Reindeer-hunting, Materiality, Entanglement and Society in Norway

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Abstract

Reindeer (*Rangifer tarandus tarandus*) has been a part of the fauna of the territory we today call Norway since the last Ice Age. Archaeological traces of hunting and trapping reindeer are many and varied in the high mountains. This paper presents a review of diverse hunting- and trapping strategies in prehistoric and medieval Norway.
Keywords: Norway, long-term reindeer hunting/trapping, society, laws, materiality, entanglement.

<1>Introduction

According to the British archaeologist Grahame Clark the "gregarious nature" of reindeer moving in bands was, for prehistoric hunters, "easy to kill when contact is established" (Clark 1975, 89). Arthur E. Spiess states, however, in his multi-ethnic work on "Reindeer and Caribou Hunters" (Spiess 1979, 19), that nothing could be more wrong.

Reindeer (*Rangifer tarandus tarandus*) has been hunted, caught and trapped, in what today is the territory of Norway, shortly after the pioneer settlers sat up camp along the coast 11–12.000 years ago. This paper will discuss how reindeer over a long time period have been hunted in Norway. The theoretical perspective revolves around two key concepts: *materiality* and *entanglement.*

<2>On Materiality

The concept of materiality encompasses animals, landscape, wind, ice-and snow, and "things", and how humans interact with these material forces. Materiality is therefore not the same as "material culture". *Materiality*

> "embraces a far greater variety of material things and substances….The social world is not simply a matter of differently empowered individuals that interact with things and each other; different kinds of materialities (things, natural features, animals, substances such and rain and snow etc.) often play crucial, although often sublime, roles in social development by just being there" (Fahlander 2008, 131).

Tim Ingold has criticized the last 15 years of "return to things"- and "symmetrical archaeology" discourse (e.g. Olsen 2003, 2010, Webmoore and Witmore 2008. Domanska

2006, cf. Olsen and Witmore 2015 for a response to this critique) for being too focused on the "artefactual domain at the expense of living organisms" (Ingold 2012, 428), and he proposes a renewed interest in ecology and "a focus on the active materials that compose the lifeworld". For Ingold (2012, 238) the concept of materiality should include animals and plants, weather, air, the grounds, mountains and streams; all life-forms interacting with humans and things.

In accordance with Ingold's (2012) proposition "towards an ecology of materials", an archaeological study of prehistoric reindeer hunting must take into consideration a wide range of phenomena: The animals, migratory patterns, landscapes, wind directions, temperature, insects, ice- and snow patterns, humans as individuals and collectives, tools and things in a wide sense, culture and society; in short, both environment, life-forms and things.

<2>On entanglement, entrapment and dependency

Ian Hodder (2012) presents in his book "Entangled" with the subtitle "An archaeology of the relationships between human and things" some perspectives and core-concepts that I find relevant for the analysis of long-term reindeer hunting. He maintains that:

"Entanglement is a mix of humans and things, culture and matter, society and technology" (Hodder 2012, 208). "The key idea in entanglement is that humans get caught in a double bind, depending on things that depend on them. This double bind occurs because material things are unruly and follow biological, chemical and physical processes of transformation and decay" (Hodder 2016, 4)

Entanglement embraces the complexity of relationships between not only humans and things, but between things and things, and humans and humans (Hodder 2011). And for the purpose of this study I would of course include animals and climate with a special focus on ice, snow, and wind.

Hodder holds that when entanglement grows in complexity the process will cause an augmented dependency between relevant factors and the result is a certain entrapment. "As humans increasingly live in a world they have produced, they have to work harder to reproduce that world on which they depend. This is dependency" (Hodder 2012, 103). He uses the term "dependence in the sense of 'reliance on'" (Hodder 2016, 14)

Thus we can get entrapped in a condition that might have been quite unforeseen when building a construction, for example to facilitate the killing of reindeer. Intentional

modification of materials, like moving stones in a landscape building fences and pit fall traps, creates "taskscapes". Ingold defines a taskscape as "an array of related activities…the taskscape is to labour what the landscape is to land…" (Ingold 2011a, 195).

In my view, the "taskscape" may act back in several ways, many of them not anticipated or intended for at the outset. In the modern world examples of unexpected and problematic outcomes of humans changing landscapes and environments are ubiquitous, e.g. introducing new species in an environment for better food procurement; the building of dams and deviating rivers causing unexpected erosion, deforestation, and changing groundwater.

Hodder argues that the things "tie the webs of interaction with dependence" (Hodder 2012, 111). Furthermore, that "archaeology shows an exponential increase in the rate of change as entanglements increase in scale and complexity" (Hodder 2012, 158). Ingold has also reflected on these issues by saying: "We can be equally sure that, in the broad course of history, the number and kinds of artifacts that humans have used have increased almost exponentially" (Ingold 2012, 430).

Consequently based on the theoretical reflections presented above, the overarching questions that will be discussed are as follows:

Which strategies for hunting reindeer have existed through time in Norway?

How did the various hunting strategies affect the entanglement between nonhuman life-forms, things, and humans?

How did culture and society interact with hunting strategies?

<1>Stalking reindeer – hunting with bow and arrow

On warm summer days the reindeer are plagued with insects and larvae that bite straight through the skin and such insects (e.g. the *Hypoderma tarandi*, warble fly) are a serious nuisance. Some researchers argue that insects constitute the main reason why reindeer gather on ice- and snow patches (Ion and Kershaw 1989). Other scientists have disputed this view and maintain that it is evident that reindeer move to ice- and snow patches "to cool down after a period of foraging during a warm, sunny day" (Anderson and Nilssen 1998, 14). However, everyone agree that all over the circumpolar area reindeer/caribou are attracted to snow- and ice patches (Figure 1). So, these cool habitats both were, and are, excellent hunting grounds

on warm days. And hunters have for thousands of years shot arrows (cf. Pilø *et al.* 2018) and lost arrows, and they have used devices to manipulate animals in favourable directions etc.

"There are two types of snow patches: seasonal snow patches and perennial snow patches. Seasonal snow patches melt during summer, whereas perennial (in this context referred to as ice patches), are present from two years up to centuries or millennia" (Nesje *et al.* 2012, 486). For the reindeer both snow- and ice patches are cool places to be on warm summer days, but the artefacts preserved that archaeologists today find, melt out of *ice patches* (Martinsen 2016, 57).

Stalking reindeer on the snow- and ice patches was probably done during all summer months when the temperature is high enough in the mountains so that the herds of reindeer gather on cool places. However, the hunt had greater chance of being successful in late summer, early autumn (August, September), because then the snow- and ice patches were smaller and the hunters could get closer to the prey. In late summer the skin is also of the best quality to make clothes and other necessities, and, if lucky, the holes that parasites have bitten through the skin during summer might have healed (Spiess 1979, 29, Callanan 2014, 23). Snowfall and the winter season may in these high Alpine areas start already in late August/early September.

It has been suggested that the snow- and ice patches were situated in "desolate and remote sites" (Callanan 2010, 49). However, in my opinion this suggestion is too general; important sites are situated some hours or a day's walk from valley settlements that have been inhabited for millennia. For an urbanized person today, they might seem remote but not for the prehistoric dwellers of the surrounding valleys.

The most ubiquitous artefacts traditionally found in the mountains of Norway associated with reindeer hunting, are arrowheads of iron (Farbregd 1972, Hofseth 1980, Fossum 1996, 26–27, Sommerseth 2015, 20). Hikers, hunters and professional archaeologists have come upon such artefacts quite randomly, and during the last century many arrowheads have been handed in to the 5 archaeological museums in Norway. Hunting reindeer on snow-and ice patches endured when firearms were widely introduced in the seventeenth century (Farbregd 2009, 161–165).

In the mid-1930ies, when there were some unusual warm summers, complete arrows with shafts and other organic materials were found close to melting snow- and ice patches and handed in to the museums both in Trondheim and Oslo. After the warm summers in the mid-

1930ies the archaeological museum in Trondheim started collaboration with local hikers and hunters in the Oppdal-region (Central Norway); they were trained to collect and document the geographical position of artefacts connected with reindeer hunting (Farbregd 2009, Callanan 2014a).

In 2006 there was a dramatic ablation of ice patches in the alpine regions of South Norway (Wammer 2007, Finstad and Pilø 2010), and the melting of glaciers and ice patches in the high alpine areas has, with varying speed, been continuous since 2006. Because glaciers are massive and moving, they crush everything. Perennial ice patches are relatively stable, but not entirely stable. However, how much ice patches move, have not, in contrast to glaciers, been researched extensively by geologists (Martinsen 2016, 56). Knowledge of the movement of an ice patch is important concerning the taphonomical processes influencing the preservation and dating of archaeological artefacts recovered. A sliding ice patch may have flushed out the oldest artefacts, while a stable ice patch may have preserved them in the ice core (Martinsen 2016, 54).

Ice patches are, in South Norway, found mostly above 1400 m.a.s.l. (Callanan 2013, 729, 2014:21). Since 2006 around 2650 finds have been registered at the Museum of Cultural history, University of Oslo. In the period 1914–2011, 234 artefacts were handed in to the NTNU University museum in Trondheim (Callanan 2013, 729). In Western Norway artefacts are also starting to come out of the ice (Høyer 2015, Bjørgo *et al.* 2016). In North Norway artefacts associated with ice patches have also been registered but they are hitherto relatively few in numbers (Sommerseth 2015:20–23).

Before the warm summers after 2000 climate researchers assumed that finds older than AD 200 would be improbable to detect because there was a considerable melting of ice-patches and glaciers in the Roman period (Nesje *et al.* 2012, 487, Callanan 2013, 732), therefore older artefacts would have been exposed and destroyed.

However in 2004 an arrow shaft was recovered on the ice patch Kringsollfonna in Central Norway that has been dated to the Early Bronze Age (3365 ± 45 BP, cal 1760–1520 BC) (Åstveit 2007, 16). By the same ice patch a slate arrowhead was found with some remains of resin that could be radiocarbon dated to 3925 ± 40 BP, cal 2500–2280 BC, i.e. the Middle Neolithic (Åstveit 2008, 15). In 2006 a leather-shoe from the Early Bronze Age (cal. BC 1420–1260) was detected on the edge of the ice patch Langfonni on Kvitingskjølen in South Norway (Finstad and Vedeler 2008, 68).

From Central Norway there are conclusive evidence that stalking reindeer on ice-and snow-patches was a preferred strategy by hunters in the Late Neolithic: "In 2010 and 2011 fragments of five Neolithic arrows and a Neolithic bow were discovered" (Callanan 2013, 729) at two ice patches in the Oppdal-region. One arrow consisted of a slate point with a 70 mm long shaft and "a sample taken from the shaft was dated to between 3361 and 3102 cal BC" (Callanan 2013, 737). The bow has been dated to median cal 1816 BC (Callanan 2013, 740).

A wide range of materiality and entanglement was necessary to hunt reindeer on ice- and snow patches; the hunter and his/her bow and arrow was not enough. The hunters had to create a "taskscape" (cf. Ingold 2011a) to facilitate the killing of reindeer. With knowledge of the behavioural pattern of the reindeer, they shaped the necessary devices for a successful hunt and they modified the environment to optimize the conditions for shooting and killing. They needed "things" of the right category to facilitate the materiality of the taskscape. Below I shall describe a hunting taskscape connected to the ice patch Juvfonne.

<2>The ice patch Juvfonne

The ice patch Juvfonne is situated c. 1800 m.a.s.l. in Jotunheimen, Oppland County (Figure 2). The ice patch is surrounded by stony terrain with very scarce vegetation; here trees are non-existent and the prehistoric hunters have, probably over an extended period, built 50 stone-set hunting blinds (Nesje et al. 2012, 488) where they could lay in wait.

In August 2009 the de-glaciated areas surrounding the ice patch were systematically surveyed. During three weeks of field work 412 artefacts were recovered (C.57293). Juvfonne continued to melt in 2010 and additional 177 objects are now catalogued (C. 58539/C. 57836). Nearly all of the artefacts recovered are so-called scare-sticks (Figure 3). These objects are also termed sewels by some researchers: Slender posts with a fluttering attachment, or flag, at the top (Spiess 1979, 128, Callanan 2010, 2014a, 18), used as a device to lead the animals towards the hunter possibly hiding behind the shooting blinds. Strangely enough only one arrow has been found yet on Juvfonne (Finstad and Pilø 2016, 120).

Radio-carbon dates show that there has been hunting activity at Juvfonne from the Roman period onwards and that the dates of scare-sticks fall "into two separate age groups: AD 247–534 and AD 804–898 (Nesje *et al.* 2012, 489). The ablation of Juvfonne is ongoing, and the organic material recovered gets older as the ice melts.

We do not know exactly how the arrangement of scare-sticks worked (Wammer 2007, 27), but since reindeer are extremely sensitive to the scent of humans, the wind direction could have been be crucial: "…the hunter, therefore, must generally stay downwind of their prey when stalking" (Spiess 1979, 37). Below follows some suggestions of various hunting strategies.

Arthur Spiess have suggested the following tactics: "….. a variation in the 'lying-in-wait' technique , involves, waiting downwind from a herd as a companion circles obliquely a mile or two upwind of the herd to allow them to get a faint human scent. The band will then move slowly downwind towards the waiting hunter"(Spiess 1979, 39). Concerning the organization of scare-stics one alternative is that the hunters awaited from where the animals came, evaluated the wind direction, and then organized very quickly how to put up the scare sticks.

Yngve Ryd (2014) has interviewed Sámi elders on how to hunt wild reindeer with a bow and arrow on snow patches and their story differ from Spiess: The reindeer are so plagued by the warble flies that they do not flee from a human who slowly sneaks, hunch-bent, towards them; the animals both see and smell the hunter and because of this it is not necessary for the hunter to stay downwind from the reindeer. "Snow patch hunting is different, as the reindeer see the hunter all the time, and therefore the hunter must move *with* the wind. The reindeer of course feel the smell, but as they also *see* where the scent is coming from, they are not so afraid" (Ryd 2014, 18). According to Ryd's informants it would be impossible to kill a reindeer hiding for example behind a boulder; the hunter had to approach the animal on the snow patch to get close enough to kill with an arrow (Ryd 2014, 17).

The Sámi elders do mention neither shooting blinds nor scare-stics. The stalking of reindeer on Juvfonne was probably somewhat different because they used devices to lead the animal in appropriate directions. Maybe the hunt could have be done by one, patient, individual hunter hiding behind the shooting blinds, however being two or more probably made the killing easier. If there were more than one archer/ bowman, they must have made their shots coordinated and simultaneously, or else the band of animals would panic and run away from the hunters.

The hunters on Juvfonne needed more "things" than knowledge and archery equipment: As mentioned above, they built shooting blinds of stone; they probably had spears for the final blow, axes and knives for the butchering of the animals and dividing the carcasses into transportable pieces. Spades have been found, not on Juvfonne, but on other sites for example

the ice patch Lendbreen dated to cal AD 382–544 (Tua-4201) and Gråvåhøy cal AD 266–271/332–538 (Beta-228586). The spades could have been used to dig into the snow to hide the meat for some days. They could also be employed to build shooting blinds of snow.

The hunters themselves must have been adequately dressed with as good shoes as possible. In case of an unsuccessful hunt it would be wise to bring food. For means of transportation they might, from the Iron Age and onwards, have used horses that were hidden away from the hunting grounds. Things associated with horses, e.g. horse shoes and horse dung have been found on the ice patch Lendbreen, but whether these finds are associated with transport of reindeer carcasses or just transport over the mountain pass is hard to decide.

An especially interesting artefact found on Lendbreen in 2011 is a piece of textile which turned out to be a tunic (Figure 4), dated to around AD 300 (1740 ±30 BP, cal AD 230–390, Beta-304746) (Vedeler and Jørgensen 2013, 792). Lise Bender Jørgensen and Marianne Vedeler (2013) describe the tunic as suiting a slender man around 175 cm high. The sleeves are very short and narrow (21 cm) and the sleeves look like they are added to the tunic, possibly a repair. The tunic is rather worn and repaired on several spots. Vedeler and Jørgensen interpret the tunic as clothing for a young reindeer hunter.

I find this piece of clothing very strange and unpractical for a hunter, the sleeves are just too narrow. I suggest another interpretation: The tunic has originally been worn by a quite small person. But the connection with the hunt is not as clothing worn by a hunter. As late as the nineteenth century pieces of clothing were used to lead the reindeer herd towards the hunter. In folktales this device was called a “blind-shooter”, i.e. a “camouflaged shooter”, and it consisted of clothes or furs which were stained by human sweat and stench (Asbjørnsen 1995 [1914], 427). The textile was positioned so that wind caught it. Reindeer are attentive to the smell of humans, and the animals will retract from the danger. In this way the hunters, waiting behind shooting blinds, could manipulate the flock in the required direction towards the shooting blinds.

Thus the blind-shooter is the reindeer hunt’s equivalent to the scare-crow, but the purpose of the blind-shooter was not only to scare, but also to lead the animals in the direction of the waiting hunters. I consider that this is a plausible interpretation of the tunic found on Lendbreen. The very narrow sleeve that is obviously added to the garment made it easier to fasten it on e.g. a cross-formed stick (like putting up a scare-crow). The arrangement made the allusion of a human and manipulated the flock.

The tunic also gives us interesting information about the climate c. 1700 years ago. The dating of this artefact coincides with a period when ice-patches and glaciers were very retracted and small (Nesje *et al.* 2012). Consequently the Lendbreen ice patch has not been that retracted in 1700 years.

The entanglement of the following "things, non-human life-forms and humans" could tentatively have constituted the Juvfonne taskscape: Animals (reindeer and insects), ice and snow, weather conditions and temperature, stones, arrows, bows, spears, knives, axes, means of transportation, personal gear (shoes, clothes etc). With one thing lacking, the hunt could turn out more awkward and less successful.

In spite of the many things needed for this hunt, it is a relatively light-entanglement situation with a low factor of dependency, compared by others strategies of prehistoric and medieval reindeer hunting in Norway. I'll turn to these strategies below.

<1>Catching reindeer in pit fall traps

The mass-harvesting of reindeer can in Norway been divided into three main-categories: Large pit-fall trapping systems, drives into water and funnel-shaped trapping systems. A distinction should be made between "*individual* hunting and catching carried out by one or, at most relatively few persons, and *collective* hunting and catching, where it is essential that many participate in order to get at the prey" (Bang-Andersen 2015, 38).

Pit-fall traps in Norway can be found alone, two or three in a row, or in huge systems and in considerable numbers. On the Dovre mountain-plateau in Central Norway there is an enormous system running from Dombås to Kongsvoll consisting of hitherto registered 1250 pit fall traps (Jordhøy *et al.* 2012a, 36). In Rondane, situated south of Dovrefjell, 1250 pit fall traps belonging to various systems are registered (Jordhøy *et al.* 2012b, 10). In Norway's northernmost county, Finnmark, large pit fall systems have been registered on the Varanger-peninsula (Vorren 1944, 1998, Sommerseth 2016).

In Southwestern Norway, for example in the mountain area Setesdalsheiene, no large systems are registered, only one single pit or two aligning pits, and the pits are often situated where the topography creates natural *affordances* (cf. Gibson 1986) for trapping reindeer, e.g. in a narrow gorge, or on a natural land bridge between two lakes (Bang-Andersen 2004, 21–38). James J. Gibson's concept "affordance" implies that the landscape affords obvious possibilities for action: "The *affordances* of the environment are what it *offers* the animal,

what it *provides* or *furnishes*, either for good or ill" (Gibson 1986, 127). The concept affordance suggests that there exists a "complementarity of the animal and the environment" (Gibson 1986, 127).

The pitfall traps are basically constructed in two ways: One type is oval or circular and dug into the soil in areas where the ground affords this (in forests, on moraine-ridges, along riverbanks etc.) (Figure 5). This type has been supported by inner wooden walls (Barth 1983:109, Bang-Andersen 2004, 85, Bergstøl 2015, 49). The pits are today seen as hollows in the ground of various depth and diameter. The oval types with inner timber lining probably had guiding wood-fences of which remains are difficult to trace. The other type found in the high alpine areas of Norway, above the tree limit, are rectangular pits carefully constructed by stones and large slabs, and they are adjoined by lines of stone fences leading the reindeer to the pit fall trap (Figure 6). The size of a typical "pit is about 2 m deep, 2 m long and 60–70 cm broad" (Barth 1983, 110)

The zoologist Edvard K. Barth (1983, 111) and the archaeologist Sveinung Bang-Andersen (2004, 43, 2015) describe the trapping of reindeer in pit fall traps as "passive" as opposed to the "active" hunting of reindeer with bow and arrow. It was not necessary for the trappers to be present when the animal fell into the pit which was constructed in a manner making it more or less impossible for the reindeer to jump out. A trapped animal could survive in the pit for several days before it was finally killed. It could also happen that the reindeer broke its neck in the fall; a buck with wide antlers could actually be hanged because the antlers got stuck on both sides of the pit.

There are both small and large systems of pit-falls distributed in the mountains, some dating back to the Bronze Age in South Norway and in North Norway (Troms and Finnmark county) even to the Late Stone Age (2800–2200 BC) (Sommerseth 2009, 252). However, early dates does not mean that the system was in uninterrupted use for thousands of years, for example a small pit fall system in Grimsdalen has been dated to be in operation in the Late Bronze Age and it went out of use at the beginning of the Roman period (Risbøl *et al.* 2011, 109). The huge and really elaborate systems are mainly from the Viking- and Middle Ages. After the medieval period, the mass-trapping systems went out of use (Bevanger and Jordhøy 2004, 19). Smaller pit fall systems also fell into decay, and by the eighteenth and nineteenth centuries this old hunting tradition stopped completely. In 1863 trapping moose and deer in

pits were forbidden by law, and the final ban for trapping reindeer in pits came in 1899 (Jordhøy *et al.* 2005, 32, Bang-Andersen 2004, 52).

A central issue for researchers studying pit fall trap systems has been the degree of "labour-intensity": How many people were needed to, bluntly put, do the job of killing the reindeer (cf. Barth 1983, 110, Fossum 1996, 93, Jordhøy *et al.* 2005, 33, Weber *et al.* 2007, 207–208). Sveinung Bang-Andersen (2004) has estimated that in Setesdal Vesthei, Southwestern Norway, it would be possible to construct a rectangular pit in four man-days, while Øystein Mølmen assumes that it could have taken between 20–25 man-days to construct the type of pits that is most common in Jotunheimen (Mølmen 1988, 37–38). I agree with Bang-Andersen that Mølmen's estimate seems too labour-intensive. Depending on the affordances of the terrain in question the time of construction would vary in each individual case.

However, not only the pits had to be built, but also the fences leading to the pits. For each trapping event the pits had to be "camouflaged" by covering them with thin wooden-sticks or branches topped with e.g. lichen, heather and moss. And then comes of course regular maintenance and surveying the pit-system, killing, butchering, and transporting the animals to nearby settlements. In many ways this so-called "passive" hunt, demands huge "activity" and the materiality and entanglement involved is more manifold than the hunt with bow and arrow.

Those who built the pit fall trapping systems undoubtedly had detailed knowledge of the migratory patterns and behaviour of the bands of reindeer; how the bands moved from summer to winter pastures, of the places where the female went to calf, where the small bands of bucks use to go etc. Constructing a pit fall of stone demands intrinsic and detailed knowledge, if it was done sloppily, e.g. placing a stone in the wall incorrectly then the animal could get its cloven hoof (claw) on it and leap out.

Building shooting blinds on the other hand close to a snow- and ice-patch could comparatively, once the positioning had been decided, be done in a jiffy and did not require specific expertise. The same goes for placing scare-sticks creating the necessary taskscape associated with the snow- or ice patch. Furthermore, the scare-sticks could also easily be re-organized. The building of stone fences in a pit fall trapping system involved, however, a kind of heavy materiality, and reorganizing a wrongly built fence would indeed be labour-intensive.

The trapper needs much of the same equipment as the bow-and arrow hunter for killing and butchering the animals; spears, knives, axes, means of transportation etc. (cf. above). I would also argue that the deeper entanglement between humans and things in the trapping way of catching reindeer also created heavier *dependency*.

The investment of time and energy to create the trapping taskscape produced dependency. It could not have been an enterprise of one or two individuals as with the archer's hunt; building these systems must have been a collective endeavor. Every season the systems had to be maintained and surveyed not to fall into decay. Maintenance of things in a broad sense catches humans "in the lives and temporalities of things, their uncertain vicissitudes and their insatiable needs" (Hodder 2016, 14). For the trappers it would be unwise not to maintain the pit fall systems because of the investments already done crafting the taskscape.

The makers of pit fall trapping systems did collectively produce for themselves an obligation that the bow and arrow hunter did not; the trappers became, compared to the bow-men, entrapped in a *deeper entanglement* with the environment, animals and things. "The human dependence on things is productive, but it also draws humans more fully into a dependence on and care for things that is entrapping" (Hodder 2016, 1). Consequently constructing sophisticated pit fall trapping systems not only trapped reindeer, but entrapped the constructors as well.

<1>Water trapping of reindeer

Driving or luring bands of reindeer into lakes or rivers is a catching and killing method that is known both in North-America and Eurasia (Spiess 1979). In Norway the site Sumtangen (c. 1200 m.a.s.l.) situated on the south shore of Lake Finnsbergvatn on Hardangervidda, which is the large mountain plateau in South Norway where wild reindeer bands still roam, has attracted researchers' attention since 1842 (Christie 1842, see Indrelid *et al.* 2007 for references to the research history).

On Sumtangen (Figure 7) ("sum" means swim, and "tangen" means ness or point/headland) the reindeer were lured/guided towards the lake by cairns with ropes between them; attached to the ropes there may have been flag-like objects and sticks were put on top of the cairns (Bergstøl 2016, 108). Close to the shore the animals were chased into the lake and killed by hunters in boats (indicated by the finds of boat nails and landing places). After the killing the

reindeer were dragged ashore and butchered. There is an enormous amount of bone material left by the hunters and they had built stone huts on the site indicating prolonged stays.

The archaeologist Svein Indrelid and the zoo-archaeologist Anne Karin Hufthammer are the last in a long row of researchers that have excavated the middens on Sumtangen. They have concluded that in the thirteenth century (AD 1250–1300) there was a period of huge activity and mass-killing of reindeer on this site (Indrelid and Hufthammer 2011, 2). The butchering pattern during this mass-trapping period differs from earlier periods in which almost all the bones were left as waste. In the Roman period the hunters left the antlers behind, while in the medieval period antlers were transported away with the meat:

> "The carcass remains were left as waste, with three exceptions: Compared with other bone elements, antlers, rib cages and upper front legs (*scapula/humerus*) are strongly underrepresented in the middens. The 13th century hunters must have regarded the antlers as valuable products, just as meat and skins. This is in contrast to the nearby Roman Age midden at Sørbu, where large antlers were left as waste" (Indrelid and Hufthammer 2011, 6).

We know that antlers were used as raw material for making combs both in the Iron- and Middle Ages (Christensen 1986). However, there is a considerable difference concerning the magnitude of comb making; in the medieval period comb making was a significant urban handicraft, and combs made of reindeer antler were produced in large quantities and extensively traded in the whole North Sea area (Mikkelsen 1994, 154–163, Røed and Hansen 2015, 69–74).

In addition to the materiality and entanglement associated with bow-and arrow hunt and pit fall trapping, for water trapping reindeer the hunters needed boats, landing-places, and they had built solid huts of stone for lengthy stays. But just as with the two other hunting strategies they were dependent on migratory patterns of the animals. The investment of setting up this robust taskscape on Sumtangen and the fence-system leading to the killing site was vast and produced a state of *deep entanglement and dependency*. However, it would not be worth maintaining if the number of animals decreased significantly. And this was probably what happened in the late thirteenth century; there is reason to believe that the intensive trapping on, not only on Sumtangen, but also in the Dovre and Rondane area (see below), over-exploited the reindeer population. Changes in the genetic diversity of reindeer populations in

Norway also point in this direction, because the genetic changes coincide with the period of mass-trapping from the eleventh to twelfth centuries (Røed *et al.* 2014).

<1>Funnel-shaped trapping systems

The funnel-shaped trapping (also termed fish-trap designed, cf. Bevanger and Jordhøy 2004, 19) systems not only "passively" lead the animals to the kill-site by cairns, fences and poles with flag-like objects. When the reindeer were closing in on the final trap, the hunters drove them into a corral. This was definitely an active method of hunting and variations of this hunting method are known all over the circumpolar area (Jordhøy *et al.* 2012b, 13 with references).

In the mountains on both the east- and west side of the northern parts of the valley Gudbrandsdalen, 15 funnel-shaped trapping systems of various size are *hitherto* known (Hole 2013, 64). Several of these sites have been discovered quite recently, and they are situated between c. 1230 to 1750 m.a.s.l. (Hole 2013, 64). Additional two systems are registered in Rendalen and Engerdal in the northern part of Hedmark County (Amundsen and Os 2015).

The dimensions of these structures vary considerably from relatively small systems with the capacity of catching 10 animals, to systems that could trap hundreds of reindeer at the same time.

Runar Hole (2013, 91) has suggested that the trapping may have started to evolve in the Roman Period, but without long fences and large corrals, these were developed later. According to Hole, during the Viking Age and Middle Ages the systems were getting larger and more complex. The mass-trapping in this area stopped abruptly in the late thirteenth century, cf. the water trapping on Sumtangen.

Egil Mikkelsen investigated in the mid-1980ies the remains of huts and bone-middens close to one of the largest funnel-shaped systems registered on Einsethø (east of the valley of Gudbrandsdalen), and he argues that the most intensive mass trapping took place from 985 AD to 1280 AD (Mikkelsen 1994, 110).

The trapping system on Einsethø (c. 1270 m.a.s.l.) was discovered in 1968 (Barth and Frøstrup 2016, 123) (Figure 8). Five kilometer long remains of fences are still detectable, and 1700 postholes associated with the fences are registered. The system is situated right on the migratory route of the reindeer herds. The fences lead the reindeer to the trap which is

constructed by several fences leading to the killing corral / stall /pen. The affordances of the terrain are astutely employed, so that the animals could not see the corral made of wood. (Hole 2013, 38).

Another impressive funnel shaped trapping system was discovered in 1999 on Verket (Figure 9) (c. 1250 m.a.s.l.), situated between Lesja and Vågå on the west side of the valley, somewhat further north of the Einsethø-structures (Einbu 2005, Jordhøy *et al.* 2005, 34, Hole 2013, Jordhøy 2013). Post-holes associated with solid fence structures can be detected over a distance of c. 4 km, and the system consists of two converging fences. 904 post-holes have so far been registered, but one can assume that the system had 1500 fence-posts at the most. Tor Einbu estimates that each of the fence-posts could have been 180 cm long, hence over 2500 m of solid pinewood was needed to construct the system (Einbu 2005, 40). The timber was felled at a lower altitude and it was later transported up to the mountain plateau, probably during the winter season. The total length of the enclosure where the animals were trapped is at least 2.4 km, and from this enclosure the reindeer were lead into a smaller enclosure in which they were trapped (Figure 10). Maybe not all of the animals were killed; there might have been a procedure of selection based on size and sex, some animals could have been released (Einbu 2005, 53). Associated with this trapping systems there are also remains of buildings.

As on Einsethø the "architects" of the Verket-system have cleverly used the affordances of the terrain to lure the reindeer to go forward between the converging fences and ending up in the killing stall (Hole 2013, 54, Jordhøy 2013, 18). Both the Einsethø-system and the Verket-system are situated close to creeks and small rivers. Running water must have been crucial to carry out butchering of an enormous amount of animals (Hole 2013, 84).

The dimensions of the trapping system on Verket have been surveyed, but no thorough archaeological investigation has been done yet. A small trench was excavated in 2006 to collect a total of 36 bone samples for DNA-analysis (Røed *et al.* 2014). Three samples of bones have been radiocarbon dated to the interval AD1015–1035 and AD 1245–1285 (Jordhøy 2013, 18). A sample from wood remains in a posthole at the end-point of the structure has been dated to cal AD 1215–1290 (BP 785 ±75) (Jordhøy *et al.* 2005, 38). Furthermore, one radio-carbon sample has been taken from the remains of a post, and this was dated to AD 1050–1200 (Einbu 2005, 40).

The place name Verket is in itself interesting as the etymological root may be the Old German word ***werka**, meaning work and action (Bjorvand and Lindeman 2000, 1059). It has also been suggested that it may point to the Old Norse *virki* meaning wood-work, cf. the solid fences end enclosures of wood (Jordhøy *et al.* 2005, 57). Both wood-work and work has the same Old German root ***werka**. A place name with the root *virki* is also found c. 5 km east of the trapping system on Einsethø, namely the shieling/summer farm "Værkjessetra". Maybe this was the place where the huge amount of timber needed for the trapping was axed and stored before the building and yearly maintenance of the Einsethø-system. Furthermore, c. 20 km as the crow flies southeast of the Einsethø-system, there is another mass-trapping system in "Verkilsdalen", another place name with the etymological root *virki*.

The construction of the funnel shaped trapping systems on Einsethø and Verket was conducted by master-builders with architect-like planning skills; the builders engineered taskscapes employing the affordances of land, water, timber, animals, things and humans. They produced killing-and butchering sites of industrial proportions, cf. the amount of timber needed. The complexity of the systems did indeed "tie the webs of interaction with dependence" (Hodder 2012, 111). These sites are definitely cases of a *deep human-things-non human lifeform- entanglement*. The huge investment in the entanglement entrapped the community in a dependency for a long time. The master-builders had produced taskscapes that made people have to work hard to maintain it. But as long as the reward was in sync with the efforts, it was all worth it.

It is a qualified guess that in the thirteenth century the structures were at the highest degree of complexity and that the large scale trapping peaked in this period. However, these mass-trappings systems were so successful that they must have caused an over-exploitation of the resource, and when the catch of reindeer receded, these massive systems were no longer profitable, and the entanglement became a heavy burden.

<1>Reindeer hunting and society

How did culture and society interact with hunting strategies? We know that people have changed in an array of ways in course of the longue durée of reindeer hunting in Norway: Culture, technology, economy, society, adaptive strategies, cosmology, almost everything is different today than in the Stone Age. But the reindeer is, in spite of genetic variations (cf. Indrelid *et al.* 2007, 140–142, Røed *et al.* 2014), concerning its *bodily affordances* for humans to use and consume, for the most part the same animal as it was in the Stone Age.

However, the behaviour of reindeer varies over time and space, and reindeer not accustomed to humans may act as "naïve prey", but once people act as predators the reindeer will do its utmost to avoid them. For example, on present Norwegian territory the wild reindeer on Svalbard (Spitzbergen) are not as sensitive to humans as the wild reindeer on the mainland. The Svalbard reindeer (*Rangifer tarandus platyrhynchus*) has been protected by law since 1925, and hunting is more restricted than in the mainland-mountains. Besides, the reindeer on Svalbard are seldom killed by predators, like polar bears (*Ursus maritimus*), because healthy reindeer usually outrun them (Derocher *et al.* 2000, 677).

The reindeer has what James Gibson (1986) termed "affordances" which structure the relationship between humans, non-human lifeforms, things and reindeers. The reindeer offers ready-to-act possibilities to humans independent of time and culture. Its raw-material (Olsen 2010, 163), the whole body of the *Rangifer tarandus tarandus*, has for thousands of years offered humans food, clothing and material for making tools. Humans have then transformed the reindeer- raw-material into Things that were useful for whatever economic, symbolic or cultural adaptive strategies they found sensible.

<2>Hunting and trapping in medieval laws

The mountain areas were in many cases commons, and the right to trap and hunt was regulated by laws in the Middle Ages.

The early medieval *Frostatingslova*/the law of Frostathing ("thing" means assembly) covering Central and North Norway includes a paragraph that regulated how to set up pit fall trapping systems in the commons: Any man could build pit fall traps as long as he did not disturb another man's hunting/trapping-luck. The distance from another man's pit-falls should be so long that it would not be possible to hear the sound of an ax-strike The law states that if a pit fall system has been falling into decay for a period of 20 winters, another trapper can take over the system and use it "if he maintains it" (*Frostatingslova*, 206, "Om dyrgardar" chap. 9). Another paragraph states that no man can dig pit falls on another man's property without permission ("Om dyrgilder", chap. 7, 191)

Gulatingslovi/the law of Gulathing covering Western Norway does not mention a paragraph on trapping systems ("Um dyrgardar"). This may be because large trapping systems were rare in the western mountain areas. The law says that any man can hunt animals independent of who own the outfields. But if he hunts with dogs he cannot hunt on another man's ground

(Gulatingslovi, chap. 24, "Um dyreveiding", 121). This law has an interesting paragraph concerning animals chased into the water; if another man than the one who owns the ground, kills the animal, he is entitled to a part of the animal called *skotbog*, that is the front shoulder of the animal. The *skotbog*-paragraph is repeated in later laws (King Magnus' law, "Landsleiebolken", chap. 59 and King Christian V's law, Femte Bog.10 cap.).

King Magnus Lagabøters Landslov (a law building on the earlier regional laws, mentioned above, covering the whole of Norway) from AD 1274 includes a paragraph ("Landsleiebolken", chap. 63) that repeats *Frostatingslova* on how to set up pit fall trapping systems in the commons with the addition that it should not be built too near a place where another man planned to build houses. King Magnus' Law reduced, compared to *Frostatingslova*, the period of decay permitted to 10 winters ("Landsleiebolken", chap. 63). The ten-year limit was repeated as late as in 1687 (*Christian V's Norwegian Law*/ Christian Vs Norske Lov, 15. April 1687: Femte Bog.10 cap.).

What we can read from these legal sources are that a trapper did not *own* a pit fall trapping system sat up in the commons, but he had a right to construct and *use* a system, but that right was dismissed if the system was not maintained. The addition in King Magnus' Law from 1274, that pit fall traps should not be built too close to a place where another man planned to build houses, was quite sensible: In the 13th century, due to a growing population, the high mountains were increasingly used as summer pasture for cows, sheep and goats. Pit fall traps near shielings and summer farms, could constitute a lethal danger for domesticated animals. The perils of traps have also been mentioned in laws issued on the Continent for example in The Visigothic law of *Liber Iudiciorum* from AD 654 "a clear distinction is drawn between setting traps far from human habitations…..and setting traps in the neighbourhood of settlements…" (Giese 2013, 488). Another interesting continental parallel concerning the *skotbog*- paragraph is found in a law issued in 643 (The Lombard laws of Rothar's Edict) which maintains that anyone who finds an animal wounded by "another man or held in a cage trap or surrounded by dogs, or which is dead, and he kills the animal himself and leaves it, may take the right foreleg of the animal together with seven ribs if he makes it clear that he has done it with good intent" (Giese 2013, 490). On the other hand if he hid the animal, he would be fined six *solidi*. As in the Law of Gulathing compensation was given to the honest and eager hunter.

The Norwegian medieval laws were, concerning activities in the outfield areas and mountains, grounded on traditional practice (sedvanerett), that is what had been the custom from "old times and age"/*forno fare or at forno* (Helle 2001, 43). Wording and phrases in the Danish-Norwegian King Christian's law from 1687 are quite similar to the ones used in Frostastingslova which was written down c. 500 years earlier. Furthermore, historians are certain that the early medieval laws were created and in use for a long period before they were written down (Helle 2001, 40–41).

Concerning hunting and trapping of reindeer this is of interest because the laws demonstrate an age old tradition that did not demand a "modernization" of duties and rights; what was considered accepted custom in the Viking Age, was also formulated as an adequate law during the reign of Christian V, long after the Kingdom of Norway had lost independency and the country was considered as a province of Denmark. The remarkable in these long lasting normative rules, is that in 1687 the mass trapping of reindeer had ceased in South Norway, but the law still regulated the making of pit fall traps.

<1>Who were the hunters and trappers?

Much of the discussions concerning the mass trapping of reindeer have revolved around the following questions: Who controlled this almost industrial killing of reindeer? Who were the hunters and trappers? Were they specialists living close to the trapping systems, or were they local valley farmers?

Arne Skjølsvold (1980) suggested that the trapping and hunting of reindeer could have been conducted by specialized groups of hunters living permanently in the mountains. This idea has now been rejected by most researchers: "The use of the traps must be seen as an additional source of income for agriculturalists living in the neighbouring valleys and in the heads of the fjords on the eastern and western sides of the mountains" (Bang-Andersen 2004, 86). However, the ethnicity of the hunters and trappers during the Viking- and Middle Ages are currently under discussion (cf. Fjellheim 2005, Bergstøl and Reitan 2008, Risbøl *et al.* 2011, Amundsen and Os 2015, Gjerde 2016, Amundsen 2017): Were they Norse, Sámis or a mixture of both ethnic groups with different roles and special knowledge in catching and hunting reindeer? None of these questions can yet be answered decisively but suggestions have been made..

Concerning the water trapping on Sumtangen, Indrelid and Hufthammer suggest that "… an enterprise of such dimensions as the 13th century mass-hunt at Hardangervidda is far above the effort that could be organized in the local communities. The farmers of the nearby valleys and fjord districts during the Iron Age and Medieval times commonly used bows and arrows or pitfalls, killing just one or a few animals at a time" (Indrelid and Hufthammer 2011, 8).

Egil Mikkelsen maintains that in the thirteenth century the King, the Archbishop and subordinate bishops had economic interests in farms close to the funnel shaped trapping system at Einsethø. And that "this was hardly due mainly to the agricultural produce they might thus acquire – trapping and the produce from this activity were of great interest to the King and the clergy" (Mikkelsen 1994, 178). He sketches a scenario where a lot of meat could be consumed locally, but also that dried meat and furs, along with antler, were transported for sale in the towns. Mikkelsen indicates that comb makers switched from making combs of antler to making them of bones around AD 1300, and that this might have had an effect on the profits of mass trapping reindeer.

Edvard K. Barth concludes, concerning the system on Einsethø and four other places in the Rondane area that an "appreciable number of people must have been involved in this hunting and it is thought that the trapping system is very old (but we) have no facts to tell us where these people lived…." (Barth 1983, 114).

Funnel shaped trapping systems with converging fences (called *vuopman*) in Finnmark, North Norway, are considered to be exclusively organized by the Sámi population (Hansen and Olsen 2004: 186). Maybe the funnel shaped trappings systems in South Norway were built by the Sámis and Norse as a joint cooperation?

Birthe Weber, who excavated the houses on Vesle Hjerkinn, close to the impressive pit fall system crossing the Dovre plateau from Dombås to Kongsvoll (cf. above) considers that the "…use of such systems presupposes the cooperation of many men, most possibly recruited from the farms in Dovre and organized in groups. Each group managed one section of the system" (Weber *et al.* 2007, 207–208).

All of the above mentioned researchers agree that mass trapping of reindeer was labour intensive and required cooperation of a number of people. I concur with this argument: The entanglement of humans, things and animals produced complex materialites connected to labour intensive activites. Local Norse people from the surrounding valleys must have been

involved. Sámis lived in the vast forest- and mountain areas of Southeast- and Central Norway. Traces of Sámi dwellings dated to the medieval period have recently be found as far south as in Hallingdal area (Gjerde 2016). Concerning the ethnicity of the trappers it is possible that both Norse and Sámi cooperated. But based on the current archaeological material there are no substantial evidence of such cooperation (Bergstøl 2008, 153–156).

The view that the Crown or Church somehow was involved in the mass trapping is based on indirect evidence, for example that these institutions owned farms not very far from the mass trapping systems. What we certainly know is that products of reindeer (combs) were included in exchange network from the Iron Age and onwards. In the medieval period combs were mass produced and included in networks of market economy. Excavations in the medieval towns have recovered bits and pieces of reindeer antler in large amounts (Hansen 2005, 180–184). Most of this waste material is without doubt associated with comb making; for example of 125 combs found on a single excavation site in Oslo, 95 % were made of reindeer antler (Wiberg 1987, 413). In the thirteenth century the mass trapping of reindeer must have been integrated in an urban exchange network.

Indrelid and Hufthammer suggest that local people could not have organized the mass trapping at Sumtangen; it was just too big an enterprise. I disagree on this point. The thirteenth century medieval society in Norway was a hierarchical society (Solli 1996). Mighty landowners could control many farms in a region; these landowning families had resources and capability to control their peasants and tenants. In my opinion they would be able to gather the people necessary to organize mass trapping like the one on Sumtangen, Einsethø and Verket. Locals, whether of Norse or Sámi ethnicity, had the best knowledge of the migratory routes of the reindeer and the intrinsic expertise of how to use the affordances of the landscape. The local magnates did not need the direct help of townsmen, but to market the produce they had to be part of an exchange network. Thus my suggestion is that the trapping could have been organized locally; the King, Archbishop/Bishops and townsmen became involved in the line of exchange at a later stage. The Crown and Church were able to claim taxes, and the townsmen could as middlemen earn profits by selling the yield of the reindeer trapping on the market.

<1>Temporality and entanglement

Stalking reindeer on snow- and ice patches has paid off both for archery hunters during thousands of years, and for firearm hunters since the seventeenth century. The complexity of

society plays little role in this kind of hunt; it could be done in the Stone Age as well as today. Only an extinction of reindeer will end this light entanglement way of hunting. Stalking reindeer on snow- and ice patches constitutes relatively small investments which entangle fewer actors and things, with less entrapment and dependency as a result.

During at least 4000 years reindeer have been caught and trapped in various systems: Pit fall traps, funnel shaped systems leading to a killing pen, systems leading the reindeer into a lake, and then killing them. These systems have changed considerably over time and the changes seem more dependent on cultural and social phenomena than the "stalking-reindeer- on-snow- and ice patch- method".

A certain evolutionary direction can be detected concerning reindeer hunting- and trapping strategies in Norway; the evolution concerns both time and entanglement. The first reindeer hunters did not build large trapping systems; none have been found yet. They hunted with bow and arrow, and they might have used scaring strategies, using cairns or scare sticks, killing the animals on ice- and snow patches. In the Sumtangen area the dating of reindeer hunting goes back to the Middle-Mesolithic, and this activity could also have been associated with water trapping.

Constructing mass trapping systems bind people to the reindeer hunt because of all the time and energy spent on building them. The systems must be maintained and checked, they are not stable (cf. Hodder 2012, 68–87) and "finished" once and for all; to function well they require attention of labour force, season after season. The stone-and wood constructions must be activated, put into practice and used every season to pay back for the effort. The trappers have become entangled with both the constructions and the animals, they are entrapped into the yearly hunt. However, if the amount of reindeer afforded to the trappers decreased radically in numbers, the trappers would disentangle themselves from the dependency and entrapment. At the end of the thirteenth century this was what happened concerning the mass trapping systems at Sumtangen and Einsethø.

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Figures:

Figure 1: Reindeer taking refuge on the ice patch Juvfonne, August 2009 (Photo: Brit Solli)

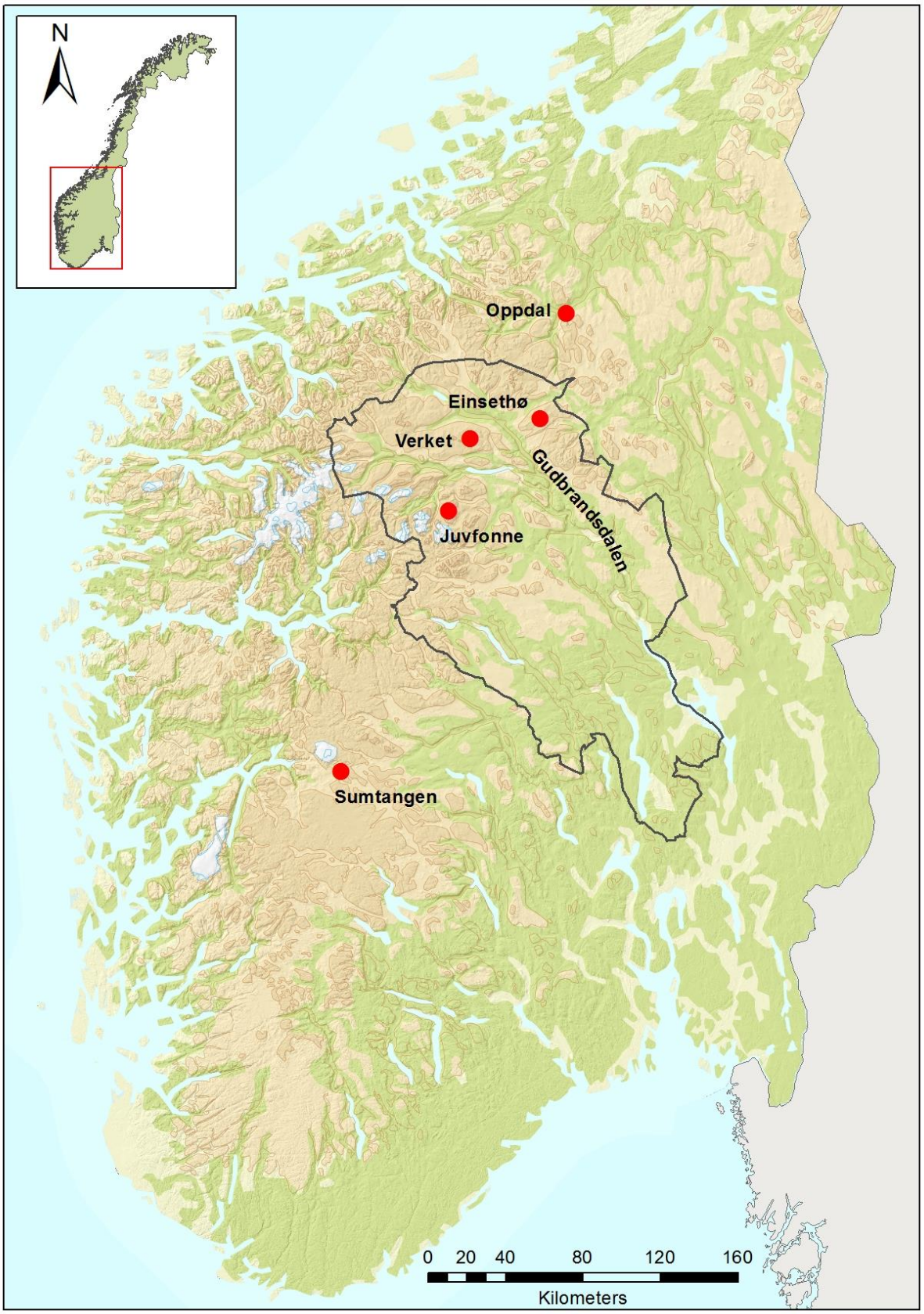

Figure 2: Map with place-names of important sites mentioned in this article (Map: Magne Samdal, Museum of Cultural History, MCH)

A206_229_F1: skremmepinne, brefunn fra Oppland. Copyright: Kulturhistorisk museum, Universitetet i Oslo. Fotograf: Ann Christine Eek 2006.

Figure 3: A complete scare stick (Photo: Ann Christine Eek, MCH)

Figure 4: The tunic (C57874) found on Lendbreen in 2011 (Photo: Marianne Vedeler, MCH)

Figure 5: Pit fall trap of the round type in Lordalen (Photo: Per Jordhøy, NINA)

Figure 6: Pit fall trap of the stone built rectangular type in Gravdalen (Photo: Per Jordhøy, NINA)

Figure 7: The water trapping site Sumtangen at Hardangervidda (Photo: Jostein Bergstøl, MCH)

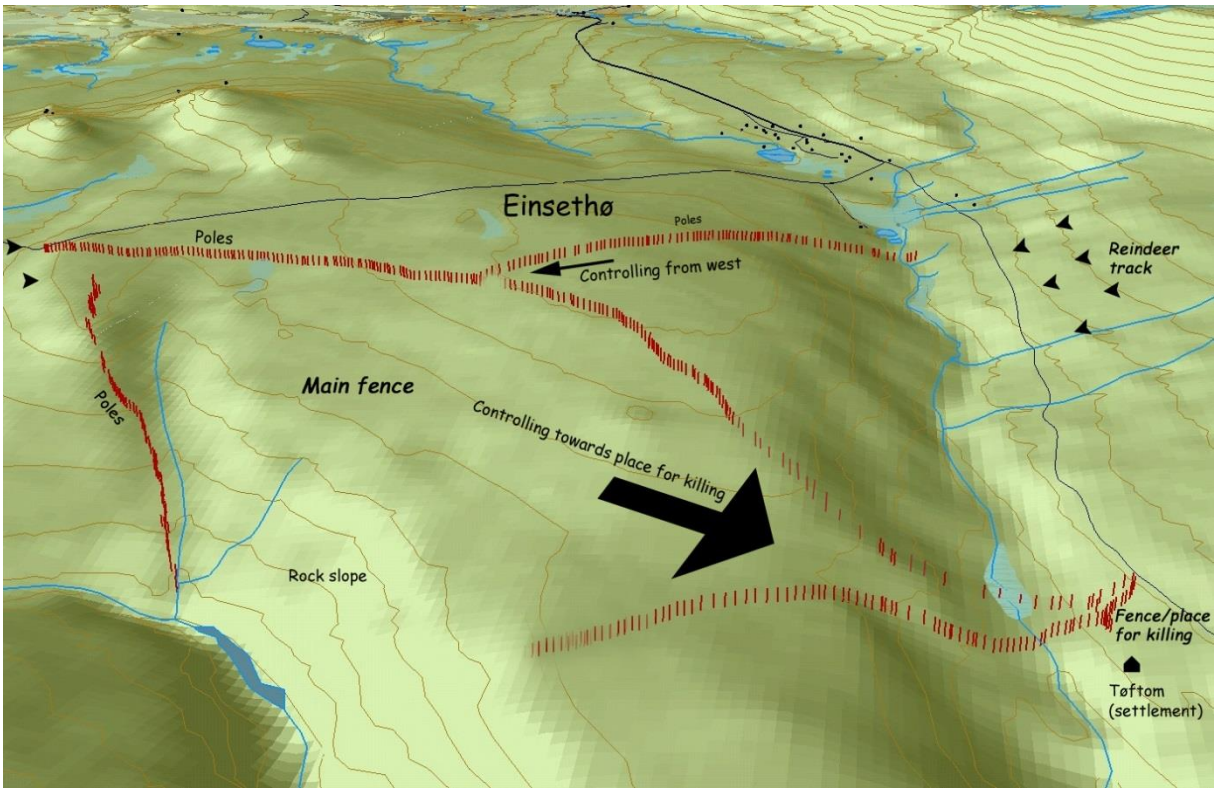

Figure 8: The funnel shaped mass-trapping site at Einsethø (Map: Per Jordhøy, NINA)

Figure 9: Overview towards kill and slaughter site at Verket (Photo: Brit Solli)

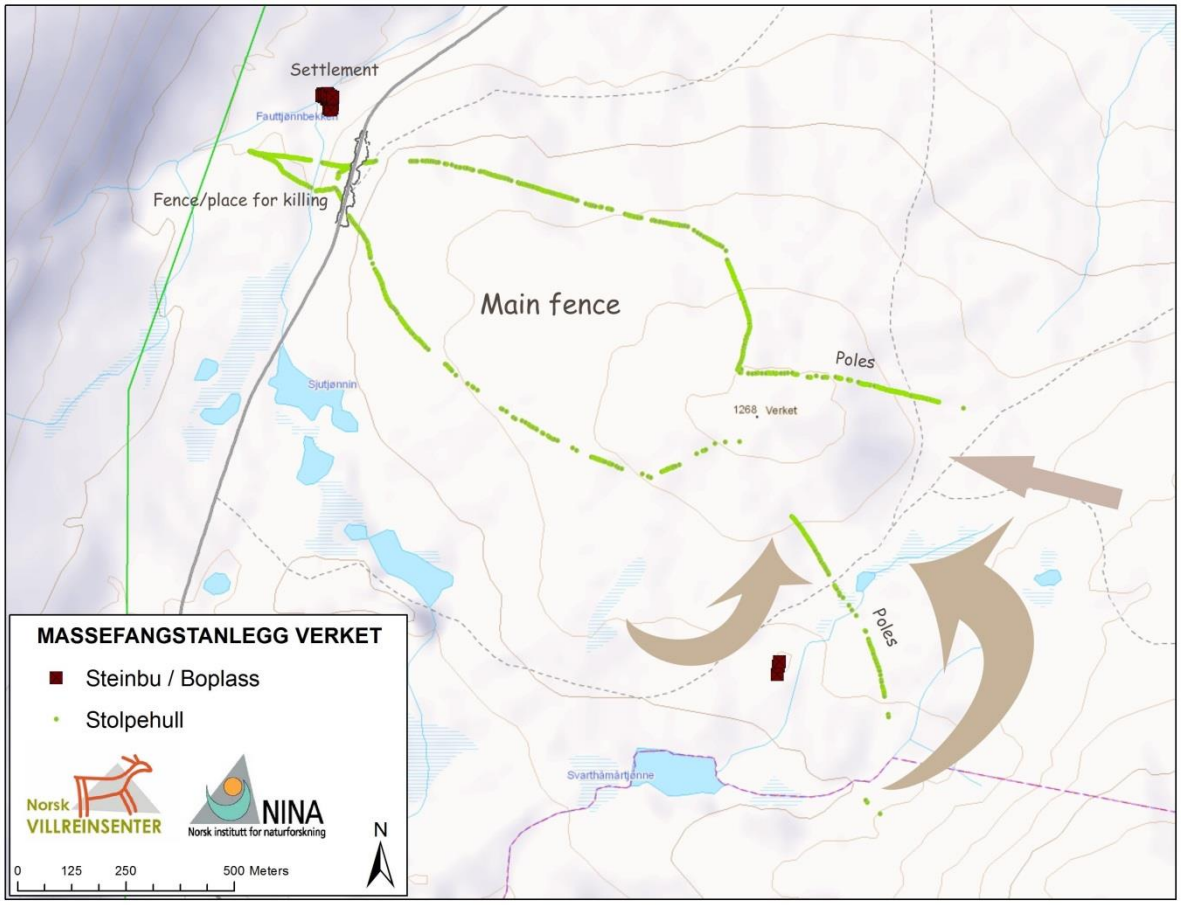

Figure 10: The funnel shaped mass-trapping site at Verket (Map: Per Jordhøy, NINA)

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