much in common with the ones of our study. That is the *shrub fence* (sw. *rishage*), which is otherwise mostly known from the North Sami area where it was used for circular pens and sometimes for linear barriers (Ruong, 1945: 176-178; Manker, 1944: 213, 1947: 94-95). Shrub fences were built of entire tree trunks placed in rows one after another and supported by poles and branches. If a tree was in the intended line, it was chopped off rather high above the ground, but not completely, so that the fallen trunk remained partly attached to the stump. Boulders and other natural obstacles were often included in the fence. If the construction was not dense enough, the holes were filled with branches and shrubs (Manker, 1944: 208-212; 1968: 200-204). Mostly, shrub fences were built above the coniferous tree line and thus of mountain birch or sometimes willow (Ruong, 1945: 178; Manker, 1944: 213). However, whole spruce trees could sometimes be used, as witnessed by a photo of a milking pen built in 1932 by reindeer herders of the Vittangi forest Sami community (Manker, 1968: 44). Similar spruce fences are also known from reindeer herding Sami on the Kola peninsula in Russia (Charnolusky, 1931: 7).

When it comes to fences built of whole pine trees, the two other fences included in the Archaeological Sites and Monuments database seem to be of this kind, but their purpose is not known (Selling 1974: 22-23; Viklund 2004: 208-209). From northernmost Sweden,

there are a couple of photos of similar fences that were used for reindeer hunting with snares (Lundemark, 1939). These fences (usually known by their Finnish name, *hangas*) were very similar to the fences of our study, and we believe that they share a common origin. However, credible sources concur that the wild reindeer had disappeared from our study area before the early 19th century (Læstadius, 1832: 344; Johansson, 1951; Hultblad, 1968: 141), and we therefore feel confident that the fences of our study were used in reindeer husbandry.

During our search through the ethnographic literature, we also happened upon an old note that fits very well with the fences we described. The note, from 1841, concerns fences that were built by some reindeer herders in Gällivare parish and includes the Sami terminology. The fences were about 1.5 m high and up to 30 km long and were placed between lakes or rivers. The *vuoto* or foundation was built of stones and the root parts of pine trees. They served as supports for the *vuoto-hålkå*, the ‘foundation rail’, consisting of long pine trees. Next came the *kaska-hålkå*, the ‘mid rail’, made of thinner pines. On top was the *paije-hålkå*, the ‘top rail’, with even thinner pines. The Sami reindeer herders used to pay farmers to help them build such fences. With good access to suitable wood, ten men could build 2.5 km of fence in one day. Three men worked with the foundation, three with the foundation rail, two with the mid rail and two with the top rail (Drake, 1918: 40). We believe that this note concerns a fence of the same type as the ones that we have described. It could be classified as a shrub fence in the sense defined above. However, since ‘shrub’ is a word more suited for fences built of bushes, we prefer to introduce the term *whole-tree fence* (sw. *helträdsstängsel*) for the fences that we have described.

### *Explaining the forest fences*

It is rare to find records in the ethnographic

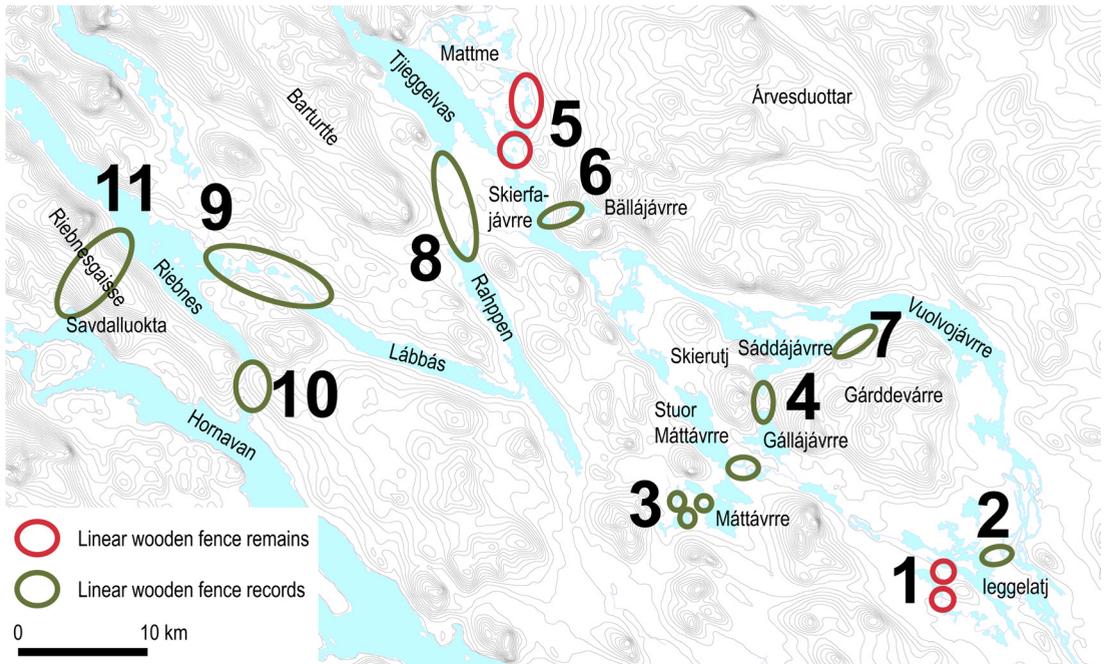


Figure 10. Remains and records of linear wooden fences in Arjeplog Municipality, listed chronologically in order of known appearance. Red ovals indicate remains that have been found in the field, whereas green ovals indicate records of fences that either have not been found (2, 4) or have not been searched for. Each number is described in the following text. © Lantmäteriet.

1. Two fences west of Lake Ieggelatj, mentioned in 1814 and described in this study (Figure 8) (CR 1815b).
2. A fence between Lake Ieggelatj and the Pite River, mentioned two times in the same protocol as no 1, and first said to be 1000 m, secondly 800 m. We searched the area but found no remains.
3. Four short fences between several smaller lakes surrounding Lake Máttávrrre, mentioned in 1814. They were located more or less on the borders of the taxation land Bårggâ in the Luokta community. The first fence was a 110 m between ‘the two Darvas Lakes’ (the distance indicates that the lakes concerned were probably Darvasjávrrre and Jårbbjávrrre); the second ca 110 m from Darvas to Ájlisjávrrre; the third ca 120 m from Ájlisjávrrre to Máttávrrre; the fourth ca 125 m from Máttávrrre to Lake ‘Licksjock’ (probably Iksjåkjávrrre) (CR 1815c).
4. Fence between Lake Gállájávrrre and Luovvaluokta (sw. Bergnåsviken) Bay in Lake Sáddájávrrre, mentioned in several sources from 1827 on. The fence marked the border between two taxation lands of the Luokta community, Gårddevårre in the east and Skierutj in the west (CR 1830; CR 1832; CR 1840). Thanks to this fence and several connecting lakes, Skierutj became a large enclosure where the reindeer could be left unguarded (Læstadius, 1831: 442). According to one source, the fence was continued from Gállájávrrre to Lake Máttávrrre (probably Stuur Máttávrrre) (CR 1832). The old fence was reconstructed around 1921 (Sami committee 1920-1921: 194), probably with roundpoles and wire (Manker, 1968: 86). Today, there is a modern fence here, marking the border between Luokta-Mávas and Ståkke reindeer herding communities. When we searched the area, we found remains of several old fences, but nothing predating the use of nails and wire.
5. Fence remains of the Tjeggelvas Nature Reserve, found and registered in the field. The southernmost part is described in detail in this article and has been dated to ca 1835. We have not found any written records of these fences.
6. Fence between the ‘Ankarlockt’ Bay on the eastern side of Lake Skierfåjávrrre, and Lake Bållájávrrre. It was men-

tioned in 1841 and 1842 as being located on the border between two taxation lands of the Luokta community, Siebmer in the west and Siejdvárre in the east (CR 1842; CR 1843).

7. Fence along 3 km of the southern shore of Lake Vuolvojávrrre. It was mentioned in the 1930s as an old feature, built of logs or trunks, intended to prevent the reindeer from swimming over the lake and reaching the mountains too early in the spring (Brännström, 2017). It was probably the same fence that in the 1940s was said to be located along the stream at 'Saddaluspe' (the outlet of Lake Sáddájávrrre). It was then about 800 m and had originally been a wooden fence, but had later been replaced by a wire fence (Manker, 1968: 86).

8. Fence between Gibdnoluokta Bay in Lake Tjieggelvas over Rådepvuobme grazing area to Lake Rahppen. Decaying remains of this fence, which was probably in use around 1900, are seen on a published photo (Ruong, 1945: 154). According to the captions, the fence was used in spring to hold the doe herd back in the boreal forest after calving, until it was time to move on to the alpine pastures. The photo shows a log fence of the same type as in Figure 11 (left).

9. Fence between Lakes Riebnes and Lábbás, 'interrupted in three places by lakes', mentioned in an interview from 1913 as being in use. The owner of the fence was a reindeer herding Sami of the Njarg community, who had his autumn site nearby (Montell *et al.*, 1913: 40). In 1921, the State's sheriff specified that the fence went from a bay in Lake Riebnes to Hárrok and from there to Lábbás (Sami committee 1920-1921: 174).

10. Fence near Riebnesluspen, the outlet of Lake Riebnes, mentioned in the same interview as no 9 and used by the same herder.

11. Fence between 'Suntoluokta' Bay (probably Savdalluokta) in Lake Hornavan and Mount Riebnesgaisse, and from there to Lake Riebnes. It was mentioned in 1913 as recently built of birch. The fence was used by three Sami herders of the Semisjaur community to control the reindeer during autumn and spring (Montell *et al.*, 1913: 27). The fence was still in use in 1921 (Sami committee 1920-1921: 174).

literature on linear fences in the boreal forest before 1920, and even rarer to find an explanation of their purpose. We will therefore try to interpret the forest fences through a combination of these rare records and findings in unpublished sources. Starting with the fences of Tjieggelvas, there is an interesting observation made by Petrus Læstadius, who was born and raised in Arjeplog Municipality and who worked among the Sami of the area 1828-1832 – just a couple of years before the fences were built. His observation specifically concerns the Sami north of the Pite River, known as the Árvés Sami. Already at this time, the Árvés Sami had large reindeer herds that could not be milked regularly, and as a consequence the does became too wild to handle. The connection also worked the other way around: in the absence of milking, the calves had free access to milk and grew stronger and more able to survive the winter, and the herds became larger. The wealthiest of the Árvés Sami were said to

own around 700 does each (Læstadius, 1831: 452). In other words, the Árvés Sami practised extensive reindeer husbandry about a century before the arrival of the North Sami.

However, there are reasons to believe that the large herds of the Árvés Sami was a rather recent phenomenon in the early 1800s. The human population of the area that is now Tjieggelvas Nature Reserve more than doubled from 1750 to 1800 (Josefsson *et al.*, 2010a). Similarly, a dendrochronological study showed a dramatic increase of the number of so called lichen stumps, remains of trees that have been cut in order to provide reindeer with arboreal lichens, during the second half of the 18th century. This result was interpreted as a reflection of an increase in the numbers of both people and reindeer (Berg *et al.*, 2011).

The fences of Tjieggelvas should be considered in this context of larger reindeer herds and a more extensive way of reindeer herding. Large herds inevitably increase the risk of competi-



Figure 11. The two fence types formerly known to have existed in Arjeplog Municipality before the arrival of the North Sami: the log fence (left) and the palisade fence (right). Both fences are reconstructions, the log fence by Lake Sundtjärnen, Malå Municipality, and the palisade fence in Raamesuene cultural center, Vindeln Municipality.

tion over grazing lands, and the court records of the early 19th century contain numerous cases of land conflict between reindeer herders north of the Pite River. Several of these conflicts involved members of the Luokta community who were inhabitants of the Tjieggelvas area. Their taxation lands were mainly located in the boreal forest and included neighbouring low alpine mountains. It has previously been concluded that each land had been designed to provide all the resources needed for a Sami family on a year-round basis (Josefsson *et al*, 2010a). However, the court records reveal that the Tjieggelvas Sami used to migrate to alpine summer pastures close to the Norwegian border, far outside their own taxation lands. For example, Jon Henriksson, whose taxation land was located in what is today Tjieggelvas Nature Reserve, in 1813 used summer pastures on Mount Miettoajvve some 40 km northwest (CR 1813). His land use was perceived as an intrusion by the Sami of the Mávas community, and between 1800 and 1840, conflicts over these alpine pastures were discussed in court almost every year.

While the Sami of the lowland Luokta community made use of the inherited highlands of the Mávas community, the Mávas Sami migrated through the forest lands of the Luokta Sami to winter pastures further east. The Mávas Sami had the customary rights to do so, but some-

times stayed longer than they were supposed to. The court records contain information about a conflict regarding Mattme, the pine forest area where the fence system of Tjieggelvas Nature Reserve is located. In 1815, Jon Henriksson and his neighbours summoned six Mávas Sami into court, demanding that they be forbidden to pass through Mattme with their reindeer. Instead, they should be obliged to migrate along the high mountain range in the northeast. According to Jon Henriksson and his neighbours, the Mávas Sami had such large herds that the reindeer pastures of the Mattme area would be completely destroyed should the Mávas' herds be allowed to enter or even pass through. During the proceedings of the court, it was said that Jon Henriksson and his fellows came down to Mattme just after Michaelmas (29th of September), whereas the Mávas Sami did not leave their alpine pastures until Andrew's day (30th of November). The defender of the Mávas Sami alleged that they would risk freezing to death if they had to follow the mountain range at this time of the year. Thus, they had no choice but to go down into the Mattme forest. The court found this reasonable and stated that the Mávas Sami should be allowed to pass through Mattme, but not to stay more than one day and only in case of holiday (CR 1815a).

We believe that the fences of Tjieggelvas Nature Reserve are best interpreted in this

context of land conflict between reindeer herders. Mattme's value as a winter grazing area is confirmed by the many stumps cut to provide reindeer with arboreal lichens, an activity that was significantly more frequent here than in neighbouring areas (Josefsson *et al.*, 2010b). Although there is a time lapse between the court rule of 1815 and our dating of the fence to ca 1835, we believe that there is a connection between the documented conflicts and the decision to build the fence system of Tjieggelvas Nature Reserve. According to the court rule, the Mávas Sami could not be forbidden to pass through Mattme during migration. However, the fences would function as barriers, which prevented their numerous herds from dispersing, and both herders and reindeer would then be more prone to move on and leave the area well before winter. We therefore conclude that these barrier fences reflect increasing reindeer herds, a rather extensive way of reindeer herding, and subsequent land use conflicts.

Not all the fences that we have studied can be explained in this way, however. There is no evidence of conflicts in connection with the fence between Luovvaluokta and Gállájávrrre (Figure 10, no 4). In the autumn of 1828, Petrus Læstadius visited the area west of the fence, called Skierutj, where several reindeer herding households had gathered. Among the herders were Sami from the north side of the Pite River, the Árves Sami, known for their large herds. Thanks to the fence and several connecting lakes, Skierutj became one large enclosure, about 15 km long and 5 km wide, where the herders could let their reindeer wander freely and gain fat during a couple of autumn weeks (Læstadius, 1831: 442). Thus, the Skierutj fences served not to keep foreign reindeer out but to keep own reindeer in.

We suggest that the fences by Lake Ieggelatj served a similar purpose. The Ieggelatj fences were first mentioned in a protocol from 1814 that was drawn up in order to define the bor-

ders of the Ståhkke taxation land. The fences did not follow the borders but were located well inside the land (Figure 8). The protocol also lists 13 reindeer pens that were scattered over the southern part of the land. Such a large number of reindeer pens is typical of intensive reindeer husbandry focused on milk production (Ruong, 1944: 94; Sommarström & Westman, 1997). Even in intensive reindeer husbandry, however, it was common to let the reindeer loose during certain times of the year (Hultblad, 1968: 140; Norstedt & Östlund, 2016), and fences would then help to control the animals. Together with a couple of lakes, these fences enclosed Mount Ieggelatjvárátj in the same way as the fences and lakes enclosed Skierutj. According to the court record, Lake Ieggelatj was one of the land's most important fishing waters. If the reindeer could wander freely nearby, sufficiently controlled by the fences and the lakes, this would have enabled the household to focus on fishing in the autumn. Another fence system, the one by Lake Máttávrrre (Figure 10, no 3) belonged to the neighbouring Bårggå taxation land where conditions were similar to Ståhkke. There were 16 reindeer pens, which implies that reindeer husbandry was intensive and focused on milk production. The fences had been built between a number of lakes that were mentioned as fishing lakes in the protocol. Unlike the fences of Skierutj and Ståhkke, however, the ones of Bårggå did not create an enclosure but rather marked the western end of the taxation land. We think that these fences served as barriers, which simplified the control of reindeer for Sami who focused on fishing outside the milking season and therefore temporarily relaxed their otherwise intense supervision.

The fence between Gibdnuokta and Lake Rahppen (Figure 10, no 8) can also be seen in the context of intensive reindeer husbandry. In this case, the fence served as a barrier to keep the does in the boreal forest during calving

season, before it was time to move on to the alpine pastures (Ruong, 1945: 154). It is not clear why this should be necessary, since the very same source tells that the does calved *after* the arrival to Båråk, located in the subalpine birch forest further west (Ruong, 1945: 156). A clue can be found in the detailed presentation of reindeer husbandry given by the Sami civil rights leader Torkel Tomasson at the first national Sami meeting in 1918. According to him, calving had earlier taken place in the alpine zone, but due to overgrazing, it had become common to keep the does in the boreal forest until the calves had gained some strength (Tomasson, 1918: 88-89). This is a very likely explanation for the barrier fence between Gibdnoluokta and Lake Rahppen, which was probably used around the same time. The same is true of the barrier fence that existed along the southern shore of Lake Vuolvojávrrre (Figure 10, no 7) and that was said to prevent the reindeer from crossing the lake and going up into the alpine mountains too early in the spring (Brännström, 2017). Both of these fences were thus not primarily aimed at keeping the reindeer inside a valuable grazing area, like the ones of Skierutj, but rather at keeping them out of an area with insufficient resources. Maybe the fences identified from further west (Figure 10, no 9-11) were built for the same reasons.

In summary, we have shown that linear forest fences were used in a context of extensive reindeer husbandry with large herds, as well as in intensive reindeer husbandry focused on milk production. They were barriers, built both to prevent the intrusion of foreign reindeer and to control the movements of own reindeer. Some fences may very well have served multiple purposes. However, when questions about barrier fences were included in the Swedish State inquiries of the early 20th century, such fences were perceived as a problem by the authorities. First, other reindeer herders were prevented from using the land. Second, the ground in-

side the enclosed areas was trampled so that the lichens disappeared. Third, the fences caused the herders to neglect the supervision of their herds. Fourth, the herders became less inclined to migrate with their reindeer (Sami committee 1920-1921: 174). Apart from the second reason, these 'problems' must have been more or less what the herders intended to achieve when they built the barriers, according to our analysis. Interestingly enough, when the extensive fence use of the Kola Sami was described by a soviet ethnographer at about the same time, it was not at all perceived as a problem. Instead, it was described as an effective means to enhance reindeer feeding and calf survival, and thus to increase the number of reindeer (Charnolusky, 1931). Not so in Sweden. When a new reindeer grazing act came into force in 1928 (SFS 1928:309), it included a paragraph (§25: 2) explicitly forbidding reindeer herders to build fences other than circular pens (sw. *ringgården*) without permission from the State's sheriff. That was the end of linear whole-tree fences. Hereafter, fences were built of roundpoles and metal wire, often with State subsidies and often even initiated by the authorities (SOU 1936: 23, p. 102-111; Ruong, 1937: 40; Rönnow, 1944: 84; Beach, 1981: 165).

## Conclusions

In this study, we have described a little known fence type and suggested that it be classified as a *whole-tree fence*. We have analysed the use of linear forest fences in general and found that they were used in both extensive and intensive reindeer herding, and that they functioned as barriers both to prevent the intrusion of foreign reindeer and to control own reindeer. We have furthermore shown that barrier fences were used in Sweden as early as in the mid 18th century and became widespread in the 19th century, from Gällivare Municipality in the north to Arjeplog Municipality in the south. Our

findings support the view that the common division between extensive and intensive herding is oversimplistic. We believe that reindeer husbandry has always been changing in response to both internal and external driving forces, and that several strategies have often been in parallel use.

In addition, we have proven it worthwhile to search for this kind of cultural remains not only in nature reserves, where almost no wood has been logged or destroyed, but also in landscapes intensely influenced by commercial logging. This is a contrast to the culturally modified trees that have disappeared almost everywhere in the heavily logged landscape. The remains of the wooden fences are visible on the ground both in a nature reserve and in an area where heavy machines have roamed. The search for fence remains should therefore be included in archeological investigations of boreal forests known or assumed to have been used for reindeer husbandry.

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### Abbreviations

**CR** Court record from Arjeplog District Court.  
**SFS** Svensk författningssamling (The Swedish Code of Statutes, Official Swedish government publication containing all current laws).  
**SOU** Statens offentliga utredningar (Swedish Government Official Reports).

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Stängsel i skogen: tidig användning av spärrstängsel i samisk renskötsel

*Abstract in Swedish/Sammanfattning:*

Spärrstängsel anses i allmänhet inte ha varit i bruk inom den samiska renskötseln i Sverige före 1900-talets början. De antas vanligen ha införts i samband med den övergång från intensiv till extensiv renskötsel som ska ha ägt rum vid denna tid. I denna studie visar vi att spärrstängsel emellertid användes på många ställen inom Gällivare, Jokkmokks och Arjeplogs kommuner från mitten av 1700-talet och framåt, särskilt i skogslandet. Fram till början av 1900-talet byggdes dessa stängsel av lokala material, främst hela träd och stenblock, varför vi kallar dem helträdsstängsel. Vissa spärrstängsel användes av renskötare som annars utövade intensiv renskötsel men som periodvis hade mindre bevakning, medan andra tillkom i samband med extensiv renskötsel, stora hjordar och markanvändningskonflikter. Extensiv renskötsel utövades således i området betydligt tidigare än vad som vanligen antas och dessutom parallellt med intensiv renskötsel i både tid och rum.