IUCN Upstream process report on the "Reindeer Hunting Area in Dovrefjell"

March 2024

DISCLAIMER

The designation of geographical entities in this report, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Table of Contents

THE IUCN RED LIST OF THREATENED SPECIES

Throughout the report we have indicated the conservation status of each species as recorded in the *IUCN Red List of Threatened Species* at the time of the evaluation, where available; for more information please visit http://www.iucnredlist.org.

Keys to abbreviations:
CR: Critically Endangered
EN: Endangered
VU: Vulnerable
NT: Near threatened
LC: Least Concern
NE: Not Evaluated

Executive Summary

The State Party of Norway submitted an upstream request for four National Parks (Rondane, Dovre, Dovrefjell-Sunndalsfjella and Reinheimen) in response to the advice by ICOMOS' upstream report on cultural values (see chapter 1). Norway inquired whether, based on its value for reindeer, the site could be nominated under biodiversity criteria, hence potentially as a mixed site. Terms of Reference with a broadened set of questions and approaches (see Annex) were agreed with Norway. The upstream process was implemented as a desk review exercise through which IUCN requested species lists from the four National Parks. Based on the species lists provided, the IUCN World Heritage Panel considered at its meeting in March 2023 that the species numbers are notable so that there may be potential. Therefore, the Panel recommended that the upstream process should continue to explore the potential of the site further.

Therefore, further desk study was conducted by the IUCN-SSC and by WCPA experts and by IUCN's Biodiversity Assessment and Knowledge Team, Protected and Conserved Areas Team, Forest and Grassland Team and the Heritage and Culture Team across IUCN's Headquarters, IUCN's Cambridge Office and IUCN's European Regional Office. IUCN also incorporated advice provided by UNEP-WCMC.

At its meeting in December 2023, the IUCN World Heritage Panel carefully reviewed the IUCN draft report as well as all information provided by the State Party and agreed the following recommendations in relation to a number of possible nomination strategies. These recommendations are as follows:

A. Reindeer-focused nomination approach (mixed site):

IUCN considers with a high level of confidence that reindeer as single attribute of Outstanding Universal Value (OUV) would not meet criteria (ix) and (x) as these criteria are much broader in definition and cannot rely on a single species. In addition, the area in question would only cover a fraction of the relevant range. The Panel notes declining reindeer populations and important integrity issues for this attribute (disturbance through infrastructure, traffic, tourism, disease, etc. leading to a poor conservation status of Reindeer).

B. Cultural landscape nomination:

In case the State Party wishes to pursue a nomination as a cultural landscape, IUCN nevertheless strongly recommends that this potential nomination takes into account the natural values of the potential nominated property. The wild reindeer populations could serve as an important attribute within a broader OUV definition, if supported by measures mitigating the integrity issues for this attribute (e.g. mitigating fragmentation, improving conditions for reindeer migration). It is important to note that this would imply the need for conservation of reindeer to be assured in areas that the populations rely on for their viability, beyond the currently envisaged boundaries of the possible nomination.

C. Broadened biodiversity nomination approach within the existing boundaries (mixed site):

IUCN notes with a medium level of confidence that the Dovre, Dovrefjell-Sunndalsfjella, Rondane and Reinheimen National Parks alone appear to have a low potential to demonstrate global significance under criterion (x). These areas however do hold significant levels of biodiversity of European, and possibly global significance, but not at the level of OUV.

Therefore, we do not recommend pursuing a mixed site approach for the area, within the existing boundaries.

IUCN further notes that there may be potential to consider the application of criterion (ix) for a considerably larger area than the components under consideration, beyond the focus of this Upstream Advice request.

These recommendations have been shared with the State Party by letter of 21 December 2023. This report has been provided following an additional fact-checking procedure.

1. Background

In line with Article 121 of the Operational Guidelines for the Implementation of the World Heritage Convention, the "Upstream Process" provides an avenue for States Parties to evaluate the strength and validity of a site's application before investing significant time and resources towards a Preliminary Assessment. The Upstream Process is therefore a means by which the State Party may receive impartial advice, consultation and analysis from the relevant Advisory Body or Bodies and use this information to determine its decision on whether to formally commence a full application for World Heritage status.

"The purpose of the advice given in the context of a nomination is limited to providing guidance on the technical merit of the nomination and the technical framework needed, in order to offer the State(s) Party(ies) the essential tools that enable it(them) to assess the feasibility and/or actions necessary to prepare a possible nomination."

Operational Guidelines, art. 121, p. 38

It is worth noting that the Upstream Process may vary in the methodology employed, encompassing desk reviews, workshops, interviews, field visits, and other approaches, where deemed applicable. Whilst the Upstream Process may serve as a strong indicator of the site's potential to demonstrate Outstanding Universal Value (OUV), the advice given will not prejudge the results of any future Preliminary Assessment and Evaluation processes.

Norway engaged the Upstream Process in 2016, when advice was requested from ICOMOS for the potential serial site of "Várjjat Siida: 12,000 Years of Indigenous Arctic Heritage, in northern Norway (Finnmark)". Having amended the proposal in light of the findings, the State Party requested further Upstream Process advice from ICOMOS in 2018. Shortly before ICOMOS' scheduled mission, the 'Reindeer Hunting Area' was added to the mission programme for evaluation. The resulting report from ICOMOS expressed the need for the assessment of natural criteria (ICOMOS 2020).

Objectives and description of Norway's upstream process request

Norway's request for an Upstream Process with IUCN seeks to address the need, highlighted by ICOMOS, for further consideration of the natural values of the site. As such, ICOMOS noted that 'the importance placed by the State Party on the presence of the last remaining occurrence of wild reindeer in this area and arguments concerning the aesthetic beauty of the landscapes inevitably raises questions about the potential for this proposal to reach one or more of the natural criteria for inscription in the World Heritage List (criteria vii-x). Accordingly, ICOMOS has sought the preliminary views of IUCN. At this stage, further work is needed in order for natural criteria to be seriously considered (making this proposal both a cultural landscape and a potential 'mixed' site)' (ICOMOS 2020, p. 37). Norway's request therefore seeks to clarify whether the wild reindeer and their habitat may have the potential to meet criterion (ix) and/or (x).

Norway's submission, as such, provides a focused overview of the key characteristics of the potential nominated property's wild reindeer population, its genetic make-up, relevant threats, and existing management measures. Importantly, the application highlights the intrinsic relationship between wild reindeer and people in the region. These identified characteristics constitute the focus of the analysis provided in this report by IUCN.

Summary of the Terms of Reference

In consultation with the State Party, IUCN has broadened the approach for this Upstream Process beyond criteria (ix) and (x) and adopted the methodology of a desk review for this Upstream process, including conducting online meetings with the State Party and IUCN Commission experts, in order to obtain information about the current situation in connection with the potential nomination. IUCN has assessed the potential of the proposed site to demonstrate OUV in regard to two points:

a) the potential for the proposed site to meet any of the four natural heritage criteria (vii) to (x); and
b) the potential for the proposed site to be nominated as a mixed site under both cultural and natural criteria; or
c) as a cultural landscape with natural values recognised under cultural criteria only.

The present report includes recommendations on whether a robust case for global significance under natural criteria might be made, including advice on potential next steps.

Above all, IUCN thanks all State Party representatives involved in this upstream process for all their valuable inputs and provision of information as well as for all highly useful consultations during the Upstream process. Furthermore, IUCN thanks Ms. Anne Gunn Ph.D, SSC Deer Specialist Group's Rangifer expert, for providing indispensable advice. The draft Upstream report has made full use of her advice and input. The report itself was subject to review and validation by the IUCN World Heritage Panel before its submission to the State Party representative. IUCN is grateful to all members of the IUCN World Heritage Panel as well as to Ms. Josephine Langley, WCPA Member, and all experts from IUCN's Biodiversity Assessment and Knowledge Team, Protected and Conserved Areas Team, Forest and Grassland Team and the Heritage and Culture Team, across IUCN's Headquarters, IUCN's Cambridge Office and IUCN's European Regional Office, who have provided substantial inputs to this report. IUCN extends its gratitude also to UNEP-WCMC, which has provided valuable advice for the present report.

Brief description of the proposed area

The potential nominated property as included in Norway's upstream request represents a 505,200 ha extension in central Norway, including four national parks: Rondane, Dovre, Dovrefjell-Sunndalsfjella and Reinheimen. There are adjacent IUCN Protected Area Category (II) and (III) sites spanning four counties and thirteen municipalities. The western section of the potential nominated property is subject to a humid coastal climate with significant snowfall in the winter months. The eastern sections of the site experience cold winters and warm summers, with limited precipitation. Together, the area extends almost from the coast in the west to the watershed between the valleys of Gudbrandsdalen and Østerdalen in the east.

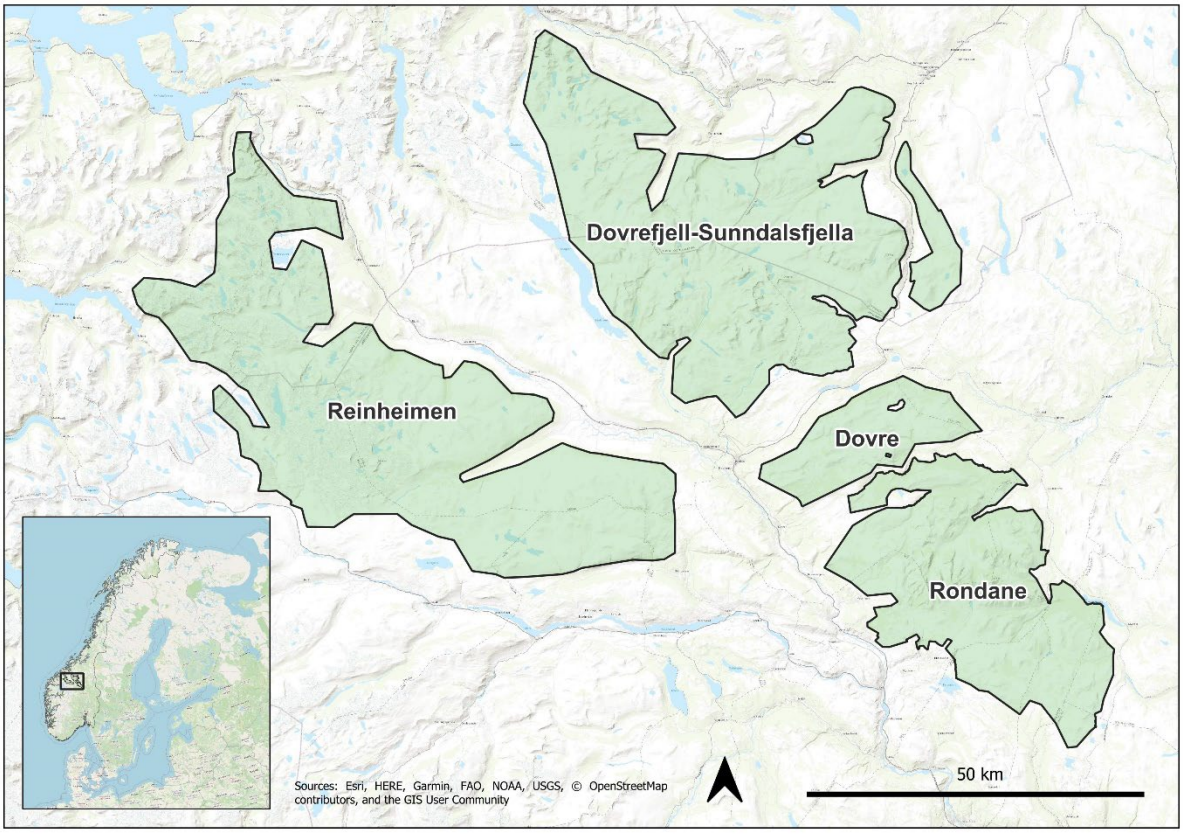


Figure 1: Map of the four national parks overlapping with the potential nominated property (Rondane, Dovre, Dovrefjell-Sunndalsfjella and Reinheimen).

The mountainous areas of the national parks stand at over 900 m.a.s.l. and are separated by deep valleys with sparse human inhabitation. The mountains of the west of the area are composed of alpine-like, jagged peaks, of acid gneiss bedrock with correspondingly poor nutrients and vegetation. In contrast, the mountains to the east of the potential nominated property are more generally rounded and sloping, upon calcareous bedrock with lush and diverse vegetation, up until the Rondane massif and the predomination once again of low nutrient soils. The valleys that separate the mountainous areas host wetlands and deciduous woodlands.

This topography is intimately connected to the practice of wild reindeer hunting, as it both creates predictability in the reindeers' movement patterns and necessitates a broad variety of 'catching devices' to suit the terrain. As such, the four national parks considered within the site are concurrent with both cultural heritage (e.g. pitfall traps, topographical naming, and archaeological finds related to reindeer hunting dating from the Mesolithic period) and wild reindeer populations.

Beyond the wild reindeer, the area also hosts Wolverine (*Gulo gulo*, LC (Regionally VU)), Willow Grouse (*Lagopus lagopus*, LC), Ptarmigan (*Lagopus muta*, LC), Golden Eagle (*Aquila chrysaetos*, LC), Gyrfalcon (*Falco rusticolus*, LC) and Rough-legged Buzzard (*Buteo lagopus*, LC) as well as numerous other bird species. The Reinheimen National Park alone contains 155 breeding species of birds, which was also noted by ICOMOS (2020).

Wider setting in terms of World Heritage properties

Norway currently hosts eight properties inscribed on the World Heritage List, of which only one, West Norwegian Fjords – Geirangerfjord and Nærøyfjord, is of natural heritage.

West Norwegian Fjords – Geirangerfjord and Nærøyfjord, inscribed in 2005 under criteria (vii) and (viii), encompasses two of the longest and deepest fjords in the world. In adopting the decision to inscribe the property on the World Heritage List in 2005, the World Heritage Committee noted that the fjords are comparable in scale and quality to other existing fjords on the World Heritage List "and are distinguished by the climate and geological setting". It was further noted that the Nærøyfjord and Geirangerfjord areas house "a great range of supporting natural phenomena, both terrestrial and marine such as submarine moraines and marine mammals. Remnants of old and now mostly abandoned transhumant farms add a cultural aspect to the dramatic natural landscape that complements and adds human interest to the area" (UNESCO 2005).

The "Reindeer Hunting Area in Dovrefjell" is located 600 km away from the Laponian Area World Heritage property, in northern Sweden, inscribed in 1996 under criteria (iii), (v), (vii), (viii) and (ix). IUCN analysis of the property, conducted in 1996, noted that "the site is of great cultural and economic significance for the Saami people, and reindeer herding is practiced throughout. The Saami have been resident for 4,000 to 5,000 years and have progressively substituted reindeer hunting for reindeer herding from the sixteenth century onwards." Some 200-250 Saami were estimated to spend summers in the nominated area, especially in the western part, herding 30,000-35,000 reindeer (IUCN 1996, p. 98).

Finally, it is worth noting Norway's potential interest in extending the Laponian Area through Tysfjord, the fjord of Hellemobotn and Rago. The potential nominated property is on Norway's Tentative List since 2002 and currently considered under criteria (iii), (v), (vii), (viii) and (ix) as well. Norway's description of the Tentative List site notes that "the combination of magnificent scenery, ancient cultural landscape and a living Lule Sami settlement beside Hellemofjorden is unique". In turn, the geography of the area is described as consisting of "an extensive, unspoilt mountain massif with varied topography, ranging from the high peaks in the northwest to a rounded upland plateau landscape in the east (…)" (UNESCO 2022).

All three sites share characteristics with the proposed Reindeer Hunting Area in Dovrefjell and serve to contextualise the criteria for OUV required for inscription on the World Heritage List and would therefore need to be carefully analysed in a Global Comparative Analysis in case a nomination for the present site would be pursued.

Approach

The present report by IUCN has been completed in accordance with the Terms of Reference presented in Annex. A team from IUCN consisting of specialists from World Heritage, Biodiversity conservation, WCPA and the SSC Deer Specialist Group have reviewed the available documentation to provide an impartial technical assessment of the area's potential to demonstrate global significance according to the corresponding natural criteria.

In the second chapter, the report discusses wild reindeer as potential attribute of OUV. Subsequently, the report broadens the view to discuss wider biodiversity values and other natural values of the potential nominated property. The Panel's recommendations are provided for the State Party's review and consideration to inform the decision as to whether to proceed in formally nominating the potential nominated property. IUCN appreciates Norway's

commitment and support for the World Heritage Convention and is grateful for its coordination and engagement to submit this Upstream request.

2. Wild reindeer as potential attribute of OUV

Introduction

This section summarises the natural attributes and ecology of Norwegian Wild Mountain Reindeer (*Rangifer tarandus tarandus*). Norway has, globally, the only remaining wild mountain reindeer of the subspecies *R. t. tarandus*. The Norwegian Wild Mountain Reindeer and their habitat are not an exact counterpart to North American and Russian Mountain Reindeer and Caribou, which are distinct sub-species (Tyler et al. In Press).

At the global level, Reindeer (*Rangifer tarandus*) is assessed as Vulnerable under Criterion A2 of the IUCN Red List of Threatened Species, due to an observed 40% decline over three generations (about 21-27 years) across the circum-Arctic countries, from about 4,800,000 to 2,890,400 individuals (Gunn, 2016). The Norwegian wild reindeer population constitutes some 25,000 (+/- 3,000) individuals, i.e. around 0.86% of the remaining global population.

This may qualify parts of the Norwegian reindeer population under Key Biodiversity Area criterion A1d (≥0.2% of the global population size AND ≥10 reproductive units of a species assessed as Vulnerable due only to population size reduction in the past or present). Therefore, a site containing ≥5,780 wild reindeer would stand a good chance as qualifying as a Key Biodiversity Area under criterion A1d. The species may also meet the same criterion if ≥0.2% of the species' global genetic diversity is represented within a site population, although the genetic diversity parameter has not yet been applied in practice.

A distinguishing feature of the Norwegian Wild Mountain reindeer from the point of view of science and conservation is their resilience and adaptability over time. Although human changes to the wild reindeer landscapes, especially roads and railways, have fragmented wild reindeer habitat and ended migratory pathways, the reindeer have persisted. The importance of their persistence as a model for other fragmented mountain and forest Rangifer sub-species cannot be underestimated.

The long-term relationship between humans and Norwegian Wild Mountain Reindeer is noteworthy for its duration and documentation. Additionally, and again from a point of view of science and conservation, current relationships between people and the wild reindeer are maintained through world class landscape and wildlife management practices.

Status and distribution

In 2021, Norway assessed Norwegian Wild Mountain Reindeer as Near-Threatened compared to Least Concern in 2010 (The Norwegian Biodiversity Information Centre 2021). The change in status was due to both the continuation of habitat fragmentation (loss of migrations) and an outbreak of Chronic Wasting Disease. Almost 60% of Norway is mountains, however roads, rail and hydro-developments fragment mountainous areas and consequently restrict the wild reindeer distribution (Figure 2). The wild mountain reindeer are found in central and southern Norway and overlap the distribution of domesticated reindeer.

Figure 2 (left): The wild mountain reindeer are found in central and southern Norway and overlap the distribution of domesticated reindeer (Source: Gundersen et al., 2022a).

The forest and mountain sub-species of Rangifer face the greatest threat due to their southern global distribution, which overlaps significantly with human settlements and activities. These sub-species have experienced long-term declines spanning decades, primarily attributed to the activities of timber and hydrocarbon extractive industries.

Consequently, moose and deer populations thrive, leading to higher numbers of wolves. The combined impact of habitat loss, direct responses to infrastructure such as roads, railways, along with occasional wolf predation, collectively drive the decline of forest and mountain Rangifer populations (González and Werner 2023).

Figure 3 (right): Historic wild reindeer distribution (M. Panzacchi, pers. comm.).

Historically (pre-1900s), wild reindeer distribution was more widespread with four large herds that seasonally migrated toward the coast for summer and returned inland in the fall (Figure 3). During the 1900s, landscape changes from human developments blocked migrations and the distribution of wild reindeer contracted and fragmented (Panzacchi et al. 2012). Currently, 24 populations and two national wild reindeer areas are recognised (Figure 4).

During the historic migrations, people hunted the reindeer using pitfall traps, fences and shooting pits. The wild reindeer spanned most of south-central Norway but then over the last 100 years, distribution contracted and the herds stopped using some of the former hunting sites although current migrations show partial continuity with earlier migrations based on the historic hunting sites (Panzacchi et al. 2012). Using GPS collars on wild reindeer shows the constancy of how wild reindeer current migratory pathways link back to their historic migrations based on the ancient stone pitfalls (Figure 5).

Figure 4: The national wild reindeer areas in the North of the map showing Central-southern Norway overlap the proposed Reindeer Hunting Area in Dovrefjell (Rondane, Snøhetta, Knutshø, Soinkletten and Forollhogna) (map from http://nvs.villrein.no/).

Abundance

Wild reindeer population during the winter in Norway has been relatively stable over the past 10 years at approximately 25,000 animals (+/- 3,000 animals). The largest herd (6,000 ± 200 animals) in winter can be found in Hardangervidda. The wild reindeer numbers for the national wild reindeer areas overlapping with the Potential Nominated Property vary annually but have remained relatively stable from 1974 to 2014 (Figure 6).

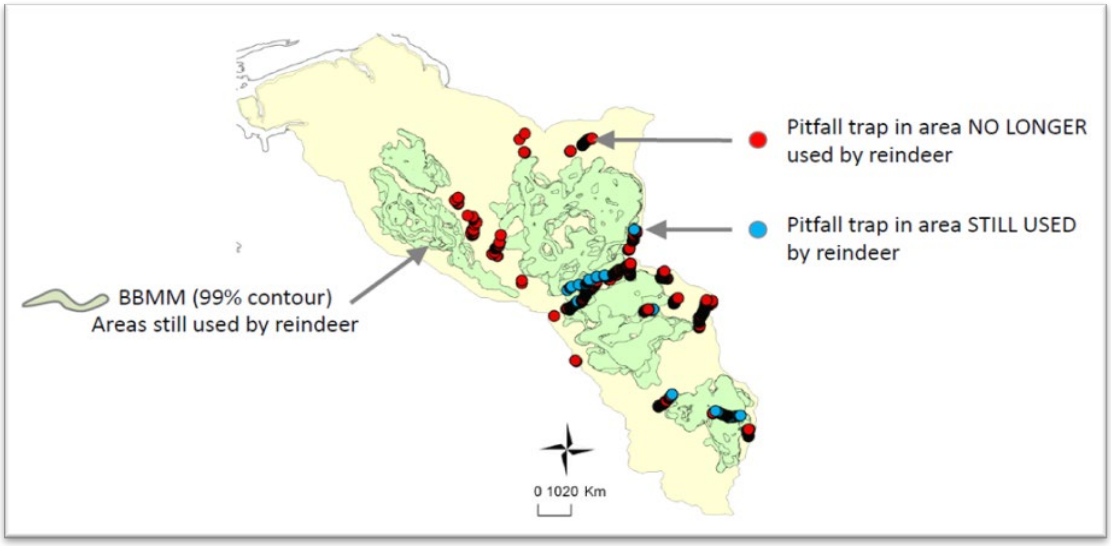
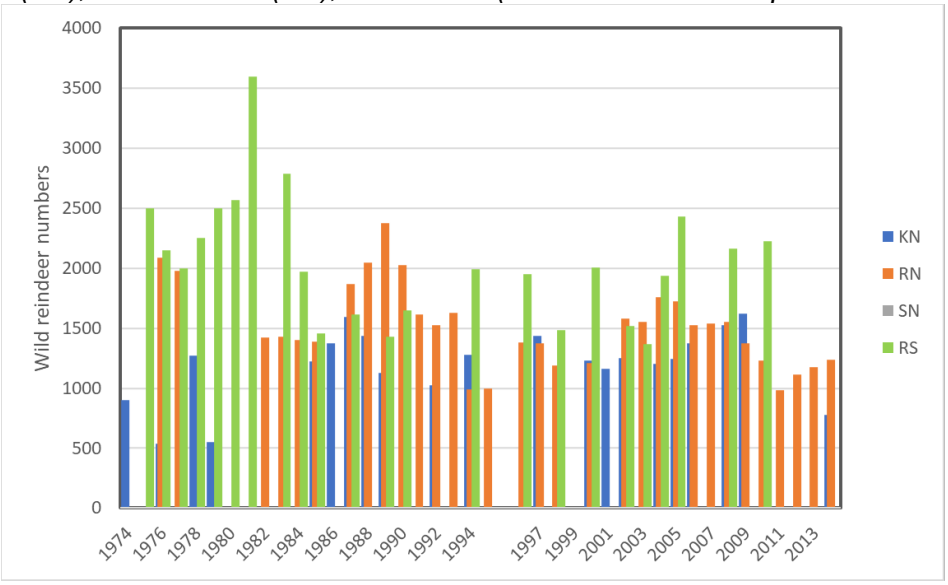


Figure 5: Comparing present migration routes based on GPS collared reindeer relative to past corridors based on pitfall traps on the Rondane and Snøhetta areas (Panzacchi et al. 2013).

Connection between reindeer and people date back thousands of years through hunting, domestication and herding. In Norway annual quotas for the hunting of wild reindeer are determined based on the state of the wild reindeer population, and data are recorded by year of the felling, region, age and sex of the animal. In 2023 for example, the number of wild reindeer felled in 2023 was 3,493 (Statistics Norway 2023).

Figure 6: Wild reindeer counts during the winter for Rondane North (RN) and South (RS), Snøhetta (RS), and Knutshø (KN), 1974-2014 (data from O. Strand pers. comm. 2016).



Genetics

Only the wild reindeer in the Rondane-Dovre area (Rondane, Snøhetta, Knutshø, Soinkletten, see figures 10 and 11) can be considered to comprise pure native wild reindeer as the other areas include mixtures of wild reindeer and domesticated reindeer. Significantly, those of the Rondane-Dovre area are a different lineage from the wild reindeer lineage detectable in the wild and domesticated reindeer mix in Hardangervidda. Overall, the genetics of the wild

reindeer reflect their history, bottlenecks and the current isolation caused by the landscape fragmented by human structures and activities. The genetic variation depends on population size and differs among the wild reindeer areas which suggests relatively low gene flow. The four wild reindeer herds in the national wild reindeer areas overlapping with the potential nominated property (Rondane North and South, Snøhetta and Knutshø) are close to threshold of numbers (~1500) where genetic variability becomes a management concern (Kvie et al. 2019).

Life-history

Calving is synchronous, with calves born within a week of each other from 6 to 27 May. The timing is strongly correlated to pre-rut dressed weights in females as under-weight cows may breed during their second heat. The cow's body mass also predicts the probability of pregnancy rates, and those rates are typically high (Reimers 1997). The rut is brief in duration and synchronised with most breeding in late September and early October (Thomsen 1977).

Weight gain is highest during the summer when the wild reindeer's diet is protein-rich from foraging on a wide range of forbs, grasses and shrubs selecting the early growth stages which are the most nutritious (Skogland 1984). The summer diet does not just depend on the growth of plants but the reindeer trade-off their exposure to insect harassment and predators relative to diet quantity and quality (Mårell et al. 2006). The winter diet is selected to be energy-rich and the reindeer are adapted to digesting lichens which are a source of soluble carbohydrates. As the reindeer foraging reduces the lichen cover, the reindeer turn to foraging more grasses, shrubs and mosses as the lichens are not an essential forage (Skogland 1984).

Management and monitoring

Responsibility for management planning for wild reindeer has changed recently to accommodate both local and technical knowledge (Bråta 2003) and is currently shared between government (Ministry of the Environment, Directorate for Nature Management), the public and landowners. The Directorate for Nature Management appoints regional boards to approve hunting and survey areas, plans and annual quotas as well as participating municipal land planning and management. The reindeer board works with the Villreinrådet (Reindeer Council) which represents regional committees composed of landowners and annually reports on the wild reindeer (see https://www.villrein.no/). The Reindeer Council has identified regional plans for long-term management of the national reindeer areas.

Norway relied on hunting to regulate herd size and prevent wild reindeer over-grazing in the absence of large predators. The quotas were based on both immediate (winter aerial surveys) and longer-term indices (body weight and jawbone length) of killed animals, but difficulties in accurately counting wild reindeer on their winter ranges limited setting the annual quotas and the hunting effort does not always result in the quota being used (Strand et al. 2012; Mysterud et al. 2021). The role of hunting interacting with climate to either limit or regulate abundance is still unclear despite analyses of trends (Tveraa et al. 2007, Bargmann et al. 2020).

A recent and globally integrative approach that is unique to the Norwegian wild reindeer monitoring is that the Norwegian Environment Agency in 2020 accepted an environmental quality standard for wild reindeer in response to international and national obligations to conserve wild reindeer and their habitats (Kjørstad *et al.* 2017). The intent is that when and if the minimum standards are not met, action plans have to be developed. The monitoring indicators are: autumn calf body mass, number of calves per 100 adult females and yearlings; proportion adult (≥ 3 year) males per adult (≥ 1 year) female; genetic diversity; health status including the presence of notifiable disease; lichen biomass; habitat and human disturbance based on functional space use and connectivity.

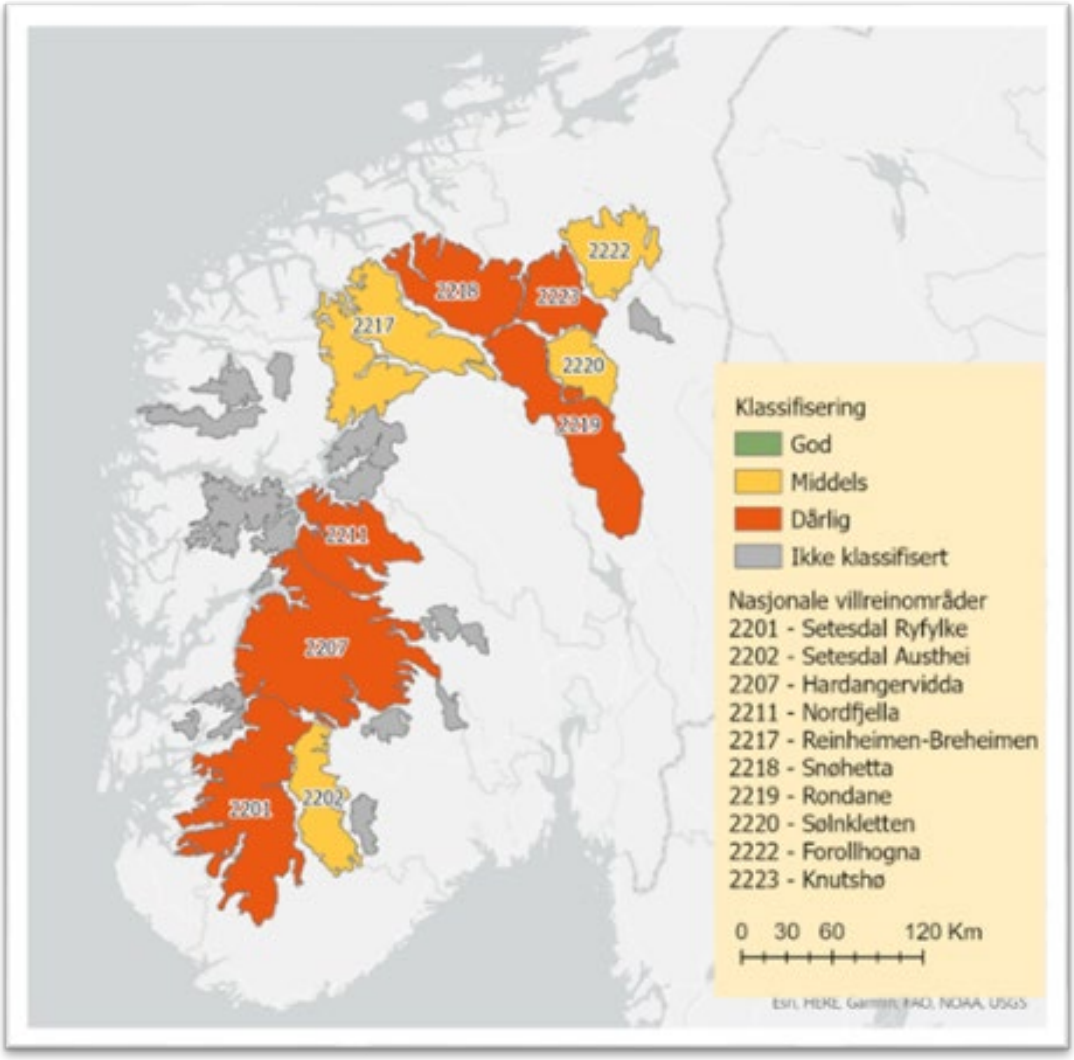


Figure 7: Overall assessment of the ten national reindeer areas. Color code red is poor quality wild reindeer area; yellow and green color is medium or good quality, respectively. Grey is wild reindeer areas that were not classified (Rolandsen et al. 2022).

Public representatives worked with scientists to first apply the environmental quality standard system in 2022 to ten national wild reindeer areas (Rolandsen et al. 2022). The overall rating is based on the rankings of eight monitoring indicators. The low ranking for the northern national wild reindeer area is due to roads, hydropower development and traffic. These factors have reduced wild reindeer's migration in Snøhetta and Rondane. The wild reindeer in Snøhetta also have smaller calves and low calf survival (low ratio calves to cows) and calf weight are low for Knutshø. The other indicators for the winter range (lichens), health, habitat

availability and genetic variation are high to moderate. Overall, the initial assessment revealed gaps in data collection and analyses as well as how roads and traffic limit migration and fragmentation areas and effects of parasites and hunting management. The next step will be action plans to establish mitigation where possible which will include public involvement.

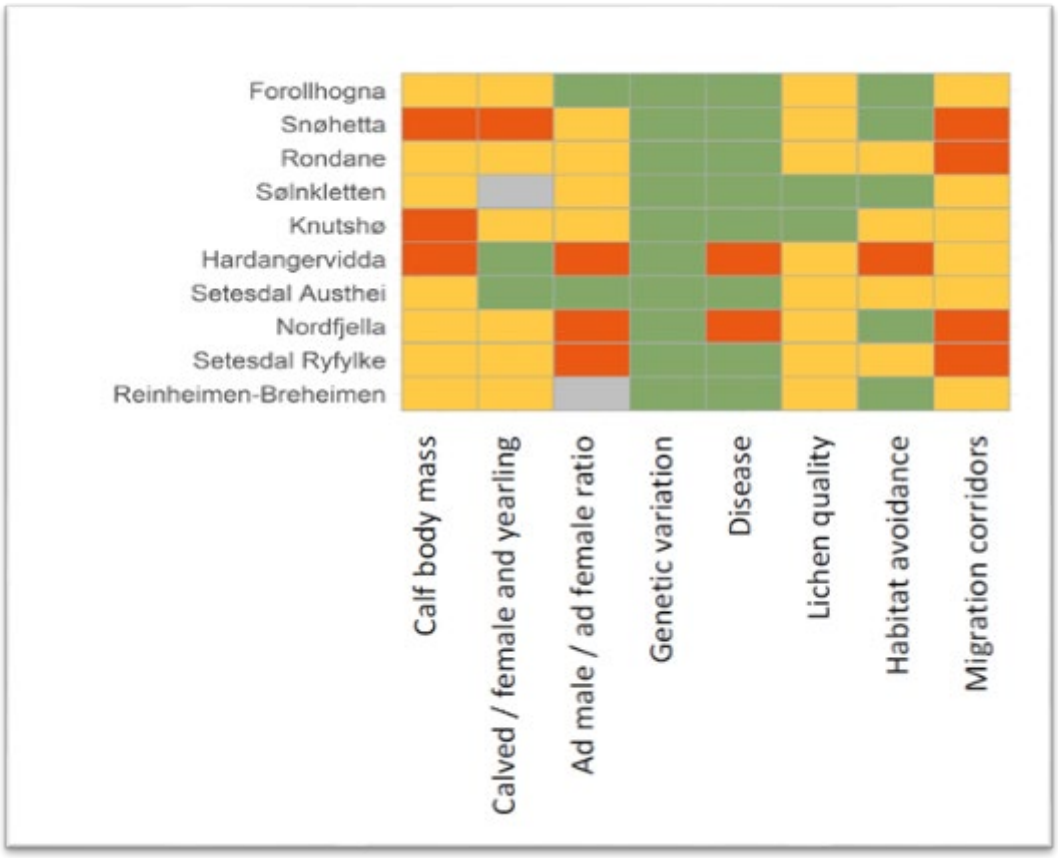


Figure 8: Summary for monitoring indicators in 2022 (Figure from O. Strand unpubl.)

Not all causes of habitat loss and interrupted migration can be mitigated (e.g. existing hydroelectric dams and major roads) but landscape modeling can be used to project gains to wild reindeer movements, which will be highly relevant to landscape planning to mitigate other developments (M. Panzacchi unpubl.). The modeling draws on studies using reindeer fitted with GPS collars especially for Rondane, Snøhetta and Setesdal Austhei (Strand et al. 2014, Panzacchi et al 2013). The GPS collars have been instrumental in describing how tourist cabins, trails and roads as well as hunting modify the probability of the wild reindeer continuing to use the traditional migratory corridors.

While the GPS collars are valuable for understanding how the wild reindeer movements are restricted or blocked by roads and other linear developments, the GPS collars have also helped in describing how tourists impact wild reindeer distribution (Gundersen et al. 2022a and b). Especially in the national parks, numbers of tourists hiking and overnighting in cabins or hotels are high during the peak season and the tourist season is followed by the fall hunting season (Gundersen et al. 2020). The wild reindeer tend to concentrate their distribution relative to the tourists but scatter in response to hunting. The information is now being used to apply zoning to mitigate the impacts of tourism while taking into account differing views of residents and tourists (Kaltenborn et al. 2014 and 2017, Gundersen et al. 2022a)

A particular aspect of monitoring and management is Norway's response to the shock of detecting Chronic Wasting Disease (CWD) in 2016 in the Nordfjella herd. The detection of a single individual in 2016 led to widespread testing which revealed a low rate of 19, mostly adults, infected individuals from the 1,081 males and 1,278 females tested: adult males were 2 to 3 times more likely to be infected (Mysterud et al. 2019) and are more likely to move between areas than females (Kvie et al. 2019). The Nordfjella herd, consisting of about 2,500 wild reindeer, was shot to minimise spread of the CWD infection. Fencing was also used to reduce the likelihood of movements. However, Hardangervidda is currently facing a reduction through the selective removal of adult males as part of managing the CWD outbreak as a case was detected (O. Strand unpubl. 2022, Mysterud et al. 2020 and 2022). Sampling to date has not detected CWD outside of the Nordfjella and Hardangervidda areas (Mysterud et al. 2022).

Ecological role

The Norwegian Wild Mountain Reindeer are not currently exposed to wolf and brown bear predation, both of which were exterminated through hunting by the early 20th century (Bevanger *et al.* 2013). Wild reindeer are outside the most likely areas where brown bears and wolves are re-colonising and, additionally, hunting is used to slow wolf recovery (Kopatz *et al*. 2014; Sollund and Goyes 2021).

Khalil *et al.* (2014) used historic hunting statistics (1846 to 1922) from Norway and Sweden to analyse associations between wolves, lynx, and wolverine relative to prey including reindeer and domestic animals. Wolverine abundance increased when lynx abundance increased, probably because lynx predation on reindeer provided carcasses for the wolverine to scavenge. Wolverine abundance in southern Norway has been monitored since 1979 through snow tracking and since 1990 through a collaring program. Landa (2011) reported that wolverine mostly killed old female reindeer in poor health. Domestic sheep did not seem to influence wolverine population levels although approximately 800-1600 lambs are killed by wolverine each year. Elsewhere, near Hardangervidda, lynx predation on wild reindeer appeared rare and the question of golden eagle predation on reindeer calves was considered an information gap (Bevanger *et al.* 2013). The low rate of predation presumably reduces scavenging opportunities but implications for typical scavengers such as wolverine, foxes and ravens are not reported. An unusual accident was a mass die-off of 323 reindeer caused by lightning in Norway which led to describing how rodents responded to the pulse of scavenger abundance (Frank *et al*. 2020).

As herbivores, wild reindeer affect both plants and nutrient cycling, but the relationships vary with climate and weather, which makes it a complex topic to summarise. Specific details for the northern wild reindeer national area are not always available as many studies are for the southern wild reindeer area or for domesticated reindeer (Bernes *et al.* 2015, Köster *et al.* 2015). Köster *et al.* (2015) described how domesticated reindeer in a subarctic mature pine forest did not affect soil temperature or soil moisture, but reduced soil microbial Nitrogen biomass. However, how reindeer foraging affects soil dynamics and plant growth is complex and depends on the habitat (Sitters *et al*. 2017).

On the summer range, grazing increased the transition of moss-rich heath tundra into a more productive, graminoid-dominated steppe-like tundra vegetation, which increased productivity of summer ranges (Olofsson *et al*. 2001). A common observation is that wild reindeer during winter can reduce lichen abundance (for example Köster *et al.* 2015) and other effects are

recorded such as impacts of summer browsing on willow thickets, which in turn can also affect other species depending on the shrubs including willow ptarmigan (Ims and Henden 2012).

Climate, habitat and diet

The climate varies with the distance to the coast and with height above sea level. That means where the 23 reindeer areas lie on the gradient from continental to oceanic climate affects summer and winter ranges (Bakkestuen *et al.* 2008). Rainfall helps plant productivity in summer while winter snowfall affects accessibility of winter forage. The higher elevation of summer ranges can reduce insect harassment and residual snowbanks provide moisture for vegetation and coolness (Skogland 1984, Anderson and Nilsson 1998).

The continental winter habitat is drier with less snow and wind-blown ridges. Based on the detailed movements of GPS collared wild reindeer, the reindeer showed strong selection for patchy snow-free habitats, typically on top of wind-blown ridges where they could efficiently forage (Falldorf 2013).

The climate gradients are reflected in the proportions of summer and winter ranges for the different reindeer areas. For example, Rondane and Snøhetta have less summer ranges (27%) compared to for example, Hardangervidda (38%) and winter (15%). Rondane and Knutshø have relatively high proportion of winter ranges (35% and 40%) compared to 15% for Hardangervidda (Jordhøy et al. 1996). However, how those relative proportion of summer and winter ranges affect population dynamics is a likely information gap especially how within those seasonal ranges, human disturbance influences how much of the ranges are available to the reindeer (Falldorf 2013).

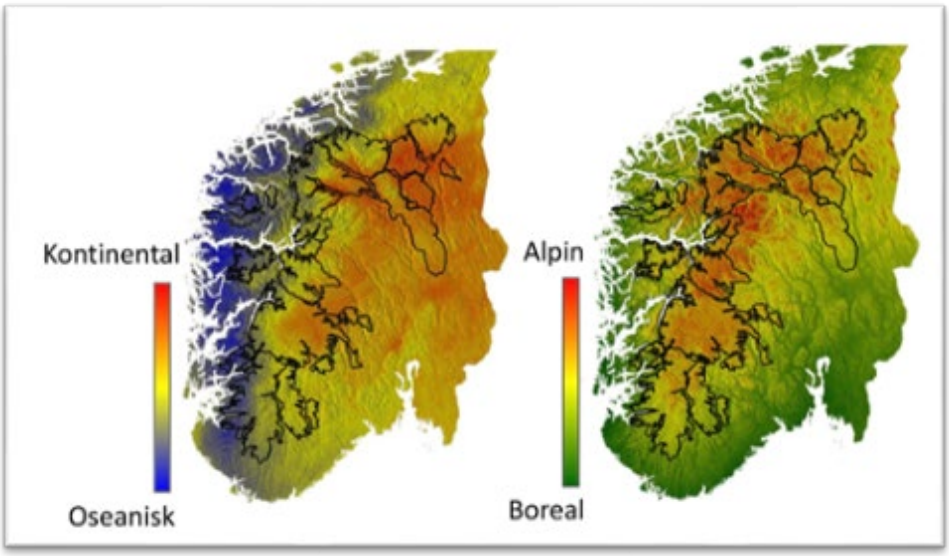


Figure 9: The maps show a scaled gradient from oceanic coastal mountains to continental inland areas (left), and a scaled gradient from boreal to alpine areas (right) (after Bakkestuen et al. 2008). The boundaries of the 23 wild reindeer areas are marked with black lines (from Kjørstad et al. 2017).

The effects of direct human disturbance to reducing habitat (road, rail and hydro-development) and indirect effects as reindeer avoid people and vehicle traffic are exceptionally well documented for wild reindeer in Norway both through behavioral observations (Reimers *et al.*

2003) and especially through the use of the GPS collars (Vistnes and Nellemann 2008, Panzacchi *et al.* 2012, 2013 and 2014). The pattern of human development in Norway and the fragmented wild reindeer ranges have long raised the question of over-grazing and density-dependent effects. Although a management goal has been to hunt the wild reindeer at a level to reduce the likelihood of over-grazing, the concepts and practicalities of defining and measuring over-grazing, raise questions about it as a management goal without more information on the relationship between reindeer productivity and foraging behavior relative to how plant nutrition and growth respond to weather and climate (for example, Mysterud 2006, Falldorf 2012).

Conclusion

Based on above overview of the conservation status of wild reindeer, IUCN notes the importance of the Norwegian Wild Mountain Reindeer as the only remaining population of its subspecies globally. However, the focus on a sub-species with an area only partially covering the distribution range would probably fall short of meeting criteria (ix) and/or (x) as these criteria are much broader as per their definition. In addition, conservation issues such as habitat fragmentation, climate change, and Chronic Wasting Disease would probably pose challenges for a nomination project, which would need to demonstrate that integrity requirements for this attribute are met. Fragmentation has a direct impact on population ecology including species viability, availability of niche resources as well as the maintenance of diversity in the genetic pool.

Therefore, a nomination approach for the inclusion of wild reindeer as single natural attribute of Outstanding Universal Value (OUV) of a mixed site may therefore not be promising. The following chapter will therefore explore further natural values of the Dovrefjell.

Nevertheless, wild reindeer could play an important role within a cultural landscape nomination approach serving as an important attribute within a broader OUV definition. This would require measures mitigating the integrity issues for this attribute, such as through the mitigation of impacts from fragmentation and through improved conditions for reindeer migration. As the populations are wide-ranging, conservation action would need to be assured in areas beyond the potential nominated property.

3. Further natural values in Dovrefjell, including in the wider area

In its upstream report, ICOMOS has noted that "the importance placed by the State Party on the presence of the last remaining occurrence of wild reindeer (…) and arguments concerning the aesthetic beauty of the landscapes inevitably raises questions about the potential for this proposal to meet one or more of the natural criteria for inscription in the World Heritage List" (ICOMOS 2020, p. 37). IUCN therefore conducted a preliminary screening of the potential for all four natural criteria. Given that for each natural criterion, a different spatial extent may be of relevance, IUCN has conducted this preliminary screening for a wider area, including areas that are adjacent to the Reindeer Hunting Area in Dovrefjell.

Superlative natural phenomena and/or natural beauty and aesthetic importance – criterion (vii)

Sites are inscribed on the World Heritage List under criterion (vii) if they "contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance" (UNESCO, 2023, p.30). IUCN interprets the criterion as including two distinct elements: firstly, superlative natural phenomena and, secondly, exceptional natural beauty and aesthetic importance. Nominations of new sites under criterion (vii) can address one or the other of these ideas or both (UNESCO / ICCROM / ICOMOS / IUCN, 2011; Mitchell, 2013). The authors of this report have also consulted the area in question with long-standing IUCN World Heritage evaluators who have regularly assessed World Heritage nominations proposed under criterion (vii) within the last ten years.

The first element, 'superlative natural phenomena', can in many cases be objectively measured and compared based on objective criteria. The term 'superlative' is defined as having more of a particular quality than anything else of the same type. For instance, a site could be considered superlative if it contains the highest mountain in the world, the deepest canyon, the world's largest cave system, or the highest waterfall (Mitchell, 2013). Based on the information received, phenomena of such superlative nature at global scale do not appear to be found in the Reindeer Hunting Area in Dovrefjell, nor in the wider area. Should the State Party nonetheless consider that potential may be found to demonstrate the superlative value, it is recommended to apply a very strict and rigorous framework with measurable indicators to the comparative analysis under criterion (vii) defining the superlative purely at the global level and not permitting qualifications of the proposed attributes (e.g. "the highest mountain in relation to its width"), which undermine the definition of "superlative" and the requirement to demonstrate global significance. Recent IUCN evaluations reinforce the importance of identifying attributes under criterion (vii) that are undoubtedly "the best of the best" at global scale (see e.g. IUCN 2021).

The second element, 'exceptional natural beauty and aesthetic importance', is harder to assess as these are subjective terms difficult to objectively measure and compare. Nevertheless, comparisons of natural beauty and aesthetic importance need to be based on measurable indicators of scenic beauty, as outlined in the resource manual on Preparing World Heritage Nominations (UNESCO / ICCROM / ICOMOS / IUCN, 2011). In its upstream report, ICOMOS has noted arguments concerning the aesthetic beauty of the landscapes and recommended consultations with IUCN in this regard (ICOMOS, 2020). IUCN has therefore screened avenues for consideration of the site under the second element of criterion (vii) and has requested pictures from the State Party to provide an idea of the site's aesthetic beauty.

Without doubt, the Dovrefjell, as well as its wider area, displays strong aesthetic values. Potential attributes include the variability of the alpine and tundra landscape, drawn with the varying snow line and constant tree line, in a landscape with altitudinal variation in flora and changing significantly its visual impression across the seasons. The large herds of wild reindeer add to that value. The wider area contains dramatic scenery, linked to mountains, ridges, canyons and other geological and geomorphological features. However, noting the Statements of Outstanding Universal Values of other high-latitude mountain World Heritage sites, it would appear unlikely that a global comparative analysis could demonstrate a similar or higher level of significance for the Dovrefjell and its wider area. For instance, the vast area of Kluane / Wrangell-St. Elias / Glacier Bay / Tatshenshini-Alsek (Canada / United States of America) (almost 10 million ha, an area more than twice as large as Switzerland) includes a "breadth of active tectonic, volcanic, glacial and fluvial natural processes *from the ocean to some of the highest peaks* in North America. Coastal and marine environments, snow-capped mountains, calving glaciers, deep river canyons, fjord-like inlets and abundant wildlife abound" (emphasis added) (UNESCO 2016a).

The potential nominated property would also need to demonstrate that it stands out from the existing World Heritage property of the "West Norwegian Fjords – Geirangerfjord and Nærøyfjord". The property's Statement of Outstanding Universal Value under criterion (vii) focuses on its natural beauty and aesthetic importance describing the Geirangerfjord and Nærøyfjord areas "to be among the most scenically outstanding fjord areas on the planet" emerging from "their narrow and steep-sided crystalline rock walls that rise up to 1400 m direct from the Norwegian Sea and extend 500 m below sea level", with numerous waterfalls and free-flowing rivers running "through deciduous and coniferous forest to glacial lakes, glaciers and rugged mountains" (UNESCO, 2014, p. 13). Similarly, the Laponian Area (Sweden) is recognised under criterion (vii) with the property "exhibiting a great variety of natural phenomena of outstanding beauty. The snow-covered mountains in Sarek and Sulidälbmá are not only magnificent to see but are a textbook of glacial-related geomorphology. The large alpine lakes in Padjelanta, with the mountain backdrop on the Swedish/Norwegian border are of exceptional beauty. The extensive Rapa Valley provides a total contrast with the alpine areas. Particularly noteworthy is its very active delta area, surrounding cliffs and rocky outliers with sheer faces plunging into the delta. The existence of the Saami culture ranging from the traditional birch and turf kata to contemporary cabins adds to the aesthetic value of the property" (UNESCO 2016b). Given there are two World Heritage properties already recognised under (vii) exhibiting a broader range of values under (vii), it appears difficult for the Dovrefjell and the wider area to demonstrate global significance under this criterion as a stand-alone nomination. Rather, the visual considerations could be presented as part of the landscape if the area were to proceed as a cultural landscape nomination.

In case the State Party wishes to pursue this criterion nonetheless, it would be essential that the potential nomination justifies criterion (vii) based on a clear definition of what values are considered and based on precise descriptions of the attributes supporting such a justification (Mitchell, 2013), following closely recommendations 1 to 3 provided by Mitchell (2013). This analysis would need to take into account the possibility that it may demonstrate that the site has no or only limited chances under criterion (vii). In case the State Party wishes to pursue a nomination as a cultural landscape, suggested in chapter 3, it is recommended to take into account the aesthetic values of the potential nominated property as part of its broader natural values.

Earth's history and geological features – Criterion (viii)

Sites are inscribed on the World Heritage List under criterion (viii) if they are "outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features" (UNESCO, 2023, p.30). IUCN interprets this criterion under 11 primary themes: (1) History of planet Earth and the evolution of life; (2) Tectonic systems; (3) Erosional systems; (4) Volcanic systems; (5) River, lake and delta systems; (6) Cave and karst systems; (7) Coastal systems; (8) Marine systems; (9) Glacial and periglacial systems; (10) Desert and semi-desert systems; and (11) Meteorite impacts. For all these themes, nominating States Parties need to scrutinise whether their proposed site displays or contains something so exceptional that is of true global significance (Mc Keever and Narbonne, 2021).

Whilst geological values are not the focus of the upstream request submitted by Norway, this report screened the area in question against all existing thematic studies addressing criterion (viii) and the above themes. The authors of this report have also consulted the area in question with long-standing IUCN World Heritage evaluators who have regularly assessed World Heritage nominations proposed under criterion (viii) within the last ten years. Based on this, four themes out of the eleven themes were identified as potentially relevant for the present site: cave and karst systems; glacial and periglacial systems; history of planet Earth and the evolution of life; and tectonic systems, whilst the latter two were deemed to be likely irrelevant in regard to the potential nominated property. This part of Norway in particular, and the Caledonides more generally, were not mentioned in any of the relevant thematic studies.

Regarding cave and karst systems, Lauritzen (1981; 1991) characterised Karst as a rare phenomenon in Norway with only about 1% of Norway's surface estimated as consisting of limestones and karst landforms. The typical karst type found in Norway is 'Stripe karst', i.e. narrow, but laterally extensive bands of intensively karstified marble zones. Whilst the need for strict protection and management is required (Lauritzen, 1981; 1991), rareness within Norway does not imply significance beyond Norway. Williams (2008) did not note any gaps on the World Heritage List that would overlap with the areas studied in this report. In a section describing some properties "as unlikely to be acceptable on the basis of physical karst features alone, perhaps because of duplication of values of ready inscribed properties", Williams (2008) argues that there may still be potential to "justify World Heritage status when nominated in association with [the properties'] outstanding biodiversity and their wider geodiversity values." (p. 9) Svalbard Archipelago (Norway) is noted as the only relevant area in Norway in that regard.

Regarding glacial and periglacial systems, IUCN notes the nearby West Norwegian Fjords – Geirangerfjord and Nærøyfjord World Heritage property, which has been inscribed under criterion (viii) (UNESCO, 2014) as this property displays "a full range of the inner segments of two of the world's longest and deepest fjords, and provides well-developed examples of young, active glaciation during the Pleistocene ice age. The ice and wave-polished surfaces of the steep fjord sides provide superbly exposed and continuous three-dimensional sections through the bedrock. The record of the postglacial isostatic rebound of the crust and its geomorphic expression in the fjord landscape are significant, and represent key areas for the scientific study of slope instability and the resulting geohazards" (p.110). This Statement of Outstanding Universal Value fully focusing on the property's geological values as fjord site would obviously not suggest the Dovrefjell and extension under criterion (viii). Nevertheless, the "surrounding mountain and catchment areas" are considered an important condition of integrity in the same Statement of Outstanding Universal Value. Therefore, if the wider area

(see figure 11), which includes further surrounding mountain and catchment areas, were considered, the wider area of the Dovrefjell could perhaps, in parts, add to the integrity.

In case the State Party wishes to pursue criterion (viii) nonetheless, it would be critical to conduct an independent global comparative analysis by international scholars (i.e. not led by the nomination project team), followed by a rigorous peer review process. It is recommended to follow the global framework for the application of criterion (viii) by Mc Keever and Narbonne (2021, see in particular pp.43). Though on a different topic, the guidance for global comparative analyses in Casadevall, *et al.* (2019, see pp.48) can provide further insights. A recent good practice example is also described in IUCN (2023, see pp. 191).

Ecosystems, ecological / biological processes, biodiversity and threatened species – criteria (ix) and (x)

Sites are inscribed on the World Heritage List under criterion (ix) if they are "outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals", and under criterion (x) if they "contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation" (UNESCO, 2023, p.30).

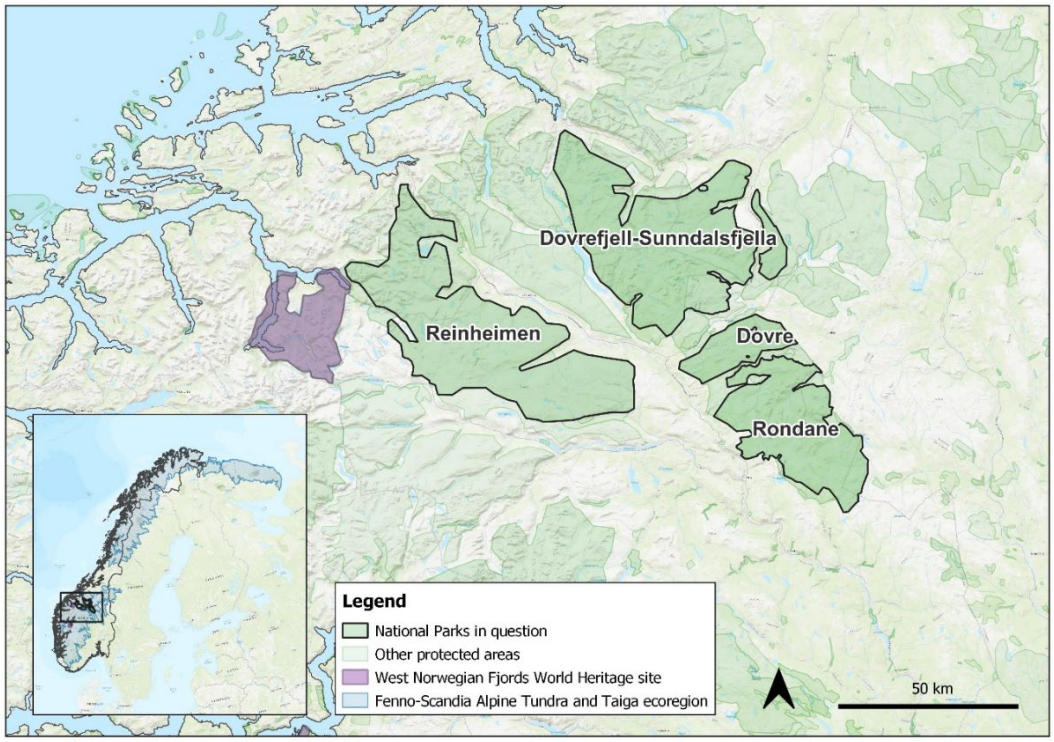


Figure 10: Map of the four IUCN Category II National Parks with the neighbouring northern component of West Norwegian Fjords. Inset map shows the area of interest in the context of the Fenno-Scandia Alpine Tundra and Taiga ecoregion.

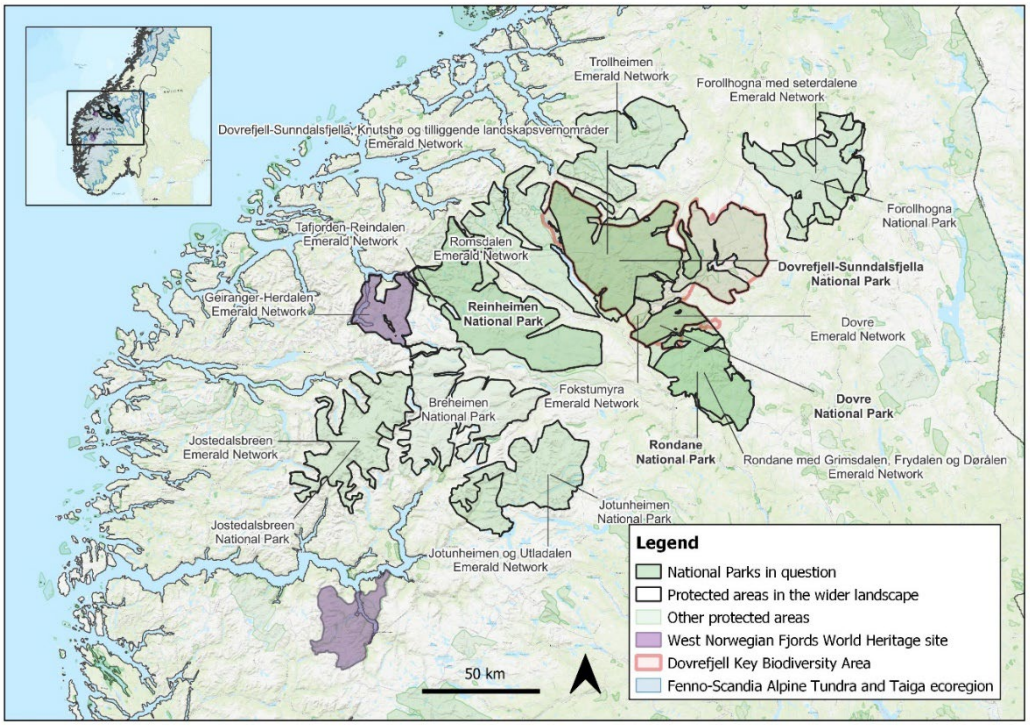


Figure 11: The protected areas included in the upstream process request shown as "National Parks in question" within their wider protected area network (note the polygons here include the northern component part of the already inscribed West Norwegian Fjords – Geirangerfjord and Nærøyfjord https://whc.unesco.org/en/list/1195/).

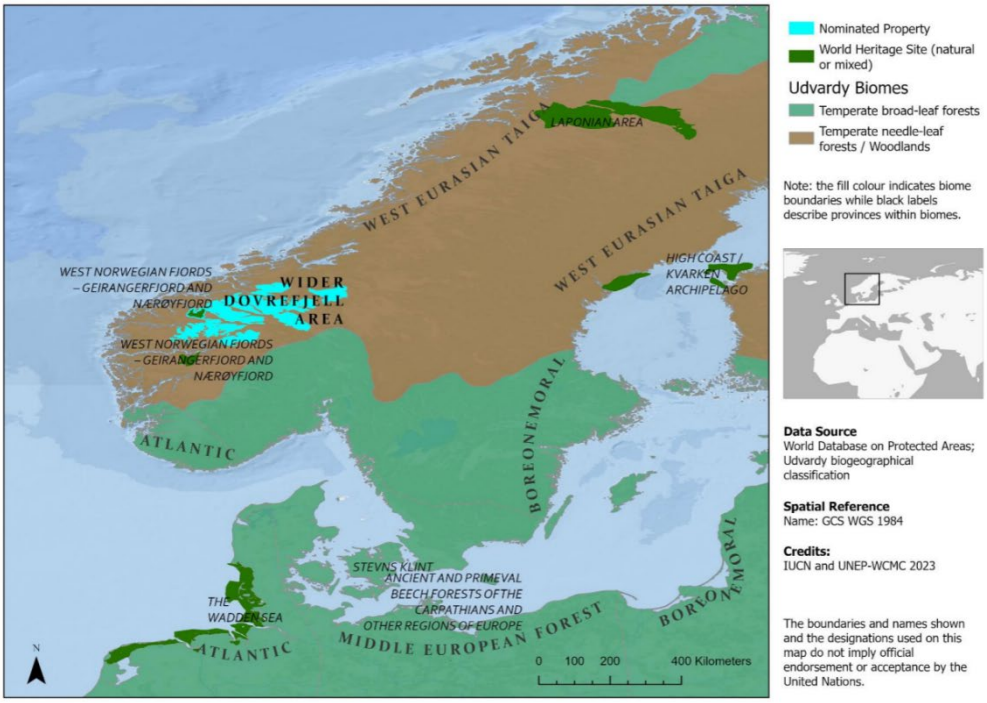


Figure 12: Map showing the wider Dovrefjell area (bright blue) and existing biodiversity World Heritage properties (dark green) in the context of Udvardy's biogeographical provinces and biomes (Udvadry, 1975). Map provided by UNEP-WCMC.

Further to the discussion in chapter 2, this section explores biodiversity values beyond the wild reindeer. IUCN has requested species lists from Norway to enable this analysis. The species data for the four national parks is summarised in table 1. IUCN notes that there are a number of globally threatened species found in the four protected areas of the potential nominated property (see figure 10) besides reindeer (*Rangifer tarandus*; VU). These include the Long-tailed Duck (*Clangula hye*malis; VU) and the Velvet Scoter (*Melanitta fusca*; VU). The Snowy Owl (*Bubo scandiacus*; VU) is found in Dovrefjell-Sunndalsfjella and Rondane, whilst the Horned Grebe (*Podiceps auritus*; VU) is present in Rondane and the Black-legged kittiwake (*Rissa tridactyla*; VU) in Reinheimen (see also table 1).

Table 1: Number of species present in the four national parks. The species lists were created using data from The Norwegian Biodiversity Information Centre and the IUCN Red List of Threatened Species. Figures in the second row indicate number of species assessed on the IUCN Red List of Threatened Species. Table compiled by WCMC.

National Park	Mammal	Bird	Reptile	Amphib.	Fish	Plant	Lichen	Fungi
Dovre	22 (1 VU)	97 (2 VU)	1	0	2	870 92	368 (1 CR)	271 7
Dovrefjell-Sunndalsfjella	31 (1 VU)	154 (3 VU)	0	1	3	1,402 (1 EN)	477	452
Rondane	26 (1 VU)	147 (4 VU)	0	0	3 (plus genus Cottus)	492	206	231
Reinheimen	30 (1 VU)	127 (4 VU)	1	1	4	873	203	121

Based on this preliminary review, the IUCN World Heritage Panel determined at its session in March 2023 that the species numbers are notable and thus recommended further analysis of the data provided. IUCN has closely collaborated with UNEP-WCMC in conducting this analysis.

Reviewing thematic studies relevant for the application of criteria (ix) and (x), IUCN firstly notes Bertzky et al. (2013) on Terrestrial Biodiversity as well as Le Saout et al. (2013) on protected areas and effective biodiversity conservation. The potential nominated property and biogeographic regions with which it overlaps are not mentioned as a gap in these studies. The potential nominated property also does not overlap with any protected area considered to be amongst the most irreplaceable in the world for mammal, bird and amphibian conservation. It also does not overlap with an Alliance for Zero Extinction site (AZEs). Further to WCMC's input, IUCN also notes earlier work including World's Greatest Natural Areas (IUCN CNPPA, 1982), which however does not list the potential nominated property as an outstanding natural site. Smith and Jakubowska (2000) do not note the potential nominated property, province or ecoregion as a gap either. Equally, the area in question does not overlap with a biogeographical region listed as a gap by Chape and Magin (2004). Finally, Thorsell and Hamilton's (2002) study on World Heritage mountain areas do not suggest the potential nominated property for nomination to the World Heritage List.

Regarding the biogeographic context of the potential nominated property, which is particularly relevant for the application of criterion (ix), IUCN notes that the potential nominated property is located within the West Eurasian Taiga Bio-geographical province (Udvardy, 1975), which is already represented by five World Heritage properties out of which three are inscribed under biodiversity criteria. The Palearctic Tundra Terrestrial realm-biome combination (Dinerstein at al. 2017) represented by six World Heritage properties out of which five are inscribed under

biodiversity criteria. Furthermore, the Dovrefjell area lies within the temperate Needle-leave Forests / Woodlands Udvardy Biome (see figure 12) and the Scandinavian Montane Birch Forest and Grasslands terrestrial ecoregion. The Laponian Area, in Sweden, is the only property inscribed under biodiversity criteria found in the same terrestrial ecoregion. The ecoregion contains some of the highest peaks in Northern Europe and largest glaciers on the continent. The high mountain treeline is unique of the Northern tundra, in that downy birch adorned by lichens and mosses are present instead of conifers (One Earth, 2023). In terms of broad-scale conservation priorities, Dovrefjell is found within the Fenno-Scandia Alpine Tundra and Taiga terrestrial priority ecoregion. This ecoregion is considered vulnerable in terms of its conservation status (Olson and Dinerstein, 2002) and also already represented on the World Heritage List by the Laponian Area.

Whilst the potential nominated property does not appear to hold the potential of filling any gaps on the World Heritage List for criterion (ix), the IUCN World Heritage Panel debated the possibility of applying a large landscape approach (see e.g. Kormos *et al*., 2017) to an area larger than the potential nominated property, enhancing integrity in terms of completeness and capturing wider ecological connectivity. This may possibly be achieved through a source-to-sea approach (or in this instance “ridge-to-fjord” or “glacier-to-fjord” approach), ideally supported by any remaining sections of free-flowing rivers (see e.g. EEA 2020). In this respect, IUCN notes that the potential nominated property is embedded within a network of large and important protected areas (see figure 11), which could cover a more significant and more varied extent of the relevant biogeographical province and biome (see figure 12). If the State Party would wish to contemplate a large landscape approach going beyond the potential nominated property, it would be also important to consider the relation with the existing World Heritage property West Norwegian Fjords – Geirangerfjord and Nærøyfjord, with one of the two component parts sitting adjacent to Reinheimen and Breheimen National Parks (see figures 11 and 12), i.e. whether the large landscape approach would be achieved through two separate World Heritage properties or through a renomination under criterion (ix) and extension of the existing World Heritage property. However, this would require more detailed analysis, which would go beyond the scope of this upstream process. Nevertheless, the IUCN World Heritage Panel considered that there may be potential for the application of criterion (ix) for a considerably larger area than the area of the potential nominated property.

Regarding criterion (x), IUCN notes that parts of the potential nominated property are recognised as an Important Bird Area (IBA), with some 17 bird species (see table 1) meeting one or more global IBA criteria at the site. The Dovrefjell IBA is the only boreal montane area in Norway which is still relatively intact and relatively unaffected by human activities (BirdLife International, 2023). The landscape consists of broad marshy valleys and forest birch *Betula*. The IBA overlaps or contains 26 protected areas, taking in the Dovrefjell-Sunndalsfjella and Dovre National Parks, as well as the interconnecting Fokstumyra Ramsar Wetland of International Importance and Emerald Network site, the eastern part of Dovrefjell-Sunndalsfjella, Knutshø og tilliggende landskapsvernområder Emeral Network site and the northernmost part of Rondane med Grimsdalen, Frydalen og Dørålen Protected Landscape. The global IBA criteria met at the Dovrefjell IBA are A1) Globally threatened species and A3) Biome-restricted species. Two Vulnerable bird species breed in the IBA, the Long-tailed Duck (*Clangula hyemalis*; VU) and Velvet Scoter (*Melanitta fusca*; VU).

As an IBA identified prior to the Global Standard for the Identification of Key Biodiversity Areas (IUCN, 2016), Dovrefjell IBAs is also a Regional KBA until it is assessed against the Global KBA criteria. Such a reassessment may identify additional species, particularly non-avian species, which qualify the site as a Global KBA. A reassessment of the KBA may also open the possibility of modifying the site boundary, taking into consideration the manageability of the site as well as the qualifying biodiversity elements (“trigger species”).

Table 2: Important Bird Area trigger species of Dovrefjell IBA

Species	Scientific name	IUCN Red List Cat.	Season	Year(s)	Population estimate at site	IBA crit. met
Long-tailed Duck	*Clangula hyemalis*	VU	Breeding	2004-2013	25-60 breeding pairs	A1, A3
Velvet Scoter	*Melanitta fusca*	VU	Breeding	2004-2013	25-60 breeding pairs	A1
Common Scoter	*Melanitta nigra*	LC	Breeding	2004-2013	25-60 breeding pairs	A3
Greater Scaup	*Aythya marila*	LC	Breeding	2004-2013	10-40 breeding pairs	A3
Common Crane	*Grus grus*	LC	Breeding	2014	max 10 breeding pairs	A3
Eurasian Golden Plover	*Pluvialis apricaria*	LC	Breeding	2014	common	A3
Temminck's Stint	*Calidris temminckii*	LC	Breeding	2013	present	A3
Dunlin	*Calidris alpina*	LC	Breeding	2005-2014	common	A3
Purple Sandpiper	*Calidris maritima*	LC	Breeding	2005-2014	present	A3
Great Snipe	*Gallinago media*	NT	Breeding	2013	400-600 breeding pairs	A1, B1i, B2
Red-necked Phalarope	*Phalaropus lobatus*	LC	Breeding	2004-2013	100-200 breeding pairs	A3
Long-tailed Jaeger	*Stercorarius longicaudus*	LC	Breeding	2013	present	A3
Northern Hawk-owl	*Surnia ulula*	LC	Breeding	2005-2014	max 10 breeding pairs	A3
Short-eared Owl	*Asio flammeus*	LC	Breeding	2005-2014	< 50 breeding pairs	B2
Rough-legged Buzzard	*Buteo lagopus*	LC	Breeding	2013	common	A3
Gyrfalcon	*Falco rusticolus*	LC	Resident	2013	frequent	A3, B2
Lapland Longspur	*Calcarius lapponicus*	LC	Breeding	2013	frequent	A3
Snow Bunting	*Plectrophenax nivalis*	LC	Breeding	2013	common	A3

Two Ramsar Wetlands of International Importance are present within or bordering the potential nominated property. Atnsjømyrene hosts several threatened species, including the Velvet Scoter (*Melanitta fusca*; VU) (Ramsar Sites Information Service, 2023a). Fokstumyra (1,799 ha) is probably the most important breeding site in Norway for the Northern Harrier (*Circus cyaneus*; LC), and an important staging site for birds in spring and early summer (Ramsar Sites Information Service, 2023b).

The Starry Breck Lichen (*Buellia asterella*; CR) used to occur in isolated patches of dry grassland from Italy to England and southern Norway. It appears to have had its centre of occurrence in the central German Mittelgebirge, but today it is thought to be extinct in all but three or four localities globally (in Norway and Germany). The species' global extant range is 18,681 km^2, with the Norwegian component 5,384 km^2 (28% of the global range) found within the wider landscape considered here. The species' range includes all four National Parks comprising the potential nominated property, but also large parts of the landscape further south as far as Jotunheimen National Park. The immediate causes for its disappearance may be outright loss of grassland habitat to agricultural and urban development, eutrophication

(through fertilizer drift, the sites being surrounding by rapeseed fields), shrub and grass encroachment and trampling of sites where suitable habitat would otherwise still exist (Spribille et al., 2015).

The entomophilous moss (using insects to disperse its spores) *Tetraplodon blyttii* (EN) is recorded in Dovrefjell-Sunndalsfjella and the surrounding landscape. It is endemic to Europe and restricted in distribution to Norway and Svalbard, the population in Sweden being possibly extinct. This species grows on bird pellets, dead lemmings, carcasses and on the droppings and hairballs of predators in the mountains. The species' known range is patchily distributed, totalling 513 km^2 over some 16 localities. Of these localities, the largest is 231 km^2 (45% of the global range) and is contained mostly within Dovre National Park and neighbouring Fokstumyra Emerald Network site. This may qualify these sites under multiple KBA criteria. The threats to this species are unknown, but it could potentially be affected by changes in the population dynamics of lemmings and voles (Hallingbäck et al., 2019).

Læstadiusvalmue or Arctic Poppy (*Papaver laestadianum*) has been assessed on the IUCN Red List as Vulnerable in 2011, with an estimated global population of 2,000 mature individuals and a global mapped range of 46,471 km^2. Therefore, a site containing ≥1% of the species' global population (i.e. 20 mature individuals) or ≥1% of the species' global range (i.e. 465 km^2) and ≥ 10 reproductive units, would likely meet KBA criterion A1b for this species. The species is near-endemic to Norway, known from six to seven locations in inner Troms and two in Sweden. The global range includes most of Dovrefjell-Sunndalsfjella, Knutshø og tilliggende landskapsvernområder as well as parts of Trollheimen to the north and Jotunheimen National Park to the south, extending as far south as Fødalen Protected Landscape (IUCN Category V) and almost to Nærøyfjorden (southern component) of the West Norwegian Fjords World Heritage property. Between Fødalen in the south and Trollheimen in the north encompasses some 17,940 km^2 or 38% of the species' global known range, with ample opportunities for KBA nomination.

Compared to World Heritage sites found in the same West Eurasia Taiga biogeographical province and/or the same Palearctic Tundra terrestrial biorealm, Dovrefjell may show a relatively high level of biodiversity for mammal, bird and reptile species, but it does not appear to clearly stand out from other relevant World Heritage properties. Whilst the potential nominated property shows a comparable number of mammals and birds, and low number of fish in comparison to the species reported in these other sites, it may well surpass other properties with its high plant diversity (see table 3). Based on species numbers taken from the Norwegian Biodiversity Information Centre species lists for the four National Parks, spatial analysis shows that Dovrefjell could have a higher diversity than reported for mammal and bird species, including regarding threatened species.

A similar pattern emerges from an overlay of the potential nominated property with the indicative number of species and globally threatened species with a distribution range that overlaps with the potential nominated property and other natural World Heritage sites found in the same West Eurasia Taiga biogeographical province, as well as in the same Palearctic Tundra terrestrial biorealm. This analysis was generated by overlaying the Protected Area boundaries for the sites with the recorded species ranges in the IUCN Red List of Threatened Species (i.e., globally classified as Critically Endangered (CR), Endangered (EN) or Vulnerable (VU)). It is important to note that figures produced through such an overlay can only be indicative due to data limitations and should not be confused with reported species numbers for sites, which are presented in table 3.

Table 3: *Indicative comparison provided by UNEP-WCMC of the potential nominated property with relevant World Heritage properties found in the same West Eurasia Taiga biogeographical province, as well as in the same Palearctic Tundra terrestrial biorealm.*
The table includes World Heritage properties for which species numbers were reported in the nomination file and subsequently recorded in the WCMC datasheets. Datasheets can be accessed online at http://world-heritage-datasheets.unep-wcmc.org. For Dovrefjell, species numbers are taken as a range from The Norwegian Biodiversity Information Centre species lists for four National Parks: Dovre, Dovrefjell-Sunndalsfjella, Rondane and Reinheimen. The area given covers these parks, but the proposed components partially encompass Reinheimen.

Property, State Party	**Total area (ha)**	**World Heritage criteria**	**Plant species**	**Mammal species**	**Bird species**	**Fish species**	**References**
Dovrefjell; Norway	**505,200**	**(iii)(iv)(v)**	**492-1,749**	**25-36**	**108-176**	**2-4**	**Upstream files**
Virgin Komi Forests; Russian Federation	3,273,023	(vii)(ix)	?	43	204	16	Datasheet
Laponian Area; Sweden	940,000	(iii)(v)(vii)(viii)(ix)	?	26	>150		Datasheet
High Coast / Kvarken Archipelago; Finland; Sweden	336,900	(viii)	?	?	24 seabirds	6-41	Datasheet
West Norwegian Fjords – Geirangerfjord and Nærøyfjord; Norway	122,712	(vii)(viii)	500	?	100	76 marine species	Datasheet
Putorana Plateau; Russian Federation	1,887,251	(vii)(ix)	569	38	140	36	Datasheet
Volcanoes of Kamchatka; Russian Federation	3,796,115	(vii)(viii)(ix)(x)	1,168	60	179	11 salmonids	Datasheet
Natural System of Wrangel Island Reserve; Russian Federation	1,916,300	(ix)(x)	748	7	169	4 (occasionally)	Datasheet
Gros Morne National Park; Canada	180,500	(vii)(viii)	1,112, 400 lichens	30	239	At least 2	Datasheet
Nahanni National Park; Canada	476,560	(vii)(viii)	1,025	42	180	16	Datasheet
Wood Buffalo National Park; Canada	4,480,000	(vii)(ix)(x)	?	47	227	36	Datasheet

Based on the above, the IUCN World Heritage Panel considers with a medium level of confidence that the Dovre, Dovrefjell-Sunndalsfjella, Rondane and Reinheimen National Parks alone appear to have a low potential to demonstrate global significance under criterion (x). The Panel acknowledges nonetheless that the potential nominated property hosts significant levels of biodiversity of European, and possibly global significance, but not at the level of OUV. In conclusion, the Panel does not recommend pursuing a mixed site approach for the potential nominated property, within the existing boundaries. However, the Panel strongly encourages the State Party to take into account the conservation of the biodiversity values of the potential nominated property in a potential nomination under cultural criteria (see also chapter 2).

4. Conclusion

This upstream report inquired whether the potential nominated property could be considered under natural World Heritage criteria. The upstream process was implemented as a desk review exercise through which IUCN requested species lists from the four National Parks. Based on the species lists provided, the IUCN World Heritage Panel considered at its meeting in March 2023 that the species numbers are notable and that the upstream process should continue to explore the potential of the potential nominated property further.

Therefore, further desk study was conducted by SSC and by WCPA experts and by IUCN's Biodiversity Assessment and Knowledge Team, Protected and Conserved Areas Team, Forest and Grassland Team and the Heritage and Culture Team across IUCN's Headquarters, IUCN's Cambridge Office and IUCN's European Regional Office. IUCN also incorporated advice provided by UNEP-WCMC.

At its meeting in December 2023, the IUCN World Heritage Panel has carefully reviewed the IUCN draft report as well as all information provided by the State Party and agreed the following recommendations, in relation to a number of possible nomination strategies. These recommendations are as follows:

A. Reindeer-focused nomination approach (mixed site):

IUCN considers with a high level of confidence that reindeer as single attribute of OUV would not meet criteria (ix) and (x) as these criteria are much broader in definition and cannot rely on a single species. In addition, the area in question would only cover a fraction of the relevant range. The Panel notes declining reindeer populations and important integrity issues for this attribute (disturbance through infrastructure, traffic, tourism, disease, etc. leading to a poor conservation status of Reindeer).

B. Cultural landscape nomination:

In case the State Party wishes to pursue a nomination as a cultural landscape, IUCN nevertheless strongly recommends that this potential nomination takes into account the natural values of the potential nominated property. The wild reindeer populations could serve as an important attribute within a broader OUV definition, if supported by measures mitigating the integrity issues for this attribute (e.g. mitigating fragmentation, improving conditions for reindeer migration). It is important to note that this would imply the need for conservation of reindeer to be assured in areas that the populations rely on for their viability, beyond the currently envisaged boundaries of the possible nomination.

C. Broadened biodiversity nomination approach within the existing boundaries (mixed site):

IUCN notes with a medium level of confidence that the Dovre, Dovrefjell-Sunndalsfjella, Rondane and Reinheimen National Parks alone appear to have a low potential to demonstrate global significance under criterion (x). These areas however do hold significant levels of biodiversity of European, and possibly global significance, but not at the level of OUV. Therefore, we do not recommend pursuing a mixed site approach for the area, within the existing boundaries.

IUCN further notes that there may be potential to consider the application of criterion (ix) for a considerably larger area than the components under consideration, beyond the focus of this Upstream Advice request.

These recommendations have been shared with the State Party by letter of 21 December 2023. This report has been provided following an additional fact-checking procedure.

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Annex: Terms of reference

IUCN Upstream Process for the "Reindeer Hunting Area in Dovrefjell" (Norway), 2022/2023
14 November 2022 - 31 July 2023

The objectives of the Upstream Process are to provide support at an early stage for sites which may have the potential to be inscribed on the World Heritage List, in collaboration with the States Parties, and before the nomination dossier is drafted. It therefore involves a feasibility study to ensure whether or not a solid case can be made for the nomination and if so to identify and programme any work that needs to be done to go ahead with the nomination. The proposed site has already been subject to an upstream process conducted by ICOMOS to review, *inter alia,* the potential of cultural values. In its upstream report, ICOMOS recommended the State Party to also consult IUCN on the potential of the proposed site under natural criteria.

The Contractor will undertake the following actions:

1. The Contractor shall meet with relevant stakeholders online and obtain information about the current situation in connection with the potential nomination based on a desk review, and shall assess the potential of the proposed site to demonstrate Outstanding Universal Value (OUV), focusing on two main points:
    a. assess whether there is a potential for the proposed site to meet any of the four natural heritage criteria (vii) to (x),
    b. assess whether there is a potential for the proposed site to be nominated as a mixed site under both cultural and natural criteria or as a cultural landscape with natural values under cultural criteria only,
2. The Contractor shall prepare an Upstream report including recommendations on whether a robust case for OUV might be made, and advise on potential next steps;
3. In conducting this work, the Contractor shall also advise on the following points if potential for a successful nomination has been identified (see point 1):
    a. parameters for the comparative analysis needed to understand more fully the potential for a successful nomination;
    b. extent of necessary survey, further research, and documentation (especially to support the comparative analysis);
    c. consideration of any potential of the proposed site to be part of a serial and/or transnational site and/or a serial and/or transnational extension;
    d. The potential attributes of OUV and how these might relate to the requirements of integrity, in case there is a potential for the proposed site to demonstrate OUV;
4. The Contractor shall ensure
    a. that advice from the SSC Deer Specialist Group's Rangifer expert, Ms Anne Gunn Ph.D. is taken into account for the above assessments,
    b. that the draft upstream report is reviewed and validated by the IUCN World Heritage Panel before it is submitted to the State Party representative.

The indicative timeline of this upstream process foresees a submission of the upstream report to the IUCN World Heritage Panel in March 2023 and the transmission of the report to the State Party thereafter. The timeline can be shortened or extended, if appropriate, and upon the agreement of both parties.