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Hunting Pit Systems as Landscape Domestication: Large-Scale Hunting in the Arctic Regions of Sweden

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Hunting pits are common archaeological features in northern landscapes, mainly researched from a morphological perspective, as dateable material is scarce. This has resulted in a limited and generalized understanding of hunting pits. While human land use in non-agrarian settings is often subtle, it can still be understood in terms of distribution and management by using relational approaches that address spatial organization and the nature of land use. This study, based on extensive field surveys and GIS analyses and guided by the concept of landscape domestication, has identified the characteristics of approximately 1500 previously unrecorded hunting pits in the Arctic region of Sweden. It examines how hunting pit systems, their selective spatial distribution, and strategic arrangement can be seen as expressions of landscape domestication. The author concludes that, through profound knowledge and deliberate resource management, communities invested in the landscape, generating dense spatial and temporal manifestations in the form of hunting pits. These systems reflect an elaborate hunting technique involving the whole landscape.

Keywords: hunting and trapping pit, landscape domestication, niche construction, hunter-gatherers, Sápmi, Arctic, Fennoscandia

Introduction

Hunting pits, a significant archaeological feature, are abundant in Sweden, with over 30,000 documented in the National Heritage Boards' database for archaeological sites and monuments (KMR). They are not exclusive to Sweden, as the practice of digging pits to trap animals is well represented in Fennoscandia (e.g. Hvarfner, 1965; Myrvoll et al., 2011) and is also known elsewhere in the world (Lemke, 2021: 1–2). Such pits could also have been used for several purposes, such as storage pits or hunting blinds (Smith, 2013; Lemke, 2021). In a broader context, diverse hunting techniques relying on structures have been and are still being used globally. These structures, made of perishable or more durable material, include kites, drive lanes, hunting blinds, and flags, all designed to guide the animals to a kill site or to allow the hunters to get close to the prey. The type of material used has clearly had an influence on the survival of such structures in

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the archaeological record (e.g. Stewart et al., 2004; Klaussen, 2008; Smith, 2013; Lemke, 2021). Hunting pits, pitfalls, or trapping pits can be described as oval or circular, more or less steep depressions surrounded by a low soil embankment. The size of the pits ranges from two to six metres in diameter, and the depth can be up to two metres (Figure 1). A common feature is that they are arranged in rows in often large numbers of pits to catch wild reindeer or moose (Mulk, 1994: 160–61, 2005; Spång, 1997: 51; Halinen, 2005; Klaussen, 2008: 5–6; Myrvoll et al., 2011: 3; Solli, 2018: 10–11; Hennius, 2020: 5–6). In northern Fennoscandia, hunting pits are often organized in systems and located near large river valleys, animal migration routes, or narrow passages (Vorren, 1958; Manker, 1960; Selinge, 1979; Mulk, 1994, 2005; Spång, 1997; Klaussen, 2008). These hunting structures have yielded radiocarbon dates from the Mesolithic and Neolithic (8000–1800 BC) to modern times (Hennius, 2020: 1). Although they are common archaeological features, hunting pits have mainly been documented from a morphological perspective (e.g. Hansson & Rahtje, 1999: 23–24), because the lack of dateable material has hampered further research initiatives. However, chronologies have been elaborated over the years (Halinen, 2005; Ramqvist, 2007; Hennius, 2020). Furthermore, there is a general lack of studies addressing the hunting pits' spatial articulation that would contextualize them as material manifestations of landscape organization (Länsstyrelsen i Norrbottens län, 1998: 59; Hansson & Rahtje, 1999: 23–24; Klaussen, 2008: 1–2; Myrvoll et al., 2011). Consequently, our general understanding of hunting pits and the societies that use them is limited. The emergence of concepts, such as landscape domestication, and techniques, such as Geographical Information System (GIS), as well as advances in radiocarbon dating are, however, advancing our understanding of the phenomenon.

Over the last decade, archaeologists have developed the concept of landscape domestication as a theoretical framework for understanding human land use, primarily in non-agrarian environments (e.g. Erickson, 2006; Eriksson et al., 2017). Landscape domestication derives from the insight that in agrarian settings the results of human land use are relatively apparent and straightforward, e.g. cultivation, irrigation, and enclosures (Terrell et al., 2003: 329–51; Smith, 2011; Eriksson et al., 2017: 155–56). In non-agrarian milieus, such impacts on the landscape are, in

Figure 1. *Two examples of preserved hunting pits.*

comparison, subtler and more difficult to capture. Often, such environments are considered to represent wilderness, which has implications for understanding the communities that live in and manage these landscapes (Bergman et al., 2015: 57–59; Lindholm et al., 2021: 9–11). Landscape domestication aims to bridge the nature–culture dichotomy by capturing the consequences of human practices and identifying related ecological processes that shape non-agrarian landscapes (Terrell et al., 2003; Erickson, 2006: 235–37; Widgren, 2012: 117–21; Eriksson et al., 2017: 148–56). This framework has contributed to enhancing our understanding of how low-intensity land use by small-scale societies structured the landscape beyond the procurement of resources (Odling-Smee et al., 2003; Terrell et al., 2003: 347–50; Widgren, 2012: 122; Eriksson et al., 2017: 155–56, 2021). Moreover, landscape domestication can also involve structural modifications, including built environments (Erickson, 2006: 244–45; Smith, 2011: 837–44; Lemke, 2021: 1–2). Hunting pits are an example of such a landscape modification, prominent in the circumpolar north (Klaussen, 2008; Myrvoll et al., 2011; Hennius, 2020).

The central idea discussed here is that the hunting pit systems should be understood as part of an elaborate hunting technique involving the whole landscape. A detailed understanding of such systems can provide an opportunity to better comprehend the nature of land use and, by extension, the communities that constructed them. Hence my wider concern is to discuss how hunting pits can contribute to a better grasp of landscape domestication by small-scale societies. To achieve this, these features require research approaches that go beyond the pits' morphology and chronology, focusing more on how societies used pitfalls for organizing and structuring their environment. Subtle human land-use practices can be extensive, as demonstrated by the large number, concentration, and distribution of hunting pits. This comprehensive land use and its processes and consequences need to be discussed by addressing the landscape as a whole, to understand how hunting pits embody and manifest aspects of landscape domestication by hunting communities.

I shall first review previous research on hunting pits and follow with a theoretical discussion. Next, I present the spatial data collected from roughly 1500 hunting pits in the Arctic region of Sweden. These data will form the basis of a discussion of extensive land use to characterize landscape domestication in northern Fennoscandia.

Previous Research on Hunting Pits in Fennoscandia

Hunting pits have been of interest to researchers since the first half of the twentieth century. Initially, the primary focus was on documenting their construction and distribution (e.g. Vorren, 1958; Manker, 1960; Hvarfner, 1965; Barth, 1981), followed by morphological aspects and the animals targeted (e.g. Selinge, 1979; Forsberg, 1985; Hansson & Rahtje, 1999). From the early 1980s onwards, the use of radiocarbon dating presented opportunities for exploring hunting pits, their chronologies, and interpretations of the fluctuations in their construction and use over time (Forsberg, 1985; Mulk, 1994; Furset, 1995; Spång, 1997; Halinen, 2005; Ramqvist, 2007). Societal interpretations range between land use by hunter-gatherers, by Sami societies, or outland use by farmers (e.g. Mulk, 1994; Ramqvist, 2007; Wehlin, 2016). However, a lack of stratified and datable material makes it difficult to date hunting pits, resulting in sparse and inconclusive dates. It is also relatively complex to establish links between hunting pits and other sites in the landscape, such as, for example, dwelling or butchering sites, since only a few are known and dated (e.g. Hansson & Rahtje, 1999: 35–37; Klaussen, 2008; Myrvoll et al., 2011: 4; Jonsson, 2022: 18–19). Despite these challenges, a refined chronology of hunting pits in Sweden using Kernel Density Estimation (KDE) modelling has recently been proposed (Hennius, 2020). Most of the radiocarbon-dated hunting pits in northern Sweden range between the Late Neolithic and the Middle Ages (e.g. Mulk, 1994, 2005; Jonsson, 2022), with a majority of dates in the region under study in the first millennia BC and AD predating the domestication of reindeer (Mulk, 1994: 160–63, 2005: 47–49). Since the radiocarbon-dated pits are relatively few at this stage, compared to the overall number of pits in the area, conclusive interpretations represent a challenge. The pits appear to remain fixed in the landscape while fluctuating in time (Widgren, 2012: 123).

The most thorough account of exploring the spatial distribution of hunting structures, strategic hunting, and the interplay between different hunting strategies and societies has been compiled for Norway (eg. Klaussen, 2008; Myrvoll et al., 2011; Solli, 2018). Consequently, researchers have identified a substantial need for contextual studies concerning societal and spatial organization all over Fennoscandia (Länsstyrelsen i Norrbottens län, 1998: 59; Hansson & Rahtje, 1999: 23–25, 40; Klaussen, 2008: 83–87; Sommerseth, 2009: 248; Myrvoll et al., 2011: 4).

Theoretical Framework

Hunting pits are the residue of an elaborate hunting technique involving the entire landscape. Here, I propose that one way to capture their spatial extent and multitemporal nature is to apply the concept of 'landscape domestication' (LD). It is a conceptual framework comprising various human–environmental interactions that recognizes human investments as resulting in more productive and worked landscapes (Terrell et al., 2003: 325–30; Erickson 2006: 235–36; Widgren, 2012: 117–24; Eriksson & Arnell, 2016: 79). LD can be defined as 'all nongenetic, intentional and unintentional practices and activities of humans that transform local and regional environments into productive, physically patterned, cultural landscapes for humans and other species' (Erickson, 2006: 241). It represents processes of land use that enhance subsistence similar to those in an agricultural landscape in terms of maintenance, social and cultural dynamics, and labour aggregation, but in a subtler form (Terrell et al., 2003; Erickson, 2006; Smith, 2011; Widgren, 2012; Clement, 2014; Lindholm et al., 2021). Furthermore, a domesticated landscape is connected to resource management relying on particular skills (Smith, 2011, 2013: 10–11; Eriksson et al., 2017, 2021: 2; Hatlestad et al., 2021). Within this framework, pit systems embody a hunting land use that targets wild game.

Additionally, we can understand LD within the wider practice of niche construction (NC), that is, processes where a reciprocal relationship between organisms and their environment alters their own and other species' niches (Eriksson & Arnell, 2016: 78). Niche construction has enhanced our understanding of how organisms actively transform their environments and how human land-use practices can contribute to adaptive processes. The processes of both adaptation and transformation are closely linked to labour and knowledge since human bio-social evolution consists of genetic, cultural, and ecological inheritance, transformed by memory and learning (Odling-Smee et al.,

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2003; Laland & ÓBrien, 2011; Riede, 2011; Laland et al., 2016; Eriksson et al., 2017, 2021: 2–3; Hatlestad et al., 2021). From these perspectives, I define LD as knowledge processes resulting in management with spatial and temporal manifestations. Low-intensity land use practices also impact and transform landscapes, manifesting human agency. This agency becomes a part of the reciprocal adaptive processes through knowledge transmission.

Small-scale societies, like hunter-gatherers and pastoralists, leave more subtle traces than most agricultural communities, which makes them more challenging to document and comprehend archaeologically, marginalizing them in our narratives (Smith, 2011; Bergman et al., 2013; Lindholm et al., 2021). Yet even subtle land-use strategies like fire management to maintain hunting grounds or to increase grazing, small-scale rotational cultivation, and hunting structures transform landscapes. Detecting and interpreting these activities often requires interdisciplinary approaches, combining archaeology with palaeoecology, ecology, forest history, and more (Terrell et al., 2003; Widgren, 2012; Eriksson et al., 2017, 2021; Lindholm et al., 2021). Such studies have questioned the division between mobile hunters and settled farmers and raised the profile of marginal areas, challenging ideas about farming and the concept of cultivation (Bergman et al., 2015: 62–63; Bergman, 2018: 16–26; Eriksson et al., 2021: 19; Lindholm et al., 2021: 28). Domestication processes dating back over 10,000 years have been identified in European landscapes (Odling-Smee et al., 2003; Smith, 2011; Nikulina et al., 2022: 990–91). In addition to the more direct ecosystem alterations usually found in agricultural environments, researchers have drawn attention to the significance of suitable frameworks, including LD, to analyse subtle and widespread landscape changes (eg. Widgren, 2012; Lindholm et al., 2021).

Current research has challenged old understandnings, small-scale and low-intensity land use also resulted in engineered ecosystems. For example, ecological globalization and resource colonization (i.e. exploitation of resources in the form of various land-use activities in non-agrarian landscapes) have strongly altered the boreal forests of central Sweden over at least the last 3000 years (Lindholm & Ljungkvist, 2016; Hennius, 2020; Lindholm et al., 2021). Human management of these forests spatially and ecologically reorganized them and provided diversified land-use systems spanning environmentally unique upland and lowland regions, resulting in a more predictable environment. Through these land use systems, marginal areas and small-scale societies became interconnected to centralized regions (Eddudóttir et al., 2021; Hatlestad et al., 2021; Lindholm et al., 2021; Wehlin et al., 2023). This kind of strategic management of resources is also evident in the hunting pit landscapes (Widgren, 2012: 122–23; Eriksson et al., 2017; Lindholm et al., 2021: 10–11, 19; Eriksson, 2023).

In the north of Sweden, several research projects have addressed land use in non-agrarian landscapes, exploring socio-economic networks and identity processes, which are relevant to this study in that they examine small-scale societies as agential players in the landscape (Bergman et al., 2013; Bergman & Hörnberg, 2015; Hörnberg et al., 2015; Östlund et al., 2015; Crumley, 2017; Josefsson et al., 2017; Bergman, 2018). For instance, deliberate burning to favour the growth of ground lichens has challenged the view on natural fire intervals and the capacity of overall management by small-scale societies (DeLuca et al., 2013; Hörnberg et al., 2018). Moreover, newly discovered iron production in northern Fennoscandia in the Early Iron Age challenge normative narratives concerning hunter-gatherers in the Arctic (Bennerhag et al., 2023).

Research Rationale

Hunting pits show elements of systematic planning and significant organization, forming a domesticated landscape. Consequently, defining criteria for identifying aspects of a domesticated landscape is essential. I suggest four significant traits that characterize the hunting pit systems in this study: knowledge, spatial manifestations, temporal manifestations, and coordinated and collaborative labour (Table 1) (Terrell et al., 2003: 325–34; Smith, 2011: 836–38, 2013: 10–11; Widgren, 2012: 121–23; Lindholm et al., 2021). Of these four aspects of LD, showing how a domesticated landscape can be identified in the field, I shall focus on two characteristics: knowledge and spatial manifestations.

Study Area and Targeted Species

The archaeological data in this study consist of hunting pits encountered in the western parts of the municipalities of Gällivare and Jokkmokk in the regions of Swedish Sápmi, above the Arctic Circle. The topography in these areas comprises mountains and hilly forests with gentle to steep slopes, predominately oriented towards the south-east. The vegetation zones are Arctic and northern boreal, mainly composed of mountain birch forests with spruce and pine in the lower regions (Sjögren et al., 2019). These Arctic conditions are more suitable for cervids like the wild reindeer, *Rangifer tarandus* (extinct in Sweden), and the domesticated reindeer, *Rangifer tarandus tarandus,* than moose (Bjärvall & Ullström 2010; Kullman, 2016; Ekholm, 2024). Wild reindeer disappeared in northern Sweden during the eighteenth and nineteenth centuries, and the chronological distribution suggests a simultaneous use of both wild and domesticated reindeer up to then. Written records are few in these areas, and maps are even more scarce. Nevertheless, records show disputes over hunting pits in the late 1600s in the coastal regions (Bergman, 2018: 68). Reindeer are herd animals, with predictable behaviour and regular migration routes, making them suitable for large-scale hunting. This predictability is owed to the reindeer's congenital curiosity and natural pattern recognition, making them follow and move along specific features and formations. They are also drawn to linearity and heights, gathering on and following ridges and narrow passages in high or hilly terrain, and spreading out on flat ground (Ingold, 1980; Forsberg, 1985; Klaussen, 2008; Smith, 2013; Lemke, 2021). However, prehistoric wild reindeer migration patterns in the Nordic region have not been identified (Myrvoll et al., 2011: 11), making the analogy to the seasonal movement of domesticated reindeer ambiguous. Instead, the predictability concerns the reindeer's congenital traits (Smith, 2013: 10).

Data and Methods

Field surveys and GIS analyses were undertaken to address the vast landscape transformations that the hunting pit systems represent. This makes it possible to study large areas and analyse complex distribution and organization processes, essential to understand the nature of human land use at landscape scale (Löwenborg, 2010; Risbøl & Gustavsen, 2018).

Before conducting field surveys, spatial analyses were undertaken in GIS. For the analyses, hillshade (an open LiDAR data

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Table 1. *Characteristics of LD.*

Knowledge	Deduced from the distribution and strategic placement of the hunting pit systems with respect to animal behaviour, topography, migration routes, and so forth, i.e. engineering skills and resource management reflected in landscape modifications.
Spatial manifestations	Materialized investments in a resource are reflected in the numbers and concentrations of built structures.
Temporal manifestations	Time of use, identified by the spatial organization of the pits to accommodate seasonal movement.
Coordinated and collaborative labour	The large number of hunting pits and the scale of their concentration demand great human effort and organization to build and manage.

digital elevation model (DEM) with a 2+ metre resolution), aerial images, and historical aerial images from the Lantmäteriet (Swedish Land Survey Authority) were used to map hunting pits. In previous studies, detecting pit structures using LiDAR has proved promising in northern landscapes, especially for hunting pits. Detectability is especially good in areas with flat terrain and low vegetation cover, as opposed to dense forests, slopes, or boulder terrain (Norstedt et al., 2020; Trier et al., 2021; Thuestad et al., 2021).

These spatial analyses were conducted in the World Heritage Site of Laponia (9400 km^2) and adjacent areas. The main focus was the eastern parts because local people had provided valuable information about possible hunting pits in the Sijdojávrre area (Figure 2). The regions and locations for conducting field surveys were selected from areas where the

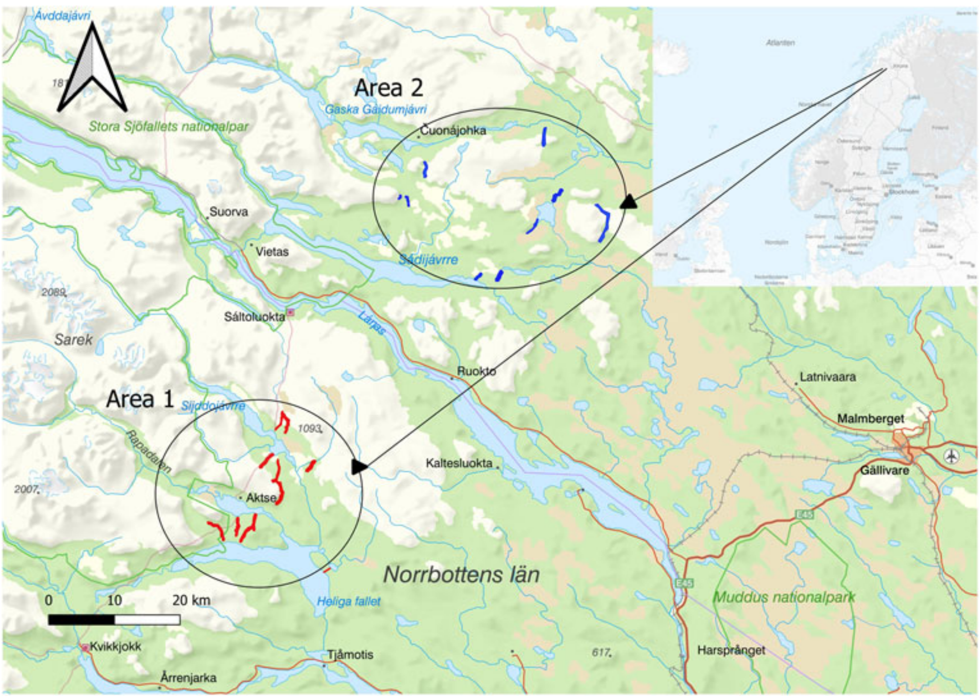

Figure 2. *Location of study areas 1 and 2 (map data ©Lantmäteriet).*

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hillshade layer indicated a high density of hunting pits. These areas were visited to verify the pit structures. In addition, extensive field surveys were conducted in the surrounding regions during other field projects within the Heritage Site. Using DEMs proved effective where conditions were positive for LiDAR. However, additional hunting pits were almost always identified during fieldwork, given that the vegetation cover and the fluctuating measuring points affected the resolution in the hillshade layer.

Results

This section presents the primary results from two survey areas (1 and 2 on Figure 2). Area 1 will serve as the main case study due to the quantity, density, and extent of the hunting pit systems. The study areas exhibit three main characteristics: a large number, concentration, and extent of hunting pits, a selective spatial distribution, and a strategic articulation (Figures 3 and 4).

The field survey identified sixteen comprehensive hunting pit systems comprising approximately 1500 hunting pits previously unrecorded in the Arctic region of Sweden, distributed in two areas: Area 1 contains seven systems (A–G), which includes approximately 1000 hunting pits over 228 km^2. Area 2 comprises nine systems and about 500 pits over 660 km^2. No pits have so far been excavated or dated (radiocarbon dating will be discussed in a forthcoming article). The number of pits ranges from forty to several hundred; systems A, D, E, and F in Area 1 have the most significant numbers, ranging between 110 to more than 300 (Table 2).

These systems are located at the rim of the western mountain chain in the boreal

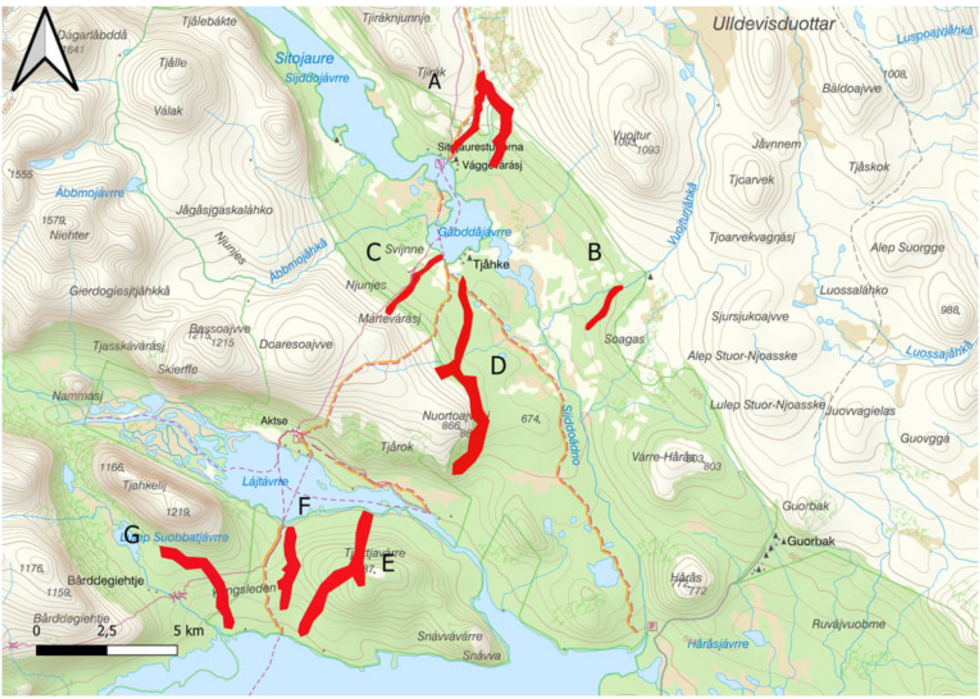

Figure 3. Location and distribution of hunting pit systems in Area 1, Jokkmokk municipality (map data ©Lantmäteriet).

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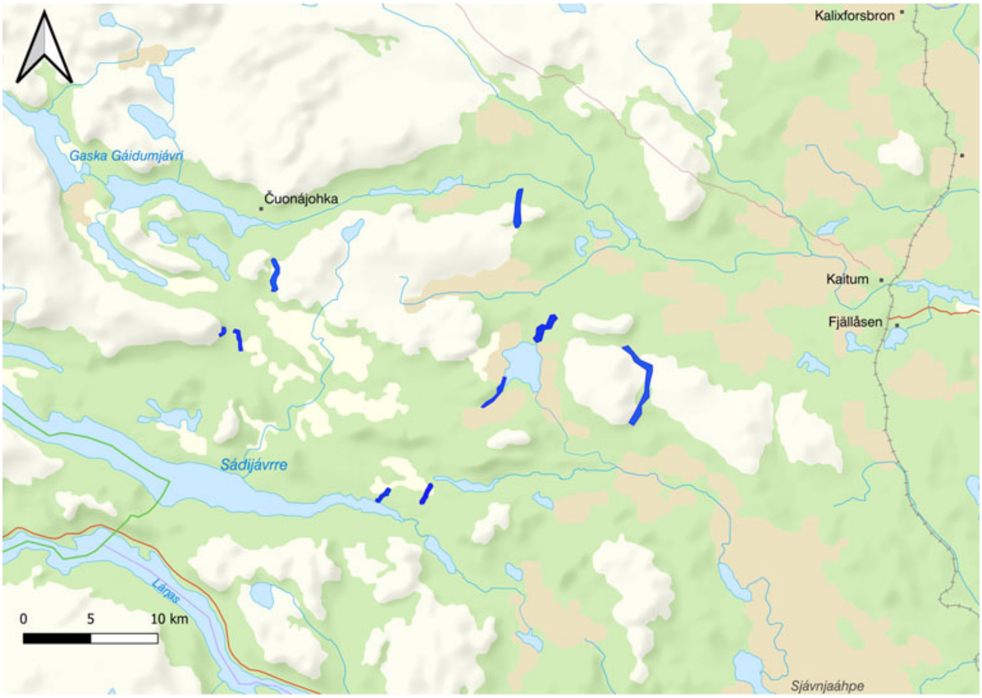

Figure 4. *The systems in Area 2, Gällivare municipality (map data ©Lantmäteriet).*

zone, where two mountain valleys come together. The distribution pattern shows concentrations at the end of mountain ridges (category L1 in Table 3) and between mountains in open depressions or small valleys (L2). These categories are visible in systems C, D, E, F, and G, with L3 and L4 being the subcategories mainly present in systems A, B, and C (Figure 3 and Table 3).

The spatial distribution shows extensive use of specific topographical zones. The definition of zones is based on earlier research in the Swedish mountain areas to categorize the distribution of hunting pits (Mulk, 2005: 45). Zone 1 represents the boreal zone below 400 m asl, Zone 2 represents the coniferous and mountain birch forests in elevations around 400–500 m asl, and Zone 3 represents the

Table 2. *Numbers, altitudes, topographical zones, and location categories for hunting pit systems in Area 1.*

	System	Number of pits	Altitude asl	Topographic zone	Location category
	A	229	640–680 m	3	L2, L3, L4
	B	*c.* 50	675–700 m	3	L2, L3, L4
	C	*c.* 40	650–750 m	3	L2, L4
	D	> 300	600–720 m	3	L1
	E	200	500–725 m	3	L1, L2
	F	110	525–575 m	3	L1, L2
	G	51	450–650 m	2–3	L1, L2
Total	7	*c.* 1000			

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Table 3. Location categories for hunting pit systems in Area 1.

L1	End of mountain areas/ridges, where the landscape opens up
L2	In open areas, depressions between mountain areas/ridges and small valleys
L3	Alongside small waterways
L4	At an angle to waterways

alpine region and areas around the tree line (Table 4). No hunting pit systems were found in topographical Zone 1 but they were found at elevations of around 500–800 m asl in Zones 2 and 3 (Table 4).

The spatial organization of the systems is linear with a central axis, i.e. the rows of pits follow a principal direction, divided into complex sections, an ubiquitous feature in Fennoscandia (Klaussen, 2008: 65–69). In all the systems, this alignment is oriented N–S, with fluctuations towards NE–SW to NW–SE, where the central axis often follows ridges, edges, or small waterways that are themselves linear. About eighty per cent of the hunting pits in the case study are oval, which is the most common shape in northern Fennoscandia (Manker, 1960; Mulk, 1994, 2005; Spång, 1997; Klaussen, 2008). However, the present-day shape of the pits is heavily influenced by erosion and root disturbance, making it sometimes challenging to estimate the original structure.

A more significant and reliable feature in these systems is the orientation of the base of the pits. Their shape is mainly rectangular and almost exclusively aligned,

Table 4. Topographical zones, based on Mulk, 1994 and 2005.

Zone	Vegetation	Altitude
1	Boreal zone	Below 400 m asl
2	Coniferous and mountain birch forests	Around 400–500 m asl
3	Alpine region	Above 500 m asl

perpendicular to the central axis of the systems, as shown in system G (Figure 5).

The results show that the most frequently encountered spatial distribution of hunting pits in systems A–G is at the end of mountain ridges in locations of type L1 and L2, occupying topographical Zones 2 and 3. Moreover, the most prevalent layout is a linear orientation on a N–S central axis and a perpendicular orientation of the base of the pits. Field surveys and GIS analyses thus show that these methods are well suited to detecting a substantial proportion of structures likely to be present in the region and that they reflect the areas most likely to include hunting pits.

Discussion

The four LD characteristics introduced earlier—knowledge, spatial articulation, temporal manifestations, and coordination and collaboration of labour—will be discussed in turn to examine how aspects of a domesticated landscape can be identified.

Knowledge

The systems in Areas 1 and 2 exhibit a distinctive pattern with striking similarities and cohesion regarding their spatial arrangement and organization (Figures 3 and 4). They all show an awareness of reindeer behaviour and an understanding of unpredictable factors, i.e. careful planning that involved the whole landscape.

Resource management requires a comprehensive knowledge of the natural environment, such as topography and the behaviour of the targeted resource, something that ethnographic and anthropological studies in the circumpolar north have shown (e.g. Odling-Smee et al., 2003; Smith, 2013: 10–11). Traditional ecological knowledge, practices, and beliefs

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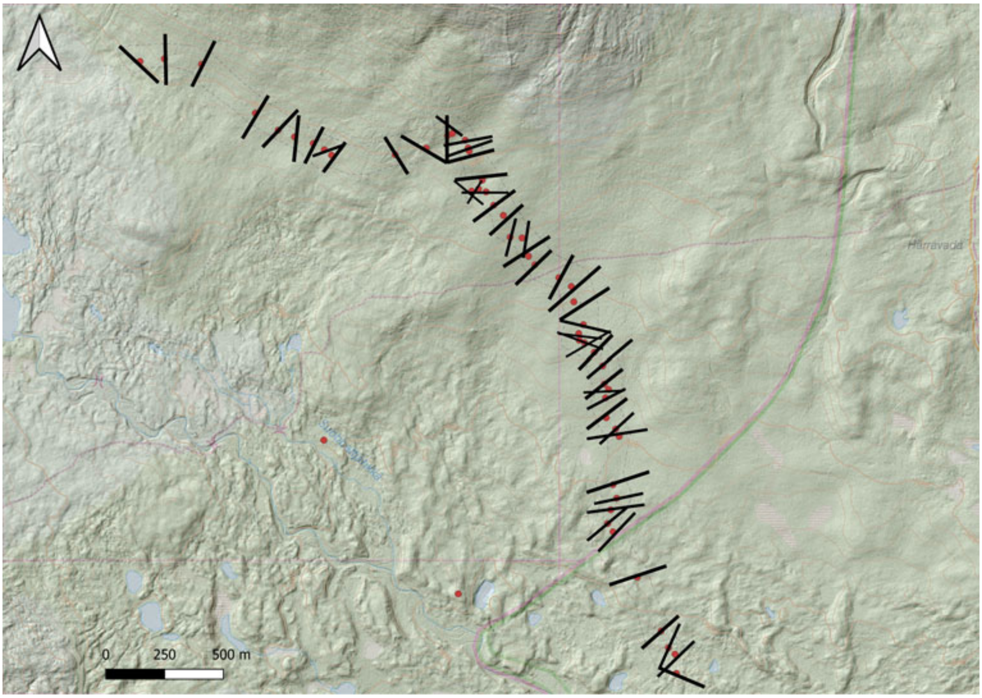

Figure 5. *Alignment of the base of the pits in system G, Area 1 (map data: ©Lantmäteriet and ©Riksantikvarieämbetets Kulturmiljöregister, KMR).*

concerning the relationship between living beings and their environment, and engineering skills, were passed down from generation to generation, i.e. were transferred to individuals and groups (Berkes, 2008; Smith, 2013: 10–11; Eriksson et al., 2017). From this perspective, the systems in the study are consistent with a knowledge of reindeer because their siting conforms to the behaviour of reindeer and is aligned with current and historical migration routes (Klaussen, 2008; Sommerseth, 2009; Smith, 2011, 2013; Lemke, 2021). The topography, climate, and vegetation, in combination with spatial organization and distribution, suggest hunting pits targeting reindeer rather than moose, and that the pits were used for trapping animals rather than for storage or as hunting blinds (Smith, 2013; Lemke, 2021), although it is possible that some pits were reused or were even originally constructed as storage facilities. Indeed, several storage pits have been found near the hunting pits. Storage pits in these regions are generally not directly connected to dwelling sites but are found in places accessible when on the move or hunting.

The data in Figure 3 indicate that most of the systems are located in areas where reindeer descend from the mountain, ready to spread out, at L1 locations, and in open spaces between higher grounds (L2) before they again gather and head for higher ground (Tables 2 and 3). By utilising the natural landscape, linear structures exploited the reindeer's behaviour, as shown by the N–S alignment of the systems, which intercepted the reindeer's E–W migration routes. This is visible in all the systems in this study. Natural features, like ridges and waterways, steered and encouraged the reindeer to follow the pit constructions (Figures 3 and 6). In

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addition, these hunting communities also frequently used areas of higher altitude, ranging between 500 and 800 m asl (Figures 3 and 4), given the reindeer's preference for higher grounds. These characteristics, together with the compelling evidence from the orientation of the base of the pits, can help determine the type of prey and the direction of movement (Manker, 1960; Mulk, 1994, 2005). The base of the pits is mainly rectangular and aligned with the migration paths of the reindeer, perpendicular to the alignment of the systems, and often consist of a convex, fan-shaped structure, funnelling the reindeer towards the pits (Figure 5). In this way, the hunting pits' spatial distribution and layout express aspects of traditional ecological knowledge.

The notion that reindeer behave in predictable ways has, however, overshadowed unpredictable variables affecting herd movements, such as weather, insects, predators, and grazing conditions (Klaussen, 2008; Smith, 2013). The whole landscape needs to be considered to comprehend the concepts of ecosystem engineering and knowledge transfer. Reindeer movement has not been a constant factor over time or place (Klaussen, 2008; Myrvoll et al., 2011; Solli, 2018; Lemke, 2021), and the hunting pit systems demonstrate the hunters' abilities to deal with unpredictable factors. These planning and engineering skills are evidenced by the significant number and concentration of hunting pits and their distribution, providing options for risk management concerning which systems to use. For example, systems E, F, and G constituted a chain intercepting the herds as they descended from the mountains, ready to spread out (Figure 6). They functioned as three barriers, working simultaneously or separately, controlling the herds' behavioural preferences and diverse movement due to

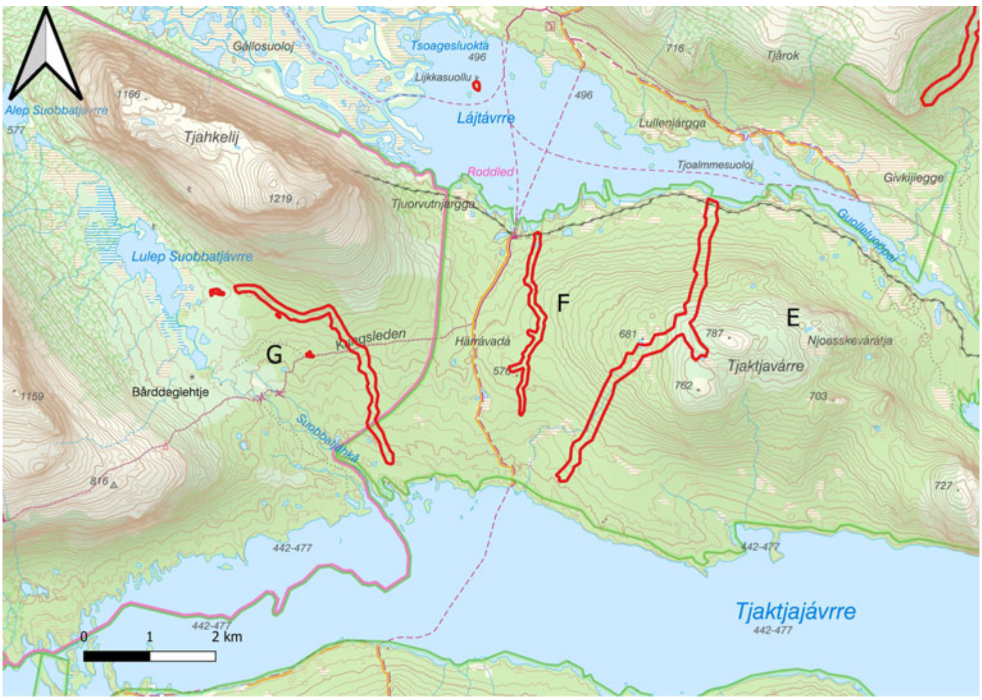

Figure 6. Linear alignment of systems G, F, and E, Area 1 (map data: ©Lantmäteriet).

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unpredictable variables, in an E–W direction. Similar ways of involving the whole landscape can be found by combining systems C and D and systems A and B. Furthermore, Area 1's systems combined to form a 20 km-long alignment cutting off the wild reindeer's migration routes, thus offering multiple opportunities for successful hunts.

Spatial manifestations

In the main case study area, active and deliberate resource management resulted in comprehensive modifications to the landscape in the form of a built environment still visible today (Smith, 2011; Lemke, 2021); hunting pits are different compared to many other hunting techniques, as they are permanent features and hence an investment in the landscape and a resource, more distinct than hunting with bow and arrow (Vorren, 1958; Manker, 1960; Klaussen, 2008; Hodder, 2012; Solli, 2018: 13, 23).

These spatial manifestations are compelling evidence, when we consider the numbers involved. The number of recorded hunting pits—as inventoried in the KMR database by 19 December 2023—predating this study was about 1000, distributed all over the large municipality of Jokkmokk, which covers 19,334 km^2. As a result of this survey, an additional 1000 hunting pits have been identified in only *c.* 228 km^2, indicating that the numbers and concentrations in this study area are exceptional compared to earlier records and possibly double the amount (Table 2). The significant alterations made to the landscape, indicated by the systems in Figure 3, also demonstrate deliberate human ecosystem engineering of the landscape for strategic purposes. The locations of the hunting pits show a more frequent use of altitudes and topographical zones, previously considered uncommon in Sweden (Forsberg, 1985; Mulk, 1994: 160–63, 2005: 45–48; Spång, 1997: 31–32, 51–55, 60–71; Sjöstrand, 2011). Earlier research conducted in the Swedish mountain region has proposed three topographical zones to categorize the distribution of hunting pits (Mulk, 1994, 2005: 45), with the montane boreal forest below 400 m asl (Zone 1) being regarded as the area most frequently used and containing the most extensive systems. However, neither spatial analysis nor field survey revealed further hunting pits in the region. Instead, large numbers were found primarily in Zone 3, with more than fifty pits in almost all systems (Figure 3, Tables 2 and 4), with systems A–G containing an average of approximately 140 pits per system. For comparison, in northern Sweden we find an average of ten pits per system (Liedgren, 2013: 3; Grimbe, 2022).

The numbers, extent, and organization of the pits suggest a cohesive management of the entire landscape, shown by the significant similarities in the hunting pits systems by location types L1 and L2, the N–S alignment of the central axis, the base of the pits pit set at right angles to this axis, and a strategic use of topographical Zones 2 and 3 (Figures 3, 4, and 5).

By establishing permanent, prominent hunting structures requiring elaborate management, unparalleled by other hunting techniques, people in these regions invested substantially in the landscape, thus creating a built environment and a specific niche.

Temporal manifestations

There is a wide range of temporal scales concerning LD, including: timespans, use time, investment in time and energy for construction, reuse and maintenance, knowledge transmission over time, and the actual timing regarding a specific season and period of use (see e.g. Lemke, 2021). This article only briefly touches upon all these different temporal aspects, instead focusing on timing. Timing shows human agency by considering predictable and unpredictable factors in land use management. The articulation and distribution of pits can help interpret the time of use. For seasonally migratory animals, like reindeer, the most favourable times of the year are spring and autumn. In spring, the animals move west up into the mountains; in autumn, they return to the boreal lowlands in the east (Klaussen, 2008: 3–5). Systems D, G, F, and E intercept the reindeer efficiently, moving from west to east by encountering and assembling the herds as they are about to spread out in more open low terrain, hence reducing human effort. The alignment of the base of the pits can provide a reliable indication as they often consist of a convex fan-shaped structure, funnelling the reindeer towards the pits (Figure 5). This is a compelling feature suggesting autumn use, since the systems are adapted for animals moving towards the low-lying areas in the east. In addition, in the Scandes mountain range, snow cover tends to be tenacious, making spring use troublesome.

Coordination and collaboration of labour

Labour cooperation is essential for managing a resource that demands modifications to the landscape. In ethnographic records, planning and knowledge are interrelated when choosing a high-value location, and large-scale hunting involves investing time, energy, and people to manage a specific resource at a particular place and time (Smith, 2011: 836–38, 2013: 8–11). For example, experiments in Sweden and Norway estimate an average of 18.6 days for one person to build one hunting pit (Spånberg, 2014: 38–44). Consequently, the combined systems E, F, and G (Figure 6) would imply sixteen years of continuous digging by a single person, which suggests collective labour. Previous research has generally regarded hunting pits as labour-intensive, requiring planning, layout, construction, maintenance, and the slaughter and handling of meat, regardless of the size of herds, the number of pits used, or their spatial extent (Vorren, 1958; Mulk, 1994, 2005; Hansson & Rathje, 1999; Klaussen, 2008; Sjöstrand, 2011; Solli, 2018). Hence, the dense concentration of pits and systems in this case study indicates substantial effort and coordination of labour (Figure 3 and Table 2). However, the large numbers and concentrations of pits do not necessarily mean that all the pits in one system or nearby systems were used simultaneously (Klaussen, 2008: 77–78; Lemke, 2021). The massive landscape transformations resulting in an extensive built environment suggest communal, cohesive management to deal with the landscape as a whole.

Conclusion

This study set out to discuss how hunting pits can help us understand land use by small-scale societies and illuminate aspects of landscape domestication in hunting landscapes. The main conclusion is that hunting pit systems involved the landscape as a whole. Communities in northern Fennoscandia were not operating in a wilderness; through systematic planning, organization, and agency, they constructed a hunting landscape with large numbers and concentrations of hunting pit systems. These systems are expressions of landscape domestication, evidenced by a major investment in land use and elaborate management skills.

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References

Barth, E.K. 1981. Konstruksjon og bruk av fangstgraver i skog. *Norsk Skogsbruksmuseum Årbok*, 9: 272–98.

Bennerhag, C., Hagström Yamamoto, S. & Söderholm K. 2023. Towards a Broader Understanding of the Emergence of Iron Technology in Prehistoric Arctic Fennoscandia. *Cambridge Archaeological Journal*, 33: 265–79. https://doi.org/10.1017/S0959774322000294

Bergman, I. 2018. *Kulturarv, landskap och identitetsprocesser i norra Fennoskandien 500–1500 e.kr*. Stockholm: Riksbankens jubileumsfond & Makadam förlag.

Bergman, I. & Hörnberg, G. 2015. Early Cereal Cultivation at Sámi Settlements: Challenging the Hunter–Herder Paradigm? *Arctic Anthropology*, 52: 57–66. https://doi.org/10.3368/aa.52.2.57

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. https://doi.org/10.3368/aa.50.2.25

Berkes, F. 2008. *Sacred Ecology*, 2nd ed. New York: Routledge.

Bjärvall, A. & Ullström, S. (2010). *Däggdjur. Alla våra vilda arter i Sverige*. Bonniers Fakta.

Clement, C.R. 2014. Landscape Domestication and Archaeology. In: C. Smith, ed. *Encyclopedia of Global Archaeology*. New York: Springer, pp. 4388–94. https://doi.org/10.1007/978-1-4419-0465-2_817

Crumley, C.L. 2017. Historical Ecology and the Study of Landscape. *Landscape Research*, 42 (suppl. 1): S65–S73. https://doi.org/10.1080/01426397.2017.1399994

DeLuca, T.H., Zackrisson, O., Bergman, I. & Hörnberg, G. 2013. Historical Land Use and Resource Depletion in Spruce: *Cladina* Forests of Subarctic Sweden. *Anthropocene*, 1: 14–22.

Eddudóttir, S.D., Svensson, E., Nilsson, S., Ekblom, A., Lindholm, K.-J. & Johansson, A. 2021. The History of Settlement and Agricultural Land Use in a Boreal Forest in Värmland, Sweden: New Evidence from Pollen Analysis. *Vegetation History and Archaeobotany*, 30: 759–71. https://doi.org/10.1007/s00334-021-00829-y

Ekholm, T. 2024. *Animals and Humans: Human-Animal Interaction in Northern Sweden During the Late Glacial and Postglacial Time*. Uppsala: Department of Archaeology and Ancient History, Uppsala University.

Erickson, C.L. 2006. The Domesticated Landscapes of the Bolivian Amazon. In: W. Balée & C. Erickson, eds. *Time and Complexity in Historical Ecology*. New York & Chichester: Columbia University Press, pp. 235–78. https://doi.org/10.7312/bale13562-011

Eriksson, O. 2023. Domesticated Forest Landscapes in Central Scandinavia During the Iron Age: Resource Colonization for Iron and Subsistence Strategies Based on Livestock. *Journal of Field Archaeology*, 48: 315–26. https://doi.org/10.1080/00934690.2023.217918

Eriksson, O. & Arnell, M. 2016. Niche Construction, Entanglement and Landscape Domestication in Scandinavian Infield Systems. *Landscape Research*, 42(1), 78–88. https://doi.org/10.1080/01426397.2016.1255316

Eriksson, O., Arnell, M. & Lindholm, K.-J. 2021. Historical Ecology of Scandinavian Infield Systems. *Sustainability*, 13: 817. https://doi.org/10.3390/su13020817

Eriksson, O., Ekblom, A., Lane, P., Lennartsson, T. & Lindholm, K.-J. 2017. Concepts for Integrated Research in Historical Ecology. In: C.L. Crumley, T. Lennartsson & A. Westin, eds. *Issues and Concepts in Historical Ecology*. Cambridge: Cambridge University Press. pp. 145–81.

Foley, R. 1995. Talking Genes. *Nature*, 377: 493–94. https://doi.org/10.1038/377493a0

Forsberg, L.L. 1985. *Site Variability and Settlement Patterns: An Analysis of the Hunter-Gatherer Settlement System in the Lule River Valley, 1500 BC–BC/AD*. Umeå: Department of Archaeology, University of Umeå.

Furset, O.J. 1995. *Fangstgroper og ildsteder i Kautokeino kommune. Rapport fra forskningsutgraving 24. Juli–3. september 1994* (Institutt for Samfunnsvitenskap, 37). Tromsø: Universitetet i Tromsø, Arkeologiseksjonen.

Grimbe, J. 2022. Arkeologisk förundersökning i Pajala 2021. Förundersökning av fångstgrop L1992:4121 och härd L2021:7049 samt datering av tjärdal L1992:9659, mesolitisk, neolitisk och historisk tid, på fastigheten Erkheikki 11:4, Pajala socken, Norrbottens län. Unpublished report, Norrbottens museum.

Halinen, P. 2005. *Prehistoric Hunters of Northernmost Lapland: Settlement Patterns and Subsistence Strategies*. Helsinki: Finnish Antiquarian Society.

Hansson, A. & Rathje, L. 1999. Den som gräver en grop åt andra. *Arkeologi i Norr*, 8–9 (1995–1996): 23–42.

Hatlestad, K., Wehlin, J. & Lindholm, K.-J. 2021. Coping with Risk: A Deep-Time Perspective on Societal Responses to Ecological Uncertainty in the River Dalälven Catchment Area in Sweden. *Land*, 10: 883. https://doi.org/10.3390/land10080883

Hennius, A. 2020. Towards a Refined Chronology of Prehistoric Pitfall Hunting in Sweden. *European Journal of Archaeology*, 23: 530–46. https://doi.org/10.1017/eaa.2020.8

Hodder, I. 2012. *Entangled: An Archaeology of the Relationships Between Humans and Things*. Chichester: John Wiley & Sons.

Hörnberg, G., Josefsson, T., Bergman, I., Liedgren, L. & Östlund, L. 2015. Indications of Shifting Cultivation West of the Lapland Border: Multifaceted Land Use in Northernmost Sweden Since AD 800. *The Holocene*, 25: 989–1001. https://doi.org/10.1177/0959683615574894

Hörnberg, G., Josefsson, T., DeLuca, T.H., Higuera, P.E., Liedgren, L., Östlund, L., et al. 2018. Anthropogenic Use of Fire Led to Degraded Scots Pine-Lichen Forest in Northern Sweden. *Anthropocene*: 24: 14–29. https://doi.org/10.1016/j.ancene.2018.10.002

Hvarfner, H. ed. 1965. *Hunting and Fishing: Nordic Symposium on Life in a Traditional Hunting and Fishing Milieu in Prehistoric Times and up to the Present Day*. Luleå: Norrbottens Museum.

Ingold, T. 1980. *Hunters, Pastoralists and Ranchers: Reindeer Economies and Their Transformations*. Cambridge: Cambridge University Press.

Jonsson, K. 2022. *Arkeologiska undersökningar av fångstgropar: Ett kunskapsunderlag*. (Rapport – Jamtli 2022: 11). Östersund: Länsstyrelsen Norrbotten/Stiftelsen Jamtli.

Josefsson, T., Hörnberg, G., Liedgren, L. & Bergman, I. 2017. Cereal Cultivation from the Iron Age to Historical Times: Evidence From Inland and Coastal Settlements in Northernmost Fennoscandia. *Vegetation History and Archaeobotany*, 26: 259–76. https://doi.org/10.1007/s00334-016-0586-7

Klaussen, M. 2008. Strategisk villreinfangst i Troms: en analyse av fangstgropanlegg og deres beliggenhet, oppbygging og bruk (unpublished Master dissertation, University of Tromsø).

KMR n.d Kulturmiljöregister (Swedish National Heritage Board's database for archaeological sites and monuments). Stockholm: Riksantikvarieämbetet [online] [accessed 2 August 2024]. Available at https://app.raa.se/open/fornsok/

Kullman, L. 2016. Fjällen klimatet och människan - naturhistoria i skarven mellan två istider. *Svensk Botanisk Tidskrift*, 110: 132–272.

Laland, K.N & O'Brien, M.J. 2011. Cultural Niche Construction: An Introduction. *Biological Theory*, 6: 191–202. https://doi.org/10.1007/s13752-012-0026-6

Laland, K.N., Matthews, B. & Feldman, M.W. 2016. An Introduction to Niche Construction Theory. *Evolutionary Ecology*, 30: 191–202. https://doi.org/10.1007/s10682-016-9821-z

Länsstyrelsen i Norrbottens län 1998. *Arkeologi i Norrbotten: en forskningsöversikt* (Rapportserie, 14). Luleå: Länsstyrelsen i Norrbottens län.

Lantmäteriet (Swedish Land Survey Authority) n.d. Geodata: Elevation Model View Service [online] [accessed 2 August 2024]. Available at: https://www.lantmateriet.se/sv/geodata/vara-produkter/produktlista/markhojdmodell-visning/

Lemke, A. 2021. Literal Niche Construction: Built Environments of Hunter-Gatherers and Hunting Architecture. *Journal of Anthropological Archaeology*, 62: 101276. https://doi.org/10.1016/j.jaa.2021.101276

Liedgren, L. 2013. Arkeologisk undersökning av Raä 413:1, fångstgrop, Älvsby sn, Norrbottens län, 2012. Silvermuseet Rapport 63. Arjeplog.

Lindholm, K.-J. & Ljungkvist, J. 2016. The Bear in the Grave: Exploitation of Top Predator and Herbivore Resources in First Millennium Sweden: First Trends From a Long-Term Research Project. *European Journal of Archaeology*, 19: 3–27. https://doi.org/10.1179/1461957115Y.0000000010

Lindholm, K.-J., Ersmark, E., Hennius, A., Lindgren, S., Loftsgarden, K. & Svensson, E. 2021. Contesting Marginality: The Boreal Forest of Middle Scandinavia and the Worlds Outside. In: C. Symes, ed. *The Global North: Spaces, Connections, and Networks before 1600*. Amsterdam: Amsterdam University Press, pp. 9–36.

Löwenborg, D. 2010. *Excavating the Digital Landscape: GIS Analyses of Social Relations in Central Sweden in the 1st Millennium AD*. Uppsala: Department of Archaeology and Ancient History, Uppsala University.

Manker, E. 1960. *Fångstgropar och stalotomter: Kulturlämningar från lapsk forntid*. Stockholm: Geber.

Mulk, I.-M. 1994. *Sirkas: ett samiskt fångstsamhälle i förändring Kr.f.–1600 e.Kr.* [Sirkas: A Sámi Hunting Society in Transition AD 1–1600]. Umeå: Arkeologiska Institutionen, Umeå Universitet.

Mulk, I.-M. 2005. Bosättningsmönster, vildrensjakt och tamrenskötsel i Lule lappmark, 100 e.Kr.–1600 e.Kr. In: O. Andersen, ed. *Fra villreinjakt til reindrift / Gåddebivdos boatsojsujttuj*. Drag: Árran julevsáme guovdásj/ Árran lulesamiske senter, pp. 33–59.

Myrvoll, E.R., Thuestad, A. & Holm-Olsen, I.-M. 2011. Wild Reindeer Hunting in Arctic Norway: Landscape Reindeer Migration Patterns and the Distribution of Hunting Pits in Finnmark. *Fennoscandia Archaeologica*, 28: 3-17.

Nikulina, A., MacDonald, K., Scherjon, F., Pearce, E.A., Davoli, M., Svenning, J.-C., et al. 2022. Tracking Hunter-Gatherer Impact on Vegetation in Last Interglacial and Holocene Europe: Proxies and Challenges. *Journal of Archaeological Method and Theory*, 29: 989–1033. https://doi.org/10.1007/s10816-021-09546-2

Norstedt, G, Axelsson, A.L., Laudon, H. & Östlund, L. 2020. Detecting Cultural Remains in Boreal Forests in Sweden Using Airborne Laser Scanning Data of Different Resolutions. *Journal of Field Archaeology*, 45: 16–28. https://doi.org/10.1080/00934690.2019.1677424

Odling-Smee, F.J., Lala, N.L. & Feldman, M. 2003. *Niche Construction: The Neglected Process in Evolution*. Princeton (NJ): Princeton University Press.

Östlund, L, Hörnberg, G., DeLuca, T.H., Liedgren, L., Wikström, P., Zackrisson, O, et al. 2015. Intensive Land Use in the Swedish Mountains Between AD 800 and 1200 Led to Deforestation and Ecosystem Transformation with Long-Lasting Effects. *Ambio*, 44: 508–20. https://doi.org/10.1007/s13280-015-0634-z

Ramqvist, P.H. 2007. Fem Norrland: om norrländska regioner och deras interaktion. *Arkeologi i Norr*, 10: 153–80.

Riede, F. 2011. Adaptation and Niche Construction in Human Prehistory: A Case Study from the Southern Scandinavian Late Glacial. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 366: 793–808. http://doi.org/10.1098/rstb.2010.0266

Risbøl, O. & Gustavsen, L. 2018. LiDAR from Drones Employed for Mapping Archaeology; Potential, Benefits and Challenges. *Archaeological Prospection*, 25: 329–38. https://doi.org/10.1002/arp.1712

Selinge, K.-G. 1979. *Agrarian Settlements and Hunting Grounds: A Study of the Prehistoric Culture Systems in a North Swedish River Valley*. Stockholm: Akademilitteratur.

Sjögren, P. & Damm, C. 2019. Holocene Vegetation Change in Northernmost Fennoscandia and the Impact on Prehistoric Foragers 12,000–2000 cal. BP : A Review. *Boreas*, 48: 20–35. https://doi.org/10.1111/bor.12344

Sjöstrand, Y. 2011. *Med älgen i huvudrollen : om fångstgropar, hällbilder och skärvstensvallar i mellersta Norrland*. Stockholm: Institutionen för arkeologi och antikens kultur, Stockholms universitet.

Smith, B.D. 2011. General Patterns of Niche Construction and the Management of 'Wild' Plant and Animal Resources by

Small-Scale Pre-Industrial Societies. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 366: 836–48. http://doi.org/10.1098/rstb.2010.0253
Smith, B.D. 2013. Modifying Landscapes and Mass Kills: Human Niche Construction and Communal Ungulate Harvests. *Quaternary International*, 297: 8–12. https://doi.org/10.1016/j.quaint.2012.12.006
Solli, B. 2018. Reindeer Hunting, Materiality, Entanglement and Society in Norway. *Journal of Glacial Archaeology*, 3: 1–26. https://doi.org/10.1558/jga.32444
Sommerseth, I. 2009. *Villreinfangst og tamreindrift i Indre Troms: belyst ved samiske boplasser mellom 650 og 1923*. Tromsø: Universitetet i Tromsø, Institutt for arkeologi og sosialantropologi.
Spånberg, M.B. 2014. Fangstens omfang og betydning i fjelltraktene. En studie av fangstanlegg og fangstgroper for rein i Rendalen og Engerdal, Hedmark (unpublished Master dissertation, University of Oslo).
Spång, L.G. 1997. *Fångstsamhälle i handelssystem: Åsele lappmark neoliticum – bronsålder*. Umeå: Umeå Universitet.
Stewart, A.M., Keith, D. & Scottie, J. 2004. Caribou Crossings and Cultural Meanings: Placing Traditional Knowledge and Archaeology in Context in an Inuit Landscape. *Journal of Archaeological Method and Theory*, 11: 183–211. https://doi.org/10.1023/B:JARM.0000038066.09898.cd
Terrell, JE., Hart, J.P., Barut, S., Cellinese, N., Curet, A., Denham T., et al. 2003. Domesticated Landscapes: The Subsistence Ecology of Plant and Animal Domestication. *Journal of Archaeological Method and Theory*, 10: 323–68. https://doi.org/10.1023/B:JARM.0000005510.54214.57
Thuestad, A.E., Risbøl, O., Kleppe, J.I., Barlindhaug, S. & Myrvoll, E.R. 2021. Archaeological Surveying of Subarctic and Arctic Landscapes: Comparing the Performance of Airborne Laser Scanning and Remote Sensing Image Data. *Sustainability*, 13: 1917. https://doi.org/10.3390/su13041917
Trier, Ø.D., Reksten, J.H. & Løseth, K. 2021. Automated Mapping of Cultural Heritage in Norway from Airborne LiDAR Data Using Faster R-CNN. *International Journal of Applied Earth Observation and Geoinformation*, 95; 102241. https://doi.org/10.1016/j.jag.2020.102241
Vorren, Ø. 1958. *Samisk villreinfangst i eldre tid*. Tromsø: Tromsø Museum.
Wehlin, J. 2016. Fångstmarkens folk. In: E. Carlsson, ed. *Arkeologi i Dalarna* (Dalarnas hembygdsbok, 86). Falun: Dalarnas fornminnes och hembygdsförbund, pp. 218–49.
Wehlin, J., Ljunge, M.O., Larsson, P.I., Eddudóttir, S.D., Ekblom, A. & Erikson, J.A. 2023. Hunter-Gatherer Farming During the First Millennium BCE in Inland, Boreal Landscapes: New Pollen Analytical and Archaeological Evidence from Dalarna, Central Sweden. *Vegetation History and Archaeobotany*, 32: 615–33. https://doi.org/10.1007/s00334-023-00933-1
Widgren, M. 2012. Landscape Research in a World of Domesticated Landscapes: The Role of Values, Theory, and Concepts. *Quaternary International* 25: 117–24. https://doi.org/10.1016/j.quaint.2011.06.021

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Les systèmes de fosses de chasse des régions arctiques de Suède : domestication du paysage et chasse à grande échelle

On rencontre fréquemment des fosses de chasse dans les régions nordiques mais les études concernent surtout la morphologie de ces vestiges archéologiques, les éléments de datation étant rares. Par conséquent, les fosses de chasse ne sont connues que de façon limitée et généralisée. Bien que les traces d'exploitation du terrain dans un milieu non-agricole fussent souvent subtiles, il est néanmoins possible d'interpréter leur agencement et leur gestion par des approches relationnelles visant à élucider l'organisation spatiale et la nature de l'utilisation du paysage. Cette étude, basée sur des prospections de terrain et analyses GIS extensives et inspirée par le concept de la domestication du paysage, a identifié les traits particuliers d'environ 1500 fosses de chasse inédites dans les régions arctiques de Suède. L'auteure en déduit que les systèmes de fosses de chasse, le choix de leur emplacement dans le paysage et leur arrangement stratégique représentent une manifestation de la domestication du paysage. Elle conclut que les communautés nordiques, par leur connaissance profonde et gestion intentionnelle des ressources naturelles, ont créé un réseau dense de fosses de chasse, investissant leurs efforts à l'échelle spatiale et temporelle. Ces systèmes reflètent une technique de chasse qui s'inscrit dans le paysage tout entier. Translation by Madeleine Hummler

Mots-clés: fosses de chasse et pièges, domestication du paysage, « construction de niche », chasseurs-cueilleurs, Sápmi, régions arctiques, Fennoscandie

Jagdgrubensysteme in den arktischen Gebieten von Schweden: Domestizierung der Landschaft und Jagd im großen Maßstab

In den nordischen Landschaften findet man oft Jagdgruben, aber man hat diese archäologischen Strukturen vor allem aus einer morphologischen Perspektive untersucht, da die Datierungselemente sehr selten vorhanden sind. Deswegen hat man nur ein begrenztes und allgemeines Bild der Jagdgruben. Obwohl die Spuren der Landnutzung in nicht-agrarischen Gebieten häufig gering sind, kann man trotzdem ihre Verbreitung und Bewirtschaftung verstehen, wenn man relationale Ansätze, welche die räumliche Organisation und die Art der Landnutzung untersuchen, anwendet. In diesem Artikel, der sich auf umfangreiche Feldstudien und GIS-Analysen stützt und der vom Konzept der Domestizierung der Landschaft inspiriert ist, werden die Charakteristiken von ungefähr 1500 bislang nicht-registrierte Jagdgruben in den arktischen Gebieten von Schweden erforscht. Die Verfasserin untersucht, wie die Jagdgrubensysteme und deren selektive Verbreitung sowie strategische Gestaltung die Domestizierung der Landschaft ausdrücken. Sie schließt, dass die arktischen Gemeinschaften durch eine tiefgreifende Kenntnis und absichtliche Bewirtschaftung der natürlichen Ressourcen in die Landschaft investiert haben. Dies resultierte in dichte räumliche und zeitliche Erscheinungsformen in Form von Jagdgruben, welche eine aufwendige und landschaftsweite Jagdtechnik widerspiegeln. Translation by Madeleine Hummler

Stichworte: Jagd- und Fallgruben, Domestizierung der Landschaft, Nischenkonstruktion, Jäger und Sammler, Sápmi, Arktis, Fennoskandien