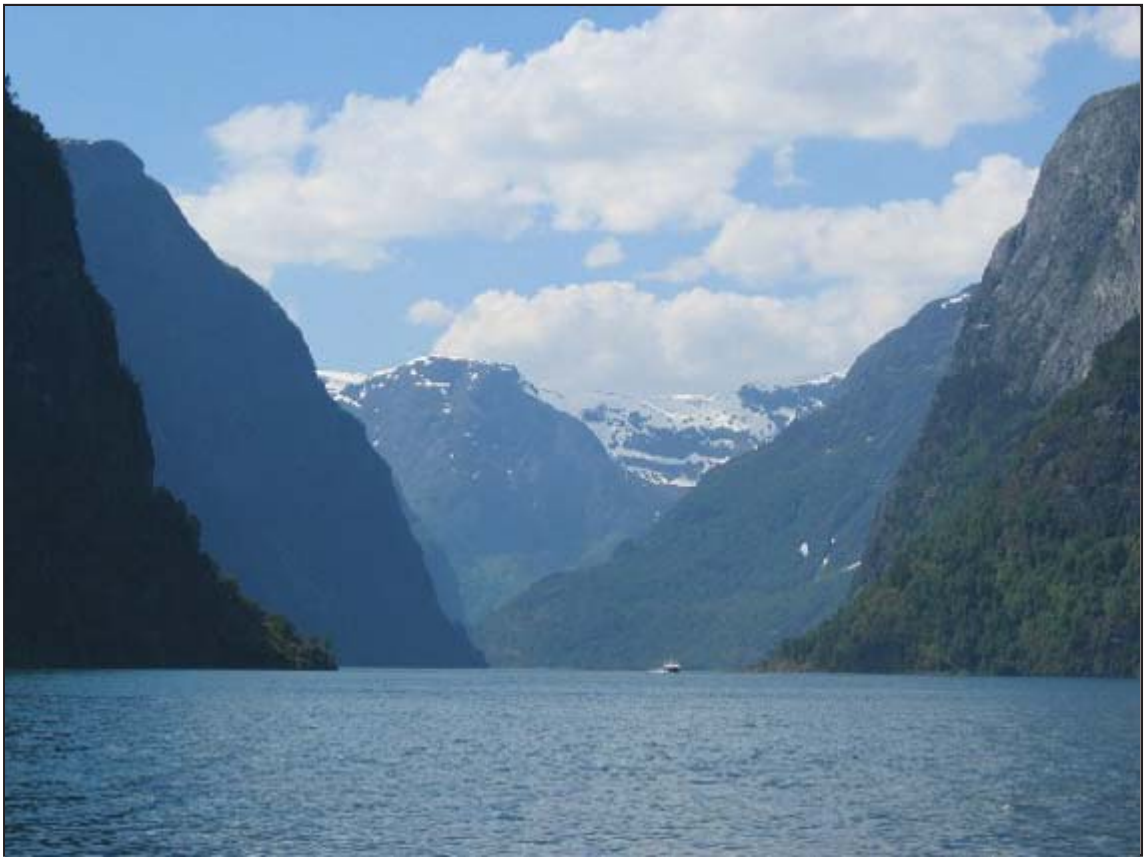
EUROPE / NORTH AMERICA

WEST NORWEGIAN FJORDS

GEIRANGERFJORD & NÆRØYFJORD

NORWAY



WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

GEIRANGERFJORD & NÆRØYFJORD (NORWAY) ID N° 1195

1. DOCUMENTATION

i) Date nomination received by IUCN: April 2004

ii) Dates on which any additional information was officially requested from and provided by the State Party: State Party provided supplementary information requested during the IUCN field visit – received by IUCN on 22 November 2004.

iii) IUCN / WCMC Data Sheet : 2 references (nomination document also contains a bibliography of 250 technical references)

iv) Additional Literature Consulted: IUCN. 2004.**Global Strategy for Geological World Heritage Sites.** Draft; Nordic Council of Ministers.2003. **Nordic Scenery: Protecting the Nordic Countryside in the 20th Century. 258p.**; Eide, Per and Olav Grinde. 2001. **The Magic of Fjord Norway.** 192p.; Aasheim A. and Oddgeir Bruaset.2001. **Geiranger – Jewel of Fjord Country.** 159p.; Aarseth I. 1997. Western Norwegian fjord sediments: age, volume, stratigraphy, and role as temporary depository during glacial cycles. **Marine Geology** 143 39-53; Nordgulen O. Fjords-a comparative analysis. Supplementary information to the nomination provided by Norway. Oct. 2004.

v) Consultations: 11 external reviewers. Representatives from the Ministry of Environment, Directorate of Nature Management, County Administrations, Geological Survey of Norway, and local tourism officials.

vi) Field Visit: James W. Thorsell. June 2004

vii) Date of IUCN approval of this report: April 2005

2. SUMMARY OF NATURAL VALUES

The West Norwegian Fjords (WNF) are located in southwestern Norway northeast of Bergen. The property is a part of the west Norwegian fjord landscape which stretches from Stavanger in the south to Andalsnes, 500km to the north east. The nomination is a serial one consisting of two tributary fjords occurring 120 km apart. The more northerly Geirangerfjord area (49,887ha) lies 60 km inland on the upper end of Storfjord while the Nærøyfjord (68,346 ha) is 100km inland at the upper end of the Sognefjord. Total area of the property is 122,712 ha, of which 111,966 ha is land and 10,746 is sea. Elevations vary from sea level to 1850m (Torvløysa mountain above Geirangerfjord) and 1761m (Stiganosi mountain above Nærøyfjord).

The two nominated sites are distinctive landscapes in a country of spectacular fjords. *Fjord* is a word of Norwegian origin, meaning a glacially over-deepened valley, usually narrow and steep-sided and extending below sea level. The fjords of Norway are among the most extensive on earth and are considered the type locality for study of fjord landscapes.

Each of the two components of the nomination are at the end of two major fjord systems that developed along faults and fracture zones at right angles, giving them a characteristic zigzag form. Both fjords are submarine hanging valleys, which have floors between 300-500m deep in ice-scoured basins. The fjords are 1-2 km wide and their sides reach a height of 1300m in places. They are surrounded by mountains with old transhumance farms in the hanging valleys, and high glacier lakes. The rivers which enter each of the fjords have not been developed for hydroelectric power as have most others in the region.

Though their differences are not dramatic, the two areas that comprise the property complement each other. Nærøyfjord is located 100km inland near the end of Sognefjord. Its fjords are 250m-2.5km wide with adjacent cliff faces 900-1400m high. The surrounding mountains are smooth-topped with high glacial lakes and a plateau glacier. The uplands of Nærøyfjord preserve much of the rounded landforms of the pre-glacial fluvial-dominated landscape. The Geirangerfjord mountains are more alpine in character; block fields are more prevalent and there is still permafrost and several small glaciers on the highest summits.

The Management Plan's summary for the property notes five main landscape types: (1) The fjord system with shore areas and undisturbed hillsides where the physical relief is more prominent than any other feature; (2) Farms of three distinct types with their surrounding cultural landscapes: fjord-side, valley and mountain-ledge; (3) Valleys of which a large number extend into the mountains and have been used for centuries for transhumant summer grazing; (4) Woods which are deciduous in the valleys and on mountainsides, coniferous at higher elevations; and (5) Mountains, where alpine vegetation extends from treeline to 1400M, above which the landscape becomes one of scree, block fields, snow fields and glaciers.

Geologically, the WNF are well-developed examples of fjord landscape and excellent examples of young active glaciation and have a long record of scientific study. They are located along the raised rifted margin of the North Atlantic where Tertiary uplift and tilting led to formation of extensive westward-flowing drainage systems that were subjected to deep glacial erosion during the Pleistocene ice age. Relatively recently in geologic terms, the products of glacial weathering were removed, leaving ice- and wave-polished surfaces on the steep fjord sides which provide superbly exposed and continuous three-dimensional sections through the bedrock. In Geirangerfjord these are Precambrian gneisses of the West Gneiss Region, an outstanding example of deeply subducted continental crust and of well preserved high-pressure rocks. In Geirangerfjord there are outcrops of peridotite and serpentinite in the predominant gneiss bedrock. In Nærøyfjord the underlying rocks are anorthosite and gabbro, and softer phyllite. The high mountain surface is a slightly undulating peneplain dissected by rivers, the courses of which were deepened, widened and scoured 20,000 years ago by the glaciers of the last Ice Age. Later, melting of the heavy ice cap allowed the land to rebound by some 110m, deepening the fjords. Over the past 5000 years most of the glaciers have disappeared, leaving thick till in places and many moraines. Where fractured, the crystalline rocks are unstable and due to weathering have created a wide variety of rock-slide scars and slumps, active scree and snow avalanche paths. Unpredictable rockfalls are still frequent hazards and, in extreme cases, have created local tsunamis in the enclosed waters of some fjords (62m high in Tafjord in 1934).

Climate is transitional between oceanic and continental and varies markedly with aspect and altitude. Snow persists from October to late May on the mountains and from late November to March in the valleys. Winter ice occurs in the fjord heads for 1-3 weeks. The vegetation is typical of this part of West Norway, being moderately diverse despite the nutrient-poor soils. This diversity is due to the range of gradients from coast to inland, from north to south, from sea level to 1800m and to the consequent variety of terrain and microclimates. Wildlife is also representative of the region and includes four species of deer, arctic fox, otter, and many marine species such as Atlantic salmon, seals, porpoise, dolphins and whales. Over 100 bird species have been recorded. Parts of the area have, in the past, been used for transhumance agriculture and its remnants are now seen as adding a harmonious human element to the natural landscape.

3. COMPARISON WITH OTHER AREAS

3.1 Comparison with other regional natural World Heritage properties

The WNF does not compare in any meaningful way with the six existing WH natural properties in the two biogeographic provinces where the nominated property is found:

(i) West Eurasian Taiga:
-Virgin Komi Forests, Russian Federation
-High Coast, Sweden

(ii) Middle European Forest / Boreonemoral:
- Belovezhskaya Pushcha / Bialowieza Forest, Belarus/Poland
- Srebarna Nature Reserve, Bulgaria
- Messel Pit Fossil Site, Germany
- Caves of the Aggtelek Karst and Slovak Karst, Hungary/Slovakia

None of the above is a fjord landscape and the geological history and coastal scenery of the WNF are quite distinct from existing WH properties in the region. WNF does, however, share the phenomenon of dramatic isostatic rebound of the High Coast of Sweden.

3.2 Comparison with other global fjords and existing WH fjord properties

The State Party provided supplementary information on this topic at the request of IUCN which further underlined the distinctiveness of the WNF and their contribution to the study of fjord landscapes at an international level.

Fjord landscapes are found in high latitudes in both the northern and southern hemispheres. Four existing WH **properties** contain fjords: Gros Morne in Canada, the St. Elias Parks complex between the USA and Canada, Te Wahipounamu in New Zealand, and the Ilulissat Icefjord in Greenland. Comparative statistical data on selected global fjords are shown in the table 1 below.

Table 1 demonstrates the many detailed distinguishing features of the WNF from existing natural WH **properties**. The fjords in Gros Morne are much shorter in length and have a maximum hinterland relief of 800m with no permanent snow or icefields. Compared to fjords in western Norway, the Glacier Bay fjord portion of the St Elias Parks complex differs in numerous ways; e.g. the tectonic setting, high rates of uplift and glacial sedimentation, a highly diverse fjord system with multiple tidewater glaciers that calve into the bay, and recent glaciation followed by fast glacial retreat recorded in historical times. The glacial history and evolution of fjords in the geologically young landscape of Te Wahipounamu - SW New Zealand result from its location above a destructive plate margin, a setting completely different from that of Scandinavia where the history of landscape evolution can be traced back to the pre-Cambrian. There is also a substantial difference in the scale: compared to the major Scandinavian fjords, the examples from New Zealand are quite short. The impressive active glacial processes found in the recently-inscribed Ilulissat Icefjord in Greenland are related to the existing icesheet and not observed in the WNF. Illulissat is also, however, a relatively short fjord with a much lower hinterland relief.

Other fjord areas exist that may be of international significance. These include the Bernardo O'Higgins National Park in Chile, the Svalbaard National Park in Norway and the Hornstrandir Nature Reserve in Iceland. However, the WNF are more extensive than these areas and, indeed, are considered the type locality for fjords in the world.

Apart from these physiographical differences it should also be noted that, although the nominated WNF site is assessed as the most undisturbed of the more than

Table 1: Typical physiographic features from selected fjords

No	Name	Length	Depth	Altitude	Location
1	Storfjorden/Geirangerfjorden	150 km	679 m	1600 m	62,5N- 7E
2	Sognefjorden/Nærøyfjorden	200 km	1306 m	1700 m	61N- 6E
3	Hardangerfjord, Norway	140 km	900 m	1600 m	60N- 6E
4	**Ilulissat Icefjord, Greenland**	40 km	No data	Ice cap	69N- 51W
5	Kangerlussuaq, Greenland	220 km	<1000 m	980 m	63N- 53W
6	Igaliku fjord, Greenland	40 km	360 m	Ice cap	61N- 45,5W
7	**Glacier Bay, Alaska**	85 km	450 m	4663 m	59,5N- 137W
8	Lynn Canal, British Columbia	129 km	No data	2323 m	59N - 135W
9	Howe Sound, British Columbia	50 km	325 m		49,5N- 123W
10	Prince William Sound, Alaska	Wide fjord complex	800 m	1689 m	60,5N- 147W
11	Port Valdez, Alaska	45 km	280 m	1689 m	61N- 147W
12	**Gros Morne National Park Newfoundland**	40 km	No data	800 m	49,5N- 7,5W
13	Saguenay Fjord, Quebec, Canada	90 km	275 m	937 m	48N - 70W
14	Hamiltom Inlet/Lake Melville, Labrador	180 km	400 m	1150 m	54N - 58W
15	Greely Fjord (Ellesmere Island)	250 km	<1050 m	2012 m	80,5N - 85W
16	Canal Messier, Chile	200 km	1270 m	3600 m	49S - 75W
17	**Te Wahipounamu, NewZealand**	40 km	No data	< 3000 m	44S - 168E

*Notes on Table 1: Names in bold denote WH **properties** that include fjord landscapes. Note that bathymetric data does not take sediment infill within the fjords into account. In many cases, the thickness of the sediments exceeds that of the present basin depth. Altitudes from the fjords in Norway are from mountains adjacent to the fjords. Otherwise, altitudes refer to the highest mountain in the region where the fjord is situated; hence this has no direct bearing on the steepness along the fjord. (Source: Nordgulen, 2004)*

200 fjords in western Norway, it is in a less natural condition than the other four existing natural sites due to more than 5000 years of human occupation. In terms of size, the WNF site is larger than Gros Morne but smaller than the other three sites. Another distinction of the WNF is that it is the upper segments of a fjord rather than an entire fjord system as occurs in the existing WH fjord sites. This is understandable in light of the length of the Norwegian fjords and the impact of human history upon the landscape. The upper segments still contain the key elements of a fjord and are of substantial size; this is not therefore considered a boundary flaw.

In summary, a combination of features sets the WNF apart from fjords elsewhere in several ways:

- Impressive physiography – their exceptional length and depth and the dramatic expression as expressed in the scenery. While fjords of similar magnitude are present, mainly in Greenland and arctic regions of Canada, most of these are in regions with seasonal or permanent sea-ice cover, are commonly backed by permanent ice fields and are directly or indirectly fed by glacial runoff;
- Geological setting – the WNF are classical examples showing a long history of geomorphological development, since the former westward-flowing drainage systems of ancient fold mountains of the Caledonia period were subjected to deep glacial erosion during the Pleistocene glaciation. Another distinctive feature of the WNF is their record of post-glacial isostatic rebound of the crust and its geomorphic expression in the fjord landscape; and

- Outstanding on-going geological processes including their global contribution to the scientific study of slope instability and consequent geohazards.

The WNF are also nominated under criterion (iii). It is always difficult to make objective comparisons of natural beauty and aesthetic importance of **properties**. Certainly the other four existing fjord **properties** are scenically impressive natural landscapes and all have been inscribed under this criterion. In terms of the iconic identification and the role of Norway's fjords in the cultural milieu of the country and the attraction they provide to international tourists, they are highly significant. Interestingly, the long record of human use of the property adds interest and value to the landscape that is not found in other fjord **properties**. In conclusion, the WNF is at least the equivalent in terms of "scenic natural beauty" to other fjord **properties** and this in turn is supplemented (though not dominated) by remnants of its human historical past.

4. INTEGRITY

4.1 Legislation and management plans

The majority of the nominated area is considered as an IUCN Category V "Protected Landscape" with several small areas within it that would be Category I "Strict Nature Reserve". All of the 8 separate protected sites within the two areas have legislative protection, the most recent designations occurring through the National Nature Conservation Act in October, 2004. Private lands make up 85% of the nominated area. Inhabited portions of the area are carefully controlled under the Planning and Building Act as well as other mechanisms such as County, Municipal and Local Development Plans. In addition, the Ministry of the Environment coordinated the signing of a "Declaration of Intent" signed by the relevant national agencies as well as all the affected six Borough Councils and County Governors. This outlines the cooperative measures to be taken as well as "…guarantees that the values in the area will endure." IUCN considers that the legislation, staffing, budget and institutional structures in place are adequate to meet the Conditions of Integrity outlined in the Operational Guidelines (July 2002). Moreover, all of the above are to be augmented if WH status is achieved.

4.2 Impacts and threats

As with all protected areas, the nominated property has its own array of management challenges which are clearly spelled out in the nomination and which were the subject of review during the field inspection. Compared to other fjord regions in the country, the nominated site is very lightly populated. No aquaculture operations, commercial fisheries or forestry plantations exist and no hydro development (apart from some possible mini-stations) is planned. A military training area near the property had been planned but has now been cancelled in light of the WH nomination. Tourism pressures are intense in both fjords but impacts are limited as most visitors are confined to cruise ships and there are adequate planning and zoning measures as well as a short visitor season which limits impacts to three months per year.

The one activity that is considered to be of more concern is mining and quarrying. At present a peridotite rock quarry is active outside but close to the boundary of the Geirangerfjord and plans exist for another nearby. The impacts here are very localized, primarily visual and rehabilitation measures will occur on completion. Within the Nærøyfjord nominated area an underground excavation of anorthositic rock takes place which may also expand in future. Though not directly adjacent to the fjord itself, the quarry has a visual impact when seen from the road to Gudvangen. On the positive side, and adjacent to the existing quarry, are the restored remains of a previous quarry which has recovered to the extent that only the small entrance cavities and a parking lot can be seen. Any expansion of underground quarrying would require an environmental impact assessment. This would need to address concerns over the direct impact of any such operation and about the arrangements for the export of the mined material and the need for related infrastructure.

4.3 Serial property questions

When serial **properties** such as this one are evaluated, IUCN poses a standard set of three questions:

- **What is the justification for the serial approach?**
  Almost all of the more than 200 fjords along the west coast of Norway have been impacted in some way by urban settlement, agriculture or hydro dams. The nominated property was selected as the best remaining two fjords that were not only the least affected by previous human activity but are also considered the most spectacular and most studied for their geological interest. Each fjord has a different morphology and geology and displays a different range of geomorphological features. The two parts of the nomination are thus complementary and each adds a special strength to the overall nomination, although the natural features found in each component site are not radically different to the casual visitor.

- **Are the separate elements of the property functionally linked?**
  Other than being tributary parts of the west Norwegian fjord region the two component sites are some 120km apart and there are no direct linkages. Rather, the two components are the two outstanding "natural" fjord areas in the entire coastal region and, taken together, provide most of the features that could be expected of a fjord landscape and its geological evolution.

- **Is there an overall management framework for all the components?**
  All of the 8 protected areas found in the two fjords have management plans and each area has a Consultative Group made up of the various agencies and groups involved in each area. The Consultative Group for both Nærøyfjord and Geirangerfjord will meet once per year. Though there is not therefore a single management agency, this group will facilitate the necessary co-ordination.

5. ADDITIONAL COMMENTS

5.1 Cultural and historical values

Many external reviewers of the WNF nomination have commented on the strong cultural and historical values of the property and how previous human impact does not detract from, but enhances, the aesthetic value of the two fjords. The nomination document also provides substantial information on the transhumance phenomena of the early inhabitants and the existence of over 350 registered old buildings, such as stave churches. Another indicator of the cultural values is reflected in the fact that both components of the nomination were included in the National Register of Valuable Cultural Landscapes". ICOMOS has also suggested in its comments to IUCN that the property be also considered under criteria related to cultural landscapes while also noting that "...human intervention is dwarfed by the scale and grandeur of the scenery".

This issue was discussed during the field evaluation with the conclusion that, although the human values are significant, they are less so than those found in other Norwegian fjords, including several other fjord areas on their Tentative List, such as the Tysfjord adjacent to the Lapponian Area WH property in Sweden, the Lofoten Islands and the Vega Archipelago WH property in Norway. Cultural values are well-recognized in the management of the property and are well-protected under Norway's Cultural Heritage Act and various local legal instruments.

5.2 Process of property **selection**

The 10 year process of property selection undertaken by the Norwegian authorities in close cooperation with other Scandinavian countries through the Nordic Council is exemplary. This approach has allowed a collective overview of the WH potential and most outstanding landscapes of the wider region. Beyond this regional view, a local consultative process with stakeholders and county officials led to broad support of the nomination as reflected in the "Declaration of Intent" referred to in 4.1 above.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The WNF have been nominated as a serial property under natural criteria (i) and (iii).

Criterion (i): Earth's History and Geological Features

The WNF are classic, superbly developed fjords, considered as the type locality for fjord landscapes in the world. They are comparable in scale and quality to other existing fjords on the WH List and are distinguished by the climate and geological setting. The nominated property displays a full range of the inner segments of two of the world's longest and deepest fjords. IUCN considers that the nominated property meets this criterion.

Criterion (iii) Superlative natural phenomena, scenic beauty

The Nærøyfjord and Geirangerfjord areas are considered to be among the most scenically outstanding fjord areas on the planet. Their outstanding natural beauty is derived from their narrow and steep-sided crystalline rock walls that rise up to 1400m direct from the Norwegian Sea and extend 500m below sea level. Along the sheer walls of the fjords are numerous waterfalls while free-flowing rivers rise up through deciduous and coniferous forest to glacial lakes, glaciers and rugged mountains. There is 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. IUCN considers that the nominated serial property meets this criterion.

IUCN also notes that the property has other important and complementary natural values under criterion (ii) and (iv) but these are of secondary significance to the criteria chosen for nomination. They should, however, be considered in the integrated management of the range of natural values found in the WNF.

7. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

The World Heritage Committee,

1. *Having examined Document* ***WHC-05/29.COM/8B***

2. *Inscribes the West Norwegian Fjords on the World Heritage List on the basis of natural criteria (i) and (iii):*

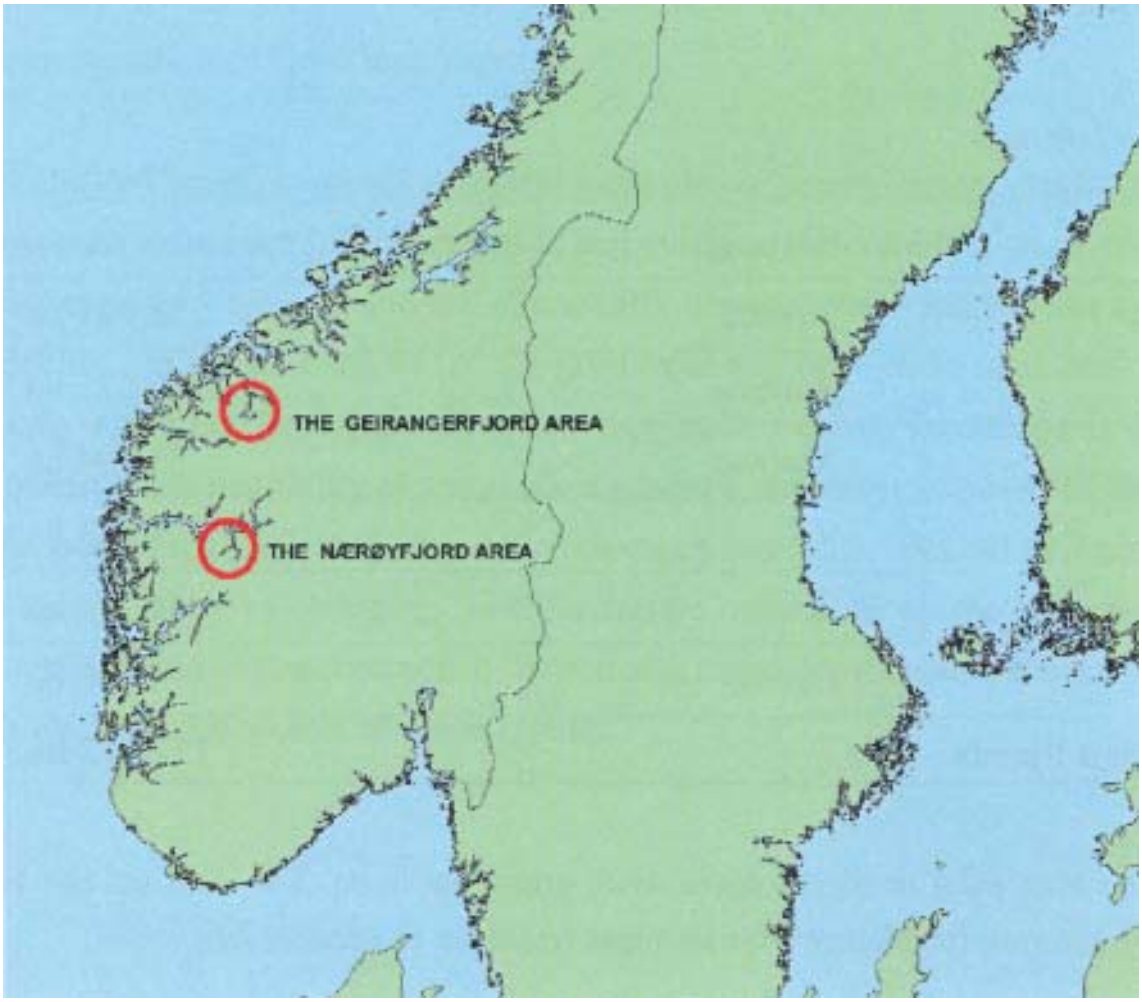
   Criterion (i): *The West Norwegian Fjords are classic, superbly developed fjords, considered as the type locality for fjord landscapes in the world. They are comparable in scale and quality to other existing fjords on the WH List and are distinguished by the climate and geological setting. The* property *displays a full range of the inner segments of two of the world's longest and deepest fjords.*

   Criterion (iii): *The Nærøyfjord and Geirangerfjord areas are considered to be among the most scenically outstanding fjord areas on the planet. Their outstanding natural beauty is derived from their narrow and steep-sided crystalline rock walls that rise up to 1400m direct from the Norwegian Sea and extend 500m below sea level. Along the sheer walls of the fjords are numerous waterfalls while free-flowing rivers rise up through deciduous and coniferous forest to glacial lakes, glaciers and rugged mountains. There is 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.*

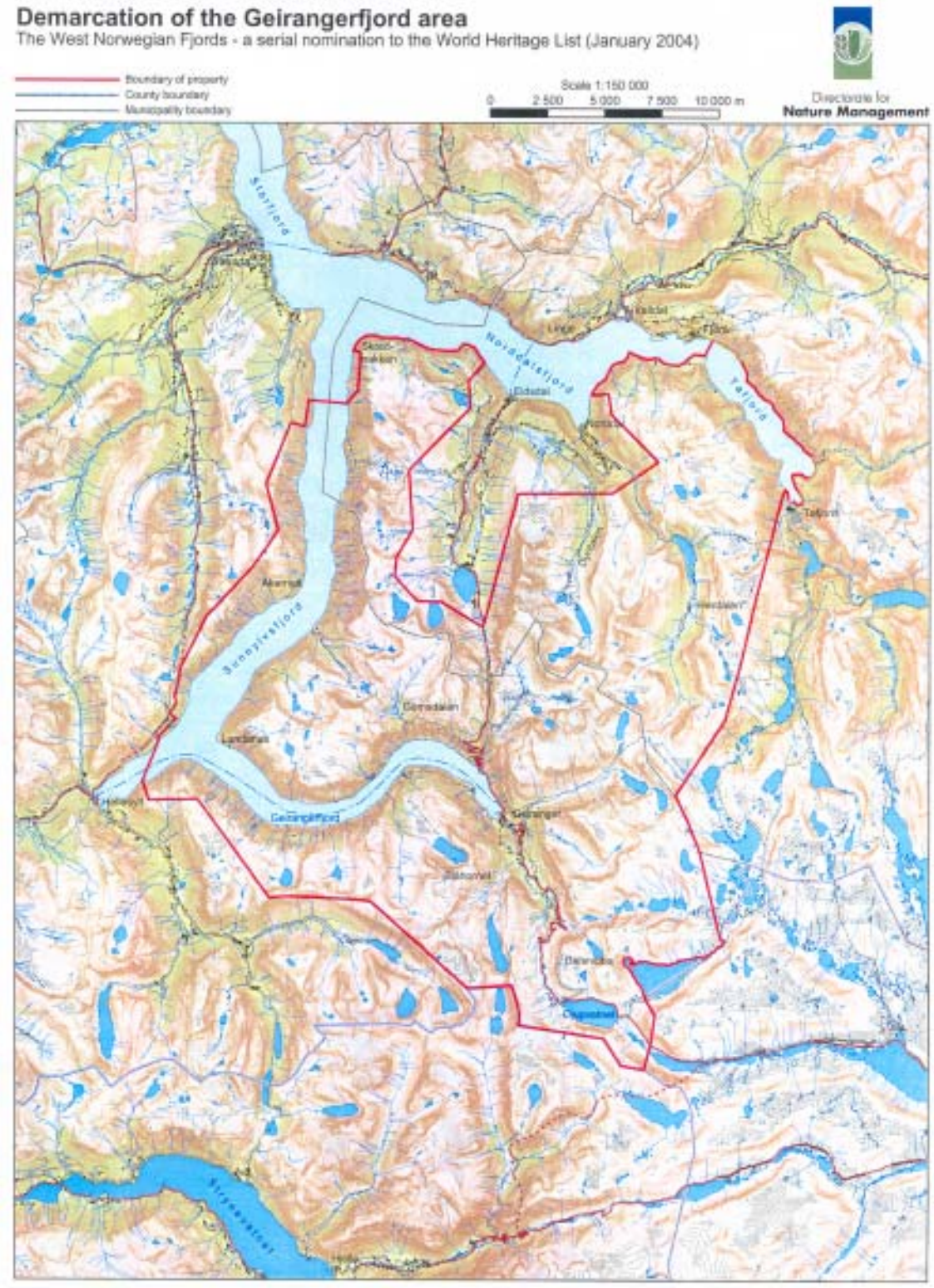
3. *Requests to be kept informed by the State Party of any proposals for expansion of quarrying activities within the* property *and of measures taken to limit impacts of existing quarries. Close monitoring will be required, as such activities, if not carefully considered, could have significant impacts on the visual quality of the* property *(criterion iii).*

4. *Commends the State Party on the thorough nomination process involving a well-designed selection process and consultation with all Nordic countries as well as local stakeholders, which led to support for the nomination.*

Map1: General Location of serial property



Map 2:


Demarcation of the Geirangerfjord area
The West Norwegian Fjords - a serial nomination to the World Heritage List (January 2004)
Boundary of property
County boundary
Municipality boundary
Scale 1:150 000
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Directorate for
Nature Management
Storfjord
Hjørundfjord
Tafjord
Sunnylvsfjord
Geirangerfjord

Map 3:


Demarcation of the Nærøyfjord area
The West Norwegian Fjords - a serial nomination to the World Heritage List (January 2004)
Boundary of property
County boundary
Municipality boundary
Scale 1:150 000
0 2 500 5 000 7 500 10 000 m
Directorate for
Nature Management
Sognefjord
Nærøyfjord
Aurlandsfjord