Laponian Area

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Sweden
Inscribed in: 1996
Criteria: (iii) (v) (vii) (viii) (ix)

The Arctic Circle region of northern Sweden is the home of the Saami people. It is the largest area in the world (and one of the last) with an ancestral way of life based on the seasonal movement of livestock. Every summer, the Saami lead their huge herds of reindeer towards the mountains through a natural landscape hitherto preserved, but now threatened by the advent of motor vehicles. Historical and ongoing geological processes can be seen in the glacial moraines and changing water courses.
© UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 02 Dec 2020

GOOD

The overall state of conservation of the Laponian Area and its values is good and stable. Established in 1996, the World Heritage site included areas that were already protected: four National Parks (among which three are awarded by the European Diploma for Protected Areas) and two Nature Reserves. Their management is highly effective. There are few direct threats affecting site's values - the main one being the potential impacts of climate change on the sensitive boreal ecosystem of the area. Other potential threats are the possible development of mining prospecting in the vicinity of the property, which could impact on both its natural and cultural values, and increasing pressure from tourism. Since 2011, a new participatory management board (Laponiatjuottjudus) is in charge of implementing the management of the World Heritage site, according to the management plan adopted in 2012. This is very encouraging as the board comprises members from different stakeholder groups, including representatives of local indigenous Sámi village organizations. Consensus decision-making is the basic working method for the Laponian management board. A management effectiveness assessment conducted in 2016 showed that the governance model and organizational collaboration is working well. However, some concerns were raised, for example that the management plan lacks clear objectives and priorities, a strategy for managing tourism, as well as measures to evaluate management impacts on the site's values. Some priorities stated would be to develop buffer zones and zonation within the Laponian Area, visitor management, as well as surveillance and inspection to address illegal activities (PWC, 2016).

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **Variety of landscapes, with spectacular mountain scenery** **Criterion:(vii)**

The World Heritage site is remarkable by its large area (almost 941,000ha), and offers a great variety of natural landscapes of exceptional beauty, that can be divided into two dominant landscapes types: the eastern lowland of Archaean geological origin, which comprises marchlands, many lakes, and mixed woodlands; and the western mountainous landscape with spectacular mountain scenery, covering two-thirds of the site. This higher part comprises a thinly-vegetated mountainous landscape with steep valleys and powerful rivers. The site contains more than 100 peaks higher than 1,800m and about 100 glaciers, mainly located in Sarek and Sulitelma areas (IUCN, 1996).

▶ **Natural phenomena of exceptional beauty** **Criterion:(vii)**

A great variety of natural phenomena of exceptional beauty relates to the variety of landscapes of Laponian Area. The World Heritage site is one of the floristically richest areas of Sweden, recording birch, low heath and alpine meadows, which are found below boulder fields, permanent snow fields and glaciers. 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, as it is a very active delta area, surrounded by cliffs of rocky outliers with sheer faces plunging to the delta (IUCN, 1996; World Heritage Committee, 2016).

▶ **Examples of historic and on-going geological processes (associated with glacial activity)** **Criterion:(viii)**

The World Heritage site offers a wide variety of features illustrating both historic and on-going geological processes associated with glacial activity: U shaped valleys, glacial cirques and moraines, talus accumulations, drumlins, presence of large erratic and rapidly flowing glacial streams. Excellent examples of ice and frost action in the tundra setting are found, including formation of polygons and an area of spectacularly collapsing and growing pulsas. Glacial rivers originating in the snowfields continue to cut through bedrock. Large unvegetated areas illustrate the phenomenon of weathering (IUCN, 1996; World Heritage Committee, 2016).

▶ **Examples of on-going ecological and biological processes** **Criterion:(ix)**

The vast mire complex of Sjávnja is the largest in Europe outside Russia. The area is virtually impenetrable for humans, except during winter. The Laponian Area includes primeval coniferous forest with dating indicating ages as old as 700 years. Natural succession continues here unimpaired (IUCN, 1996; State Party of Sweden, 2006; World Heritage Committee, 2016).

Other important biodiversity values

▶ **Significant biodiversity values**

Vegetation: the dominant vegetation is open woodland of white birch (Betula pubescens) with a ground cover mostly of mountain crowberry (Empetrum hermaphroditum) and bilberry (Vaccinium myrtillus) and meadows with globeflower (Trollius europaeus), (Aconitum septentrionale) and blue sowthistle (Lactuca alpine). The eastern lowland is taiga interspersed with large open heaths. Forests of Norway spruce (Picea abies) and Scots pine (Pinus sylvestris) in drier areas form the largest single block of virgin forest in Sweden (44,000ha). The oldest trees of the pine forests of Muddus are about 700 years old.

Botanically the west of the Laponian Area, containing a rich alpine flora, is one of the most interesting mountain regions in the country. The Padjelanta alpine meadows and particularly Jeknaffo mountain support scarce species such as Arctic cinquefoil (Potentilla hypartica) and creeping sandwort (Arenaria humifusa) (UNEP-WCMC, 2011; Laponiatjuottjudus, 2012).
Fauna: The site have a greater number of vertebrate species than any other mountain region in Sweden. The native reindeer (Rangifer tarandus) are all semi-domesticated. The Laponian Area counts some rare mammals, such as brown bears (Ursus arctos), wolverine (Gulo gulo), European otter (Lutra lutra), Arctic fox (Vulpes lagopus), Eurasian lynx (Lynx lynx), and a large population of moose (Alces alces) in the Rapa Valley (UNEP-WCMC, 2011; Laponiatjuottjudus, 2012).
Resident large birds include white-tailed eagle (Haliaeetus albicilla), golden eagle (Aquila chrysaetos), gyrfalcon (Falco rusticulus), peregrine falcon (F. peregrines) and merlin (F. columbarius). In the Sjaunja mires and the bog surrounding Muddusjaure, more than 150 species have been seen, at least 100 of which have been confirmed as breeding, some 50 being dependent on wetland habitat (IUCN, 1996; UNEP-WCMC, 2011; Laponiatjuottjudus, 2012).

Assessment information

Threats

Current Threats

High Threat

While poaching, logging and overgrazing appear as relatively low threats, climate change induce a rapid glacier decline that jeopardizes the World Heritage site's natural values.

▶ **Livestock Farming / Grazing**

(Overgrazing associated with reindeer herding)

Very Low Threat
Inside site, not applicable
Outside site

The issue of overgrazing was mentioned in the first IUCN summary for World Heritage nomination, underlining that the Sámi reindeer-herding communities already cooperated with the Swedish Environmental Protection Agency to address this question (IUCN, 1996). Therefore, this issue is not seen as a direct threat to the World Heritage site. Moreover, the question of change in vegetation in relation to reindeer grazing has been the object of scientific investigation in the area (Olofsson et al., 2010), which all emphasize the importance of reindeer grazing and trampling for sustaining high biodiversity values. Reindeer grazing also fills very important role for the provision of multiple ecosystem services, both cultural for Sámi communities (Reimerson, 2016; Rouet-Leduc and von Essen, 2019), but also regulating, for example for carbon sequestration and storage or habitat for species (Suominen and Olofsson, 2000).

▶ **Logging, Harvesting & Controlling Trees**

(Intensive logging outside the site)

Low Threat
Inside site, scattered(5-15%)
Outside site

Boreal forests of northern Sweden have long been exploited for logging industry (starting more than a century ago) and are still used for intensive logging (Berg et al., 2008). No such activities are operated within the protected borders of the Laponian Area and its century old national parks, but logging activities can occur just outside those borders. This is for example the case in the area of Muddus (east part of the site), where one can see clear-cut forest landscapes outside the national park while being inside the protected area. This phenomenon may thus affect the aesthetic value and unity of landscapes. Intensive forestry activities can also impede reindeer grazing activities from Sámi pastoralists. There is a trend of land use change from pastures to intensive forestry activities (Courault and Cohen, 2020).

▶ **Hunting and trapping**

(Poaching of large carnivores)

Other targeted species names
Brown bears (Ursus arctos), wolverine (Gulo gulo) and Eurasian lynx (Lynx lynx)

Data Deficient
Inside site, extent of threat not known
Outside site

Large carnivores, especially brown bears (Ursus arctos), wolverine (Gulo gulo) and Eurasian lynx (Lynx lynx), are all exposed to the risk of poaching inside the boundaries of the Laponian Area. It is suggested that illegal killing add up to 42–69% of the total mortality of these species and that the large size and remoteness of these areas, with low public presence, low intensity of patrolling and thereby low risk for poachers to be detected, are factors contributing to these high rates (Rauset et al., 2016). Improved collaborations, enforcement and active management are needed to address this issue.

▶ **Habitat Shifting/ Alteration, Droughts, Desertification, Temperature extremes, Storms/Flooding** — **Very High Threat**
Inside site, localised(<5%)
(Climate change leading to glacier loss)

Climate change and especially rising temperature already deeply impact the local cryosphere. For instance, the ~150 glaciers present in the site already lost a significant part of their volume over the last decades (Bosson et al., 2019). According to greenhouse gas emission scenarios, a very small portion (0 to 20%) of their current volume of ~10 km3 should remain by 2100 (Bosson et al., 2019). Glacier disappearance will severely jeopardize the natural values of the World Heritage site and especially the value "example of historic and on-going geological processes associated with glacial activity". It will generate cascading consequences on ecosystems locally (e.g. formation of new terrestrial and freshwater ecosystems) and downward (e.g. modification of water and sediment fluxes).

Potential Threats

Low Threat

The overall potential threats affecting the World Heritage site are considered as low or very low and the general state of integrity of the site is reported as good. The main potential threats listed are taken into account in the recent process and plan for managing the site (Laponiatjuottjudus, 2012). The most significant ones relate to increasing pressure from tourism, intensive forestry and potential mining in the vicinity of the Laponian Area, which could impact on both the natural and cultural values by restricting reindeer movements around the site. However, the future effect of climate change (glacier loss, ecosystem shifts) appear as important potential threats that have to be carefully considered.

▶ **Mining & Quarrying** — **Low Threat**
Outside site
(Mining prospecting at the vicinity of the site)

In 2012-2013, investigations related to two mining projects were launched in the surroundings of the Laponian Area, the first one (in Ruoutevare) being situated in and adjacent to the southwest boundary of the World Heritage site. After the first permits allowing investigations expired, no further mining projects were launched and mining activity is not likely to be operated in this area. The second project is situated about 30 km south-southeast from the boundary of the Laponian Area, in Kallak (Gállok in Sámi). The potential area of extraction is situated fully outside the World Heritage site, but both the Swedish National Heritage Board and the Swedish Environmental Protection Agency consider this mining activity potentially harming to the values of the site since the migratory routes of the reindeer would be obstructed, thus affecting biodiversity values as well as herding practices (cultural values) (Mahmood and Janson, 2013). This concern has been communicated with the World Heritage Centre by the Swedish National Heritage Board and the Swedish Environmental Protection Agency (see for instance Swedish National Heritage Board, 2015). In 2017, the County Government of Norrbotten has advised against the proposal to mine in the area because of the risks of disruption to reindeer herding activities, but the Swedish Government has not issued a final decision yet (IUCN Consultation, 2020).

▶ **Temperature extremes** — **Data Deficient**
Inside site, extent of threat not known
Outside site
(Temperature raise having effects on sensitive subarctic ecosystems)

Though still not precisely assessed, some research has focused on the impacts of temperature raise, and more broadly climate change on arctic and subarctic ecosystems (Kaarlejärvi et al., 2012; Nuttall and Callaghan, 2000). A change in climate will affect the future of the arctic ecosystem. For example Arctic bumble bee communities might face severe problems within the next 50 - 100 years (Fourcade et al., 2019). The ongoing decay of palsas (peat mounds with a permafrost core) is also considered to be driven

by increasing air temperature and precipitation, in particular over the most recent decades (Olvmo et al., 2020).
The EALAT research project led from Kautokeino-Norway, is focusing on climate change impact on reindeer, arctic environment and herding in Arctic countries, and adaptation to changes (Oskal et al., 2009). The boreal ecosystems of the Laponian Area, situated in northern Sweden above polar circle, are likely to be affected by diverse changes. Consequently, some changes may affect the values of the World Heritage site (Oskal et al., 2009). Especially traditional livelihoods of Sámi communities are and will be affected by the effects of climate change, and the provision of ecosystem services from subarctic ecosystem services will be affected (Kelman and Næss, 2019; Markkula et al., 2019).

► Changes in traditional ways of life and knowledge systems that result in negative impact

Very Low Threat
Outside site

(Modernization of techniques and use of motor vehicles (for herding))

According to IUCN's evaluation of the Laponian Area World Heritage nomination (IUCN, 1996), "the site's integrity issue in relation to reindeer herding focuses mainly around the use of technology in the husbandry activity itself", referring, for example, to the increasing use of aircrafts (or more recently helicopters), motorcycles and snowmobiles to round up the herds and move them between pastures, that generate noise pollution (Sámi herders have special rights regarding the use of motor vehicles within the protected area). The 1996 IUCN evaluation report concludes that "in the overall context, the use of motor cycles is not seen as a threat to the integrity of the site which does not mean that local impacts should not be assessed"; a conclusion on the whole shared by the appraisal report for European diploma of Protected Areas, stating that "however, it has to be expected that some compromises will have to be found to allow modern way of life in accordance with conservation objectives" (Galland, 2012,). The management plan of the Laponian Area (Laponiatjuottjudus, 2012) addresses this issue on the basis of a cooperation between the diverse authorities involved in the management of the site, and endeavours to maintain a sustainable management of the area allowing the necessary modernization of herding techniques in harmony with conservation objectives (Laponiatjuottjudus, 2012) .

► Recreational Activities

Very Low Threat
Inside site, throughout(>50%)

(Increasing pressure from tourism)

The tourism industry in the Laponian Area is based on the principles of eco-tourism, and the tourist culture and popularity have grown over the years. However, development of a sustainable tourism industry has not been prioritized and a clear tourism management strategy, as well as a framework for granting tourist business authorizations, are needed to tackle tensions between different interests (PWC, 2016; Laponiatjuottjudus, 2012). There is a concern that an increase in visitor numbers will put pressure on this sensitive ecosystem, and reindeer herders have experienced issues with summer tourism constantly disturbing the reindeers during these few months of very important grazing time (Laponiatjuottjudus, 2012). However, too strict regulations on visitation would go against the freedom of the Swedish Right of Public Access (Koninx, 2018). The Laponia management board, Laponiatjuottjudus, is considering some management options such as zoning, which could direct people away from sensitive areas to places that are able to withstand higher visitor pressure and/or are prepared for visitors to minimize disturbance for the reindeer industry (Laponiatjuottjudus, 2012).

Overall assessment of threats

High Threat

Current and potential threats to the World Heritage site are relatively low, well identified and addressed by the managing authorities, except the consequences of climate change on ecosystems and especially on the local 155 glaciers that are one of the key natural features of the site. Climate change is especially intense in this high latitude region and monitoring and anticipating its effects on local natural and cultural heritages will constitute a major issue for managing authorities. Additionally, the evolution of mining projects at the vicinity of the Laponian Area remains to be considered in the long-term horizon, potential mining in the vicinity of the site could impact on both the natural and cultural values by restricting reindeer movements around the site. Development of guidelines for a

sustainable tourism industry in the Laponian Area is also needed.

Protection and management

Assessing Protection and Management

▶ **Highly Effective**

The site is composed of four national parks and two nature reserves (World Heritage Committee, 2016). Since 2011, the site has a participatory management board (Laponiatjuottjudus), in charge of implementing the management plan (adopted in 2012). This participatory management system comprises representatives of the diverse authorities: the state, the county, the municipalities and the local indigenous Sámi village organizations. Since establishment, the Laponia management board shares the responsibility of managing the Laponian Area with the County Administrative Board (Länstyrelsen), which keeps a dominant role in administrating the area. (Laponiatjuottjudus, 2012). This management system is presented as an example of good practice by the UNESCO World Heritage Centre for its collaborative dimension and the significance of local people's participation (World Heritage Review, 2012).

▶ **Mostly Effective**

A participatory management board (Laponiatjuottjudus), which includes different levels of authorities and representatives of the local indigenous reindeer-herding Sámi communities, is responsible for implementing the Laponian Area management plan adopted in 2012 (Laponiatjuottjudus, 2012). A management effectiveness assessment, undertaken by a private consultancy company in 2016, showed that the collaborative governance model is working well. However, some concerns were raised, for example that the management plan is too broad and lacks clear short- and long-term objectives and priorities, that there are no measures in place to evaluate how the management impacts on the World Heritage site's values and also that it lacks a strategy for managing tourism. The assessment proposed some priorities for the future management of the site, including the development of a buffer zone and zonation within the Laponian Area, a clear visitor management strategy, as well as increased focus on surveillance and inspection to address illegal activities (PWC, 2016).

▶ **Highly Effective**

The boundaries of the site follow a mosaic of established protected areas (national parks and nature reserves). When the Laponian Area was nominated as a World Heritage, it was estimated that there was no significant need for a buffer zone, as the size of the site was considered large enough to preserve its values. However, after the first periodic report (State Party of Sweden, 2006), UNESCO called for the need of a buffer zone. Today, the Laponian Area is to a great extent surrounded by protected areas and intact mountain areas, and together with the Sámi village organizations' winter grazing lands (mainly situated outside the site), these areas function as a de facto buffer zone for the preservation of the values of the Laponian Area. There are, however, adjacent areas that are not protected and could potentially pose threats in terms of large-scale forestry, mineral extraction and energy production. The development in these areas will be monitored and the planning and decision-making authorities have a common ambition to develop a buffer zone for the Lapnian Area (Laponiatjuottjudus, 2012).

▶ **Highly Effective**

The World Heritage site is well integrated into regional and national planning systems: both the County Administrative Board (regional level) and the Swedish Environmental Protection Agency (national level) are involved in the development and implementation of the Management Plan, together with the local authorities and the local Sámi village organizations (Laponiatjuottjudus, 2012).

▶ **Highly Effective**

There are nine Sámi village organization active within the Laponian Area. A Sámi village organization is an administrative unit of economic co-operation within a specific geographical area where its members can conduct reindeer husbandry. The nine Sámi village organizations have about 60,000 - 65,000 reindeers grazing inside the Laponian Area during the summer season. Though not involved in the first stages of the World Heritage nomination, local people and especially indigenous reindeer-herding Sámi people progressively took part in long negotiations with local, regional, and national authorities around the management of the World Heritage site (Green, 2009; Roué, 2013), institutionalized in a framework called Laponia Process implemented between 2006 and 2010. This process led to a collaborative management structure (Laponiatjuottjudus) established in 2011, comprising representatives of the diverse levels of authorities: five representatives of the local Sámi village organizations and four representatives for respectively the state, the region and the two municipalities that support the protected territory. The process of developing a new management model for Laponian Area is of great symbolic importance, particularly in the recognition of the Swedish state by handing over the majority and the role of the chairmanship in the Laponia management board to the indigenous Sámi people, including administrative and decision-making power (Stjernström et al., 2020).
Since 2011, Laponiatjuottjudus is in charge of managing the area according to conservation objectives detailed in the management plan adopted by consensus in 2012 (Laponiatjuottjudus, 2012; Green, 2009; Galland, 2012; Revelin, 2013b). According to an evaluation undertaken in 2016, the new management structure has led to an overall well-functioning collaboration between the authorities and the Sámi village organizations, where the Sámi perspective and knowledge about reindeer herding and its conditions have been better acknowledged and management is undertaken in greater agreement with the Sámi village organizations (PWC, 2016). There is also a clear willingness and ambition from most public and private stakeholders to find and develop a sustainable management model for indigenous Sámi natural and cultural heritage (Stjernström et al., 2020).

▶ **Highly Effective**

Most of the Laponian Area is protected under different regimes (four national parks and two nature reserves) which are under the legal framework for protected areas in Sweden, related to the authority of the Swedish Naturvårdsverket (Swedish Environmental Protection Agency) (Laponiatjuottjudus, 2012).

▶ **Mostly Effective**

The legal framework is being effectively enforced and permit requests are thoroughly evaluated and monitored. However, there is a perceived lack of resources and capacity for surveillance work and to detect and address infringements (PWC, 2016).

▶ **Mostly Effective**

Three recommendations were made by the World Heritage Committee in the Decision for the Laponian Area inscription (20COM VIII.B, 1996): 1) to continue to work conjointly with the indigenous Sámi people, 2) to extend the inventories on species, and 3) to consolidate the management plan for the site (a complementary suggestion was made that welcomed the consideration of a transboundary site with Norway). As the participatory management structure exemplifies, the conjoint work with the Sámi people has well improved since the inscription (in 1996), and management is now undertaken in greater agreement Sámi perspectives and knowledge about reindeer herding (Laponiatjuottjudus, 2012). Records for overall species inventories are still difficult to find. Though an important work focuses on predator inventories and management, and is conducted in collaboration with local Sámi reindeer-herders (Galland, 2012). The Tentative List of Norway lists a potential extension of the Laponian Area as a transboundary site to include "Tysfjord, the fjord of Hellemobotn and Rago" (World Heritage Centre, 2002).

▶ **Highly Effective**

The World Heritage site is mainly used for reindeer herding, as it has been for the previous centuries, as well as subsistence fishing and hunting. A huge work is made together with the local Sámi village organizations to ensure a sustainable use of the area (Laponiatjuottjudus, 2012). As the national park system in the area is very old (first parks were established in 1909), uses of the areas (especially leisure

hunting and fishing) have been historically controlled in order to maintain the stability of natural resources. Leisure and tourism uses are mainly focused on soft and nature-based activities (Revelin, 2013a).

▶ **Data Deficient**

In 1996 (inscription of the site) the annual budget for the mountain unit was approximately US$ 1,5 million (UNEP-WCMC, 2011). The management organization is financed through the Swedish Environmental Protection Agency and the state allocation for “measures for valuable nature”. In recent years supplementary funding has been added from, among others, the Swedish National Heritage Board (PWC, 2016).

▶ **Mostly Effective**

In addition to the nine members sitting in the participatory Laponian management board, an office was established to implement the management work. There are currently nine fulltime staff positions, one of whom is also director of the Naturum Laponia Visitor Centre. The office is responsible for the operational activities, notably to provide information, inventories of both biological state and knowledge, handling enquiries from the tourist industry, issues concerning reindeer husbandry and generally coordinating the management of the World Heritage site. This is still a young organization and the operational assignment is considered to be very extensive. Hence, resources and competence at the office may still need to be developed, especially in relation to administration and management (PWC, 2016).

▶ **Mostly Effective**

An eco-museum and visitor centre (“naturum”) has been constructed in Stuor Muorkke (Stora Sjöfallet) and was formally opened in September 2014. In connection with a network of smaller information centers located in other strategic points of the World Heritage site, this eco-museum presents a permanent exhibition on the richness, and natural and cultural history of the Laponian Area (Revelin, 2013b).

▶ **Data Deficient**

Between 2002 and 2007 a project called "Norra Norrland" was implemented to encourage and develop tourism and craft activities in the Laponian Area. In the frame of the project, 28 local tourist companies participated in seminars and workshops to improve their skills in tourism related issues, and in a second phase the trademark “Laponia” was established on the national and international travel market (Aro, 2009). With the constitution of the new participatory Laponia management board or Laponiatjuottjudus in 2011, the previous ban on commercial activities for tourists was removed and authorization can now be granted by the County Administrative Boards, in consultation with the Sámi village organizations, to facilitate business opportunities for people who live and work in and around the Laponian Area (Holmgren et al., 2017). However, development of a sustainable tourism industry has so far not been prioritized and there is a need for a clear tourism management strategy. Guidelines for areas such as tourism, air traffic and off-road vehicle use are to be developed to support the Laponiatjuottjudus and a subdivision of the Laponian Area into zones will clarify how the site is to meet the demands of visitors and local population. The Laponiatjuottjudus is striving to make the World Heritage site a pilot testing area for a sustainable tourism industry (Laponiatjuottjudus, 2012).

▶ **Mostly Effective**

Yearly inventories of large predators are conducted conjointly between national parks administrations and local Sámi reindeer-herders (Galland, 2012; World Heritage Committee, 2016). A population study of the threatened Gyrfalcon in the mountain regions of the Laponian Area and annual surveys of breeding Peregrine Falcons and White-Tailed Sea Eagles have been conducted. A monitoring system on invasive species (especially plants) would be beneficial.

▶ **Highly Effective**

Scientific research is conducted in the World Heritage site by different institutions, especially the Swedish University for Agricultural Sciences (Galland, 2012). Research notably addresses the monitoring

of predators, floristic inventories, invasive species, glaciology, geomorphological processes, climate change, forest ecology, as well as research on reindeer husbandry and Sámi culture. Three research stations of various importance are situated in the surroundings of the site: Tarfala, Kvikkjokk and Abisko, but researchers need to have permission from the county of Norrbotten to do research in the Laponian Area. Though the site is situated in a very peripheral area, far from urban centres, it presents good scientific facilities, in addition to a long tradition of scientific interest after Linnaeus' expedition in the late 18th century.

Overall assessment of protection and management

Highly Effective

The protection and management of the World Heritage site is mostly or highly effective, thanks to the century old national parks system of the country, and the effectiveness of its more recent participatory management system. Some more work is needed to ensure a future sustainable balance between tourism, conservation and reindeer husbandry.

▶ **Assessment of the effectiveness of protection and management in addressing threats outside the site** — **Highly Effective**

Because of its remoteness and existence of very old national park and nature conservation systems, the Laponian Area is not subject to significant threats from the outside. The main concern derives from mining projects, whose advancements are closely followed by both the National Heritage Board and the Swedish Environmental Protection Agency (Mahmood and Janson, 2013).

▶ **Good practice examples**

The participatory management of the Laponian Area World Heritage site, involving authorities from the diverse levels of the Swedish society, and especially the local indigenous Sámi village organizations is a significant example of good practices. This example has already been recognized and encouraged by the UNESCO World Heritage Centre, notably through the publication of an article in the World Heritage Review n°62 in 2012.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Variety of landscapes, with spectacular mountain scenery** — **Good** **Trend:Stable**

The natural landscapes of the Laponian Area were reported in good state of conservation in the appraisal report for European Diploma for protected Areas (Galland, 2012). Some concerns exist, however, these relate to potential future impacts of climate change and increasing temperatures.

▶ **Natural phenomena of exceptional beauty** — **Good** **Trend:Stable**

The state of preservation of the World Heritage site's natural phenomena is good. The site contains areas of exceptional natural beauty and extensive and well preserved uninhabited taiga and mountains (UNEP-WCMC, 2011). However, increasing pressure from tourism could potentially impact negatively on this fragile landscape.

▶ **Examples of historic and on-going geological processes (associated with glacial activity)** — **Good** **Trend:Stable**

The current state of historic and on-going geological processes is good. Apart from climate change, potential threats from outside of the World Heritage site, such as logging, mining and energy production, are being closely monitored.

▶ **Examples of on-going ecological and biological processes** — **Good** **Trend:Stable**

As well as other values of the World Heritage site, the more recent reports evoke a good state of conservation of Sjaunja Area (UNESCO, 2006). Climate change and logging could pose potential future threats to ecological and biological processes within the site.

Summary of the Values

▶ **Assessment of the current state and trend of World Heritage values** — **Good** **Trend: Stable**

The overall state of conservation and trend of World Heritage values are good and stable. All reports share the conclusion of good management practices and few threats that could directly affect the values of the site in the short- and medium-term. The main concern in the long-term is the potential and uncertain impacts of climate change and in the medium-term the potential of new mining activities nearby and increasing pressure from tourism.

▶ **Assessment of the current state and trend of other important biodiversity values** — **Low Concern** **Trend: Stable**

The overall state of conservation and trend of other important biodiversity values are generally seen as good and stable, however, some concerns exist regarding threatened species of flora and fauna. The boreal ecosystems of the Laponian Area, situated in northern Sweden above polar circle, are likely to be affected by future climate change (Kaarlejärvi et al., 2012; Maliniemi et al., 2018), moreover, potential increase in tourism pressure could also pose a negative impact on these fragile ecosystems (Koninx, 2018; Tolvanen and Kangas, 2016). Rauset et al. (2016) have also shown that large carnivores, such as brown bears (Ursus arctos), wolverine (Gulo gulo) and Eurasian lynx (Lynx lynx), are all exposed to the risk of poaching inside the boundaries of the Laponian Area.

Additional information

Benefits

Understanding Benefits

▶ **Water provision (importance for water quantity and quality)**

The World Heritage site contains an important water stream network (many rivers, lakes, marshlands, waterfalls, etc.), several of which have their source in the numerous glaciers of the west of the area. The water is naturally potable in the all area.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

▶ **Contribution to education**

The World Heritage site presents a potential to contribute to disseminating knowledge on, for instance, Sámi culture, nature history and botany. As such, some tourists, or even guided tours follow the itinerary

of Carl von Linné, who made botanic expeditions in the area in 1732.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► Importance for research

Especially for the local indigenous Sámi people, the Laponian Area is important for the transmission of knowledge and know-how related to Sámi livelihood and reindeer husbandry. It is also important for visitors and for scientific interest as it contains huge and almost untouched natural areas.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► Outdoor recreation and tourism

Nature based tourism is an important activity in the World Heritage site. Main tourist practices are mountain hiking (during summer season), and cross country skiing (during winter season). The site offers good infrastructures for those activities, comprising maintained trails and overnight cabins. Tourism is an important complementary resource for local people. Fishing is also an important leisure activity in the site.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► Wilderness and iconic features

Several sacred Sámi sites are comprised within the property, often related to emblematic landscapes, as for instance, the Skierfe mountain in the Rapa Valley. Landscapes and toponymy have essential cultural values, as the old indigenous Sámi nomadic culture is based on transhumances with reindeer herds in the huge natural landscapes of northern Sweden. The Sámi names of places are very descriptive of the landscapes, which has allowed the Sámi reindeer-herding communities to move safely in those vast areas for centuries. Traditional knowledge and know-how related to landscpes and tranhumances are thus important heritage values.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Moderate, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► Sacred natural sites or landscapes

Because of its huge natural landscapes, with few obvious traces of human presence, and its century old conservation systems, the World Heritage site is often associated with the values of wilderness, in spite being a predominantly Sámi cultural landscape. The "wilderness" values are nevertheless notably important in terms of tourism development.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing

- Overexploitation Impact level - Moderate, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► History and tradition

There have not been many archaeological investigations in the mountain region in Sweden, due to earlier Swedish archaeological ideas and believes that no one lived or left any traces there. Today, researchers have recognized that this area is very interesting, and that there are evidences of human presence from as far back as 7000 BP. Some archaeological settlements located inside the Laponian Area demonstrate long continuous use of the area by the Sámi indigenous people. The Laponia Area management organization or Laponiatjuottjudus has done some archaeological investigations in the area, and can already show many new findings, for example, that both Sámi and non-Sámi people have been living in the Sjávnjá mire area for several thousand years.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► Access to drinking water

In line with the Swedish Right of Public Access to nature, non commercial water use is permitted in the World Heritage site. Clear water is a huge resource in the area as it is potable everywhere in the streams and lakes of the site. Both tourists and inhabitants use it for ordinary consumption (drinking, washing, cooking).

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► Livestock grazing areas

Reindeer husbandry is an important activity in the area, and an essential dimension in the Sámi culture. As well as an important subsidence for Sámi reindeer-herders and also other locals.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► Fishing areas and conservation of fish stocks

Fishing is an important dimension in the traditional Sámi livelihood and culture. As reindeer herders, nine Sámi village organizations also benefit from special rights for fishing in the protected area (they are for instance allowed to use nets). The local reindeer-herding Sámi people are also allowed to sell fish, which provides them with a small and seasonal complementary income. Leisure fishing is allowed in specific zones, which makes them attractive for fishing tourism.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Moderate, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► Collection of wild plants and mushrooms

A specific Swedish constitutional right, the "allemansrätt" (right of public access to nature, independently of property rights) allows harvesting of common plants (if not protected) everywhere in Sweden, including in protected areas (though some rules may restrict or expand the Right of Public Access in the case of protected areas). So wild food plants and mushrooms collection is permitted within the Laponian Area World Heritage.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► **Legal subsistence hunting of wild game**

Hunting is allowed in the site for people belonging to one of the nine local Sámi village organizations according to special authorizations based on their continuous presence and use of the area as their traditional lands. Other people can hunt seasonally with special permits (applied at the regional County Administration).

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Low, Trend - Continuing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

►

Four positions have been created since 2012 within the new office in charge of implementing the management of the Laponian Area. In addition, nine members work part time as representatives sitting in the participatory management board (Laponiatjuottjudus).

Summary of benefits

The Laponain Area World Heritage site generates a number of important key benefits, such as general environmental services, knowledge production and transfer, cultural and spiritual values, health, recreation, food and water. The effect of potential negative factors to these benefits are generally low. There exists a latent threat from climate change and pollution, but at present this does not negatively affect the selected benefits. Exploitations in the form of mining could potentially pose a threat to all of the benefits listed above (especially environmental, cultural and spiritual services), if realized in practice. Previous extensive hydropower exploitation (installed long before the World Heritage designation) has had detrimental effects on the water stream network and iconic natural and cultural features (such as Stuor Muorkke/Stora Sjöfallet) in the area, as well as submerging Sámi settlements and reindeer grazing land, devastating enormous areas and depleting fish populations and animal life. The effect of invasive species (especially invasive plants) is potentially a risk to the benefits, but so far there is a lack of information here and a need for effective monitoring systems to evaluate this potential negative factor further.

Projects

Compilation of active conservation projects

№	Organization	Brief description of Active Projects	Website
1	Laponiatjuottjuddus	Participatory management board implementing conservation objectives of the Laponian Area	Laponia.nu

№	Organization	Brief description of Active Projects	Website
2	Naturvårdsverket	Swedish Environmental Protection Agency, supervising the overall conservation planning for Swedish protected areas	http://www.swedishepa.se/Enjoying-nature/Protected-areas/ https://www.naturvardsverket.se/Var-natur/Skyddad-natur/Nationalparker/ (in Swedish)

REFERENCES

№	References
1	Aro, J. (2009). Norra Norrland (SE): Development of the “Laponia World Heritage”. [online report], (9 January 2009). <https://ec.europa.eu/regional_policy/en/projects/best-pract...; Accessed 23 April 2020
2	Beach, H. (2001)’World Heritage and Indigenous Peoples: The Example of Laponia’ in Upholders of Culture: Past and Present. B. Sundin (ed) Royal Swedish Academy of Engineering Sciences (IVA), Stockholm.
3	Berg, A., Östlund L., Moen, J., and Olofsson, J. (2008). ‘A century of logging and forestry in a reindeer herding area in northern Sweden’. Forest Ecology and Management, 256 (5) : 1009-1020.
4	Bosson, J. B., Huss, M., & Osipova, E. (2019). Disappearing world heritage glaciers as a keystone of nature conservation in a changing climate. Earth's Future, 7(4), 469-479.
5	Courault, R. and Cohen, M. (2020) ‘Evolution of Land Cover and Ecosystem Services in the Frame of Pastoral Functional Categories: A Case Study in Swedish Lapland’, Sustainability, 12(1), p. 390. doi: 10.3390/su12010390.
6	Dahlström, Å. N. (2003) Negotiating Wilderness in a Cultural Landscape. Predators and Saami Reindeer Herding in the Laponian World Heritage Area. Acta Universitatis Upsaliensis (Uppsala Studies in Cultural Anthropology no 32), Ph D thesis, Uppsala.
7	Eilertsen, S. M., I. Schjelderup & S. D. Mathiesen (2000)’Plant quality and harvest in old meadows grazed by reindeer in spring’ in Journal of Science of Food and Agriculture 80:329-334.
8	Eilertsen, S. M., I. Schjelderup and Mathiesen S. D. (2002). Early season grazing effects on birch, grass, herbs and plant litter in coastal meadows used by reindeer: a short-term case study, in Rangifer 22:123-131.
9	Eilertsen, S. M., Schjelderup I. and Mathiesen S. D. (1999). Utilization of old meadow by reindeer in spring in norther Norway, in Rangifer 19:3-11
10	Fourcade, Y., Åström, S. and Öckinger, E. (2019). Climate and land-cover change alter bumblebee species richness and community composition in subalpine areas. Biodiversity and Conservation, 28(3), pp.639-653.
11	Galland, P. (2012). Appraisal Report for European Diploma of Protected Areas. Muddus National Park, Sarek & Padjelanta National parks. Strasbourg, France: Council of Europe.
12	Green, C. (2009). Managing Laponia, a World Heritage as an arena for Sami ethno-politics in Sweden. PhD thesis. Uppsala, Acta Universitatis Upsalensis.
13	Holmgren, L., Sandström, C. & Zachrisson, A. (2017) Protected area governance in Sweden: new modes of governance or business as usual?, Local Environment, 22:1, 22-37, DOI: 10.1080/13549839.2016.1154518
14	IUCN (1996). World Heritage Nomination – IUCN Technical Evaluation, Laponian Area (Sweden). In: IUCN World Heritage Evaluations 1996, IUCN Evaluations of nominations of natural and mixed properties to the World Heritage List. [online] Gland, Switzerland: IUCN, pp.97-106. Available at: < https://whc.unesco.org/document/154240> [Accessed November 2020].
15	Kaarlejärvi, E., Baxter, R., Hofgaard, A., Hytteborn, H., Khitun, O., Molau, U., Sjögersten, S., Wookey, P., and Oloffson, J. (2012). ‘Effects of warming on shrub abundance and Chemistry Drive Ecosysytem-Level changes in Forest-Toundra Ecotone. Ecosystems, 12 (8) : 1219-1233.
16	Kelman, I. and Næss, M. W. (2019) ‘Climate change and migration for Scandinavian Saami: A review of possible impacts’, Climate, 7(4), pp. 1–14. doi: 10.3390/cli7040047.

№	References
17	Koninx, F. (2019). Ecotourism and rewilding: the case of Swedish Lapland. Journal of Ecotourism, 18(4), pp.332-347. https://doi.org/10.1080/14724049.2018.1538227
18	Laponiatjuottjudus (2012). The Management Plan of the Laponian World Heritage site. Regulations and Maintenance Plan for the National Parks and Nature Reserves. (Tjuottjudusplána / Förvaltningsplan) [online]. Laponiatjuottjudus / Laponiaförvaltningen (Laponia management board). Available at: https://laponia.nu/wp-content/uploads/2014/08/Laponia-forva…. Accessed June 20 2017.
19	Mahmood Q. and Janson R, (2013). Letter on “mining projects in the vicinity of the World Heritage property “Laponian Area”, Sweden”.
20	Maliniemi, T., Kapfer, J., Saccone, P., Skog, A. and Virtanen, R. (2018). Long-term vegetation changes of treeless heath communities in northern Fennoscandia: Links to climate change trends and reindeer grazing. Journal of Vegetation Science, 29(3), pp.469-479. https://doi.org/10.1111/jvs.12630
21	Markkula, I., Turunen, M. and Rasmus, S. (2019) ‘A review of climate change impacts on the ecosystem services in the Saami Homeland in Finland’, Science of the Total Environment. Elsevier B.V., 692, pp. 1070–1085. doi: 10.1016/j.scitotenv.2019.07.272.
22	Nuttall, M. and Callaghan, T. (2000). The Arctic : Environment, People, Policy. Amsterdam, The Neederlands : Harwood Academic Publishers.
23	Oksanen, L. & J. Moen (1994) ‘Species-specific plant responses to exclusion of grazers in three Fennoscandian tundra habitats’ in Ecoscience 1:31-39.
24	Olofsson, J. and L. Oksanen (2005). Effects of reindeer density on vascular plant diversity on North Scandinavian mountains, in Rangifer 25:5-18.
25	Olofsson, J., Moen J. and Östund, L. (2010). Effects of reindeer on boreal forest floor vegetation: does grazing cause vegetation state transitions? Basic and Applied Ecology, 11(6) : 550-557.
26	Olvmo, M., Holmer, B., Thorsson, S., Reese, H. and Lindberg, F. (2020). Sub-arctic palsa degradation and the role of climatic drivers in the largest coherent palsa mire complex in Sweden (Vissátvuopmi), 1955–2016. Scientific Reports, 10(1), pp.1-10.
27	Oskal, A., Turi, J.M., Matissen, S. and Burgess, P. (2009). EALAT, Reindeer herding, traditional knowledge and adaptation to climate change and loss of grazing land. Kautokeino, Norway : ICRH .
28	PWC (2016). Laponiaförvaltningen - En utvärdering (Evaluation of the Laponia management) [online] (in Swedish). PWC, September 2016. Available at: https://laponia.nu/om-oss/dokument/ [Accessed 23 April 2020]
29	Rauset, G.R., Andrén, H., Swenson, J.E., Samelius, G., Segerström, P., Zedrosser, A. and Persson, J., (2016). National parks in northern Sweden as refuges for illegal killing of large carnivores. Conservation Letters, 9(5), pp.334-341. https://doi.org/10.1111/conl.12226
30	Reimerson, E. (2016) ‘Sami space for agency in the management of the Laponia World Heritage site’, Local Environment, 21(7), pp. 808–826. doi: 10.1080/13549839.2015.1032230.
31	Revelin, F. (2013a). Ecotourism and Extraction in Saami Lands: Contradictions and Continuities. In: Büscher B. and Davidov V. (Eds.) The Ecotourism and Extraction Nexus: Rural Realities and Political Economies of (un)Comfortable bedfellows, pp 193-214, London, Routledge.
32	Revelin, F. (2013b). Montagnes à vivre, à voir et à préserver : dynamiques du tourisme et sites européens du Patrimoine mondial (Laponia et Pyrénées-Mont Perdu). PhD thesis, Paris : MNHN.
33	Rouet-Leduc, J. and von Essen, E. (2019) ‘The Compromises of Rewilding in Swedish Laponia: Implications for Nature Reconciliation’, The Journal of Transdisciplinary Environmental Studies, 17(1). Available at: http://www.journal-tes.dk/.

№	References
34	Roué, M. (2013). ‘Paysages culturels et gouvernance : nouveau contrat social et retour du refoulé’. In Luginbühl, Y. and Terrasson, D. (eds). Paysages et développement durable, pp261-274. Versailles : Quae.
35	State Party of Sweden (2006). Periodic Report Second Cycle Section II: Laponian Area. [online] Paris, France: UNESCO World Heritage Centre, pp.1-5. Available at: < https://whc.unesco.org/document/163344>. [Accessed November 2020].
36	Stjernström, O., Pashkevich, A., & Avango, D. (2020). Contrasting views on co-management of indigenous natural and cultural heritage – Case of Laponia World Heritage site, Sweden. Polar Record, 56, E4. doi:10.1017/S0032247420000121
37	Suominen, O. and Olofsson, J. (2000) ‘Impacts of semi-domesticated reindeer on structure of tundra and forest communities in fennoscandia: a review’, Annales Zoologici Fennici, 37(4), pp. 233–249.
38	Swedish National Heritage Board (2015) Letter to the World Heritage Centre. https://www.naturvardsverket.se/upload/miljoarbete-i-samhal…. Accessed June 29 2017.
39	Tolvanen, A. and Kangas, K. (2016). Tourism, biodiversity and protected areas–review from northern Fennoscandia. Journal of environmental management, 169, pp.58-66. https://doi.org/10.1016/j.jenvman.2015.12.011
40	UNEP-WCMC (2011). Laponian Area, Sweden. UNEP-WCMC World Heritage Information Sheets. [online] Cambridge, UK: UNEP-WCMC. Available at: <https://yichuans.github.io/datasheet/output/site/laponian-a…; [Accessed November 2020].
41	Väre, H., R. Ohtonen & K. Mikkola (1996) ’The effect and extent of heavy grazing by reindeer in oligotrophic pine heaths in northeastern Fennoscandia’ in Ecography 19245-253.
42	World Heritage Centre (2002). Tentative Lists. Norway. [online] Paris, France: UNESCO. Available at: < http://whc.unesco.org/en/tentativelists/state=no> [Accessed 8 June 2020].
43	World Heritage Committee (1996). Decision 20COM VIII.B. Inscription: The Laponian Area (Sweden). In: Report of decisions of the 20th session of the World Heritage Committee (Merida, Yucatan, 1996). [online] Paris, France: UNESCO World Heritage Centre, pp.62. Available at: < http://whc.unesco.org/en/decisions/2974> [Accessed November 2020].
44	World Heritage Review (2012). World Heritage and Indigenous People. World Heritage Review n°62.
45	Zobel, K., M. Moora, V. K. Brown, P. Niemela M. Zobel (1997) ’Secondary succession and summer herbivory in a subarctic grassland: community structure and diversity’ in Ecography 20:595-604.
46	den Herder, M and Niemelä P. (2002). Effects of reindeer on the re-establishment of Betula pubescens subsp. Czerepanovii and Salix phylicifolia in subarctic meadow, in Rangifer 23:3-13.