Ilulissat Icefjord

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Denmark
Inscribed in: 2004
Criteria: (vii) (viii)

Located on the west coast of Greenland, 250 km north of the Arctic Circle, Greenland's Ilulissat Icefjord (40,240 ha) is the sea mouth of Sermeq Kujalleq, one of the few glaciers through which the Greenland ice cap reaches the sea. Sermeq Kujalleq is one of the fastest (19 m per day) and most active glaciers in the world. It annually calves over 35 km3 of ice, i.e. 10% of the production of all Greenland calf ice and more than any other glacier outside Antarctica. Studied for over 250 years, it has helped to develop our understanding of climate change and icecap glaciology. The combination of a huge ice-sheet and the dramatic sounds of a fast-moving glacial ice-stream calving into a fjord covered by icebergs makes for a dramatic and awe-inspiring natural phenomenon. © UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 02 Dec 2020

GOOD WITH SOME CONCERNS

There are currently no serious concerns regarding the World Heritage values of the site. The main current threats include impact from tourism, fishing, boat traffic and helicopter/plane flights, but the management authorities are addressing current threats efficiently. Climate change will seriously affect the site's values in the future and will result in significant changes in the glacial landscape, as well as in vegetation and animal habitats.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **The only remnant in the Northern Hemisphere of the continental ice sheets from the Quaternary Period** **Criterion:(viii)**

The Ilulissat Icefjord is an outstanding example of a stage in the Earth's history: the last ice age of the Quaternary Period. The ice-stream is one of the fastest (40m per day) and most active in the world (WHC, 2014). Its annual calving of over 40 cu. km of ice which accounts for 10% of the production of all Greenland calf ice, more than any other glacier outside Antarctica (Joughin et al 2013). The glacier has been the object of scientific attention for 250 years and, along with its relative ease of accessibility, has significantly added to the understanding of ice-sheet glaciology, climate change and related geomorphic processes (World Heritage Committee, 2014). The ice sheet formed during the Middle and Late Pleistocene over a once temperate landscape, the south central part of which drained through large rivers to Disko Bugt, still marked as channels under the ice and submarine troughs. The ice sheet's oldest ice is estimated to be 250,000 years old, which is fed by an annual accumulation of snow matched by loss through calving and melting at the margins. The ice sheet holds a detailed record of past climatic change and atmospheric conditions (in trapped air bubbles) for this entire length of time, and shows that during the last ice age the climate fluctuated between extreme cold and warmer periods.

▶ **Natural spectacle** **Criterion:(vii)**

The combination of a huge ice sheet and a fast moving glacial ice-stream calving into a fjord covered by icebergs is a phenomenon seen in Greenland and Antarctica. Ilulissat offers both scientists and visitors easy access for close view of the calving glacier front as it cascades down from the ice sheet and into the ice-choked fjord. The wild and highly scenic combination of rock, ice and sea, along with the dramatic sounds produced by the moving ice, combine to present a memorable natural spectacle (World Heritage Committee, 2014). It is the most prolific and fastest ice-calving tidewater glacier (glaciers that calve into the sea) in Greenland producing a constant procession of icebergs and still actively eroding the fjord bed.

Other important biodiversity values

▶ **Arctic vegetation**

The flora of the area is a low-arctic type, typical of the nutrient-poor silicaceous soil which, where humid, shows solifluction an effect such as frost boils. Colonization of the margins of retreating ice also provides examples of plant succession. The main plant communities of the area are heath, fell-field, snow-patch, herb-slope, willow-scrub, fen, river-bank, seashore and aquatic (State Party of Denmark, 2002).

▶ **Sea life**

The upwelling caused by calving icebergs brings up nutrient-rich water which supports prolific invertebrate life and attracts great numbers of fish, seals and whales that feed on the generated nutrients. 20 species of fish have been recorded in the area; the dominant species is the flatfish Greenland halibut (Reinhardtius hippoglossoides) which feeds mainly on northern shrimp and euphausid crustaceans (IUCN, 2004). The halibut migrates seasonally in and out of the fjord, living both on the benthos and in the open sea. Warmer waters bring the Atlantic cod. The ringed seal is a high Arctic species, but it is also found in the low Arctic if there is sea ice. Harp seals, fin and minke whales occur in summer at the fjord mouth with very occasional blue and Greenland whales. Beluga visit Disko Bugt in autumn and winter.

▶ **Sea birds**

The seabirds are typical for the area, with numerous breeding colonies attracted by the high primary productivity of the glacier front, and by fish discarded by the local fishery. Large flocks of northern fulmar and gulls feed among the grounded icebergs. These are mainly Iceland gulls, glaucous gulls with lesser numbers of great black-backed gulls, kittiwakes and guillemots with great cormorant (IUCN, 2004).

▶ **Land birds and mammals**

Land birds include several species of geese, snow buntings, rock ptarmigan and Peregrine falcon. There are few mammals within the property. Arctic fox is believed to be common, whereas Arctic hare occur mainly in the higher land near the inland ice (IUCN, 2004).

Assessment information

Threats

Current Threats

Low Threat

Climate change is the greatest current threat. Other main current threats include impacts from tourism; fishing, boat traffic and helicopter/plane flights. The situation is still under control; the management plan addresses most of the issues and regulations have been updated and implemented.

▶ **Shipping Lanes** — **Low Threat**

(Boat traffic and helicopter/plane flights)

Inside site, localised(<5%)
Outside site

Boat traffic in the bay as well as sightseeing helicopter flights impact the spectacular aspect of the site as well as some of its biological values.
The disturbance is affecting nesting birds and sea life (State Party of Denmark, 2009; WHC, 2007; WHC, 2009). Cruise ships are not permitted within the property and anchoring of boats is also prohibited.

▶ **Recreational Activities** — **Low Threat**

(Impact of tourism)

Inside site, localised(<5%)
Outside site

Tourism pressure brings physical damage, such as erosion of vegetation, as well as noise and pollution from motorized vehicles, vessels and helicopters. It also has the potential to stress the capacity of local utilities such as potable water, sewer, electricity production, and communications infrastructure. The situation is addressed through the revised management plan and is under control (Steering Group, 2018). Ilulissat is the most visited tourist destination in Greenland. Tourists that visited Illulissat in 2019 were 31,099 and increased 9,1% from 2018 (Statistics Greenland – Tourism 2019). Number of cruise passengers in Ilulissat during 2019 were 14,762 and increased 14% compared with 2018, but for the country overall the increase was 2% between years (Statistics Greenland – Cruise ship statistics 2019).

▶ **Fishing, Harvesting & Controlling Aquatic Species** — **Low Threat**

(Fishing)

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

Other targeted species names
Greenland halibut (Reinhardtius hippoglossoides)

Greenland halibut is common along the West Greenland Coast and is an important socio-economic resource for the Greenland community. Halibut fishing in the Ilulissat Icefjord takes place mainly during the winter and is traditionally performed with longline from small open boats or dog sledges through a hole in the sea ice. More than one third of the Disko Bay Greenland halibut catches are from a small area near the mouth of the Ilulissat Icefjord. Large fishes are caught inside the icefjord at greater depth. Since 2009 catches in Disko Bay have gradually increased and in 2016 catches were 10,760 tons. This was followed by a poor season in 2017 where only 6409 tons was caught. In 2018, halibut catches reached 8399 tons, thereof 920 tons in the Disko Kangia (Ilulissat Icefjord). These are high figures of

catches. The Disko Bay is of major importance to the shrimp fishing industry and earlier studies suggest that by-catch of Greenland halibut could have a negative effect on recruitment to the inshore stock component (Nygaard, 2019).

▶ **Habitat Shifting/ Alteration, Temperature extremes, Storms/Flooding** — **High Threat**

(Climate change) — Inside site, throughout(>50%); Outside site

Due to global warming, the melting of the glacier is accelerating and the calving front is changing. The Greenland Ice Sheet's fastest glacier, Sermeq Kujalleq (Jakobshavn Isbræ), sped up more than sixfold between the 1980s and 2000s and has overall lost mass every year from 1998 to 2018 (Mouginot et al., 2019). The increase in annual discharge could extend the factor to 10 within decades (Joughin et al., 2014). While the potential for large losses depends on a number of factors, including the depth and inland extent of glaciers, for the majority of Greenland's glaciers it will be difficult to sustain such large increases in ice discharge (Joughin et al., 2014).

Potential Threats

High Threat

Climate change is the most serious potential threat, but is out of control of the site's management. Increasing tourism (mass tourism), including an increasing number of cruise ships, can be a threat to the values of this World Heritage site if the management and infrastructure are not prepared for it, as the Arctic environment is especially vulnerable to human pressure and impact.

▶ **Recreation & Tourism Areas** — **Low Threat**

(Tourism increase) — Inside site, scattered(5-15%); Outside site

Further increase of tourism is supported by the Government of Greenland (2016) in the national tourism strategy plan 2016-2020. Present construction at the airport in Ilulissat with longer landing strip (2200 meters) will, when finished, allow landing of larger airplanes and airplanes flying over longer distance. There are also strong discussions on building larger ports facilities so larger cruise ships can dock (Government of Greenland 2016, Avannaata Kommunia, 2018).

▶ **Habitat Shifting/ Alteration, Temperature extremes, Storms/Flooding** — **High Threat**

(Climate change) — Inside site, throughout(>50%); Outside site

Global warming is already impacting the site and is going to lead to significant changes in glacial landscapes in future. This is a global issue out of control of the site's management. In Danmarks Meteorologiske Institut climate report for Ilulissat, it is assumed that in the next decades there will be higher temperatures both in summer and winter, increased heavy precipitation (>10 mm), and around 2050 the distribution of pack ice will be noticeably decreased. At the end of the century there will be no consolidated ice cover in the Disko Bay (Danmarks Meteorologiske Institut, 2019).

Overall assessment of threats

Low Threat

Climate change is already affecting the site and is most likely to have the largest impact in the future. The main current threats include impact from tourism; fishing, boat traffic and helicopter/plane flights. The managing authorities are handling current threats efficiently. There are currently some concerns about future developments in tourism and commercial fisheries at Ilulissat. Fishing and hunting inside the World Heritage site could be sustainable, but supervision and monitoring has to be more effective.

Protection and management

Assessing Protection and Management

▶ **Mostly Effective**

Avannaata Kommunia is a new municipality of West Greenland created in 2018 mainly from the former Qaasuitsup municipality (Avannaata Kommunia, 2018). The national responsibility for the management of the World Heritage site is by the Naalakkersuisut (the Government of Greenland) through the Ministry of Nature and Environment. The actual management of the World Heritage site is in collaboration and dialogue with Avannaata Kommunia. A new management plan (MP) was implemented in 2018 but many information f.ex. on tourism and fishery are not up to date (Steering Group, 2018). Opportunities and threats are listed. Different stakeholders are mentioned but it is not clear how much they are involved or how much they participate in decision-making for the World Heritage area. There are some conflicts mentioned in the MP between the tourism and the fishery industry, and the locals, but it is not clear how serious they are. A revised MP with evaluation and adjusting, is due in 2020.

▶ **Mostly Effective**

The effectiveness of the management system is difficult to assess as no measurements or information are introduced in the Management Plan. The management system appears effective with some concerns around the low number of employees working in the site and the capacity to fulfill the management objectives with a growing tourism industry. In 2020, a revised monitoring plan will be prepared and implemented, also a sustainable tourism plan for Ilulissat Icefjord and preparation of guidelines for tourist sailing near fishing boats (Steering Group, 2018).

▶ **Highly Effective**

The boundary of the site has been drawn to encompass all the interdependent elements of the geological process of the Icefjord – the relevant portion of the inland ice sheet, the ice stream, the glacial front and the fjord. The boundary also follows the watershed of the fjord and thus incorporates the adjacent moraines, kame terraces and deltas. Excluded are the settlements of the nearby villages of Ilimanaq and Ilulissat where a de facto buffer zone is defined within the municipality plan (IUCN, 2004). The landscape buffer zone was implemented in the municipal plan in 2014 and is a 2 km buffer zone from the World Heritage boundary and buffer area south of Ilulissat. The buffer zone is intended to protect the World Heritage site against construction, buildings, and installation (Steering Group, 2018). This minor boundary modification was approved for Ilulissat Icefjord by the World Heritage Committee in 2019 (World Heritage Committee, 2019).

▶ **Some Concern**

In the regional and national planning system the focus is mainly on fishing and tourism industries and new possibilities for further development and growth f.ex. with expansions of airports and port facilities. For the future, the vision is on the possibility of the third primary industry, the Raw Minerals sector (Government of Greenland, 2016, Avannaata Kommunia, 2018).

▶ **Data Deficient**

Information and data insufficient. Public meetings in 2008 and 2012, interviews with different stakeholders, supervision of the area by the municipality and site manager and park ranger observations and ongoing contact with users of the protected area (Steering Group, 2018).

▶ **Mostly Effective**

Good legal framework is in place; the principle legislative instrument is the 1980 Nature Conservation Act of Greenland (IUCN, 2004).
In 2007 the Executive Order no 10 of June 15 2007 on the protection of Ilulissat Icefiord was endorsed by the Parliament in Greenland. This was a revision of the Executive Order no 7 of March 25 2003 with following improvements:
• Traffic in Sermermiut is permitted only on designated paths in the period between April 1 and October 31.

- All navigation with vessels larger than a tonnage of 1,000 Gross Registered Tonnes is prohibited
- Anchoring and laying up boats are prohibited within the protected area
- Restrictions on pitching of tents and use of open fire (maximum 24 hours in the same locality).

▶ **Mostly Effective**

Enforcement of the relevant regulations appears effective.

▶ **Data Deficient**

Several measures have been undertaken to respond to World Heritage Commitee Decisions and a detailed report was submitted in 2007 (State Party of Denmark, 2009). In 2009 the World Heritage Committee recommended that the State Party develop adaptive management measures to ensure the long-term protection of the site in response to climate and other environmental change. It also encouraged the State Party of Denmark to collaborate with other States Parties whose World Heritage sites contain glaciers to monitor the impacts of global climate change (World Heritage Committee, 2009). No information about these implementations is available. In 2019, in the Decision approving the creation of a buffer zone for this site, the Committee also requested the State Party to clarify the policies that will apply to the local and recreational buffer zones, in particular regarding the scope of development that is anticipated to be permitted (World Heritage Committee, 2019), which was provided to the World Heritage Centre in January 2020.

▶ **Some Concern**

The management plan 2009-2014 aimed to minimize threats to the site and ensure sustainable activities including tourism, hunting and fishing and sustainable land use (World Heritage Committee, 2009). These aims are still ongoing in the MP 2018-2020 f.ex. through supporting a biologically sustainable basis for hunting and fishing. Sustainable hunting and fishing are very important inside the protected area.
The Ministry of Fisheries and Hunting, Avannaata Kommunia, Greenland Institute of Natural Resources, GFLK, KNAPK, SQAPK, Royal Greenland and Halibut Greenland signed an intent in 2017 with the purpose to create a starting point for future discussions on practicing responsible fishing for halibut at local, regional, and national level (Steering Group, 2018).

▶ **Data Deficient**

Funding was considered adequate at the time of inscription of the property (IUCN, 2004); however, no recent information is available.

▶ **Some Concern**

A site manager for Ilulissat Icefjord is employed by Avannaata Kommunia to carry out the daily tasks. Since 2009, Avannaata Kommunia has hired one Park Ranger. Other public employees work to varying degrees with the World Heritage site. All actions and tasks are coordinated through the site manager (Steering Group, 2018). No information is available about staff training and development.

▶ **Mostly Effective**

A number of activities were planned in 2007 (State Party of Denmark, 2009):
Icefjord Office will accumulate and dissipate scientific popular articles about climatic changes in Ilulissat Icefiord.
The Icefjord Office will spend the project funding on educational purposes to increase awareness of the values of Ilulissat Icefjord to the local community, Greenlandic public and visitors. Projected educational activities about Ilulissat Icefjord include: Creation of a web page; National TV-broadcast; Creation of a DVD; Signposting in the World Heritage Site.
As of May 2014, there is a detailed website with information on the site, including access, research and administration.
The new Ilulissat Icefjord Center will be opened in the summer of 2021 and is the first visitor center in Greenland: it will "tell a story of ice, of human history and evolution on both a local and global scale." (Dorte Mandrup, 2020). Ilulissat Icefjord Center will give both local and global visitors an experience and

education, and can create jobs, income, and development for the community (Steering Group, 2018).

▶ **Mostly Effective**

Sustainable tourism plan for Ilulissat Icefjord will be implemented in 2020 and preparation of guidelines for sailing near fishing boats is in process. Management initiatives are listed up in the Management Plan and all deal with regulated activities in the area, mainly for tourism. The purpose of the initiatives is to secure a decent balance between protection and the use of the area, so that the values of the site are preserved (Steering Group, 2018).

▶ **Data Deficient**

A comprehensive Monitoring Plan was developed in 2007 by the Geological Survey of Denmark and Greenland (GEUS) (State Party of Denmark, 2009). No information is available on former monitoring measurements. Avannaata Municipality at the Icefjord Office is responsible for implementing the monitoring plan. A revised monitoring plan will be implemented in 2020.

In future, the monitoring of the World Heritage site will be based on the following criteria:
- Realistic and practical in relation to the resources available for monitoring.
- Focus on the values justifying the inscription of the area on the World Heritage List (Scenery and glaciology).
- Focus specifically on the geographical areas subject to the biggest impact from human activities (Steering Group, 2018).

▶ **Highly Effective**

Scientific research over 150 years has made Ilulissat Icefjord one of the best observed ice-streams in the world (IUCN, 2004). A significant and unique set of glaciological records and many scientific publications have been written about the site. The site displays most of the surface characteristics of the Greenland ice margin clearly, compactly and accessibly. From the relatively ice-free mid of 18th century onwards, the Icefjord interested many scholars who noted its fluctuations over the years. Studies, especially over the last 10-20 years using aerial photography, core drilling, deep radar sounding and satellite monitoring, have been intensive.
Such research has enlarged understanding of ice-stream dynamics, glacial erosion and deposition, Quaternary geology and prehistoric climates through the examination of ice cores.
Regarding monitoring of the impacts of global climate change, Ilulissat will have much to offer in future as well.
The ISAAFFIK website provdies an overview of arctic research activity and projects in Ilulissat Icefjord (ISAAFFIK, 2020).

Overall assessment of protection and management

Mostly Effective

The site appears to be well managed; however, there is a lack of recent information on certain aspects. The management system appears effective with some concerns around the low number of employees working in the site and the capacity to fulfill the management objectives with growing tourism industry. Sustainable activities including tourism, hunting and fishing and sustainable land use are important factors to consider in the management of the site.

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

Some Concern

Fishing and boat traffic outside of the site need to be controlled. Expansions of airports and port facilities will increase impact on the site with more traffic, pollution and tourists. With increasing tourism more services, facilities and infrastructures are needed f.ex. more buildings, waste, sewage, electricity production, etc.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **The only remnant in the Northern Hemisphere of the continental ice sheets from the Quaternary Period**

Good
Trend:Stable

The geological features of the site remain in good condition (State Party of Denmark, 2009; WHC, 2009).

▶ **Natural spectacle**

Low Concern
Trend:Deteriorating

There is a concern about the future impacts of climate change on the glacial landscape and natural phenomenon of glacial calving. However, currently the site still represents an outstanding natural phenomenon.

Summary of the Values

▶ **Assessment of the current state and trend of World Heritage values**

Low Concern
Trend: Stable

The site's World Heritage values are well preserved despite the increase in tourism. However, there is more serious concern about the future impacts of climate change on the glacial landscape and natural phenomenon of glacial calving. Overall, currently the site still represents an outstanding natural phenomenon.

▶ **Assessment of the current state and trend of other important biodiversity values**

High Concern
Trend: Data Deficient

Sea life may be affected by boat traffic and fishing along the coast, as well as by reduction of ice calving in the bay. There are also concerns regarding potential overfishing of some fish stocks and potential cascade affects on the marine ecosystem.

Additional information

Benefits

Understanding Benefits

▶ **Outdoor recreation and tourism,**
Natural beauty and scenery

Ilulissat Icefjord is the most visited site in Greenland offering outstanding natural beauty, scenery and wilderness.

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

▶ **Importance for research,**
Contribution to education

The site has an outstanding record of glacial history and is a critical site for studying glacier dynamics. It also has an exceptional potential for observation of the impacts from climate change.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - High, Trend - Increasing

Research and records on climate changes are important to monitor, understand, and predict the situation in the future. They can also be base for public education f.ex. how human lifestyle can influence the environment.

► **Legal subsistence hunting of wild game,**
Fishing areas and conservation of fish stocks

Seal hunting and fishing are permitted inside the site and usually carried out by individuals on small dinghies or dog sleds. These activities are important elements of Greenland cultural heritage and identity. It is, however, important to ensure that the hunting and fishing are sustainable.

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

The traditional sustainable relationship between habitat and cultural heritage will vanish with climate change.

► **History and tradition,**
Wilderness and iconic features,
Sacred natural sites or landscapes,
Cultural identity and sense of belonging

The site has been home to human settlements for hundreds of years and represents an important piece of Inuit history and cultural heritage.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Very High, Trend - Increasing

Recent changes, such as the loss of the glacier's floating ice tongue and the glacier's rapid retreat, represent significant changes that have an influence on the daily lives of Ilulissat residents. While on the surface some activities, such as moving ones boat out of the port to ride out tidal waves caused by large calving events, may seem like positive changes, they point to substantial changes in what it means to live in a glaciated landscape and loss of the associated cultural norms.

►

The inherent beauty and awe inspired by this site, from the fast flowing outlet glacier to the fjord and bay filled with icebergs, combined with its relative accessibility by sea and air, make it a popular tourist destination. Combined with the fish export economy, economies in support of tourism (from food and lodging to local shops and adventure services) employ a significant portion of the local population. These economies are critical at a time when subsistance activities are no longer sufficient to ensure survival.

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

Summary of benefits

Ilulissat Icefjord World Heritage site has become iconic for understanding and studying the impacts of global climate change. The knowledge is important for education on a global scale about glacier, climate, habitat and human influence. The vulnerable Arctic environment is changing and this affects traditional cultural heritage. Some traditional activities might disappear, but the site's outstanding natural beauty and scenery of a fast melting glacier attracts tourists and supports the ecosystems on which fisheries depend, alleviating some of the negative impacts associated with this loss of traditional activities.

Projects

Compilation of active conservation projects

№	Organization	Brief description of Active Projects	Website

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