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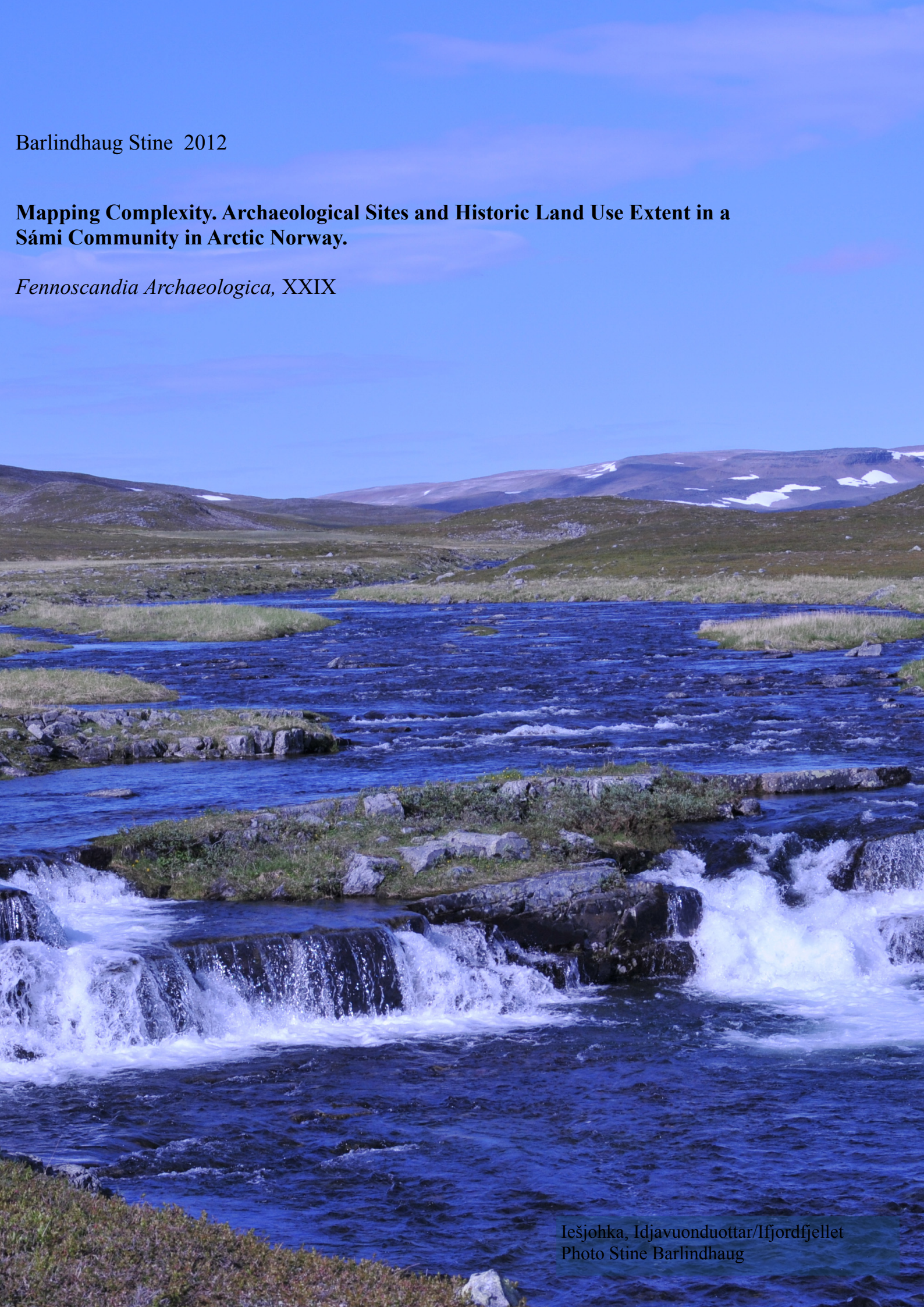

Iešjohka, Idjavuonduottar/Ifjordfjellet
Photo Stine Barlindhaug

Stine Barlindhaug

MAPPING COMPLEXITY. ARCHAEOLOGICAL SITES AND HISTORIC LAND USE EXTENT IN A SÁMI COMMUNITY IN ARCTIC NORWAY

Abstract

Finnmark is the largest and northernmost county in Norway. Being sparsely populated and with relatively little of the land affected by modern infrastructure, to many people it may appear as pure nature and wilderness. Yet, throughout these landscapes there are innumerable traces and features related to current and past land use. The duration and 'visibility' of these traces vary in terms of age, their material character and people's ability to see them due to experience and knowledge. This paper focuses on the extent and complexity of land use discussed in the context of fieldwork carried out in Deanodat (Vestertana), the County of Finnmark, northern Norway. Through a collaborative process with the community, knowledge of land use and its material manifestations in the landscape has been mapped.

Keywords: archaeology, Sámi land use, landscape, participatory GIS, Arctic Norway, mapping

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INTRODUCTION

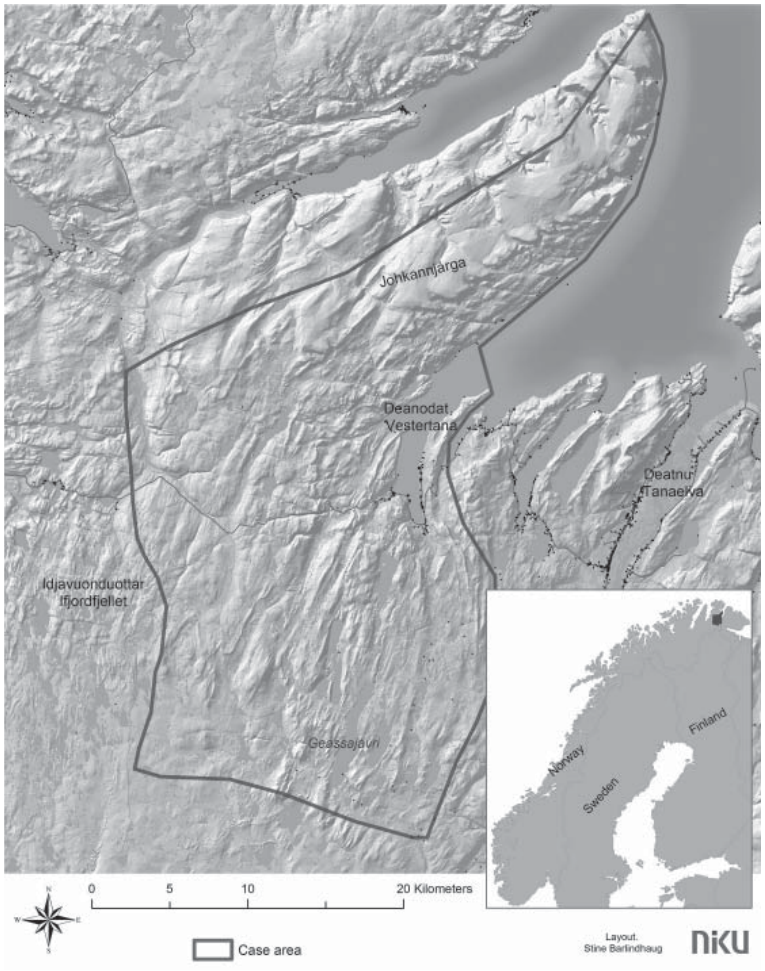
Archaeological surveying and mapping usually emphasises the plotting of actual sites and monuments (Skjelsvik 1987; Gaukstad 2001: 133; Myrvoll 2008: 21). During the last two decades, the cultural heritage management authorities have gradually introduced a landscape dimension into the management process (Gaukstad 2001). Still, maps visualising the location of archaeological sites usually constitute the basic data for archaeological interpretations of past land use. This paper discusses how a wider perspective on archaeological survey and mapping can contribute to a more contextual understanding of past land use. By combining archaeological data with people's knowledge about past and present land use, I will explore the extent and complexity of historic land use in Finnmark, with the areas surrounding Deanodat (Vestertana) as a case study.

The Norwegian colonisation and the following impact on the indigenous Sámi mode of living took place late in this area, with the first Norwegian settlers in Deanodat coming in around 1850 (Pedersen 2001: 388). The unique and valuable indigenous knowledge still exists, with some individuals possessing lived experience from land use practises that in most other areas have changed radically during the second half of the 20th century.

The archaeological context does not consist only of physical, man-made features, but should also be seen in relation to the landscape, continuing land use and local knowledge (Stewart et al. 2004: 184). I will discuss in the following how an increased focus on activities and events along the meshwork of lines following people's movements in a landscape (cf. Ingold 2007) can contribute to a deeper understanding of archaeological sites.

Working in northern landscapes is a rewarding task for an archaeologist, because the sparsely forested landscape and a thin vegetation cover allow visual layers of history to be easily observed (Olsen 2010). In addition, the relative absence of modern infrastructure has left the physical landscape almost unchanged through centuries. Even archaeological sites of considerable age are can be easily recognised as visual structures in these landscapes, and thus remain a part of people's everyday landscape. In order to appreciate the extent and complexity of land use, GIS tools have been used here to visualise oral knowledge concerning traditional land use in combination with georeferenced physical remains in the terrain.

Fig. 1. Study area.[1]



Study area

Deanodat (Vestertana) is located at the head of the Tana Fjord, the County of Finnmark, northern Norway (Fig. 1). The Sámi communities in this area represent both migrating reindeer herding communities and a sedentary coastal Sámi community. The land use carried out by both the reindeer herders and the settled community in Deanodat is extensive and covers a vast area. The area chosen as a case study in this paper does not cover the totality of their land use, which would have been impossible within the frame of this project. Still, the selected area and land use practices in the study area are considered to be representative of the region as a whole.

Geographically, the study area extends from the Peninsula of Johkan (Digermulhalvøya) in the north, and stretches towards the south past Lake Geassejávri (Sommervann) (Fig. 1). The northern part of the study area is used as summer pasture by reindeer district 13-Lágesduottar, while the southern part of the area is used by reindeer district 9-Olggut Čorgaš during autumn and spring. During the summer, the reindeer herders from district 13-Lágesduottar live in mountain cabins close to their summer pastures.

The sedentary coastal Sámi community in Deanodat have used most of the area for a variety of activities related to traditional land use until the 1980s and to some extent they still do. Their economy has largely been based on fishing and marine resources, but the utilisation of land resources – the focus of this paper – has also been extensive and important both economically and culturally. During the last few decades, the number of residents has steadily diminished. Today there are around 18 inhabitants in the village, practically all of whom (with four exceptions) are over 50 years old, whereas back in 1970 there

were around 80 inhabitants as well as a boarding school, a church and three stores. Thus, the first-hand knowledge concerning traditional land use and landscape is in danger of being lost with the older generation (those over 50). However, the situation is slightly different among the reindeer herders, as the younger generation – to a larger degree – is being recruited to the traditional means of livelihood. Still, due to radical changes in reindeer herding management, and especially as a result of the introduction of motorised equipment, knowledge concerning traditional landscape perception and land use prior to these changes is fading.

It is important to emphasise that the reindeer herders and the coastal Sámi do not constitute totally separate groups, but they nonetheless perceive themselves as two distinct communities. It has been common that some of the people born into the reindeer herding economy later settled along the coast and adapted a coastal Sámi economy, as is the case for several of the families in Deanodat as well. Several of the coastal Sámi families in Deanodat have close kinship ties to the reindeer herding families, and thus share many elements of history, identity and knowledge. In the following, the Sámi communities who share the same landscapes during the spring, summer and autumn will simply be referred to as the Deanodat community, as their differences in livelihood and economy are not important to the focus of this paper.

METHODOLOGICAL APPROACH

As noted, the basic approach used in this research is a combination of local participation and GIS (Geographical Information Systems) for documenting knowledge concerning historical land use and sites. The communities themselves have participated in gathering information concerning knowledge about their traditional landscapes, and how they use (or traditionally used) these areas. Only one informant expressed scepticism concerning the project in general, but still volunteered to take part in the mapping. However, there was a general agreement not to publish knowledge related to certain resources, such as cloudberry picking areas and good fishing lakes. The collaborators have full access to the data and map outputs from the interviews and the archaeological surveys, and any further publications based on this material need to be approved by the community.

An important and fundamental idea in Participatory GIS (PGIS) is that the control of access and use of cultural spatial data shall be kept in the hands of those communities that generated it. In this way PGIS practices can protect traditional knowledge from external exploitation. It has been argued that communities taking part in PGIS projects are to a greater degree able to participate in regional decisions and succeed in being heard. Another effect of a PGIS project may be seen in the changing social and political roles of the involved individuals and the greater participation of both the local participants and the larger community in decision making processes (Fox et al. 2005; Rambaldi 2005; Rambaldi et al. 2005).[2]

Participatory GIS implies a 'democratisation of GIS' and emphasises contexts and other related issues (Dunn 2007: 616–7). Indeed, the use of GIS technology raises challenges and ethical issues concerning the access, control and ownership of geographical information and outputs – issues it is important to focus on continuously (Fox et al. 2005). Another potential problem is that maps based on GIS software come up short compared to indigenous knowledge in many ways, and thus threaten to 'freeze and flatten' the complexity. There has also been an increased awareness of internal differences and power relations in the participant communities, as well as an increased focus on the internal impact of participation (Harris & Weiner 1998: 2; Corbett & Keller 2005). The effects of mapping technology can be both empowering and disadvantageous for a community in terms of its relation to the past, as noted by several scholars who have called for a critical discussion on the uses of GIS (Shrader-Frechette & Westra 1997; Harris & Weiner 1998; Ursher 2000; Craig et al. 2002; Corbett & Keller 2005; Fox et al. 2005; Turnbull 2007).

Acknowledging the value of local knowledge is not a totally new idea in archaeology, especially not among archaeologists working with Sámi issues. Projects where elements of participation and local knowledge have been carried out – as an example, the Norwegian–Swedish documentation project Saemieh saepmesne–Samiske rommet, which carried out fieldwork in the South Sámi area during the years 2008–11, may be mentioned (Ljungedahl & Norberg 2011; Norberg & Fossum 2011; see also Vorren 1962;

Fjellheim 1999; Skandfer 2009; Sommerseth 2009; Barlindhaug & Pettersen 2011; Porsanger & Guttorm 2011).

Collaborative work

The initiative for exploring PGIS methodology in archaeological context and using a Sámi case study came from the author, but the Deanodat village volunteered to be a case area for the project after one of the inhabitants, by coincidence, heard about my plans.

Knowledge concerning land use was mapped in co-operation with the community through interviews and an archaeological survey project. Contact with the community was made through a local association, the 'Vestertana kapell og bygdelag' in the village of Deanodat, as well as the boards of the two local reindeer herding districts – Lágesduottar and Olggut Čorgaš. Community members that wanted to share their knowledge (altogether 11 people, all of them with lived experience of traditional land use) were interviewed and their local knowledge was visualised on land use maps. The mapping included oral information about traditional land use (resource areas, sites, routes, etc.), stories and incidents connected to places in their landscape as well as contemporary, historic and prehistoric sites. Older interview records from the 1970s (Pedersen 1978; 1994) were also included in the material. The land use maps based upon the interviews have been checked and approved both by each individual interviewee and in group meetings. Upon the request of the community, the mapping process was continued in the group meetings by adding supplements as well as correcting locational details.

Based on the land use maps, archaeological surveys were conducted in the community's traditional lands in collaboration with knowledge-holders from the community. Both historical and contemporary sites were recorded, and the results from the archaeological fieldwork were also presented at an open community meeting.

All surveying was conducted without the use of off-road vehicles, as even with motorised equipment it would have been impossible to cover the whole area within the scope of this project, and thus particular areas were chosen for the survey. The areas were selected with the object of them being representative of the types of terrain associated with the livelihoods of both the reindeer herd-

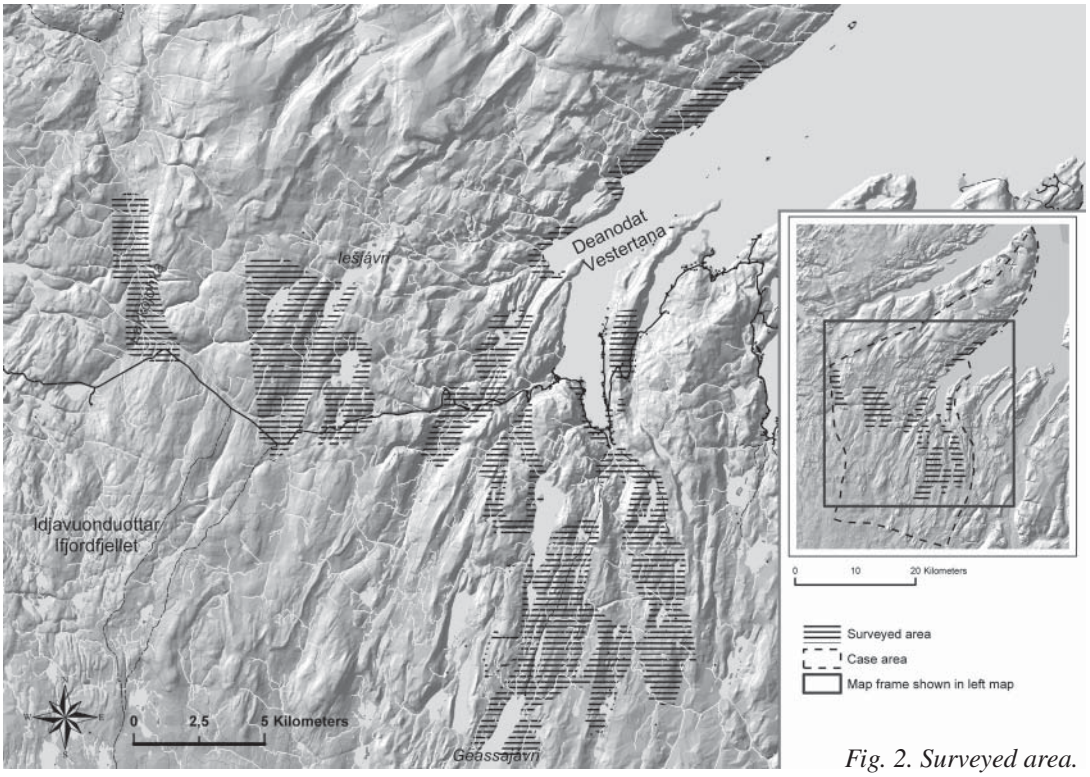


Fig. 2. Surveyed area.

ers and the coastal Sámi. The selection was done by the surveying team, and we managed to cover everything we had decided, with the exception of an alpine area in the northernmost part, where weather conditions hindered fieldwork (Fig. 2). Approximately 70 square kilometres, including all dominating geographical zones (like forested valleys, alpine mountains and coastal areas), was systematically surveyed in the course of six weeks of fieldwork. Both areas with reported land use and known sites, and ones without previously known sites or land use practices, were surveyed.

Storage and visualisation of the data

The data collected in the project was stored, analysed and visualised using the ArcGIS software developed by ESRI together with the MS Access database software. GIS software links geographical location and attributes information into a map that can combine many layers of information, and thus contribute to a better understanding of spatial relationships between nature and anthropogenic phenomena, or more specifically (as in this study) between landscape and land use systems (Tripathi & Bhattarya 2004; Bernhardsen 2006; Conolly & Lake 2006; McCoy 2009). In the GIS system, the information stored in the database is linked to georeferenced lines, points and polygons on maps.

Sketch mapping vs. cartographic maps

During the interviews, the community members themselves drew on topographic paper maps at scale 1: 50 000 (M711 series). Sketch mapping involves community members drawing a map onto paper from memory; they are not to scale but represent the relative position of features to one another (Rambaldi et al. 2005). The maps visualise parts of the community's common memory, such as present and past dwelling sites, hunting areas, fishing lakes, berry picking areas, and what routes to choose in different seasons. They also drew the changes through time, in both how they moved around and variations in what resources they have utilised. Also, special events, experiences and other stories were marked whenever it was possible to link them to a geographical area or site. Furthermore, the database contains information about cultural sites with visual structures – both those sites that people still have knowledge of, and sites the purpose of which has been lost since time immemorial.

An alternative way to record the data could have been to have each individual interviewee sketch a map of their land use knowledge. The reason for not applying this method is that, on one hand, the land use covered in this research spans across an area of more than 800 square kilometres, and sketch mapping the necessary topographic features prior to situating one's land use on such a vast area would take too long for each interviewee. Another reason was the importance of mapping cultural sites in such a way that we could relocate them during the surveys later on. A prerequisite for the method now used is that those involved in the study are familiar with the topographic maps involved, which is the case in the community in this study.

Ingold (2007: 84–5) argues that drawing on a cartographic map like we have done is like drawing on the text in a text book. He maintains that drawing people's whereabouts on a cartographic map will not be representative. This, he says, is because the nature of a cartographic map is that they have borders to separate spaces that represent occupation and do not show habitation. In a later publication, Ingold (2011: 149) upholds his position and claims that the western cartographic conventions have given people the illusion that the earth is spatially divided into a mosaic of areas that we occupy. We should instead think about habitation as being opposed to occupation, as people do not move across the surface but along a meshwork of paths.

Irrespective of Ingold's denouncement of western maps, we experienced that the cartographic map worked very well as a basis for sketching. The cartographic information on the map was not understood in a 'dead' way, as probably is the case when someone not familiar with the landscape reads the map. The interviewees were familiar with the topographic base maps that have been commonly used at all levels and fields in Norway since they were first produced in 1952 (Berge 2009). Due to their thorough knowledge of the landscape, they automatically saw 'their' landscape on the map; their routes, familiar places and places related to incidents and narratives. They could even comment on small inaccuracies, as for instance the shape of a bog. Their intimate relation to the landscape made it easy to look 'through' the modern and, in Ingold's terms, 'occupational' features like borders, roads and power lines. Instead, the maps displaying familiar landscapes and names

actually brought up memories and helped people to remember. By exposing people to, for example, archaeological remains or a familiar landscape, one brings history to the fore and triggers a remembering process (Burström et al. 2006). Burström et al. describe what happened when they brought people out to a site of a historic incident that took place during World War II:

> *Standing there, they surprised themselves by suddenly remembering things they had not thought about in decades. … Holding the parts in their hands, showing it to us, looking at its form and construction, feeling its weight and its surface against their skin, they started to remember things they did not know they still had memories of* (Burström et al. 2006).

The maps used during the interview worked as a good alternative to bringing people out into the actual landscapes, which in this case – involving such a vast area – would have been an overwhelming task. If people had drawn sketch maps on a blank paper we would, of course, have got a different result, but for our purpose I feel confident that the best-suited method was chosen.

The procedure used is closely linked to Tobias' (2009: 38) description of 'map-biography,' which he describes as being suited for rigorous use-and-occupancy map projects specially aimed at documenting extensity, as well as being a well-functioning and well-tested method used for decades (Brody 1982; Chapin et al. 2005; Tobias 2009). To both the researcher and the local community, the topographic map legends and layout are 'common tokens' and thus constitute a necessary base for further interaction and communication (Rambaldi 2005). Thus, the maps are well suited for being an intermediary between the close intimate knowledge and more distant knowledge-holders represented by the general public, scientists and different management levels. When used in GIS tools, one can easily change the scales and at the same time keep the familiar layout, and thus increase the area of application.

RESULTS AND DISCUSSION

The interviews and the community mapping gave rich georeferenced data containing information of a variety of historical and contemporary land uses in the study area (Fig. 3). Both annual seasonal variation in activities and changes through time where mapped. Thanks to the informants' knowledge, the database featured information about 300 archaeological sites with visible remains already before the archaeological survey began. Typically these were dwelling sites connected to activities such as hunting, herding, fishing, berry picking, wood chopping and habitation, usually within a time span stretching back approximately 200 years. In addition, several informants knew of prehistoric sites where origin and context no longer was a part of people's memory. These were often house sites,

Fig. 3. A contemporary reindeer pen. Photo: Stine Barlindhaug, NIKU.

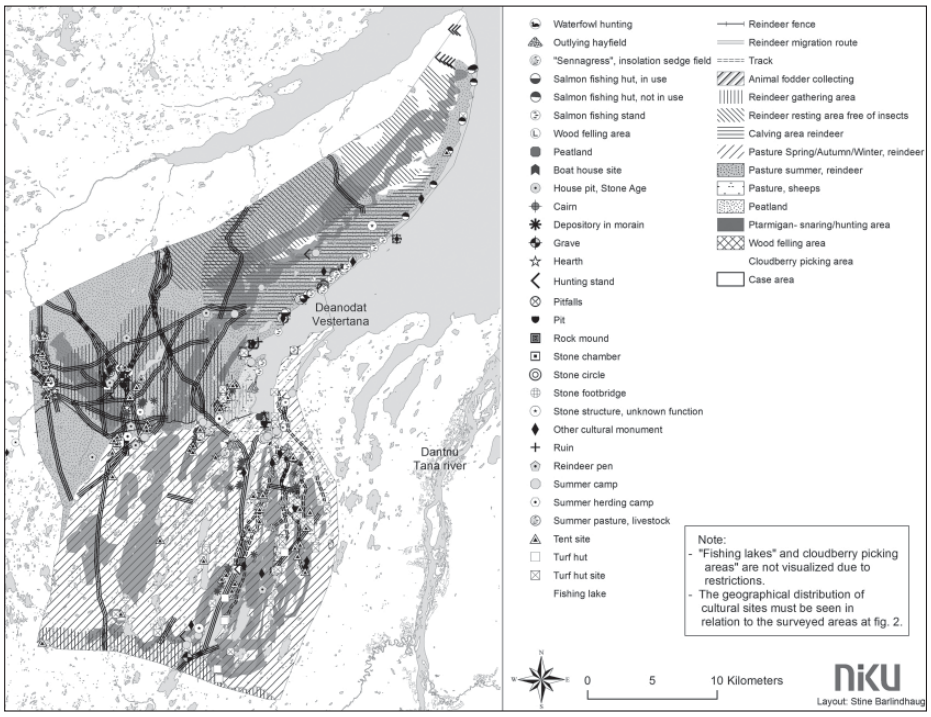


Fig. 4. All layers of mapped land use and sites in the study area visualised on same map.

hunting stands, caches in moraines, cairns, and a variety of stone pens and leading 'fences'. Some of these remains date back to the Stone Age. In addition to sites with visible features marked as points on the map, 73 lines representing trails and reindeer migrating routes and 427 polygons representing areas for different hunting and gathering activities, and activity areas related to reindeer herding, were mapped as well.

Together this data makes for an 'overcrowded' map if all the layers are visualised at the same time (Fig. 4). A map like this, however, gives a good visual impression of the extent of the land use as well as of geographical intensity.

After six weeks of archaeological fieldwork the database contained 721 cultural sites, ranging from 6000 years old house sites to turf huts still in use today (Fig. 5). The majority of the sites are related to Sámi land use, such as hunting, reindeer herding, fishing, husbandry and berry picking and date to the last few centuries (Fig. 6). Included here are also many of the sites that were located with the help of the interviews, and which have now been verified and positioned with a GPS.

Types of sites recognized.	
Points	**Polygons**
Outlying hay field	Gathering area (reindeer)
Sedge harvesting (Sennagress)	Reindeer resting area free of insects
Hunting stand	Calving area
Pit	Seasonal pasture (reindeer)
Cairn	Pasture (livestock)
Stone pile	Peat harvesting
Stone chamber	Ptarmigan snaring
Stone circle	Ptarmigan hunting
Stone footbridge	Cloudberry harvesting
Stone structure	Wood felling
Ruin	
Burial site	
Depository (moraine ground)	
Turf hut	
Turf hut site	
House pit	
Boat-house pit	
Tent site (Lavvo)	
Hearth	**Lines**
Pitfall	Reindeer fence
Waterfowl hunting	Migration route (reindeer)
Fishing lake	Stone fence
Summer camp	Row of cairns
Summer herding camp	Track
Reindeer pen	
Salmon fishing hut	
Salmon fishing hut site	
Salmon storage (Ishus)	
Happening/incident	
Other	

Fig. 5. Types of sites recognised during the mapping process.

Fig. 6. Viggo Larsen documenting a stone circle adjacent to a system of stone cairn rows. Photo: Stine Barlindhaug, NIKU.

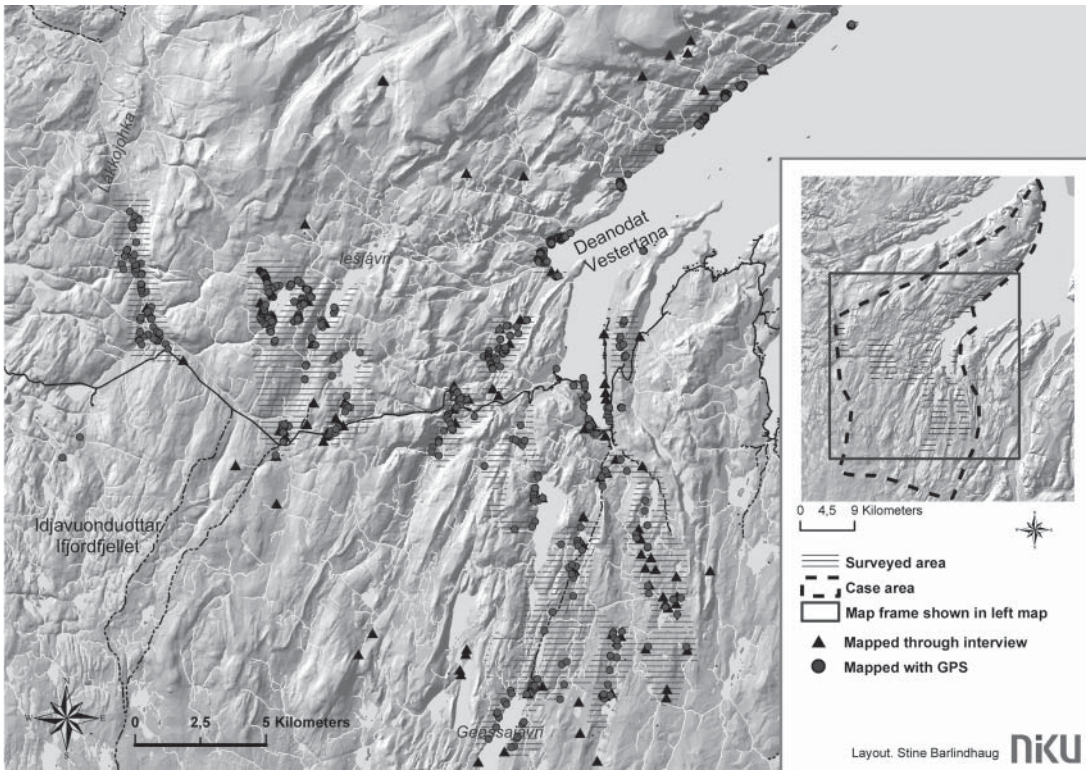


Fig. 7. Sites mapped through interviews and sites mapped with GPS during the survey.

Prehistoric sites in people's memory; Continuation and time depth

The majority of the 'new' sites discovered during the survey were prehistoric. From the interviews, we recorded information about a fair amount of prehistoric sites known to locals, and during the survey we often experienced that there were more sites in the nearby area. The accuracy and reliability of the information from the knowledge-holders was very good, and shows that oral sources may be very useful even when searching for prehistoric sites (Aporto 2004; Barlindhaug & Pettersen 2011). On the map in Figure 7, both the sites mapped through the interviews and the sites documented during the fieldwork are shown, and the coincidence between the two is clear. During the survey we found almost all the sites pointed out in the interviews, except for some in the area of Leaibbusvuopmi (Leibosdalen). This valley is especially fertile and is dominated by wetlands and scrubs, and thus any physical remains are easily overgrown by vegetation.

In addition to finding the actual sites that came up in the interviews, we often found additional sites of the same category as well as other cultural heritage sites nearby. This can be illustrated with a case from Idjavuonduottar (Ifjordfjellet), where we had information about stone features that formed lines and circles on the western side of Lake Devkkošjávri, as well as of remains of a stone fence crossing the narrow isthmus of a peninsula, thus turning it into a reindeer pen. Also, a few tent sites south of Lake Iešjávri were pointed out in the interviews. Figure 8 illustrates the situation before and after surveying this area, which turned out to be very rich in sites connected to both wild reindeer hunting and herding of domestic reindeer.

Features related to reindeer hunting in this area are generally assumed to be older than the 16th century, when the transition to a reindeer herding -based economy took place (Olsen 1994; Hansen & Olsen 2004; Sommerseth 2011). We had detailed information about tent sites used by the informants between 1930–60 and second-hand information about older (around 100 years old) sites. We also documented sites that are even older, the origins of which are no longer in anyone's memory. Previous research, as well as

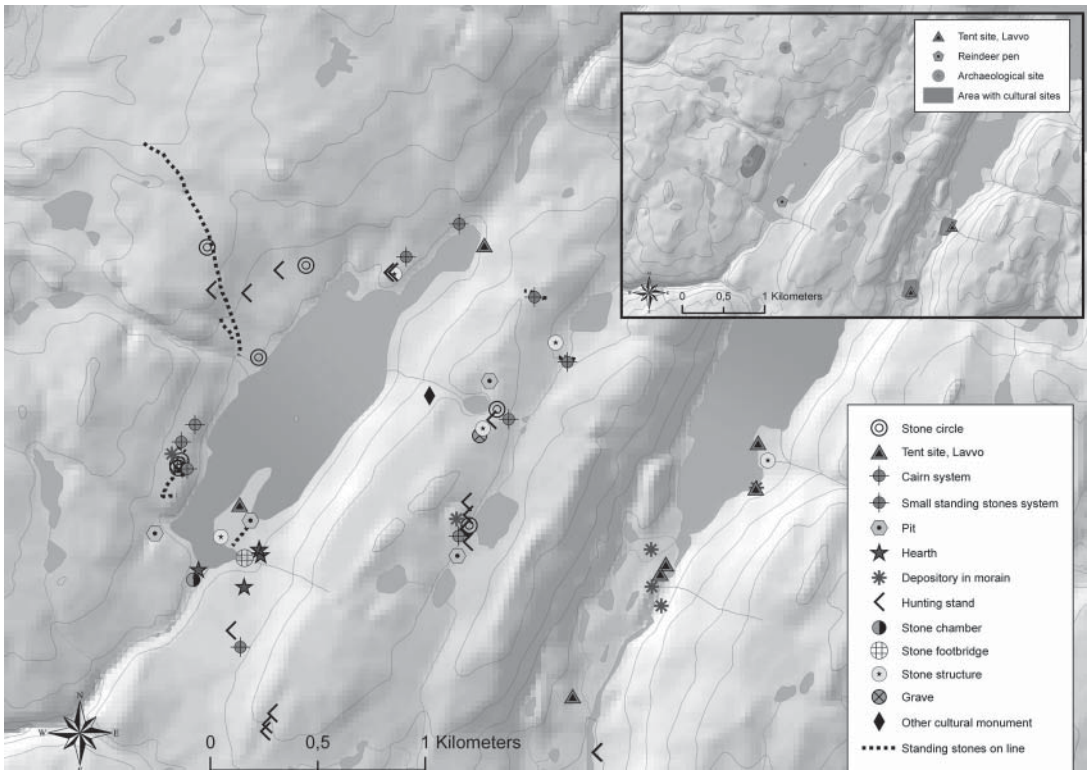


Fig. 8. Mapped information about visible sites gathered through the interviews (smaller map) and the same area after field survey (larger map).

datings, made of hearths (*árran*) in tent sites from similar areas, indicate a period of use from the Middle Ages until around 1960 (Hansen & Olsen 2004; Scanche 2005; Sommerseth 2011). This mix of tent sites – some with a known origin and others located nearby at different stages of being overgrown – clearly shows differences in age and is characteristic of the study area in general.

The informants' knowledge of land use traditions stretches to some extent approximately four generations back in time, as their grandparents had received knowledge from their own grandparents. One particular site-use tradition we became aware of during the fieldwork was the reuse of turf hut locations. A site with a newly renovated turf hut south of Lake Dápmotjávri can serve as an example here. Today there is a 'modern' turf hut with bunk beds, two windows, a gas oven and an ordinary entrance door. Until 2009, this hut was smaller and its interior derived from the beginning of the 1980s. About 20 metres further north are the traces of a turf hut that was abandoned during the 1970s, and consists of the visible but quite overgrown remains of the framework and the old wood stove. Another two metres towards the northeast lay the barely visible remains of a third turf hut with an open hearth inside. None of the interviewees had knowledge of the latter site, the age of which is therefore unknown, but may be considerable judging by its poor state of preservation. The last-mentioned site was found by chance the summer after the survey was completed. We stayed overnight in the turf hut while checking out some other things. We arrived only a few days after the last snow had melted in June and it was only a question of days before the new grass vegetation would have covered the oldest turf hut site completely (Fig. 9). In the Low Arctic climate zone the summers are short and 'hectic'. As soon as the snow is gone, things happen fast. One often says that we do not have a spring; first it is winter and then suddenly it is summer!

Contrary to the normal state of affairs in these northern landscapes, where sites are usually visible over millennia, features like turf hut sites located in the vicinity of bogs and branches are easily overgrown and can be a challenge to find. Tent sites, on the other hand, are usually located on dry and well-drained locations and due to the very thin vegetation cover are often visible even if they are totally overgrown and close to a thousand years old.

Fig. 9. Three 'generations' of turf hut sites south of Lake Dápmotjávri. Photo: Stine Barlindhaug, NIKU.

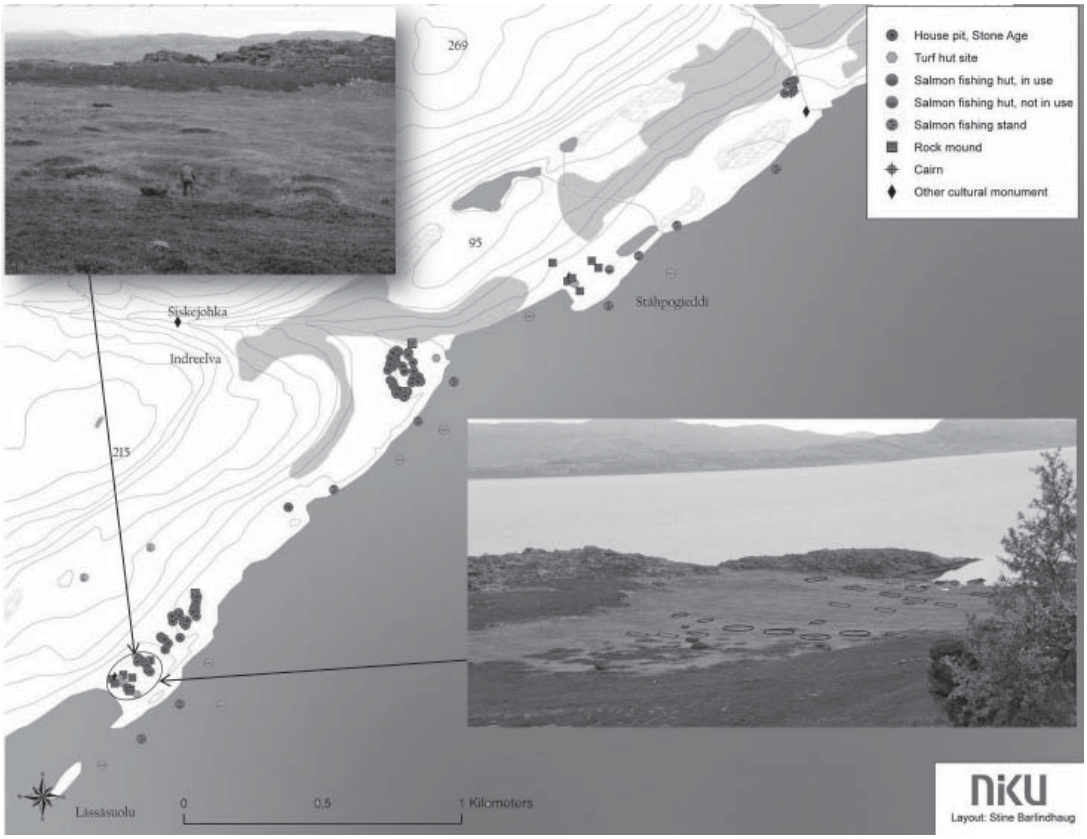


Fig. 10. Both turf huts and prehistoric housepits, representing at least a 6000-year-long time span, are numerous and very visible along the coast of northern Finnmark.

The dwelling sites along the coast are distinctly visible. The housepits and sites represent habitation dating back at least 6000 years. Coastal housepits are well documented and dated through a range of excavations along the coast of Finnmark. It is also possible to date them roughly based upon their location, form and height above sea level (Helskog 1974; 1980; 1983; Olsen 1994).

The research carried out in Deanodat has shown that there is a significant time span and continuity in land use patterns (Fig. 10). As in the examples mentioned here, the same areas have seen various activities and dwelling sites connected to both prehistoric hunting of wild reindeer and historic reindeer herding. Turf hut locations have been reused both in the interior and along the coast, both by the hunters-herders and the coastal Sámi.

The reciprocal benefits of collaboration

Local knowledge was a key factor in finding all of the 'additional' sites encountered in survey as well. The team consisting of a trained field archaeologist and local experts, with knowledge on both the landscapes, land use and local traditions, turned out to be very effective in finding sites (see also Barlindhaug & Pettersen 2011). Another benefit from this collaboration was that our perception of the landscape was enhanced, too, in the sense that meaning was achieved through new contexts (Stewart et al. 2004). Knowledge about historical events and cultural encounters is embedded in people's traditions, as is knowledge of human involvement in the environment, and these aid the interpretation of archaeological sites in the same landscape (Stewart et al. 2004: 185). Stewart et al (2004: 184) also point out the value of involving communities and people who still have lived experiences in hunting and gathering, and thus are able to contextualise sites within oral traditions. For instance, the discoveries of older hunting sites located in the same topographical context as many of the newer reindeer herding sites triggers questions and discussions. Both

reindeer herders and elders from the village can discuss and reflect upon these sites in a very different way than scientists, representatives of various administrative bodies or members of the general public. In addition, we benefit from being in a landscape that does not differ much from how it was in earlier times.

As Viggo Larsen, one of the knowledgeable local experts, and I walked through the landscapes together in the summer of 2010, we learned from each other. The archaeologist gained valuable knowledge from someone with experience about how people relate to their landscapes according to topography, vegetation, seasons, climate and resources, as well as traditions, history and earlier incidents. Working in an area with pronounced seasonal variations such as northern Norway, the seasons are a critical factor to keep in mind. In addition to being a researcher, I also grew up in this region and thus am familiar with the long and dark winters and the landscape, but the reminder is still useful. Ingold (2005) rightfully calls for more attention towards how weather conditions impact on people's perception of landscapes. In the following, I will present two examples, one showing how an awareness of seasonal changes is an important prerequisite for the archaeological perception of sites, and one showing how wind direction has been decisive for how a group of tent sites appears morphologically.

Many turf hut sites in the valley of Leaibbusvuopmi were usually located almost in a bog, often surrounded by extensive areas of dense willow, and were topographically sheltered. In the summer, which is the time of year for archaeological surveying, many of these places will definitely not be the number one spot to stay. The mosquitos and other insects will be swarming, you can easily get wet, the willows are almost impossible to walk through, and the view is not the best. When moving around in this landscape in the summer, when the sun is up day and night, it can be easy to forget that for more than half of the year these people's land use has been conducted during the winter in a snow-covered landscape and limited daylight. When it comes to building turf huts, there is of course the aspect that one needs to be close to good turf sources (bog), and such areas are also often good for picking cloudberries. Still, seen from a summer point of view, there would have been many 'better options' available. The turf hut locations in a winter landscape, on the other hand, have plenty of firewood in the immediate vicinity, and excellent conditions for ptarmigan trapping in the willows, now covered with snow and easily crossed on skis. The turf huts are well protected from the rough winter weather, and a good view is not very important when it is dark outside anyway. This example brings me back to Ingold (2005: 102), who writes: '*The implication is that as the weather changes we do not see different things, but we do see the same things differently.*' Seen from an arctic point of view, and as shown by the example above, the weather changes the landscape and not just the way we look at it. Thick layers of snow cover up most of the visual details seen in a summer landscape, and frozen lakes and rivers are a very concrete change in the landscape, which not only affects how we see things but very much changes what the landscape offers related to the different possibilities in how to move around and how to use the land. Working as an archaeologist in northern landscapes, as in this case, requires special attention to the fact that landscapes and their affordances do change dramatically through the yearly cycle, especially as many researchers visit their study areas only during the summer.

The other example shows how weather conditions (wind direction) have caused morphological variation among the 136 documented tent (*lavvo*) sites that caught our attention. As shown in Figure 11, the classical structure in a traditional Sámi *lavvo* is a central fireplace with two rows of stone (*bearpmet*) stretching out from the fire place towards the entrance (Ränk 1949; Leem 1956 [1767]). What we often found was that in some areas the tent sites commonly only had one *bearpmet*, and even if the entrance in this area systematically seemed to face eastwards, the orientation of the *bearpmet* varied, some being to the north and some to the south of the entrance. We were told from elders among the reindeer herders that there was a very practical explanation for this: during spring and autumn migrations, when only staying for a night or two and when the family was not coming along, a tent site could look like this. Under such circumstances, there were fewer people and no need the full area of a *lavvo*, so they only made half of it ready with branches and skins. In addition they made sure to organise the tent so that they sat with their backs facing the wind and the smoke from the hearth inside the tent did not drift towards them.

These examples show how oral traditions and traditional knowledge can help archaeologists to contextualise and comprehend their findings in a given landscape. Oral traditions are being affirmed by the landscape and visible archaeological sites and vice versa, archaeological features are being affirmed by oral traditions (Stewart et al. 2004: 207). Viggo Larsen and Lars Andre Anti broadened their knowledge of what sites can look like centuries and millennia after they went out of use, as well as getting to know types of cultural heritage sites new to them. Quite a lot of knowledge was shared and exchanged during the six weeks of surveying, resulting in new knowledge.

In the broader community, perception of the landscape was affected too. In general, this was stimulated by factors such as community meetings, where maps visualising archaeological sites throughout their landscape were presented, and the general effect of the interviews and surveying that led to more attention and discussions on these issues among community members. Those members of the community that had lived experiences from an extensive traditional land use, and thus had also regularly observed archaeological sites and seen the decay of sites used by their close forefathers, had a deliberate relation to such features while moving in the landscape. Still, the results from the collaborative work, systematised in the GIS tools and visualised on maps, facilitated a possibility to communicate the time depth – the high number and the extent of prehistoric sites in their landscape – to the broader community. A new layer of knowledge was thus made accessible through this project. Some members of the community had related knowledge and thus a contextual setting, where this new layer of information fitted in, while to others this represented new knowledge.

The effects of this collaboration were a result of the community meetings, the scientific archaeological construction of the past and, at the same time, the encounter between archaeology and local knowledge concerning land use (Stewart et al. 2004). With archaeological knowledge combined with detailed traditional knowledge, and equipped with a thorough knowledge of the topography, our ability to predict and find other potential areas for sites was strengthened.

In the community as a whole, there is a clearly expressed desire and enthusiasm to have this data made available in a form that enables them to go out themselves in their traditional landscapes. This desire is perhaps expressed most strongly by those with less intimate knowledge about features in the landscape and traditional land use, who are anxious to relocate the remains that represent the land use of their forefathers.

Fig. 11. To the left an árran *with two* bearpmet *while the* árran *to the right only has one* bearpmet. *Photo: Stine Barlindhaug, NIKU.*

Fig. 12. Map on the left shows the ptarmigan hunters' land use in the study area between the 1960s and the 1980s; map on the right shows the extent of trapping areas related to only one turf hut.

Land use and visible sites

Mapping of land use is largely dependent on oral sources in order to obtain information about the geographical extent and intensity of the use. Often the visible physical remains resulting from the different activities are few or may not exist at all. For instance, there are no means to map the land use systems related to ptarmigan trapping and hunting without somebody telling you about it. The trapping went on from November to March during the dark winter period and in a snow-covered landscape, while the small-calibre rifle and shotgun hunt went on for a short period during the autumn, usually in October. During the trapping season the hunters lived in turf huts in the mountains, spending the days checking their trap lines using skis. The only possible physical remains from this activity are the turf hut sites while the tents commonly used as dwellings during rifle hunt leave even fewer traces. On the small map in Figure 12, hunting areas for ptarmigan (both trapping and with rifle), describing the areas used by four different men, are shown. The lower map shows the area used for trap lines related to one specific turf hut as the dwelling base. The extent of the used area in the lower map is vastly different from what remains visible today as a cultural heritage site, namely a single turf hut.

Areas used for cloudberry picking are even more extensive than those related to ptarmigan hunt, but this information is sensitive due to a still ongoing and important tradition among most people in the study area, and will not be publicised. Another traditional and commercially important activity that was practised throughout the area until the 1970s was fishing in the lakes. The commercial activities of these fisheries usually took place during the winter, typically using fishing nets under the ice, an activity that is not practiced anymore in a commercial context. However, fishing for household use is still a highly esteemed activity both during summer and winter, and publicizing maps over the best fishing lakes is thus not desirable. The interviewees made an interesting distinction between the lakes by referring to them as either men's or women's fishing lakes. This was related to the fact that most women in the past were responsible for animal husbandry and thus could not be away for several days. Lakes

that could be reached during daytrips were thus 'reserved' for those who could not go too far. This tradition was also practised during the cloudberry-picking season. The elderly and smaller children also benefited from this custom.

Oral information is important also when it comes to the details of historic reindeer herding and related land use, but on this subject there are also written sources and historical maps available, even if the information in them is of a more general character (Vorren 1962; Pedersen 1994; 2008). The reindeer stocks depend on a vast area for grazing, calving and other needs; they need, for example, an access to alpine areas with substantial patches of snow in order to avoid insects. Compared to the low number of turf huts associated with the sedentary community's land use in the outfields, the number of dwelling sites related to reindeer herders is more numerous. Annual and seasonal changes in snow and grazing conditions cause a greater variation in a nomadic reindeer herding life, and new tent sites were thus often made at different locations. In addition to this, there are traces of different herding activities, such as pens, fences and leading fences.

A variety of cultural heritage sites representing land use from a time immemorial until today was documented in the study area. These are spread throughout the landscape, along the coast, in the interior valleys and the alpine landscapes. In Figures 12 and 13, two different visualisations of historical land use are presented. In Figure 13, on the map to the left, the totality of land use areas (tracks, hunting areas, migrating routes, berry picking areas and so on) are presented as lines and polygons, visualising the extensive and intense land use during the last century. The map to the right, on the other hand, represents the traditional way of visualising archaeological sites, where points represent the location of sites (in this case only those with visible remains on the surface). The two maps generate two very different types of associations for the viewer. The map with a combination of lines, polygons and points is more dynamic and expresses somehow that the land use in this area involves extensive movement in the landscapes, while the other map is more like a still picture with fixed points. The interviews

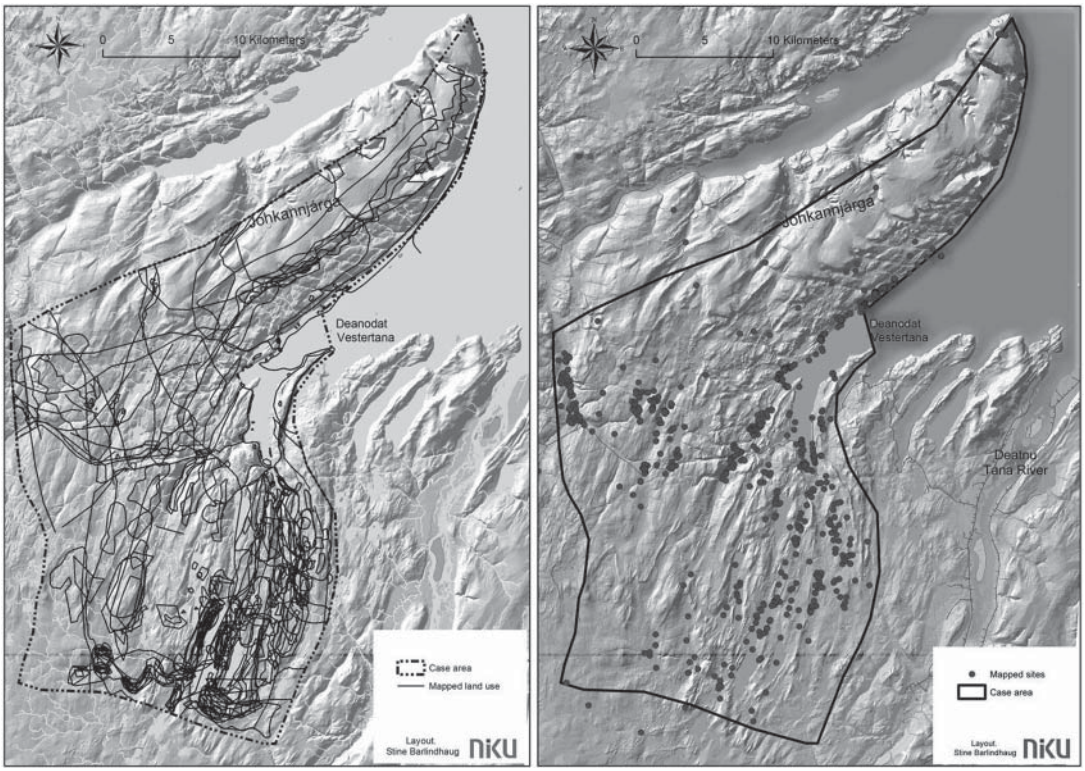


Fig. 13. Activity areas and routes used during the last 70 years (left) and the totality of mapped sites representing a time span of 6000 years (right).

have given a glimpse into a community's movements in their landscape during a time span of approximately the last 100 years, while the visible sites marked as points represent a time span of approximately 6000 years. Imagine how a land use map would look like if we could visualise people's movements in these landscapes from the same time span!

We can of course never do that but the visualised correlation between visible sites and land use shown here are a useful insight and a reminder when interpreting archaeological sites in a landscape. Having this insight brings another dimension to the archaeological interpretation of prehistoric land use. It is important to take into account the activities that have taken place between all the 'points' filling ordinary distribution maps of archaeological sites in an area. The experiences obtained through this project lead us to the discussions around peripatetic walking or wayfaring. Ingold (2007: 75) explains wayfaring as 'movements along' in landscape that is not only a continuous surface, but also consists of a mesh of interweaving 'lines' that represents movements, knowledge, stories and incidents through history. The idea is that life happens also while travelling: babies are born, one meets other people, knowledge is exchanged, and so forth. During these movements you also dwell, hunt, fish and gather, and thus sites relating to habitation and subsistence practices are also part of these lines. They are the meeting points, and the succession of meetings makes the lines more intertwined around such areas (see also Olwig 2002; 2008; Aporto 2004; Collignon 2006; Simonsen 2008; Ingold & Vergunst 2008; Ingold 2011). Ingold writes that '*The lines of the meshwork are the trails along which life is lived*' (2011: 81), while Aporto (2004: 15) uses the term 'memoryscape' to describe a community's common memory about the places and routes they have used through history.

Through the interviews, I acquired a good glimpse into the community's 'memoryscape' related to their landscapes. There was a common and detailed knowledge about the surroundings, and I was told many of the same stories over again – stories they, in turn, had told over and over again throughout their lives. These stories were retold to me and supplemented with the interviewee's individual experiences that often confirmed this common knowledge. The next time someone retells their story in the community, these individual experiences will be added by the reteller as part of the common knowledge. Of course, listeners will understand and relate to the stories differently in accordance to their own knowledge and stories. Stories possess the ability to osculate knowledge, mode of life and traditions and thus have an inherent capacity to preserve traditions (Nergård 2006: 29).

CONCLUDING DISCUSSION

By combining traditional archaeological fieldwork with close collaboration with the local communities, we benefited from finding many more sites than we would have found otherwise, but perhaps more importantly, by getting a more comprehensive and multifaceted knowledge concerning land use and the archaeological sites. There is a clear benefit from moving around in the landscapes by foot together with the knowledge-holders, while documenting sites, as well as from having discussions with people after having followed the routes I had earlier been told about. It gives a valuable insight and platform for discussions of prehistoric sites, as well as the ability to contextualise the stories told.

A concrete output from the study is the datasets with extraordinarily detailed information on historical sites in the surveyed areas, and the many stories and incidents that are connected to both sites and routes in the landscape. Local knowledge and other data gathered through this project represent parts of this community's common memory. Some of these memories are narratives about special events, like a story about two small girls who did not pay enough attention while herding the reindeer close to a lake, causing many animals to drown when they fell through the ice. Or, for instance, everyday accounts about spending several weeks in the mountains trapping ptarmigan, or concerning the reindeer herder's life at the summer settlement, or the heavy loads of cloudberries that have been carried down to the village for sale. Such 'memories' also have a 'material' side, represented by the many documented physical sites. Narratives, incidents and customs are in the same way represented by and intertwined with physical features such as dwelling sites, pitfalls and trails. Their existence depends on interaction with landscape features, man-made features and equipment (Olsen 2010: 120). Olsen (2010) has discussed how scholars often '*…underrate the*

role things themselves play in enabling remembering and upholding the past…'. He discusses how things help us recognise historical change, such as how still visible archaeological sites or landscape features can trigger our memory.

In the Low Arctic landscape of Deanodat, the regrowth rate is slow, as is level of agricultural activity, making even sites and features from the very distant past still visible for those who move around. These features bring up memories or trigger thoughts in different ways related to the person's knowledge and experience. Associations related to an archaeological feature in the landscape will not usually derive from memories related to personal experience, but for a knowledgeable local they may be triggered by familiar narratives or intimate knowledge about the landscape and related land use. On the other hand, an archaeologist or some other person, further removed to the traditional ways of life, will have other associations. The enduring past is dependent on the duration of things – both man-made and natural landscape features – which make the past a part of the present, and thus offer a possibility to constitute new actions and memories again and again (Olsen 2010: 121).

By gathering and documenting both physical features and land use knowledge, the Deanodat community went through a different level of attention to land use knowledge, probably resulting in a longer-lasting awareness, than would otherwise have been the case. A 'circulating chain' (Latour 1999) of knowledge and truth related to landscape and people's knowledge of land use traditions was achieved. Latour (1999: 69–74) describes in his book *'Pandora's hope'* how such a chain running from local data to general scholarly knowledge must be reversible and as uninterrupted as possible in order to maintain its truth-value. He also describes how, in the course of the different steps of transformations, one both gains and loses something. There will be, for instance, a reduction of the information and concrete knowledge related to ptarmigan hunting from what is held by a knowledgeable hunter like Viggo compared to what is written in the transcribed interview. Further reduction takes place when that information is taken to the database and on the map, and finally put into words in a paper like the present one. On the other hand, there will be a gain too, in that one can compare this data to other areas, predicting the knowledge onto other geographically similar but less familiar areas. They can be enriched and informed by research conducted there, as well as by maintaining and transferring some of the local knowledge about land use that otherwise would be lost. Moreover, the network to be reached with knowledge of historic land use in Deanodat has definitely increased through the use of GIS (Latour 1999: 78).What is lost in terms of concreteness and situated knowledge is compensated for by the achieved generality that enables comparison, storage and dissemination. However, this gain would be of little value if the chain is not reversible in the sense that one can go back through the different steps of transformation and relocate an actual tent site on the described locality or a landscape feature described in a narrative. Gradually, the generation who have lived a more traditional life, closely affiliated with the landscape and natural resources, will be gone. However, elements of their knowledge will remain and can circulate Latour's chains (1999: 69). However, a prerequisite for following Latour's chains back and forth is things like landscape features and cultural sites. Things are also a necessity in the actual process of gathering data through the use of field recording equipment, such as camera, GPS, paper maps, notebooks, etc. For storing the data, there are also things involved, such as computers, software, paper maps, photos and interviews written on paper. The list could be made very long, but I'll stop there. In addition, an important prerequisite for the described transformation of data and the circulating reference is the physical presence of landscape formations and archaeological sites. Thus, as Olsen (2010: 121) asserts, the duration of archaeological features plays an important role in keeping the past in the present. The material record is also a focal point of local and scholarly attention and discourses, thus playing a crucial role in enabling collaboration and mutual exchange.

Together with the duration of human-made things, the landscape itself is fundamental as a memory bank. Northern landscapes hold a long memory, they rarely forget. The knowledge of and stories related to, for instance, ptarmigan trapping consist of human-made things like the wire and string in the actual trap, a knife, skis and usually a turf hut, but also things like good willow areas, suitable snow conditions, branches to make small 'gates' to set up the trap in, and so on. The archaeological features that result from this activity

and are still visible in the landscapes today are, as I explained earlier, usually limited to the turf hut site, but for a person with local knowledge also things like topographical features, vegetation, snow and weather conditions, the time of the year, and so forth, can help bring up memories of past times. An intimate knowledge of a landscape intertwined with narratives, traditional economy, and related issues, is thus a mediator for keeping parts of the past present for today. This can be referred to as a '*habitual memory*'. The concept has been discussed by Bergson (2004) and Olsen (2010), among others, and is described as '*…a bodily memory preserved by repetitious practice, and where the past continues by being relieved in our routines and ways of dealing with things…*' (Olsen 2010: 116).

For many of the members of the Deanodat community, both the reindeer herders and the inhabitants of the coastal Sámi village, habitual memory related to land use has persisted as a result of two factors: orally transferred cultural knowledge and the still active practice of many aspects of traditional land use. For the next generation, with less lived experience but still much second-hand knowledge, the habitual memory will be different, and the grandchildren will be even further distanced from traditional land use. Through a project like the one presented here, people have been exposed to material that triggers their memory, and through using and creating maps, 'memories' of both man-made features in the landscape and different landscape elements associated with land use activities have been evoked. The community has been exposed to things (maps, fieldwork in the landscape) and situations (interviews, community meetings, general discussions) that have brought forward knowledge that was no longer in active use, but still present as habitual memory at different levels (Burström et al. 2006; Harrison & Schofield 2010; Olsen 2010: 118).

This research has shown that extensive land use does not necessarily result in a landscape rich in cultural monuments. In spite of the extensive, varied and seasonal activities carried out by these communities, there are many activities that do not leave any conspicuous traces in the landscape. On the other hand, by combing documented visible features with the transcribed georeferenced traditional knowledge into a GIS system, the extent and intensity of land use emerges in a complete and comprehensible framework.

It has been argued here that during the interviews, the topographic maps worked as a mediator and helped people with lived experience from a traditional life to remember. With a database and the associated visualisations on maps, as illustrated in this article, a new layer of memory can be said to facilitate new experiences and actions between people and the (past) material. The GIS media have the ability to extend the network of interaction and thus offer people with less intimate knowledge (both from the community and otherwise) the tools to experience material that, in spite of its considerable age, is durable and still today with us.

NOTES

[1]All maps by Stine Barlindhaug, map source: Norwegian Mapping Authority.

[2] For further reading about PGIS methodology, see, e.g. Shrader-Frechette & Westra 1997; Harris & Weiner 1998; Ursher 2000; Barron 2002; Craig et al. 2002; Fox et al. 2005; Rambaldi et al. 2005; Corbett & Keller 2006; Dunn 2007; Turnbull 2007; Wood et al. 2010; Barlindhaug & Pettersen 2011.

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