

## PREHISTORIC REINDEER-HUNTING IN THE SOUTHERN NORWEGIAN HIGHLANDS

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**Abstract:** In contrast to the European alpine areas and lowland plains, where *Rangifer tarandus* L. became extinct during the final Late Glacial, the species has survived in a wild state in relatively unchanged natural environments in parts of the southern Norwegian highlands. As a consequence, reindeer behaviour and reindeer hunting strategies both in the Mesolithic and during later periods can be tentatively transferred from observations of animals still living here and archaeological remains. The pioneer use of the interior of Norway were short-term reindeer hunting expeditions to recently deglaciated highland areas 9800 uncal. y. BP, soon after the colonization of the outer coast. During the following three thousand years, most major mountain areas came successively into use as hunting grounds. This paper summarizes current research on coast-to-mountain mobility patterns and reindeer hunting methods in Southwest Norway, from stealth hunting with stone-tipped arrows to the application of permanent stone-walled reindeer pitfall traps. Recognition of both existing wild reindeer biotopes and physical remains from prehistoric reindeer hunting as unique parts of the World Heritage is emphasized.

**Keywords:** Pioneer settlement, mobility patterns, mountain exploitation, reindeer hunting, pitfall traps

**Résumé:** Au contraire des zones alpines et des basses plaines de l'Europe où le *Rangifer tarandus* L. s'éteint à la fin de la dernière ère glaciaire, cette espèce a survécu à l'état sauvage dans un environnement relativement préservé dans une zone montagneuse du sud de la Norvège. En conséquence, il est possible d'essayer de restituer le comportement du renne et les stratégies de chasse, tant au Mésolithique que lors des périodes postérieures, à partir à la fois d'observations d'animaux toujours vivants et des restes archéologiques. L'utilisation pionnière de l'intérieur de la Norvège correspondaient à de brèves expéditions de chasse dans des zones montagneuses récemment déglacées. Elles peuvent être datées aux environs de 9800 BP non calibré, immédiatement après la colonisation des côtes. Durant les trois millénaires suivants, la majorité des principales aires montagneuses sont successivement exploitées pour la chasse. Cet article présente l'état de la recherche sur les modèles de mobilité de la côte vers la montagne au sud-ouest de la Norvège, ainsi que sur les techniques de la chasse au renne. Ces dernières vont de la chasse discrète avec des flèches à pointe en pierre à la création de pièges creusés et aux parois aménagés de murs de pierres. L'existence de biotopes où existent des rennes sauvages et les restes physiques de la chasse préhistorique au renne constituent des éléments uniques de l'héritage du monde.

**Mots-clés:** Première interaction humaine, modèle d'occupation, exploitation de la montagne, chasse aux rennes, trappes

### INTRODUCTION

Highland occupation by hunter-gatherers represents a widespread phenomenon in Europe's prehistory with large geographical and chronological variation due to differences in natural environments and cultural background. The aim of this paper is to present some main results from recent archaeological research on prehistoric reindeer-hunting strategies in the Norwegian highlands, an area of work which to a large extent seems to be inadequately known outside the Scandinavian academic circles. By throwing light on prehistoric inland and mountain use within environmental settings essentially different from most other parts of the world, it may hopefully give perspectives and ideas to ongoing studies on hunting methods, site types and mobility patterns in more centrally located European montane areas. Due to the restricted space I shall concentrate *geographically* to the Southwest Norwegian highlands and *thematic* on the pioneer phase of use, coast/inland mobility patterns and the capture of wild reindeer through time by different hunting methods. The physical character of the actual areas, the landscape history and peopling of Norway will first be addressed.

Western Norway, directly facing the open North Sea, is a landscape of great variation made up mainly by unprotected outer coastlines and long, narrow East-West

oriented fjords as Sognefjord penetrating up to 200 kilometers into a strongly undulating gneiss-granitic landmass belonging to the Caledonian mountain range. The only large basin is Boknafjord with a myriad of islands and sounds behind the City of Stavanger. The southwestern mountain areas, characterized by ice-scraped rock surface with little or no quaternary deposits, a large number of small lakes and some few glaciers are mainly situated between 800 and 1200 m above sea-level. In northwestern and central parts of the southern Norwegian mountain chain the highest peaks are of far more Alpine character, protruding up to 2500 m. A population of about 30000 reindeer of tundra type still exists dispersed over 40000 sq.km (Skogland 1994: 37), making these mountain areas environmentally unparalleled elsewhere in Europe.

Deglaciation of the outer coast between 15000 and 14000 y. BP<sup>1</sup> represents a *terminus post quem* for the colonization both of coastal Southwest Norway and of Norway in its entirety. The Late Glacial terrestrial macrofauna is not known, except reindeer which can be traced back to 12500 BP at Blomvåg outside Bergen (Lie 1986: 41-46) and survived on the coast at least until 10200 BP at Egersund further south (Lie 1990: 7-21).

<sup>1</sup> All C-14 datings are in uncalibrated radiocarbon ages, when not otherwise stated.

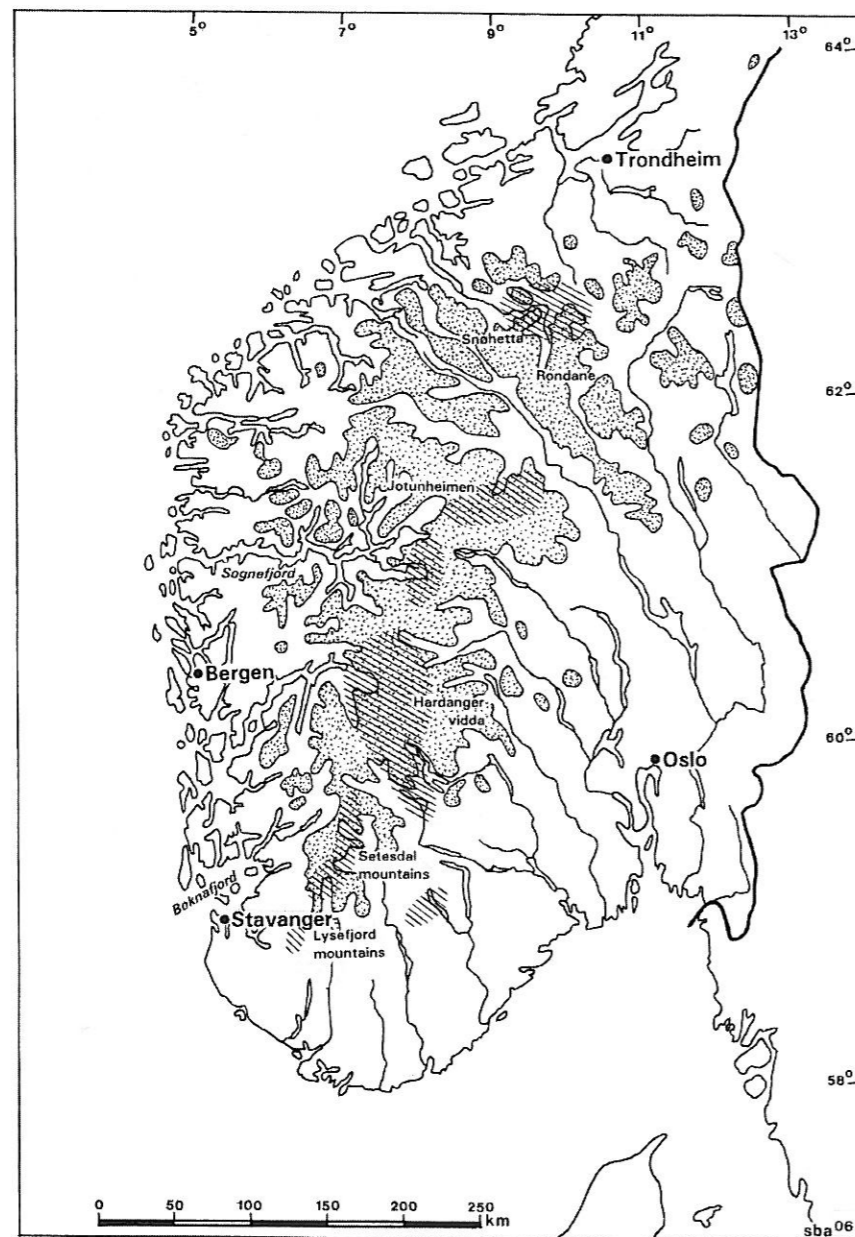


Fig. 9.1. Map of South Norway showing land above 1000 m a.s.l. (stippled), main concentrations of Stone Age sites attributed to reindeer hunting (shaded) and mountain areas treated in the article

Around 10000 – 9800 BP the frontline of the inland ice was positioned at the mouths of main fjords as the Lysefjord and the Sognefjord, and between 1000 and 1500 years later all mountain areas except the Hardangerjøkulen massif were deglaciated (Andersen 1980: 214; Anundsen 1985: 220-223; Nesje *et al.* 1994: 380). A progressive retreat of the ice-cap opened wide inland areas with a sprouting herbaceous cover to be utilized: on a year-round basis by reindeer – and these more occasionally by two-legged predators.

In spite of favourable conditions probably existing already during the Allerød chronozone, the earliest coastal settlement in Southwest Norway was first established around the Glacial / Holocene transition 10000 BP

(Bjerck 1994: 25-58; Bjerck 1995: 131-144; Høgestøl & Prøsch-Danielsen 1995: 123-130; Bang-Andersen 1996: 219-243; Bang-Andersen 2003a: 5-14). Within just five to ten generations, which archaeologically may be characterized as an “event”, the whole of the 3000 km long Norwegian coast from eastern Oslofjord to North Cape became inhabited due to extremely rich maritime resources and well-developed sea-faring and sea-hunting technologies (Bjerck 1990: 1-32).

#### MESOLITHIC COAST/INLAND INTERACTION

Reindeer, migrated from the North European plains via the former dry North Sea bottom and sea-ice covering the



Fig. 9.2. Aerial view of a 9800-9300 (radiocarbon) yr. old multiple occupied open-air hunting site with two tentrings at lake Store Fløyrlivatn in the Lysefjord mountains. The outwashed moraine-ridge derives from the Younger Dryas glacial advance stage. Photo: Museum of Archaeology, Stavanger©

100 – 150 km wide Norwegian rift during the winter months, were probably *not* as some scholars (e.g. Rolfsen 1972; Fuglestad 2001) have suggested, the main economic or supernatural incentive for the colonization of coastal Norway. By then most reindeer herds were no longer directly available, having moved to ice-free areas in the mountains.

For a long time the archaeological record of the earliest inland enterprise was virtually unknown due to strong emphasis on coast/lowland fieldwork and research. Until a few decades ago the earliest sites attributed to reindeer hunting in southern and southwestern parts of the Norwegian highlands were dated to about 7000 uncal. y. BP, at the central plateau of Hardanger-vidda to about 8300 and in the northern parts of the main mountain chain to about 8800 BP (Bang-Andersen 1989: 338-34). This is now turned upside-down by groups of open air reindeer hunting sites at lakes Myrvatnet and Store Fløyrlivatnet (610 and 760 m a.s.l.), situated 20 km apart in the Lysefjord mountains in Southwest Norway, with earliest C-14 ages of 9600 and 9750 y. BP respectively.

All sites are open-air, highly restricted both in extension (ca. 10 – 50 sq.m) and find amount (ca. 500 – 4000 lithic artefacts), and some contain extraordinarily well-preserved tentrings and hearths (Bang-Andersen 2003b). There can be little doubt about the validity of the datings as the charcoal samples derive mainly from short-lived trees as

willow and birch, are contextual, processed with low levels of confidence (usually 50 to 100 years) and in accordance with the site inventories of tanged points, simple lanceolates and Zonhoven points of flint, or more occasionally rock crystal or quartz (Bang-Andersen 1990: 215-226; Bang-Andersen 2003: 5-25). Compared to the main climate development of continental Europe (f.i. Mörner 1993: 249) the Norwegian inland and mountain enterprise appears to have started virtually in the cool shadow of the Piottino Oscillation between ca. 9900 and 9700 uncal. y. BP.

It is important to note that the earliest Myrvatnet/Fløyrlivatnet sites were in the neighbourhood of the retreating inland ice, suggesting a harsh and windy periglacial tundra-like environment with reindeer as the main and probably only accessible big game. The exact distance to the ice from human habitations has so far not been possible to determine, as two marginal moraine systems (Trollgaren, Blåfjell), indicating moister climate and glacial advance stages in the area during the Pre-Boreal chronozone, are only indirectly radiocarbon dated to about 9600 and 9300 plus/minus 200 y. BP (Andersen *et al.* 1987: 10). A number of twenty-six C-14 datings from the settlement sites attest discontinuous series of stays of a sporadic character at Myrvatnet/Fløyrlivatnet, not separated by extremely long periods. The size and character of the sites point to visits of restricted hunting parties of three to five persons.

In this author's opinion the sites may only be interpreted as the products of late summer or early autumn expeditions performed by logistical mobile task groups with home territory on the coasts of Southwest Norway. Following the linear main drainage systems of rivers and valley lakes, the distance from most likely points of departure in the lowland is only 30 to 60 kilometres, or between two and four days travel upstream (Bang-Andersen 1990: 225; Bang-Andersen 1996: 436-439; Bang-Andersen 2003a: 12). Compared to seasonal movements of 500 kilometers or even more, documented among certain sub-recent circumpolar hunter-gatherer societies (e.g. Rogers 1972), and necessary also for most prehistoric coast/mountain interaction patterns in central and southern Europe, the short transportation lines would seem to ensure high economic yields at low time efforts. A limiting factor which has to be given priority by future research, is the general lack of Mesolithic transit sites, which according to the theory as a matter of necessity should exist in the intermediate zone of steep and narrow valleys connecting coast to inland. However, the locating of such sites used only for short overnight stays or some hours' rest, may be like finding the needle in the haystack. One probably needs to look very close *both* to classical settings like dry terrace banks and marked river-lake confluences and more untraditional, unsuspected sites in order to succeed.

#### REINDEER AS PREY ANIMAL AND A HUMAN RESOURCE

Due to a total absence of osteological material in the Early Mesolithic southwest Norwegian mountain sites, the suggestion of reindeer as the "one and only" prey is hypothetical, but logical judged indirectly as to the site location in relation to recent reindeer ethology, and the specialized, task-specific artefact inventory exclusively made up by razorsharp arrowheads and scrapers. In spite of relative moderate weights (adults normally 60 -100 kilos), wild reindeer of the Eurasian tundra/mountain subspecies (*Rangifer tarandus tarandus* L.) may rightly be characterized as drugstores and tool boxes, as even the viscera and stomach content is eatable and of high nutritional value. At the same time reindeer represent mobile drugstores and tool-boxes due to the unique insulation effects of the skin and the applicability and physical strength of reindeer antler, bone and sinew material. This author recognizes the latter properties to have been the major motivation behind the coast/inland/mountain enterprise during the Mesolithic, together with the special excitement, spirit and challenge attributed to reindeer hunting.

Despite many Mesolithic sites being investigated, the cultural historical implications of this specialized reindeer exploitation are at best poorly understood. However, reindeer generally appear unpredictable in smaller or larger aggregations in predeterminate landscape enclaves, and are easily killed by bow and arrow within a range of



Fig. 9.3. Oblique close-up photograph of an exceptionally well-preserved stone-walled reindeer pitfall at Litledalsfleene in Suldal municipality, Setesdal/Ryfylke mountain region. Photo: Museum of Archaeology, Stavanger©

25 to 30 m. Contrary to what has earlier been claimed (Clark 1967: 64-65; Gordon 2003: 15-23), the herds are not at all easy to follow and round up on main migrations when they proceed long distances per day in open landscapes. The animals have to be intercepted by the "head-'em-off-at-the-pass" or, probably less frequently, the "search-and-destroy" method (Burch 1972: 346-347; White 1989: 609-632) at topographical bottlenecks during seasonal or daily moves. An alternative to stalking individual reindeer is collective drives on land or into water, postulated to have been performed as early as in the Late Glacial during reindeer fall migrations passing the classical Ahrensburgian tunnel valley in Schleswig-Holstein (Bokelmann 1991: 72-81; Schild 1996: 146), and described in far closer detail from sub-arctic eskimo and sami societies (e.g. Leem 1767). As all variants of mass killing of gregarious big game presuppose deliberate planning and a larger number of human participants, such massacres are not found relevant to explain the background of the small, task-specific Early Mesolithic sites in the southwest Norwegian mountains.

As other highland regions in Norway were later taken into use from geographically widely different coast or valley areas, it seems justified to speak of not just one, but a succession of "first discoveries" of the mountains. During the later Mesolithic, the Neolithic and the Bronze Age seasonal exploitation of reindeer by bow and arrow continued in the mountain areas in southern Norway, to a large extent carried out from the same lakeside positions by reoccupation of earlier open-air hunting stations (Bang-Andersen 1989; Indrelid 1994), but increasingly also from rockshelter sites and stone huts.

#### LATER PERIOD REINDEER CAPTURE BY PITFALLS AND OTHER FIXED FACILITIES

Far more easily recognized remains related to prehistoric reindeer hunting than open-air field camps, kill-butcher sites and caches are *stone-walled pitfalls*. On a world basis this trap type has only been described from the southern Norwegian Caledonian range between Trollheimen in the North and the Lysefjord mountains to the South, a highly restricted area in Jämtland, inner Sweden, and one unverified occurrence at Andøya in northern Norway (Bang-Andersen 2004). These permanently installed expressive facilities intended to capture individual animals, in Norway characteristically termed "reindeer graves", consist of a 1,5 to 2 m long, 0,5 to 0,9 m wide and 1,5 to 2 m deep rectangular dry-walled catch chamber without any fixed ideal ratio, concealed by a horizontal camouflage cover of twigs and local vegetation. Low funnel-shaped approach fences of stone normally lead to one or both end-walls. Another variant of reindeer pitfall traps: *oval earth pits* dug without interior wall support and visible fences, exists far wider distributed in northern Fennoscandia, and allegedly in Siberia. In central Norwegian mountain areas these partly overlap with rectangular stone-walled and stone-fenced pitfalls.

Depending on the changing topography in different parts of the highlands the pitfalls are constructed singly, two or three together or as large systems of individual pitfalls connected by a low stone fence. The singular pitfalls, without comparison most common in the rugged and water-dominated mountain landscape in Southwest and West Norway, typically exploit narrow passes such as lake- or river edges, the foot of steep mountain slopes and the floor of gorges which still form parts of the reindeer migration routes of today (Barth 1983; Bang-Andersen 2004). Essential to note is that the pitfalls, stone-walled or not, were intended for passive capture of animals moving unsuspecting at slow pace, and to keep the prey trapped alive until it could be taken care of – virtually: put to death. The bottom of the catch chambers is therefore not fitted with vertical, pointed stakes.

In spite of counted by thousands, less than 50 stone-walled reindeer pitfalls have been examined by excavation. Some localities have been radiocarbon dated

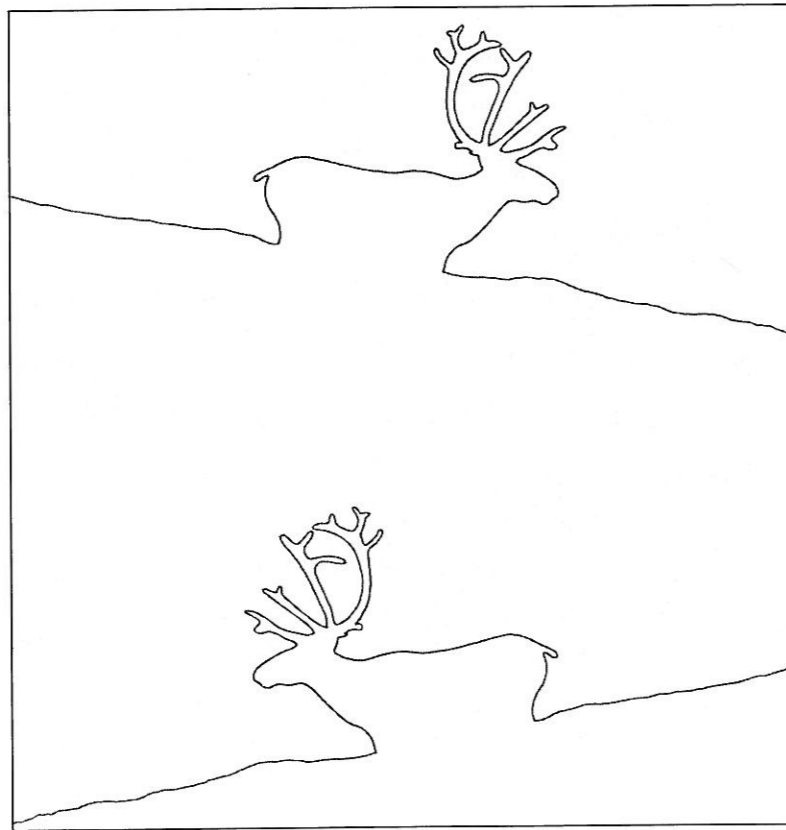
by preserved wood from the camouflage cover and others by buried humus horizons blanketed within the surrounding earth bank from the digging of the pitfall chamber, respectively producing possible minimum- and maximum ages. None of them are convincingly determined to the Stone or Bronze Ages. The main period of use is the Iron Age and Early Medieval, between approx. 1800 and 800 uncalibrated y. BP, when reindeer were still being hunted by bow and arrows as it appears from stray finds of iron arrowheads and wooden arrowshafts. The main performers now, however, were not all-time hunter/gatherers from outer coast- and fjordgap areas but part-time hunters settled as cattle and outfield farmers in adjacent valley and fjordhead landscapes (Bang-Andersen 2004: 44-67).

Adequate alternatives to the catching of individual animals by pitfalls or archery is *mass-trapping of reindeer* by actively driving large animal herds through elaborate, 300 to 4000 m long converging fence systems into narrow stone-built corrals or slaughter pens, or into large water basins. Neither the first method, documented in particular in the central massif of Rondane (Barth 1983: 112-113) and in North Norway, nor the latter, used for instance in parts of the Hardangervidda (Blehr 1973: 102-112), appear to have been applied during these later prehistoric periods in more abrupt, dissected and sparsely populated areas as the interior parts of Southwest Norway.

#### REINDEER HUNTING STRATEGIES WITHIN A EUROPEAN PERSPECTIVE

After having been a major prey animal widely dispersed both in coastal, upland and mountain areas on the European continent for tens of thousand years, most wild reindeer populations apparently became extinct during the close of Pleistocene; in the Alpes and in South France around 12000 y. BP (Bridault *et al.* 2000: 47-57; Bintz 2003: 145; Delpech 2003: 271-289). According to radiocarbon datings reindeer seem to have disappeared by the Late Glacial / Early Holocene transition in the eastern Baltic region (Ukkonen *et al.* 2006: 222-230), and later been wiped out from England, South Sweden and Denmark between 9700 and 9200 y. BP seemingly as a partly synchronous event due to environmental changes in the Pre-Boreal period (Barton & Roberts 2004: 339-341; Liljegren & Ekström 1996: 137; Aaris-Sørensen *et al.* in press). Few if any physical remains from this extensive, long-lasting hunting enterprise, profoundly influencing the minds and activity patterns of Late Glacial and Early Holocene human groups, have been preserved beyond settlement sites, on- and off-site depositions of reindeer bone and shed antler, and some cave depictions in southern Europe.

As described in the introduction, a similar ecological process occurred along the Norwegian coast, where the reindeer herds were not totally eliminated but displaced to inland areas, constituting the mountains of



South Norway as a final refuge for the Eurasian *Rangifer tarandus tarandus*. A parallel to this is the arctic tundra of Beringia and islands in the East-Siberian Sea (f.i. Pitul'ko & Kasparov 1996), which now contain the genetic remains of North-American / Siberian arctic and tundra reindeer *Rangifer tarandus pearyi* and *Rangifer tarandus granti*.

What appears in conclusion as the main legacy of Norwegian reindeer hunting and multiple landscape use in prehistoric times to European archaeology, and World Heritage management?

Firstly, the remarkably early approach by man towards mountain environments in Southwest Norway taking place only about one hundred years after the outer coast was permanently, and almost immediately after the actual area had been deglaciated, should be clearly borne in mind. Only the extremely compressed landscape relief of Southwest and West Norway with short geographical distances and low travelling efforts from seaboard to high mountains, combined with an actual presence of reindeer, may have made this pioneer enterprise into desolate periglacial landscape scenes possible. It seems as a highly relevant task to get the time-lag between first human coast and mountain utilization compared in other parts of Europe, for instance on the Malaga and Valencia coasts of Mediterranean Spain and along the Ligurian coast of France and Italy, where the distance to wide high mountain areas is only between 25 and 50 km or about similar to coastal Norway.

Secondly, a 12000 calendar-year long more or less unbroken tradition of coast/highland interaction with a varying degree of social complexness based on reindeer hunting, which is still being practiced. Different from most lower- and median-altitude Continental European mountain areas, the Norwegian highlands have until recently undergone relatively few environmental changes since the late Pre-Boreal. As a consequence wild reindeer has survived and kept its traditional way of life and migratory patterns more or less unchanged throughout the ages. By this, detailed observations of present animal behaviour appear to provide valuable clues to human activity in the past, far more explicit than elsewhere in Europe.

#### REINDEER AND REINDEER HUNTING TRADITIONS AS WORLD HERITAGE

In conclusion it is imperative to underline that the wild reindeer of today as permanent inhabitants of the Norwegian mountains since the deglaciation, represent the last genetic relicts of the populations of tundra type reindeer formerly inhabiting wide areas in Europe, and profoundly influencing both prehistoric people's mentality and daily behaviour. Due to the cumulative effects of large-scale watercourse development, road constructions and an increasing leisure industry establishments in the mountains of South Norway during the last decades, these tradition-bearers are now severely endangered. As a consequence, both Eurasian wild reindeer as a species and the manifold of physical remains connected to prehistoric reindeer

hunting – habitation sites, pitfall traps, corrals, meat caches, shooting hides, stray finds – should now be red-listed. In particular, still unspoiled hunting grounds and reindeer biotopes in the central Snøhetta-Rondane area deserve to be implemented as unique and irreplaceable mountain landscapes according to the terms and criterias laid down by UNESCO.<sup>2</sup>

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<sup>2</sup> Cf. f.i. Operational Guidelines, Annex 3, § 9-11.

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