
WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

THE HIGH COAST (SWEDEN)

ADDENDUM TO 1999 IUCN TECHNICAL EVALUATION

1. DOCUMENTATION

The above nomination was reviewed by the 23rd extraordinary session of the Bureau of the World Heritage Committee (29 November-4 December 1999) which reached the following conclusion:

“Following comments of IUCN concerning the need for better documentation of the values of the marine portion of the area, the relation to the proposed Quark World Heritage nomination and integrity issues, the Bureau decided to defer this nomination. The Bureau noted that the State Party might also wish to consider nominating the area as a cultural landscape.”

In its evaluation report, submitted to the November 1999 Bureau, IUCN also requested a more complete comparative analysis of the area.

In April 2000, the State Party provided the World Heritage Centre with additional information addressing the Bureau's concerns. This Addendum to the original IUCN 1999 technical evaluation is based on the additional material submitted by the State Party, and takes into account the results of a second field evaluation in August 2000. In preparing this report IUCN has also considered the draft World Heritage nomination document of the Kvarken (Quark), and a field visit to the site in August 2000.

Additional Literature Consulted: Freden, C. (Ed.) 1994. **National Atlas of Sweden - Geology**. 208p. Sjöberg, B. (Ed.) 1992. **National Atlas of Sweden - Sea and Coast**. 128p. Geological Survey of Sweden, 2000. **The Importance of Basic Geological Perspective in Society**. 18p. Nordic Council of Ministers, 1996. **Nordic World Heritage: Proposals for New Areas for the UNESCO World Heritage List**. Nord 1996:31 (Copenhagen), 194p. Embleton, C. & King, C.A.M. 1968. **Glacial and Periglacial Geomorphology**. Edward Arnold, 608p. Flint, R.F. 1971. **Glacial and Quaternary Geology**. Wiley and Sons, 892p.

Consultations: 4 additional external reviewers, relevant scientists and representatives of provincial and municipal government in Finland and Sweden.

Field Visit: Paul Dingwall, August 2000.

2. REVIEW OF SUPPLEMENTARY DOCUMENTATION

a) Additional Information on Natural Values

i) **Terrestrial Biota:**

The vegetation of the High Coast (HC) displays marked altitudinal zonation and great spatial variability, with high floristic diversity, due to the complex pattern of soils and substrate on an uplifted, high-relief land surface. For example, a full range of forest types is concentrated within a small area, with mature forests on till-capped plateau surfaces above the highest shoreline (285m asl) being particularly noteworthy. The geological, topographical and climatic conditions also combine to make the HC a distinctive vegetation boundary zone, with a rare blend of southern plants with northern Boreal, western oceanic and eastern continental species. There is also intermixing of southern and relict alpine plant species from warmer and colder periods, respectively.

The HC contains large mammal species, such as bear, lynx and moose, which are widespread in Scandinavia. While the coastal birdlife is typical of the region, the terrestrial birdlife is rich and varied due to the altitudinal range and topographic diversity which also provide habitats attractive to some rare

birds of southern origin. Invertebrate fauna is not well known, though insects may be richer than elsewhere because of the floristic diversity, and landscape evolution may have produced some anomalous distributions.

The region's terrestrial biota in general, and its plants and vegetation history in particular, have not been extensively studied. However, the terrestrial flora and fauna appear essentially undistinguished in the region overall. They derive their greatest distinction and scientific significance from their connection with the process of land uplift.

ii) The Marine Realm:

The biological character of the HC's marine environment is a consequence of several major controlling influences such as: brackish waters of very low salinity; the most sharply contoured submarine topography in the Baltic, extending to depths in excess of 200m close inshore; little tidal influence, with shifting water levels determined mainly by changing weather conditions of air pressure and wind; and seasonal ice cover. Natural environments have undergone dramatic changes since glacial times, passing through marine, brackish and freshwater conditions. The resultant mosaic of shallow, sheltered embayments and deep, open waters provides a range of habitats for a mix of marine, brackish and freshwater species, low in species diversity but high in population numbers for some macrofauna species. Some species are relics of earlier periods, and others are at the extremes of their latitudinal and environmental limits. For the most part, however, the marine biota are described as being typical and representative of that found throughout the Baltic, rather than special or unique.

The special feature of the marine realm, imparting the greatest scientific significance, is that it represents the submarine extension of the topographical continuum of landscapes undergoing isostatic uplift. Continual elevation of the land results in inlets becoming progressively cut off from the sea, transforming them into estuaries and ultimately lakes (some of which retain their name as bays). Meanwhile, shorelines are constantly reshaped, new islands are born offshore, and others become peninsulas as they unite with the mainland. The terrestrial influence progressively extends seawards into the Bothnian Sea. This process has major effects for the associated plants and animals that must constantly adapt to the changing environments. Thus, the nearshore marine area constitutes an integral part of the ongoing geological evolution of the HC and, as such, it is an important natural component of the entire property.

iii) Natural Beauty

The HC derives its scenic attractiveness from its uncommonly (in the Baltic) hilly terrain and from the closely interrelated landscapes and seascapes of islands, bays, shores, lakes, slopes and plateau summits. The site also demonstrates forested tracts interspersed with sheltered valleys harbouring picturesque fishing and tourist villages and small towns surrounded by neatly tended pastures and cropland. The whole creates a landscape of great scenic value and aesthetic appeal. However, the area derives much of its aesthetic value from the interaction of its natural and cultural heritage rather than its natural values. Many of the aesthetic attributes are also typical of coastal regions in Sweden and the Baltic generally.

b) Comparison with Other Areas

i) Glaciation and Isostasy in World Geology:

Glacial periods are very rare in the overall geological history of the earth. Repeated glaciation is the outstanding feature of the Pleistocene Era of geological time, beginning about 1.5 million years ago, when ice covered an area of the world more than three times greater than at present. The indirect impacts of glaciation, particularly through changes in sea level, affected much of the earth. Northern Hemisphere glaciation was manifested by two huge continental-scale icesheets; the Laurentide (North American) and Fennoscandian (European) icesheets, extending from polar to middle latitudes. Both have essentially disappeared through post-glacial melting over the past 10-20,000 years. But their legacy is seen in characteristic erosional and depositional landforms (e.g. till plains, drumlins and eskers), and in raised shorelines due to isostatic rebound of the earth's crust that was depressed as much as 800m under the weight of icesheets up to 3km thick. Ice loading keeps the bedrock below sea level under the two remaining massive icesheets of Antarctica and Greenland. However, in North America and Scandinavia slow uplift continues as the crust adjusts to removal of the ice cover. This process of post-glacial crustal rebound, known as isostasy, is therefore a global geomorphological phenomenon of importance for shaping landscapes.

ii) Comparative Analysis:

The only comparable area in the world exhibiting regional scale isostatic land uplift like that seen at HC is centred on Hudson Bay in Northern Canada. Over the past 8-10,000 years, both areas have experienced an approximately equivalent total uplift above present sea level in excess of 280m, and both are continuing to rise currently at a similar rate of 8-10mm per year. However, HC is rather more exceptional in several respects. Its steeper relief confines relict shorelines into a 2km-wide coastal zone, compared to a 50km belt at Hudson Bay where the topography is gentler. Biological affinities with the geological history are, thus, more starkly displayed on HC. The HC also has a warmer climate, with a diversity of biotypes compared to the ubiquitous tundra vegetation at Hudson Bay.

The HC is far better known and documented scientifically, and is essentially the “type area” for research on isostasy, the phenomenon having been first recognised and studied there (Flint, 1971). While the highest shoreline in the Baltic was mapped as early as 1888, the pattern of isostatic rebound in Hudson Bay remains poorly recorded and mapped (Embleton and King, 1968). The HC also differs in having a long (5,000 year) history of human settlement with an abundant archaeological record, while Hudson Bay has been only sparsely populated by a largely hunting culture.

iii) Relation of the High Coast to the Kvarken Area

The Kvarken (Quark) area, a possible World Heritage nomination, is the narrow threshold of shallow, brackish sea and till archipelagos separating the Bothnian Sea and Bothnian Bay. Located near the centre of the Fenno-Scandian isostatic uplift area, like the HC it is rising at a rate of 8-9mm per year. Uplift is expected to continue for another 10,000 years, to a height of 130m above present levels. Within 3,000 years a land bridge will arise from the shallow (25m deep) waters, thus joining the mainlands of Finland and Sweden. This process will cut Bothnian Bay off from the Bothnian Sea thus forming the largest lake in Europe.

Unlike the predominantly erosional HC, the Kvarken is a moraine archipelago. Its flat topography comprises glacial till deposited by the melting icesheet and formed into hummocky moraines and drumlins rising only 20-30m above sea level. The archipelagos are mostly less than 1,000 years old. Uplift of the shallow seabed rapidly transforms bays into fladas and glo-lakes, then into freshwater lakes, even over the lifetime of a single human generation. Plant succession is equally rapid on the newly created land, displaying marked shoreline zonation. Each phase of uplift has its own characteristic vegetation assemblage, with young marshes of sedges at sea level extending through a series of successional stages to mature spruce forest furthest from the shore.

While the HC and the Kvarken have isostatic rebound in common, they are geologically contrasting areas with marked differences in topography. This in turn has important implications for differences in plant and animal life. The HC has a dramatic land surface of bedrock hills, high islands, steep shores and deep bays and straits - features that do not otherwise occur in the Baltic region. The Kvarken is a low-relief area of extensive archipelagos of till and intervening shallow sea. The HC is also much older, revealing 10,000 years of geological evolution, as opposed to the corresponding 2,000-year history of the Kvarken. The HC is, therefore, a relatively stable biological environment, while the Kvarken, whose low-lying landscape is constantly changing due to rising land, is biologically highly dynamic, with plants and animals continuously colonising newly emergent land surfaces and successional habitats. Thus, the HC and Kvarken areas differ considerably in the ways land uplift processes act on the biota. They are, in fact, complementary in terms of their biophysical evolution. They represent, respectively, the high and low topographical extremes of post-glacial uplifted landscapes in the Baltic.

c) Cultural Values

Archaeological sites, some remarkably well preserved, reveal 7,000 years of human agrarian and maritime settlement in the HC, all confined by the steep topography into a narrow coastal strip of 2-3km. Displacement of coastal settlements by isostatic land uplift has created a relict cultural landscape with evidence of different peoples at successive levels above the sea. The oldest remains, from the Stone Age of 5,000 years BC, now stand at 150m above sea level, and corresponding Bronze Age (1,000 years BC) and Iron Age (15 years AD) sites are found, respectively, at 30m and 15m above the present shoreline. Adaptation of peoples to conditions created by land uplift means the geological history and cultural history are, thus, closely entwined.

The remarkable imprint of 7,000 years of human occupancy on a landscape experiencing the world's highest isostatic uplift is a significant cultural heritage asset, and one that is important to preserve for future generations. However, cultural landscapes and prehistoric remains are widespread throughout Scandinavia, and at the current state of knowledge it is difficult to assess the comparative significance of the HC. At this stage, the qualities of the cultural resources of the HC are not considered by the State Party to be of World Heritage standard, though subsequent research may alter this view.

d) Integrity

Boundaries

The boundaries of the nominated property are located to encompass the principal area of national conservation interest, extending inland to include the full zonation of uplifted land and some of the highest shoreline, while excluding areas under large-scale forestry management by forestry companies. Seaward, the boundary incorporates key offshore islands and marine areas that are a logical extension of the topographic continuum of uplifted land surface, thus taking account of ongoing geological processes. Industrial areas are excluded.

However, very little of the High Coast is legally protected with 82% of the area allowing for some form of development. External reviewers also raised concerns about the inclusion of villages and towns within the nominated area and raised the question of consistency with previous recommendations of the Bureau and Committee. For example, in the case of the Aeolian Islands (Italy), also nominated under criteria (i), the 1999 July Bureau recommended the State Party address "the exclusion of human use areas" from the nominated area. However, in the case of the High Coast it is the entire landscape that is undergoing isostatic uplift and that is, axiomatically, required to be included to paint the overall geological picture. Moreover, the presence of such developed sites does not compromise or detract from the geological values. Also, much of the human-use of the HC is limited to small villages and traditional farming rather than the larger urban areas of the Aeolian Islands. Given good management practices, this low-level human use is unlikely to threaten the conservation status of the property. There are also many existing natural World Heritage sites with human populations as outlined in IUCN's Global Theme Study working paper "Human Use of World Heritage Natural Sites – A Global Overview."

The 1999 IUCN technical evaluation report noted some large-scale developments within the site such as a major highway running through the area, the construction of a new bridge, the visual intrusion of a large television tower and proposed expansion of wind turbine generating stations. IUCN is concerned about this type of development within the site and believes that these issues could complicate future monitoring of the site.

Management

The State Party has advised that work has commenced on preparation of a management plan for the nominated property, and a management committee is being formed, representative of the County Administrative Board and the Forestry Board, and of the two local municipalities. The management plan addresses long-term management objectives and prescriptions, particularly with reference to geological and biological phenomena associated with land uplift, the marine environment, natural landscape and forest management. Emphasis is given to legal protection mechanisms under 1999 environmental legislation.

The Centre received additional information from the State Party on 27 September including a "Proposal for the Management Programme and Management Committee for the High Coast" and minutes from the inaugural meeting of the "Management Committee and Reference Group for the High Coast." The information includes an overview of Swedish environmental legislation, which will serve as a basis for the Management Committee. The goals of the Committee are: 1) to promote long-term sustainable development in the High Coast; and 2) to secure the values which form the basis of the nomination, encompassing the geological values and the other major natural and cultural values.

IUCN concludes that, if implemented effectively, the proposed management regime and legislative basis for the management of the HC would satisfy the Conditions of Integrity as laid out in the Operational Guidelines. The management of the site should therefore be reviewed in the near future to evaluate its effectiveness.

3. CONCLUSION

The additional documentation submitted by State Party has allowed IUCN to assess the following issues relating to HC:

- a) biological and scenic values;
- b) the value of the marine portion;
- c) the site's potential as a cultural landscape;
- d) the site's comparative value;
- e) the relationship of HC to the proposed Kvarken World Heritage nomination; and
- f) the integrity of the site.

In relation to these issues IUCN finds as follows:

a) biological and scenic values

The biological and scenic values of the HC are regarded as undistinguished and typical of those found elsewhere in the Baltic region, even though the former are inadequately known from a scientific and conservation viewpoint. IUCN concludes that the site does not merit inscription under criterion (ii) or criterion (iii)

b) the importance of the marine area;

The marine portion of the nominated sites is a submarine extension of the emergent land surface, and is thus an integral physiographic element in the paramount on-going geological process of land uplift.

c) the site's potential as a cultural landscape;

The cultural resources and landscapes of the HC complement and amplify the geological history. They are considered to be of considerable conservation value and of national importance, but their relative significance in the Nordic region is undetermined. Thus, it remains to be demonstrated from further study whether the HC meets the qualifying cultural standards for World Heritage.

d) the site's comparative value

A review of the documents and the field observations confirms that the the High Coast is the best, and most scientifically renowned, demonstration anywhere in the world of the geological phenomenon of isostatic uplift of land. It is an illustration of the processes accompanying the growth and recession of a Pleistocene continental ice sheet and their effects on glacial landform evolution. High Coast is considered by IUCN to meet criterion (i).

e) Relation of HC to the possible Kvarken World Heritage nomination

The Kvarken shares with the HC the phenomenon of land uplift. However, in its lower topographic expression and consequently more dynamic attendant biological development, the Kvarken contrasts rather than compares with the HC. They are complementary biophysical extremes in the pattern and process of post-glacial rebound of land in the greater Baltic region. There would, thus, be merit in further documenting and assessing the scientific and conservation values of the terrestrial and marine environments of the Kvarken.

f) Integrity

IUCN is concerned about the inclusion of the human-use sites within the nominated area. However, it is the entire landscape that is undergoing isostatic uplift and that is, axiomatically, required to be included to paint the overall geological picture. Moreover, the presence of such developed sites does not compromise or detract from the geological values, nor threaten the conservation status of the property. Under these circumstances, IUCN concludes that the exclusion of sites of human occupation is unwarranted.

Given effective implementation, the proposed management regime and legislative basis for the management of the HC would satisfy the Conditions of Integrity as laid out in the Operational Guidelines. However, IUCN believes that the management of the site should be reviewed in two years time to evaluate its effectiveness.

4. RECOMMENDATION

That the Committee **inscribe** the High Coast under natural criterion (i). In light of the evolving management regime, the Committee may wish to recommend a review of the effectiveness of the management of this site in two years time.