

Convention Concerning the Protection of the World Cultural and Natural Heritage

***IUCN Evaluation of Nominations of
Natural and Mixed Properties to the
World Heritage List***



Report to the World Heritage Committee
Twenty-eighth session
28 June – 7 July 2004 – Suzhou, China



Prepared by IUCN – The World Conservation Union
April 2004

Table of Contents

Introduction

IUCN Technical Evaluation Reports

A.1	Natural Properties	ID No	Page
	Arab States		
	Hawar Islands - Bahrain	N 1126	1
	Asia Pacific		
	Tropical Rainforest Heritage of Sumatra – Indonesia	N 1167	9
	Europe / North America		
	Rock Cities of the Bohemian Paradise - Czech Republic	N 1129	25
	Ilulissat Icefjord – Denmark	N 1149	37
	Ilhas Selvagens – Portugal	N 1151	45
	Primeval Forests of Slovakia – Slovakia	N 1133	55
	Latin America /Caribbean		
	Corcovado National Park and Isla del Caño Biological Reserve – Costa Rica	N 1128	65
	Coiba National Park – Panama	N 1138	73
	Pitons Management Area – Saint Lucia	N 1161	81
A2	Deferred Nominations for which additional information has been received		
	Africa		
	The Cape Floral Region of South Africa – South Africa	N 1007 Rev	95
	Europe / North America		
	Palaeohabitat of Tarnóc – Hungary	N 667 Rev	107
	Natural System of "Wrangel Island" Reserve - Russian Federation	N 1023 Rev	115
A3	Extension of properties inscribed on the World Heritage List		
	Europe / North America		
	Western Caucasus (Extension to include the Teberdinskiy Reserve) - Russian Federation	N 900 Bis	127
	Gough Island Wildlife Reserve (extension to include Inaccessible Island) - United Kingdom	N 740 Bis	137
	Latin America / Caribbean		
	Area de Conservación Guancaste (Extension to include the Sector Santa Elena) - Costa Rica	N 928 Bis	143

	ID No	Page
B. Mixed Properties		
B.1 New nominations		
Latin America / Caribbean		
Cajas Lakes and Ruins of Paredones – Ecuador	N/C 1124	147
B.2 Extensions of properties inscribed on the World Heritage List to include additional Natural Criteria		
Europe / North America		
St. Kilda (Hirta) renomination to include cultural criteria and extension to include marine area - United Kingdom	N/C 387 Bis	155
C. Cultural Properties		
Europe / North America		
The Madriu-Perafita-Claror Valley - Andorra	C1160	165
Þingvellir National Park – Iceland	C1152	173
Vegaøyane –The Vega Archipelago – Norway	C1143	181

Numerical Index of IUCN Evaluations of properties to be examined by
the World Heritage Committee at its 28th Session

ID Number	State Party	World Heritage Property Proposed	Page
N/C 387 Bis	United Kingdom	St Kilda (Hirta)	155
N 667 Rev	Hungary	Palaeohabitat of Tarnóc	107
N 740 Bis	United Kingdom	Gough Island Wildlife Reserve	137
N 900 Bis	Russian Federation	Western Caucasus	127
N 928 Bis	Costa Rica	Area de Conservación Guancaste	143
N 1007 Rev	South Africa	Cape Floral Region of South Africa	95
N 1023 Rev	Russian Federation	Natural System of "Wrangel Island" Reserve	115
N/C 1124	Ecuador	Cajas Lakes and the Ruins of Paredones	147
N 1126	Kingdom of Bahrain	Hawar Islands	1
N 1128	Costa Rica	Corcovado National Park and Isla del Caño Biological Reserve	65
N 1129	Czech Republic	Rock Cities of the Bohemian Paradise	25
N 1133	Slovakia	Primeval Forests of Slovakia	55
N 1138	Panama	Coiba National Park	73
C 1143	Norway	Vegaøyan – The Vega Archipelago	181
N 1149	Denmark	Ilulissat Icefjord	37
N 1151	Portugal	Selvagens Islands	45
C 1152	Iceland	Pingvellir National Park	173
C 1160	Andorra	The Madriu-Perafita-Claror Valley	165
N 1161	Saint Lucia	Pitons Management Area	81
N 1167	Indonesia	Tropical Rainforest Heritage of Sumatra	9

THE WORLD HERITAGE CONVENTION

IUCN TECHNICAL EVALUATION REPORTS

April 2004

1. INTRODUCTION

This technical evaluation report of natural sites nominated for inclusion on the World Heritage List has been conducted by the Programme on Protected Areas (PPA) of IUCN – The World Conservation Union. PPA co-ordinates IUCN's input to the World Heritage Convention. It also co-ordinates activities of IUCN's World Commission on Protected Areas (WCPA) which is the world's leading expert network of protected area managers and specialists.

In carrying out its function under the World Heritage Convention IUCN has been guided by four principles:

- (i) the need to ensure the highest standards of quality control and institutional memory in relation to technical evaluation, monitoring and other associated activities;
- (ii) the need to increase the use of specialist networks of IUCN, especially WCPA, but also other relevant IUCN Commissions and specialist networks;
- (iii) the need to work in support of the UNESCO World Heritage Centre and States Parties to examine how IUCN can creatively and effectively support the World Heritage Convention and individual sites as “flagships” for biodiversity conservation; and
- (iv) the need to increase the level of effective partnership between IUCN and the World Heritage Centre, ICOMOS and ICCROM.

Members of the expert network of WCPA carry out the majority of technical evaluation missions. This allows for the involvement of regional natural heritage experts and broadens the capacity of IUCN with regard to its work under the World Heritage Convention. Reports from field missions and comments from a large number of international reviewers are comprehensively examined by the IUCN World Heritage Panel. PPA then prepares the final technical evaluation reports which are outlined in this document.

IUCN has also placed emphasis on providing input and support to ICOMOS in relation to cultural landscapes and other cultural nominations which have important natural values. IUCN recognises that nature and culture are strongly linked and that many natural World Heritage sites have important cultural values.

The WCPA membership network now totals over 1400 protected area managers and specialists from 120 countries. This network has provided much of the basis for conducting the IUCN technical evaluations. In addition, the Protected Areas Programme has been able to call on experts from IUCN's other five Commissions (Species Survival, Environmental Law, Education and Communication, Ecosystem Management, and Environmental, Economic and Social Policy), from other specialist offices in the IUCN Secretariat, and from scientific contacts in universities and other international agencies. This highlights the considerable “added value” from investing in the use of the extensive networks of IUCN and partner institutions.

2. FORMAT

Each technical evaluation report presents a concise summary of the nomination, a comparison with other similar sites, a review of management and integrity issues and concludes with the assessment of the applicability of the criteria, and a clear recommendation to the World Heritage Committee.

Standardised data sheets, prepared for each nomination by UNEP - World Conservation Monitoring Centre (UNEP-WCMC), are available in a separate document.

3. SITES REVIEWED

28 site files were reviewed by IUCN in the 2003/2004 period, involving 17 field inspections. These comprised:

- 17 natural site nominations (including 3 extensions and 1 deferred site where additional information had been received),
- 2 mixed site nominations and
- 9 cultural landscapes.

Joint missions were carried out with ICOMOS for 1 mixed site nomination. Joint missions were also carried out with ICOMOS to 3 cultural landscapes and the reports for these sites are included in this document. IUCN reviewed an additional 6 cultural landscape nominations and provided comments directly to ICOMOS where relevant to assist them in their evaluation process.

A number of general observations can be made from the nominations evaluated in this session:

- i) A large number of weak and poorly prepared nominations have been received;
- ii) A large majority of the nominations have very poor comparative analyses. IUCN reminds the Committee and States Parties that all nominations should include a thorough global comparative analysis that justifies the claim for outstanding universal value;
- iii) The majority of nominated sites evaluated by IUCN came from the European region; and
- iv) An increasing number of sites could potentially be part of larger serial nominations on a more regional scale, emphasizing the need for regionally harmonized tentative lists.

At a recent meeting of the Advisory Bodies and the World Heritage Centre, it was recommended that the World Heritage Centre needs to be stricter when assessing the completeness of nominations submitted.

The files reviewed by IUCN in 2003/2004 are as follows:

ID Number	State Party	World Heritage property proposed
-----------	-------------	----------------------------------

A. Nominations of natural properties to the World Heritage List

A1. New Nominations

1089	Austria	Hohe Tauern National Park (core zone) Carinthia, Salzburg, Tyrol (withdrawn by State Party – no evaluation report presented)
1126	Bahrain	Hawar Islands
1128	Costa Rica	Corcovado National Park and Isla del Caño Biological Reserve
1129	Czech Republic	Rock Cities of the Bohemian Paradise
1149	Denmark	Ilulissat Icefjord
1167	Indonesia	Tropical Rainforest Heritage of Sumatra
1138	Panama	Coiba National Park
1151	Portugal	Ilhas Selvagens
1161	Saint Lucia	Pitons Management Area
1133	Slovakia	Primeval Forests of Slovakia

A2. Deferred nominations for which additional information has been received

667 Rev	Hungary	Palaeohabitat of Tarnóc
1060 Rev	Kenya	Rift Valley Lakes Reserve (information insufficient to report to Committee at this time)
1023	Russian Federation	Natural System of "Wrangel Island" Reserve
1007 Rev	South Africa	Cape Floral Region of South Africa

ID Number	State Party	World Heritage property proposed
A3. Extension of properties inscribed on the World Heritage List		
928 Bis	Costa Rica	Area de Conservación Guancaste (Extension to include the Sector Santa Elena)
900 Bis	Russian Federation	Western Caucasus (Extension to include the Teberdinskiy Reserve)
740 Bis	United Kingdom	Gough Island Wildlife Reserve Minor extension
B. Nominations of mixed properties to the World Heritage List		
B1. New nominations		
1124	Ecuador	Cajas Lakes and the Ruins of Paredones
B2. Extension of properties inscribed on the World Heritage List		
387 Bis	United Kingdom	St. Kilda (Hirta) renomination to include cultural criteria and extension to include marine area
C. Nominations of Cultural Landscapes to the World Heritage List		
C1. Cultural Landscapes for which IUCN took part in field inspection		
1160	Andorra	The Madriu-Claror-Perafita
1152	Iceland	Pingvellir National Park
1143	Norway	Vegaøyan -- The Vega Archipelago
C2. Cultural Landscapes for which IUCN carried out desk reviews. <i>Comments provided to ICOMOS where relevant</i>		
1127	Germany/ Poland	Park Muzakowski / Muskauer Park
1026 Rev	Italy	Val d'Orcia
1142	Japan	Sacred Sites and Pilgrimage Routes in the Kii Mountain Range, and the Cultural Landscapes that surround them
1081	Mongolia	Orkhon Valley Cultural Landscape
1117 Rev	Portugal	Landscape of the Pico Island Vineyard Culture
1140	Togo	Koutammakou (le pays des Batammariba)

4. REVIEW PROCESS

In carrying out the Technical Review, IUCN is guided by the Operational Guidelines, which requests IUCN "to be as strict as possible" in evaluating new nominations. The evaluation process (shown in Figure 1) involves five steps:

1. **Data Assembly.** A standardised data sheet is compiled on the site, using the protected area database at UNEP-WCMC;
2. **External Review.** The nomination is sent to experts knowledgeable about the site, primarily consisting of members of IUCN specialist commissions and networks and contacts from the region (approx. 80 outside reviewers provided input in relation to the sites reviewed in 2003/2004);
3. **Field Inspection.** Missions are sent to evaluate the site on the ground and to discuss the nomination with relevant authorities and stakeholders;

4. **IUCN World Heritage Panel Review.** The IUCN World Heritage Panel intensively reviews all field inspection reports, comments from reviewers and associated background material, and agrees a final text and recommendation for each nomination;
5. **Final Recommendations.** After the World Heritage Panel has reviewed the evaluations, clarifications are often sought from the State Party. Changes based on any further information from States Parties are incorporated into the final IUCN evaluation report which is sent to the World Heritage Centre eight weeks prior to the Committee meeting.

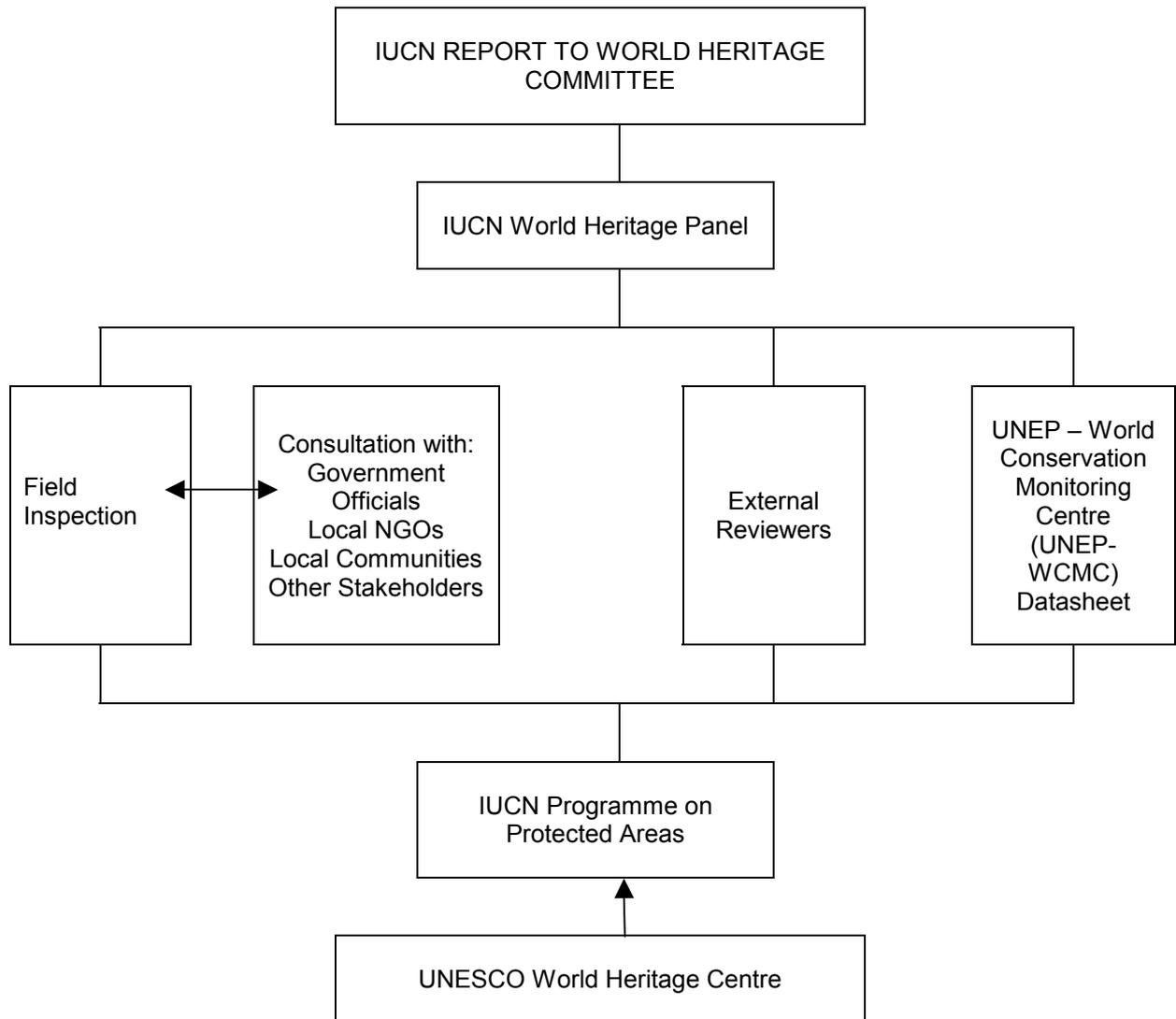
In the evaluations, the Biogeographic Province concept is used for comparison of nominations with other similar sites. This method makes comparisons of natural sites more objective and provides a practical means of assessing similarity. At the same time, World Heritage sites are expected to contain special features, habitats and faunistic or floristic peculiarities that can also be compared on a broader biome basis.

It is stressed that the Biogeographical Province concept is used as a basis for comparison only and does not imply that World Heritage sites are to be selected solely on this criteria. The guiding principle is that World Heritage sites are only those areas of outstanding universal value.

Finally, it is noted that the evaluation process is aided by the publication of some 20 reference volumes on the world's protected areas published by IUCN, UNEP-WCMC and several other publishers. These include (1) Reviews of Protected Area Systems in Oceania, Africa, and Asia; (2) the four volume directory of Protected Areas of the World; (3) the three volume directory of Coral Reefs of the World; (4) the six volume Conservation Atlas series; (5) The four volume "A Global Representative System of Marine Protected Areas; and (6) Centres of Plant Diversity. These documents together provide system-wide overviews which allow comparison of the conservation importance of protected areas throughout the world.

As in previous years, this report is a group product to which a vast number of people have contributed. Acknowledgements for advice received are due to the external evaluators and reviewers and numerous IUCN staff at Headquarters and in the field. Many others contributed inputs during site inspections. This support is acknowledged with deep gratitude.

This report presents the official position of IUCN.



A. Nominations of Natural Properties to the World Heritage List

A1 New Nominations

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

HAWAR ISLANDS (KINGDOM OF BAHRAIN) - ID N° 1126

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 11 references.
- ii) **Additional Literature Consulted:** Pilcher N., Phillips R., Aspinall S., Al Madany I., King H., Hellyer P., Beech M., Gillepsie C., Wood S., Schwarze H., Al Dosary M., Al Farraj I., Khalifa A. and Böer B., 2003. **Hawar Islands Protected Area (Kingdom of Bahrain). Management Plan. First Draft.** National Commission on Wildlife Protection; Aspinall S., Al Madany I., King H., Pilcher N., Phillips R., Al Dosary M., Al Farraj I., Khalifa A., Gillepsie C., Schwarze H., Wood S. and Böer B., 2003, **Hawar Islands Biosphere Reserve study, Bahrain.** National Commission for Wildlife Protection and UNESCO; Wilson M., 2003. **World Heritage opportunities for marine biodiversity conservation in the East Atlantic, the Southern Mediterranean, the Red Sea, the Gulf, Gulf of Oman and Arabian Sea.** Egyptian National UNESCO Commission and UNESCO; UNESCO, 2002, **Proceedings of the World Heritage Marine Biodiversity Workshop, Hanoi, Vietnam,** World Heritage Papers 4; UNEP-WCMC, 2003, **Seagrass Atlas of the World;** GBRMPA, WB, IUCN, 1995, **A Global Representative System of Marine Protected Areas.** Vol. III.
- iii) **Consultations:** 10 external reviewers consulted. Staff from the National Commission for the Protection of Wildlife (NCWP) and other national institutions involved in the management of the site.
- iv) **Field Visit:** Dr. A. Jeudy de Grissac, November / December, 2003.

2. SUMMARY OF NATURAL VALUES

The nominated site covers an area of 58,100ha, including 52,900ha of marine areas and 5,200ha of land. The Hawar Islands are an archipelago of 36 small desert islands. Hawar is the largest island covering around 4,100ha and is surrounded by the shallow waters of the Gulf of Salwah. The nominated area is located 26km southeast of the main island of Bahrain and extends to the international maritime boarder with Qatar. The islands are either flat (beach rock or fossil reefs covered by sand or gravel) of an altitude close to sea level or emerging remnants of limestone and sandstone formations (up to 28m for Hawar and 14m for other islands). Hawar Island is an association of both types. On land, coasts are fringed with a heavy cover of halophytes that, with the exception of patches of thornbrush, constitutes the predominant vegetation of the islands.

The marine environment constitutes an extensive area of shallow waters (most of the site is less than 6m depth with an average of 2m and a maximum of 20m, which also represents the maximum fishing depth for cormorants). As a result of the shallow waters and arid climate, the salinity is very high, up to 52 parts per thousand in open waters and higher in enclosed lagoons or mudflats (sabkhas). With a tide reaching 1.5m, the flat islands can be partly flooded during storms. The currents are locally very strong and usually from north to south. Due to the shallow waters, the tide and the dominant winds, long sand spits occur to the south of some islands as well as channels with overhangs and caves in the seagrass beds.

The marine ecosystem is mainly composed of extensive, dense and undisturbed seagrass beds covering different types of substrate (sandy, muddy or rocky). Seagrass beds are present off the coast of Bahrain, Qatar, the United Arab Emirates and, to a lesser extent, the

southern coast of Saudi Arabia. Within the nominated site the structure constituted by the roots of phanerogams is more than two meters thick and could have been built over the past two or three centuries.

Two relatively isolated populations of green turtles and dugongs are dependent on the seagrass beds. Up to 200 dugongs have been recorded in the area and 400 to 500 individuals are said to exist locally in three to four herds, although this is yet to be confirmed by systematic research. Hawksbill, leatherback and loggerhead turtles are also reported for the nominated site. Most marine species, however, are not detailed in the nomination document.

Annually, more than 200,000 breeding or migrating waterfowl and wintering raptors occur on the islands. Of the 192 species of birds recorded in Bahrain, 132 are present on the Hawar Islands. Prominent among these are Socotra cormorant with over 20% of the global population (100,000 to 150,000) breeding in the site, and the western reef heron with 10% of the regional population (around 325 pairs) breeding on the islands. Other important species present in the nominated site are osprey (with 20% of the world population breeding in the site), sooty falcon, lesser kestrel and flamingo. In relation to mammals there is a population of 300 reem or sand gazelles, possibly descended from a native population of which 30 were seen in 1976. Arabian Oryx and Nubian Ibex have been introduced in the islands.

3. COMPARISON WITH OTHER AREAS

There are currently (2003) 15 sites inscribed on the World Heritage List primarily for their marine values; 7 of them include island ecosystems. There are another 26 sites inscribed on the World Heritage List which also include marine areas, 18 of which include island ecosystems. The nominated site is located in the Anatolian-Iranian Desert Biogeographical Province (Udvardy 1975) where no marine site has been inscribed in the World Heritage List.

The key ecosystem of this site is the extensive seagrass bed, an important ecosystem for maintaining marine processes and productivity. However, this ecosystem extends off the coast of Bahrain, Qatar, the United Arab Emirates and, to a lesser extent, the southern coast of Saudi Arabia. There are other sites inscribed on the World Heritage List, such as Belize Barrier Reef Reserve System (Belize); Cape Girolata, Cape Porto, Scandola Nature Reserve, and the Piana Calanches in Corsica (France); and Ibiza, Biodiversity and Culture (Spain), just to mention few examples, with extensive seagrass beds. In the case of Ibiza, the reef formed by the seagrass bed structure is 4 meters high, the highest reef reported world-wide of this origin (San Félix, 1998). This is twice as high as the reef structure reported in the nominated site. In addition, these above-mentioned World Heritage sites are richer in relation to marine biodiversity than the Hawar Islands, and include coral reefs which are almost negligible in the nominated site.

The nomination gives emphasis to the significance of the site due to the presence of an important population of dugongs, considered the second largest worldwide. However, this population is not exclusively present in the nominated site as they move along the waters of the Gulf of Salwah. There is also no scientific evidence that dugongs are breeding in Bahrain waters. In addition, it is important to note that the largest population of dugongs under effective protection occurs in Shark Bay World Heritage site, Western Australia, with a population of over 10,000 dugongs which represents approximately 13% of the world population.

In the Middle East region there are other sites of similar characteristics such as the Socotra Archipelago (Yemen), declared a Biosphere Reserve in 2003, and the Jubail Wildlife Sanctuary (Saudi Arabia) which contains important seagrass habitats and coral species. Jubail is also a key bird wintering site and is the nesting site for hundreds of thousands of terns. Jubail is also the largest green and hawksbill turtle rookery in the Gulf, from which turtles migrate to Oman, the United Arab Emirates and Iran. The site is also comparable and shares similar ecological characteristics with the Marawah Archipelago of the United Arab

Emirates, almost ten times larger than the nominated site (556,100ha) which is classified as a Managed Resources Marine Protected Area (Category VI, IUCN).

4. INTEGRITY

4.1. Ownership and Legal Status

The nominated site is 97% state owned. The remaining 3% is owned by a consortium of Government shareholders. All the other islands are state owned. The marine area around the islands was declared as a Wildlife Sanctuary in 1995 (Royal Decree N° 2/95) and the islands were established as a protected area in 1996 (Edict N° 16/96). In 1997 the site was declared as a Ramsar site under the Ramsar Convention on Wetlands, which was ratified at the national level by Royal Decree N° 3/97.

4.2. Boundaries

The boundaries of the site are adequate to protect the terrestrial environments associated to the islands but, according to a number of reviewers, not well designed to offer effective protection to key marine species occurring in the area, such as the dugongs and sea turtles population.

4.3. Management

Additional information provided by the State Party in February 2004 in response to questions from IUCN, noted that the Governor of the Southern region of Bahrain (which includes Hawar Islands) has established a "Public Commission for the Protection of Marine Resources, Environment and Wildlife" with the governor being appointed as the head of this commission (with a rank equal to a Minister). This newly established commission is the single authority responsible for the management of the nominated site. However, while this is a positive step, the information provided by the State Party notes that the commission is under funded to adequately meet its objectives, including those associated to the protection and management of the nominated site.

At the local level, there is no staff, infrastructure or equipment for managing the site. Patrolling at sea is part of the normal activities of the Coast Guards. The military troops (Bahrain Defence Forces) are responsible for the local security and provide support for surveys or coastal cleaning. However, the "Public Commission for the Protection of Marine Resources, Environment and Wildlife" has submitted to the Ministry of Finance and National Economy and to the Civil Service Bureau a proposal to fulfil the staffing and financial requirements needed for the effective management of the site, including for the establishment of a Marine and Fisheries Control, Protection and Monitoring Unit in the islands that will take over the responsibilities currently fulfilled by the National Coastguard. This proposal is yet to be approved.

Clarification has also been provided by the State Party in relation to the management category applied to the nominated site, which was unclear in the nomination. At present the "Public Commission for the Protection of Marine Resources, Environment and Wildlife" is proposing to the National Assembly that the site should be categorised as a National Park (Category II, IUCN, 1994). However, this proposal needs to be discussed and approved at different levels and most probably it would need to be supported by a national law. Thus its approval would take time and it may not occur before the end of 2004.

On the other hand, progress has been achieved in relation to the adoption of the draft management plan for the site that was submitted as part of the nomination. The "Public Commission for the Protection of Marine Resources, Environment and Wildlife" has officially adopted, based on the provisions under the Legislative Decree No. 21 on the Protection of the Environment, this management plan as the key tool for protecting and managing the nominated site. While this is a positive step that has already generated additional support from the National Coastguard to the protection of the site, the full implementation of the

management plan requires additional human and financial resources and the implementation of a targeted capacity building programme to prepare field staff.

4.4. Human use of the area

On land, there is no development on the islands except for Hawar Island where the infrastructure includes military facilities (fenced), a coast guard position, housing for administrative staff (unoccupied) and a resort compound (fenced) including hotel and chalets. Military presence and activities have been reduced in the past years (from 5000 to 2000 troops) and cleaning of military ranges and infrastructure conducted.

The hotel facilities include a hotel and some chalets. Following the dredging of a channel to access the hotel, the building of artificial islands in front of the hotel was started but has been stopped due to the lack of authorisation. However, equipment and materials have not yet been removed. The number of visitors is estimated at around 20,000 per year, mainly from Bahrain. The hotel has its own boat for transportation and the movements of visitors are restricted to the resort. The road network is limited and access to tracks is restricted to authorised vehicles only. The resort management has introduced numerous exotic species of plants without control. A power plant and a desalination plant are available but not sufficient to accept the growing demand for visitation. There is no real management of the liquid waste (directly discharged into the sea) or of the solid waste (open-fill pit). The coastal areas receive floating foam and plastics brought by currents and associated to coastal activities as well as maritime traffic. There are also reports of oil pollution associated to maritime traffic around the islands.

Fishing activities have been forbidden in most of the proposed protected area by the local authority and this is enforced by the Coast Guards and the Bahrain Defence Forces that are patrolling the area regularly. Fisheries are now restricted to some coastal traps along the coast of Hawar for local needs. Trawling for shrimps exists to the north but outside the protected area boundaries. However, in the opinion of some reviewers this is disrupting the movement of dugongs and other key marine species. Traditional fishing or egg collection from locals or foreigners (mainly from Qatar) have been stopped by the military presence on both sides of the border.

In addition to plant species, several species of fauna have been introduced to Hawar Island, in particular Addax, Arabian Oryx, and Nubian Ibex. These introductions have been implemented as part of a wildlife restocking plan. These species are now competing with the native reem gazelle. There are no goats but hares, rats and cats have also been introduced on this island and could threaten bird populations if transported unintentionally to other islands.

Additional information received by IUCN from the State Party (February 2004) notes that the nominated site is part of the Exploration Block No. 6 defined by the Bahrain Petroleum Company (BAPCO) and currently assigned to Petronas Carigali (Malaysia) for exploration. Petronas has already conducted a seismic survey (non intrusive, i.e. not using explosives) and drilled one deep well close to the northern edge of the nominated site. A second well is planned for the second half of 2004 or early in 2005. While the information provided by the State Party emphasises the commitment of Petronas to apply international petroleum industry standards for environmental protection and safety, no information was provided on whether or not the site will be subject to exploitation if exploration confirms the presence of economically viable hydrocarbon reserves. This is a key issue of concern due to potential impacts to the integrity of the site.

4.5 Other threats

A number of reviewers noted that there are a number of threats that could affect the future integrity of the site. These are:

- Climate change and related sea level rise could have an impact on at least six of the islands with an altitude of less than one meter.

- Lack of a proper long-term land use and development planning for the main island of Hawar, including a Strategic Environmental Assessment (SEA) of tourism development.
- Dredging channels in the waters of the nominated site for routing vessels and the consequences on the water quality, disturbance to dugongs and other vulnerable marine species and impacts on the seagrass communities.
- Impacts associated to land-based sources of pollution from Qatar, which is only 2km away from the nominated site.

5. ADDITIONAL COMMENTS

ICOMOS has reviewed the nomination document and has noted that it provides information on the cultural attributes of the islands which appear to include what could be significant archaeological remains. A small number of pre-historic sites have been identified together with the remains of villages, mosques, graveyards and several cisterns and water collecting systems. ICOMOS therefore recommends that the significance of these remains should be assessed in order to determine and implement appropriate conservation measures and to propose how they should be considered in the overall management of the site.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The site has been nominated under natural criteria (ii) and (iv).

Criterion (ii): Ecological processes

The nominated site contains an extensive seagrass bed, an important ecosystem for maintaining marine processes and productivity. However, this ecosystem extends along the coast of Bahrain, Qatar, the United Arab Emirates and, to a lesser extent, the southern coast of Saudi Arabia. The geological processes associated with the evolution and dynamics of these islands are common to many marine areas in the Arab region and worldwide and it is better reflected in other sites already included on the World Heritage List under this criterion. IUCN considers that the nominated site does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

The nominated site contains the second largest population of dugongs in the world and an important percentage of the world's breeding population of the Socotra Cormorant. However, the survival of the population of dugongs is not entirely depending on the protection offered by the nominated site as they move along the waters of the Gulf of Salwah. In addition, there are other protected areas in the region and worldwide with greater biodiversity including globally important populations of sea birds. IUCN considers that the nominated site does not meet this criterion.

The nominated site, as discussed in Section 4, does not meet the conditions of integrity as required under the Operational Guidelines of the Convention.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee **not to inscribe** Hawar Islands on the World Heritage List. IUCN would also like to recommend to the Committee to encourage the States Parties of Bahrain, Qatar, the United Arab Emirates and Saudi Arabia to consider, if they wish to do so, the possibility of preparing a marine transboundary nomination covering, but not limited to, the Gulf of Salwah.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION
TROPICAL RAINFOREST HERITAGE OF SUMATRA (INDONESIA) ID N°1167

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** Two references.
- ii) **Additional Literature Consulted:** De Wilde, W.J.J.O. and Duyfjes, B.E.E. 1996. **Vegetation, Floristics and Plant Biogeography in Gunung Leuser National Park, in Leuser: A Sumatran Sanctuary**, Yayasan Bina Sains Hayati Indonesia; Flora and Fauna International, 2003, **The Ecological and Subsequent Social-Economic Impacts of Ladia Galaska**, Technical Memorandum, Sumatran Elephant Conservation Programme, FFI; Marshall, A.J., Jones, J.H., Wrangham R.W. 2000, **The plight of the apes: a global survey of ape populations**. Briefing paper. Department of Anthropology, Harvard University; Thornton, I. 1997, **Krakatau: The destruction and reassembly of an Island Ecosystem**, Harvard University Press; Whitten, T., Sengli J. Damanik, Jazanul Anwar, Nazzaruddin Hisyam, 2000, **The Ecology of Sumatra**, The Ecology of Indonesia Series, Vol. I Periplus.
- iii) **Consultations:** Five expert reviewers. Ten external reviewers consulted. The mission met with experts and high-level representatives from the Directorate of Forest Protection and Nature Conservation (PHKA), Jakarta; the Ministry for Environment; Jakarta Office of UNESCO; Leuser Development Programme; North Sumatra Planning Board; Flora and Fauna International, Sumatran Elephant Programme; National Park staff; Provincial authorities; Office for Investment, Culture and Tourism of Lampung Province.
- iv) **Field Visit:** Peter Hitchcock, January, 2004.

2. SUMMARY OF NATURAL VALUES

The Tropical Rainforest Heritage of Sumatra (TRHS) nomination comprises three widely separated protected areas on the island of Sumatra, one of the larger islands and westernmost of the Indonesian archipelago of some 17,000 islands.

By way of introduction, Indonesia occupies only 1.3% of earth's land surface, its 17,000 islands include more than 10% of the world's flowering plants, 12% of the world's mammal species, 17% of all reptiles and amphibians and 17% of the world's bird species (BAPPENAS 1993). This extraordinary biological richness is the reason why Indonesia is recognised as one of the 7 megadiverse countries, containing 2 of the world's 25 'hotspots' (areas of high diversity as defined by Conservation International – CI). Of the 200 WWF Global Ecoregions, 18 are located in Indonesia – 11 terrestrial, 4 freshwater and 3 marine.

Sumatra comprises part of the WWF "Sundaland" hotspot and is the location of the 'Sumatran Islands Lowland and Montane Forests Ecoregion'. Whitten (2000) estimated the original vegetation cover of Sumatra to include 5,680,000 ha of montane forest and 25,154,000 ha of tropical evergreen lowland forest. The lowland tropical forests have been largely destroyed in recent decades (circa 20% remaining, mostly as small remnants) and montane forest is increasingly threatened by logging and agricultural encroachment.

The biodiversity of the forests of Sumatra is exceptional. There are an estimated 10,000 species of plants, including 17 endemic genera. This very diverse flora is in large part shared

with other parts of the West Malesian region that extends from southern Thailand to the island of New Guinea. The part of Sumatra north of Lake Toba includes a distinctive Sumatran flora (de Wilde and Duyfjes 1996), most distinctive in the montane and sub-alpine vegetation, especially the '*blang*' forest.

Animal diversity in Sumatra is also impressive, with more than 200 mammal species and some 580 bird species of which 465 are resident and 21 are endemics. Of the mammal species, 22 are Asian species not found elsewhere in the Indonesian archipelago and 15 are confined to the Indonesian region, including the endemic Sumatran orangutan.

Geologically, Sumatra is located on the southern edge of the Asian tectonic plate adjacent to the oceanic floor section of the Austro-Indian plate that downthrusts beneath the island. The collision of the two plates has created the uplifted mountain range, the Bukit Barisan Range, extending the full 1680 km length of the island with many active volcanoes. Climatically, GLNP, KSNP and the western part of BBSNP fall within Type A (wet) of the Schmidt and Fergusson climate classification. The southern part of BBSNP is drier and is akin to a Type B climate, with an annual dry season of 5 months.

Turning now to the nomination, this has total core area of **2,595,125** hectares, the nomination comprises three national parks (Taman Nasional) established under national legislation of the Republic of Indonesia:

- Gunung Leuser National Park (GLNP) (established in 1980) 862,975 ha.
- Kerinci Seblat National Park (KSNP) (established in 1992) 1,375,350 ha.
- Bukit Barisan Selatan National Park (BBSNP) (established in 1982) 356,800 ha.

All three parks are located on Bukit Barisan range, that runs from Aceh in the north-west to Bandar Lampung in the south-east. Together they represent whole or part of the three most significant remnant 'islands' of the once vast Sumatran forests.

The nomination includes the highest mountain in Sumatra, Gunung Kerinci (3,800 m). This is also Indonesia's highest volcano and remains very active. Since both GLNP and BBSNP have minor frontages to the Indian Ocean, the altitudinal range of the nomination extends from the highest mountains on Sumatra to sea level. Thus all three protected areas in the nomination exhibit a wide altitudinal zonation of vegetation, from lowland rainforest to montane forest, extending to sub-alpine low forest, scrub and shrub thickets in GLNP and KSNP. But most of the nominated parks are mountainous with only small lowland areas (for example, 12% of GLLNP is below 600m). The nominated areas are therefore more characteristic of the Bukit Barisan Mountain Range than of Sumatra as a whole, which is otherwise predominantly lowland with very extensive floodplains.

GLNP is a part of one of 18 regions in Indonesia classified by the WWF as part of the 200 Global Ecoregions of importance for conservation of the world's biodiversity. The distribution of some species of animals in Sumatra is believed to provide evidence of the role played by the Toba tuff eruptions 75,000 years ago. For example, the Sumatran orangutan is not found south of Lake Toba and the tapir is not found north of it. Further, the high level of endemism in the mammals and birds is presented as evidence of the bridge-barrier relationship between the Sumatra biota and that of mainland Asia as a consequence of sea level changes. Despite periodic land bridges to Asia, Sumatra has developed a high endemism, an important natural process well represented in the nominated sites. The altitudinal range and connectivity between diverse habitats in the nominated sites, in particular in GLNP and KSNP, would have facilitated on-going ecological and biological evolution.

There are no formal buffer zones included in the nomination. However, GLNP is the core of a tract of protected lands comprising the Leuser Ecosystem. This is of great conservation significance in itself but is also a critically important buffer zone to the park. There are other protected lands adjoining KSNP and BBSNP presently representing effective buffers but due to extensive illegal logging and encroachment, these can no longer be assumed to be permanent buffers.

3. COMPARISONS WITH OTHER AREAS

The geology of the TRHS is typical of the region. The TRHS includes two sample transects across the Sumatran subduction zone with largely intact naturally vegetated landscapes, incorporating sections of the uplift, rifting and volcanic zones. KSNP provides a transect with a very clearly defined rift valley and associated volcano, the largest in Indonesia. Whilst these represent important earth science values, they are features that are widespread throughout the region, and are not the basis of a distinctive claim for outstanding universal value.

From a biodiversity and ecological perspective, there is no comparable area within Indonesia, although a cluster forest site in Borneo has been nominated for examination in 2004/2005. However, the TRHS has significantly higher mammal diversity than the island of Borneo, which lacks many of the larger Sumatran mammals, which are endemic to that island.

Although many of the Asian mammals once extended further east in the archipelago, extensive clearing, intensive agriculture and other human activity has progressively eliminated at least the larger mammals and their habitat from Bali and Java. The only other existing large World Heritage site in Indonesia is Lorentz National Park in Papua which is located in a completely different biogeographic realm (Australian realm).

Although Ujung Kulon National Park World Heritage site is just across the Sunda Strait from BBSNP, its very much smaller size and lesser biodiversity, means that it does not compare with either BBSNP or the TRHS nomination as a whole. There is also little basis for comparison with the Komodo National Park World Heritage site in eastern Indonesia where the primary values are the endangered 'komodo dragon' species and adjacent marine areas. Looking more widely, none of the mainland Asian sites exhibits the effect of sea-level oscillations on the on-going biological evolution, evidenced by the high level of endemism in Sumatra. Indeed, the TRHS needs to be compared with other places in the South Eastern Asian biogeographic region, as well as elsewhere in the tropical world. At the global level, the biodiversity of the TRHS nomination compares very favourably with that of other World Heritage sites. The best test of comparison is to compare like-with-like, using Manu National Park (Peru) and the Central Amazon Conservation Complex (CACC, Brazil), which includes Jau National Park, in the high biodiversity Amazon forests of Brazil, as shown in Table 1 below.

Table 1: Comparison of biodiversity between the nominated site and other World Heritage sites

Biodiversity class	Mammals	Birds	Reptiles & Amphibians	Fish
Protected Area				
TRHS (nominated area) 2,595,124 ha	Circa 180	Circa 450	Circa 200	30+
Manu NP (Peru) 1,532,806 ha	99	850	120	Circa 200
CACC, Brazil 5,232,018 ha	120	411	Circa 150	320
Thungyai-Huai Kha Khaeng, Thailand 622,200 ha	120	400	139	113
Lorentz NP, Indonesia 2,350,000 ha	41	274+	150+	Circa 100

The nominated site clearly excels in the high biodiversity of mammals when analysed at a global scale and one of the highest biodiversity of birds only after Manu National Park that protects 15% of all the birds species of the world. The broadly comparable diversity when compared with the much larger CACC is not surprising, given the much greater altitudinal range and hence habitat diversity of the Sumatran sites.

The large mammals of the TRHS (tiger, elephant, rhinoceros, tapir, sunbear and orangutan) are indicators of the Asian realm. The regions that need to be directly compared are the island of Java, peninsular Malaysia, Thailand, Myanmar, Borneo, Vietnam and Laos. Both Java and Sumatra have been periodically linked by land bridges in a geological timescale to Asia. However, Sumatra demonstrates an evolutionary divergence in response to longer isolation.

The Sumatran sites are distinguished by the high level of endemism, including the three Sumatran endemic large mammals. However, at the generic level, the most comparable sites are several in Malaysia and Thailand which share with the TRHS several large mammals, including the tiger and elephant, but lack the high plants and animals endemism of the Sumatran taxa, among montane biota.

In summary, the features of the TRHS that make it globally and regionally distinct from other existing World Heritage sites in biodiversity terms are:

- Very high fauna biodiversity rating at the global level;
- In SE Asia, overall fauna and flora biodiversity comparable only with some Borneo prospective sites.(e.g. 4,000 + plant species);
- The highest mammal diversity in insular SE Asia (incl. 22 Asian species not found elsewhere in insular SE Asia);
- Critically important habitat for many rare and threatened faunal species.(e.g. 58+ birds on 2000 IUCN Red List of Threatened Species);
- Critically important habitat for four threatened large mammals , three of which are Sumatran endemics (tiger, elephant, orangutan);
- Outstanding climatic refugial value for many species, and outstanding habitat diversity over a large altitudinal range (from sea level to 3,800 m);
- The presence of outstanding diverse and distinctive 'Asian' montane biota.

Finally, in terms of landscape and natural beauty, the TRHS cluster differs from the distinctive landscapes of both Kinabalu Park and Gunung Mulu National Park in Malaysian Borneo. It differs too from Taman Negara in peninsular Malaysia and the Thungyai - Huai Kha Khaeng Wildlife Sanctuaries (Thailand). All the above lack the volcanic component of the TRHS. Unlike Kinabalu Park and Gunung Mulu National Park, the natural beauty of the TRHS is mostly dispersed and often of a smaller scale, including many individual beautiful features, such as alpine landscapes, waterfalls, lakes, caves and rivers. Although Ujung Kulon National Park includes the remains of one of the world's most famous volcanoes, Krakatau, its scale and spectacle is not comparable to the volcanoes in the nomination such as Gunung Kerinci volcano in KSNP (3,404 m). This mountain is a 'classic' and active stratovolcano, the highest indeed in SE Asia (3,800 m). Moreover, the site is remarkable as the only nominated one in SE Asia with active volcanoes embedded in tracts of rainforest.

4. INTEGRITY

4.1. Legal Status

All three nominated parks are public lands designated as national parks by the Government of Indonesia. National Park status is the appropriate level of legal protection in Indonesia. The managing authority of all three nominated sites is presently the Directorate General of Forest Protection and Forest Conservation (PHKA) within the Ministry of Forestry. The nomination refers to the handover of management of the Leuser Ecosystem from the Leuser Management Unit to the Leuser International Foundation (LIF) in 2004. The home page of the LIF advises that it has a thirty year concession over the Leuser Ecosystem. The GLNP, however, will continue under PHKA management.

4.2 Management

Park rangers (mainly Polisi Hutan or Forest Police) administrative staff and technicians are employed at each park. Staff may from time to time be formed into special units such as a 'Rhino Management Unit'. Total staff numbers however (GLNP – 237, KSNP – 162, BBSNP – 127) suggest a greater management capacity than is the case. There is a need for increased training and resourcing to achieve greater effectiveness, especially in law enforcement. Whereas base salaries of staff are funded, in almost all cases there is a serious lack of resources for effective field routine management: for example, a shortage of vehicles severely limits mobility of field staff..

Management plans, as required by Indonesian law, exist for all three parks. However, many staff are not conversant with them, suggesting the need for a more concise document for briefing and training purposes.

The level of involvement and cooperation of local communities, including local government, in management of the parks, vary greatly within the nominated areas. In some cases, local communities and local government are seen by managers as a serious threat to the parks: in others they are playing a supporting role. In KSNP with a memorandum has been developed between 14 or more local governments and the park management: a commendable initiative. Even so, the level of support by local government has declined since management has opposed the opening of new roads through the park and demonstrated increasing effectiveness in anti-poaching and anti-logging activities within it. The operation of two large international aid projects in KSNP (GEF) and GLNP (part of EU sponsored Leuser Management Unit) resulted in a great deal of consultation and interaction with local communities on many aspects of park and wildlife management.

It is apparent that the financial resources available over the past decade have varied greatly within each site, as well as between sites, as shown in Table 2. Further major changes are imminent as a result of recent and pending cessation of several international aid programs.

Table 2: Trends in financial resources to nominated sites (indicative only)

Budget Period	GLNP	KSNP	BBSNP	Total
1984/85-1994/95	US\$63,886.00 (70% from National budget)	Approx. average annual budget - US\$6,546,960.	Most funding came from National Budget	
1984/85–1994/95	US\$63,886.00	Most funding since 1996 came from the KS-ICDP Project* totalling US \$46 million. This project finished in 2002.		
2000	US\$192,696.00 (\$96,460 from National budget; \$13,635 from Gunung Leuser Mgt. Strengthg. Fund)			
2001			US\$240,450	
Annual Funding (approx. only)	US\$190,000	US\$6,546,000*	US\$240,000	*US\$6,976,000

*Note: The KS-ICDP project has now finished.

All three nominated parks have outstanding tourism potential. However, a variety of factors are impeding or preventing significant tourism development. These include inadequate strategic planning for tourism; totally inadequate infrastructure in parks; poor road infrastructure in some localities outside parks; lack of certainty in protection of the natural resource; illegal activities continuing to degrade the resource (e.g. logging along scenic forest routes); and security problems in Nanggroe Aceh Darussalam (NAD). If these issues are

addressed tourism could be an important alternative to provide additional funding for managing these parks.

4.3. Boundaries

Gunung Leuser National Park

GLNP is one component of a much larger block of high quality wildlife habitat and natural landscape known as the 'Leuser Ecosystem'. The Leuser Ecosystem provides major habitat for four threatened and critically threatened Sumatran endemic large mammals exist here, including the Sumatran Orangutan (critically endangered - CR), the Sumatran Tiger (CR), the Sumatran Elephant (endangered, IUCN Red List) and the Sumatran Rhinoceros (CR). GLNP, embedded in the Leuser Ecosystem, contains habitat of all four species though does **not** contain '*the most important habitat*' of three of those species (elephant, tiger and orangutan) in the region. Furthermore, GLNP is the only part of the cluster nomination that falls within the range of the critically threatened endemic Sumatran orangutan: while it contains important orangutan habitat, much of the critically important habitat is located outside the nominated area in the surrounding Leuser Ecosystem.

Unfortunately, some of the best evidence of significant on-going ecological and biological processes is contained in the part of the Leuser Ecosystem outside the nomination. For example, the recent discovery of evolutionary adaptation in a population of orangutans (use of tools) is limited to a population outside of the nominated GLNP. The most important areas of high biodiversity of the Leuser Ecosystem outside GLNP are mainly (i) the Singkil Barat Wildlife Reserve, (ii) Langsa lowlands and foothills, and (iii) the Aceh Highlands and the Tapaktuan lowlands. The Singkil Barat Wildlife Reserve alone is a threatened lowland swamp forest and considered by the Leuser Management Unit as being of global significance for conservation of the Sumatran orangutan.

In addition much of the regional scale migration of the Sumatran elephant in the Leuser area largely takes place outside of GLNP in the Leuser Ecosystem. Furthermore, the Policy Dialogue on World Heritage Forests held in Berastagi, Sumatra in December, 1998 paid particular attention to the nearby Leuser Ecosystem. The Berastagi proceedings refer to both BBSNP and KSNP but specify the Leuser Ecosystem instead of the smaller component GLNP. Limiting the nomination to the Gunung Leuser National Park section of the Leuser Ecosystem creates an anomalous situation and fails to meet international expectations from this important serial site nomination.

Kerinci Seblat National Park

KSNP is by far the largest of the three nominated areas. Whilst many of its boundaries interface with developed lands or highly degraded lands, some boundaries adjoin critically important habitat that currently functions as an integral part of the park ecosystem. With development proceeding apace outside the park, some of those boundaries will become very problematic, especially for the larger mammals. For example, the western boundary of the park between Padang and Bengkulu transects tiger and elephant habitat. If development is allowed to extend up to the park boundary in such locations, the park will become very much more difficult to manage, unnecessary people/wildlife interaction will occur, and long term survival prospects for the larger mammals will be greatly diminished.

There is clearly a case for urgent review of the boundary of KSNP with view to identifying opportunities for protection of additional habitat critical to the larger endangered mammals. In particular, there are a number of adjoining logging concessions in which logging has been completed but which remain important habitat for larger mammals. There is also a critical habitat link between the east and west blocks of the park that requires urgent protection.

Bukit Barisan Selatan National Park

The existing boundaries of BBSNP are adequate for the purpose of the nomination. Smallest of the three nominated sites, BBSNP has greater pressure from surrounding developed lands. Nonetheless,, some adjacent protected forests and degraded forest lands are of complementary importance as habitat for the larger mammals, in particular for tiger, elephant and to some extent rhinoceros. Two of the three species are critically endangered and their

survival will depend very much on the protection and management of populations outside the national park, either as future additions to the park or as managed buffer zones. Failure to initiate protection and management of large mammal populations and/or their habitat outside the park will ultimately threaten the survival of the park.

4.4. Human Impact

There are four fundamental and related threatening processes that are continuing to impact on the nominated sites. The common denominator in all cases is access provided by roads and the failure to enforce the law effectively. Roads in tropical forests where law enforcement is ineffective are 'the beginning of the end' for rainforest ecosystems, facilitating illegal logging, encroachment, poaching and other ecologically degrading activities. The nominated Sumatran forests are no exception.

4.4.1 Illegal Logging

The unsustainable exploitation of tropical forests in Indonesia has degraded or destroyed so much of the lowland forests that timber exploitation is now increasingly dependent on illegal exploitation of protected areas, including national parks. This problem is very evident throughout Indonesia and attempts to control it have been largely ineffective. Illegal logging is a threat in all three areas and can be expected to reach a crisis point in the next few years as timber supply from outside the protected areas continues to rapidly decline. The international linkages in the illicit timber trade are presently the subject of a dispute between the Malaysian and Indonesian governments. A number of people interviewed asserted that illegal logging in Sumatra was highly organised, from the forest to the port, and that Sumatran timber was being exported as certified timber from other countries. Illegal logging is now very much a national issue currently being debated in Indonesia, both as an election issue and a matter that the President is publicly trying to address.

4.4.2 Encroachment

Encroachment into forest areas, including national parks, for subsistence agriculture and industrial plantations has now reached a critical point in many parts of the country. The three nominated parks are no exception to this general pattern. Significant recent organised illegal encroachments into a rare tract of lowland rainforest in GLNP were claimed by informed sources to have been an illegal operation facilitated as a 'business venture'.

4.4.3 Poaching

A combination of economic and social issues, combined with improved accessibility has intensified poaching of wildlife, in particular of elephants, tigers and rhinoceroses. All three nominated parks have a poaching problem that threatens the larger mammals. With international assistance, great effort is being put into anti-poaching activities in several of the parks, particularly KSNP.

4.4.4 Roads

As already noted, roads within and near the nominated sites facilitate forest and wildlife destruction.. KSNP is threatened by several road proposals that would cross critically important parts of the park. Those road proposals are currently being publicly debated and there is no guarantee that they will be cancelled.

GLNP, together with the surrounding parts of the Leuser Ecosystem, is also seriously threatened by a major highway proposal and several other road proposals. The proposed Ladia Galaska road traverses the northern section of the Leuser Ecosystem. Although it does not directly cross the GLNP, it will seriously impact on the park by changing the accessibility of the highland parts of the park. Its impact on the greater Leuser Ecosystem will be even greater; as well as facilitating illegal logging it will seriously impact on the critically important habitat of the Sumatran elephant. Although the road is a local initiative, it has now been approved-in-principle by Central Government. However, there appear to be dissenting opinions about the scheme in parts of the Government and the President has become involved in the issue.

4.5 Other Threats

4.5.1 Law Enforcement

Deficiencies in law enforcement probably represent the greatest single threat to the long-term survival of the natural heritage values of the nominated sites. Informal evidence gathered during the mission confirms that law enforcers often fail to uphold the law and instead seek financial gain from illegal activities. Most concerning is evidence of government officials involved in illegal logging in national parks. It was repeatedly asserted to the mission that military personnel participated in or controlled illegal logging operations, especially in the Aceh section of the Leuser Ecosystem. The involvement of law enforcers in illegal operations makes it doubly difficult for the park managers, PHKA, to obtain cooperation and support for their law enforcement. In the absence of major improvements in the effectiveness of law enforcement in the nominated sites, their long-term viability cannot be assured and much of their natural heritage values must be considered under serious threat.

There is some good news: with support from the police, recent convictions have been secured in cases of tiger poaching and illegal logging in KSNP. And the issue of illegal logging is now very much a national one, and has been raised in the course of both parliamentary and Presidential elections.

4.5.2 Decentralisation

There are presently some problems arising in terms of the authority of local government in national parks arising from the 'Otonomi Daerah' legislation that devolves a lot of powers from central government to local government. Provincial Governments are also exercising some powers in national parks in Indonesia. The confusion has the potential to threaten the integrity of the nominated parks and needs to be resolved.

4.5.3 Management Resources

As noted above, the adequacy of resources for management of the TRHS is an issue. Further, more support is urgently needed from law enforcement partner agencies, such as the police. This is an issue acknowledged by PHKA staff and a foreign aid project has been initiated to try to deal with it.

4.5.4 International Assistance

Both KSNP and the Leuser Ecosystem (including GLNP) have benefited from major international assistance in natural heritage management. In BBSNP however there is a low level of international assistance and resources and management are inadequate. The European Union funded the Leuser Management Programme, which has provided excellent data to assist in the planning and management of the Leuser Ecosystem, including GLNP. With cessation of major funding to KSNP in 2002, and the finalisation of the Leuser programme late in 2004, a major shortfall in management resources for the TRHS will arise. Major new international funding for all three sites, especially for BBSNP, will be critically important to their survival as protected areas.

5. ADDITIONAL COMMENTS

Justification for Serial Approach

When IUCN evaluates a serial nomination it asks the following questions based on the requirements in the Operational Guidelines:

a) What is the justification for the serial approach?

The main justification for the serial approach is that together the three parks form the cores of the three regions that offer the greatest potential for long term conservation of the distinctive and diverse biota of the island of Sumatra, including many endangered species. The three sites, all located on the Bukit Barisan mountain chain, in combination also provide biogeographic evidence of the evolution of the island of Sumatra and its rich biota. Together, the three sites include much of the critically important habitat necessary for long term

conservation of critically endangered species, in particular the large mammals endemic to Sumatra.

b) Are the separate elements of the site functionally linked?

The three separate elements of the nomination are essentially not functionally linked, particularly at the large mammal level. Unlike a number of existing serial World Heritage sites, the lack of functional linkages between the three components of this nomination raises questions about the appropriateness of them being considered legitimate parts of a serial nomination. Whereas both the Leuser Ecosystem and KSNP could independently qualify as World Heritage, BBSNP would be in doubt. BBSNP nonetheless makes a significant contribution to the biodiversity significance of the nominated sites by contributing populations of numerous rare or endangered species. BBSNP retains some semblance of a functional habitat link with KSNP but without a concerted effort, this corridor is likely to be eliminated by development over time.

c) Is there an overall management framework for all the units?

There is not presently an overall coordinated management framework for the three units but some coordination initiatives are proposed in the nomination document, which are to be implemented upon World Heritage listing. From a conservation viewpoint, greater cooperation and coordination between the three sites would be beneficial for effective management of each of the sites. Similarly, across the Sunda Strait, the Ujung Kulon World Heritage site would benefit from being included in coordinated management programs with the TRHS sites, more particularly BBSNP as many management issues are similar, e.g. rhinoceros management.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Tropical Rainforest Heritage of Sumatra has been nominated under all four natural criteria.

Criterion (i): Earth's history and geological features

The site has important earth science values, represented in cross sections across the main mountain range of Sumatra. However the fact that the feature is widespread within the wider region, does not support a distinctive claim for inscription under criterion (i). IUCN considers that the nominated site does not meet this criterion.

Criterion (ii): Ecological processes

The nominated areas represent the most important blocks of forest on the island of Sumatra for the conservation of the biodiversity of both lowland and mountain forests. This once vast island of tropical rainforest, in the space of only 50 years, has been reduced to isolated remnants including those centred on the three nominated sites. The Leuser Ecosystem, including the nominated GLNP, is by far the largest and most significant forest remnant remaining in Sumatra. All three nominated sites would undoubtedly have been important climatic refugia for species over evolutionary time and have now become critically important refugia for future evolutionary processes. IUCN considers that the nominated site meets this criterion.

Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance

The TRHS sites are all located on the prominent main spine of the Bukit Barisan Mountains, known as the 'Andes of Sumatra'. Outstanding scenic landscapes abound at all scales. The mountains of each site present prominent mountainous backdrops to the settled and developed lowlands of Sumatra. The combination of the spectacularly beautiful Lake Gunung Tujuh (the highest lake in SE Asia), the magnificence of the giant Mount Kerinci volcano,

numerous small volcanic, coastal and glacial lakes in natural forested settings, fumaroles belching smoke from forested mountains and numerous waterfalls and cave systems in lush rainforest settings, emphasise the outstanding beauty of TRHS. IUCN considers that the nominated site meets this criterion.

Addition of the Leuser Ecosystem to the nomination, as discussed above, would greatly enhance qualification on this criterion with its magnificent mountain forests, coastal swamp forests and natural beaches and the relative abundance of large mammals.

Criterion (iv): Biodiversity and threatened species

All three components of the nomination are areas of very diverse habitat and exceptional biodiversity. Collectively, the three sites can be expected to include more than 50% of the total plant diversity of Sumatra. At least 92 local endemic species have been identified in GLNP. The nomination contains populations of both the world's largest flower (*Rafflesia arnoldi*) and the tallest flower (*Amorphophallus titanum*)

The relict lowland forests in the nominated sites are very important for conservation of the plant and animal biodiversity of the rapidly disappearing lowland forests of South East Asia. Similarly, the montane forests, although less threatened, are very important for conservation of the distinctive montane vegetation of the TRHS.

The rapid and extensive destruction of the rainforests of SE Asia, Sumatra in particular, will continue to increase the already outstanding importance of the TRHS nomination for biodiversity conservation. The diversity of landscape, altitude, geology and habitat type will facilitate longer-term survival of many species through periods of climatic change.

IUCN considers that the nominated site meets criterion (iv).

Although the three nominated sites meet criterion (iv), qualification against this criterion would have been greatly enhanced if at least the critical habitat of endangered large mammals in the Leuser Ecosystem had been included in the nomination. The Leuser Ecosystem contains the most critically important habitat of the Sumatran endemic orangutan and elephant and some of the most important habitat of the endemic Sumatran tiger. For instance, Marshall, Jones and Wrangham (2000) note that 47% of the orangutan habitat in protected areas will be lost in the next decade, with less than 1% of habitat undisturbed by 'infrastructural' development by 2030. There is clearly an urgency to secure this critically important habitat.

7. RECOMMENDATIONS

- 7.1 IUCN recommends that the World Heritage Committee **inscribe** the Tropical Rainforest Heritage of Sumatra on the World Heritage List under natural criteria (ii), (iii) and (iv).
- 7.2 IUCN further recommends that the Committee should advise the State Party to consider extending the WH site to include other Leuser Ecosystem protected lands surrounding Gunung Leuser National Park, particularly the Singkil Barat Wildlife Reserve, Langsa lowlands and foothills, Aceh Highlands and the Tapaktuan lowlands. Such action should however be not be proceeded with until the integrity questions referred to in section 7.3 have been addressed and the mission called for on 7.4 completed satisfactorily.
- 7.3 IUCN also recommends that the World Heritage Committee should at the same time **inscribe the site on the List of World Heritage in Danger** on the basis of Operational Guidelines 83 (i) Ascertained Danger.

Given the type and immediacy of the identified threats, it is important that the Government of Indonesia, with the assistance of the international community, responds with urgency to ascertained threats facing the three components of this serial nomination. In particular IUCN recommends:

- i) a major coordinated effort, to address the serious threats posed to the nominated sites by on-going illegal logging and agricultural encroachment;
 - ii) urgent review of the Ladia Galaska Road, especially its likely serious impacts on both the nominated Gunung Leuser National Park and the surrounding Leuser Ecosystem;
 - iii) a coordinated effort to secure longer-term international assistance (especially for capacity building) to better protect and manage the nominated sites, with highest priority being for Bukit Barisan Selatan National Park;
 - iv) protection of the critical habitat 'missing link' across the Merangin River between the main eastern and western blocks of the Kerinci Seblat National Park;
 - v) a special funding project to urgently replace the many derelict visitor facilities and infrastructure and to develop a ecotourism/visitor management strategy in Bukit Barisan Selatan National Park.
- 7.4 IUCN advises the Committee to request the State Party to agree to invite a mission to the site within 2 years of its inscription. Based on the report of that mission, the Committee will need to decide whether to remove the site from the List of World Heritage in Danger, to retain it on that List of World Heritage in Danger or to remove it from the World Heritage List altogether.
- 7.5 Finally, IUCN recommends the Committee to request the State Party to submit detailed topographical maps clearly showing the boundaries for each site as soon as possible.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION
ROCK CITIES OF THE BOHEMIAN PARADISE (CZECH REPUBLIC) ID N°1129

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 1 reference
- ii) **Additional Literature Consulted:** D. Uličný (2001) Depositional systems and sequence stratigraphy of coarse-grained deltas in a shallow marine, strike-slip setting: the Bohemian Cretaceous Basin, Czech Republic, in **Sedimentology** 48: 599-628; P. Budil *et al.* (1999). Examples of important geological localities in the Sudetes (Czech Republic), in **Polish Geological Institute Special Papers**, 2: 27-32; **Czech National Council Act on the Protection of Nature and the Landscape, 1992. Regulation of the Government of October 14, 2002 Proclaiming the Český Ráj Protected Landscape;** T. Weighell (2003). Draft **Global Strategy for Geological World Heritage.**
- iii) **Consultations:** 4 external reviewers. Relevant officials from the Czech Ministry of Environment, Academy of Sciences, Český Ráj Protected Landscape Area, provincial authorities and the UNESCO National Committee. A public meeting was held with stakeholders in Turnov, the capital of the Liberec Region.
- iv) **Field Visit:** Stuart Chape, October 2003.

2. SUMMARY OF NATURAL VALUES

The Rock Cities of the Bohemian Paradise (RCBP) are a series of sandstone outcrops located in the north of the Czech Republic, 70km northeast of Prague near the town of Turnov, and spread across three regions: Liberec, Hradec Králové and Central Bohemia. The nominated ten sites, which form a serial nomination, lie within a 20km radius of Turnov. The RCBP are the core zones within a broader Bohemian Paradise (Český Ráj) Protected Landscape Area (BPPLA). The BPPLA is itself in three separate units and provides the buffer zone around each RCBP site. Assigned to IUCN Protected Area Management Category V, BPPLA is not included in the nomination; however, all the nominated sites fall within it. The total area of the RCBP core zones is c.17 km² and the BPPLA buffer zone c. 181.52 km². All the individual RCBP sites meet the criteria for IUCN management categories III or IV. The details of these sites, and of the surrounding BPPLA, are shown in Tables 1 and 2 below.

Table 1: The ten clusters, their size and status, making up the nominated site

Rock City	Area (km²)	Boundary (km)	Status
Hrubá Skála	4.23	10.18	Nature Reserve
Apolena	0.28	4.20	Nature Reserve
Přihrazské Skály	5.01	18.99	Nature Reserve
Údolí Plakánek	0.81	11.32	Nature Reserve
Kozlov	0.45	3.12	National Nature Monument
Suché Skály	0.13	2.22	National Nature Monument
Prachovské Skály	0.40	7.50	Nature Reserve
Klcočské a Betlémské Skály	2.09	10.77	Nature Reserve
Sokol	0.95	7.41	Nature Reserve (part)
Kozákov	0.70	3.62	National Nature Monument
Total Area RCBP:	17.05 km²		

Table 2: Size of the Bohemian Paradise Protected Landscape Area

BPPLA	Area (km²)	Boundary (km)
North	34.45	52.35
South	124.26	61.74
East	22.82	26.62
Total Area BPPLA:	181.52 km²	

The RCBP cluster sites are well-forested landscapes of thick, vertically jointed quartzitic sandstone strata, once a plateau, rising above rolling agricultural countryside. The plateau is now deeply dissected, broken and eroded into isolated outcrops of escarpment cliffs, columns and towers, spiny ridges, canyons and intricate rock formations. Among the rocks are a variety of rock, forest, meadow and wetland microhabitats. The eroded sandstone plateau is formed of Upper Cretaceous overlain by late Tertiary claystones and mudstones. These strata were later uplifted and folded, cut by a major fault, intruded by younger basaltic dykes and stocks and severely eroded along vertical rectangular jointing into the present shattered state. The resulting rock forms are highly varied, with pillars and spires, honeycomb weathering, hollows, galleries, clefts and other erosional phenomena.

Each of the nominated Rock Cities contains geomorphological variations and different erosional features, which together present a diversity of sites across the landscape linked by a common geological evolution. Hrubá Skála is the largest and most complete rock city with outcrops of columns 50-90m high, three wide canyons and a range of erosional forms. It is well forested, with some meadows and ponds. Apolena is a steep forested jumble of rock with much rhombic honeycombing. Přihrazské Skály has table hilltops, basalt dykes and the widest range of meso- and micro-relief, within well-preserved beech woods. Údolí Plakánek is a canyon with travertine outcrops floored by meadows and a lake. Kozlov is a ridge of sandstone blocks. Suché Skály is a sharp ridge above the Jizero River with walls up to 80m high. Prachovské Skály is an eroded plateau remnant with forested escarpment walls of high pillars. Klokočské a Betlémské Skály is a cuesta (escarpment) displaying a wide range of meso- and micro-relief formations. Sokol is forested calcareous sandstone containing labyrinths of rock. Kozákov is a forested mountainside escarpment. The geological and geomorphological global values of the nominated sites fall into three main streams: sedimentology and stratigraphy; morphology of rock surfaces; and brittle tectonic structures. These are discussed further in the comparative assessment below.

The climate is cool temperate continental, varying a little with altitude. Average annual temperatures range from below 5°C in winter to around 20°C in summer. The average annual rainfall is about 500-700mm.

The nominated area is primarily forest, the dominant species being European beech and a pine-oak association, and lies within the Middle European Forests biome. However, while the RCBP contain important original remnant vegetation, including some larger areas of original forest, most of the conifer forests surrounding the sandstone formations have been planted and maintained historically as commercial plantations of introduced spruce and pine. Almost 1,000 species of vascular plants have been recorded and the area is especially notable for ferns and orchids. Cold shaded ravines in several sites shelter mountain species such as the rare Killarney fern. There are ponds and marshy meadows with ash and alder, and many sedge species. Red campion is noted in the Plakánek valley and giant horsetail in Hrubá Skála.

In terms of fauna, Hrubá Skála has beech marten, wintering lesser horseshoe bat (Vulnerable - VU) and many invertebrates. The caves of Apolena shelter ten species of bats, including the western barbastelle (VU). European otter (VU) and Bechstein's bat (VU) also occur in the nominated area. Invertebrate species are plentiful but not well known. Birds recorded include grey heron, black stork, white stork, white-tailed eagle, honey buzzard, kestrel, crane, European eagle owl and corncrake (VU).

3. COMPARISON WITH OTHER AREAS

The RCBP have been nominated on all four natural World Heritage criteria. The emphasis of the nomination is on values relevant to criterion (i), based on a claim for outstanding values of the site's combined geological and geomorphological features, occurring within a temperate climatic context.

A comparative analysis was presented by the State Party in the nomination document, but does not adequately compare the RCBP to other international sites. The State Party was advised accordingly and additional information on the global significance of the area was provided, including additional scientific references and a comparison with 13 'Related Sandstone Areas of the World' as follows:

- Bohemian/Saxonian Switzerland National Park, Czech Republic/Germany
- Wulingyuan Scenic and Historic Interest Area, China (WH site, criterion iii)
- Greater Blue Mountains, Australia (WH site, criteria ii and iv)
- High Weald, England
- Meteora Group of Monasteries, Greece (WH site, criterion iii)
- Tassili n'Ajjer, Algeria (WH site , criteria ii and iii)
- Zion National Park, USA
- Arches National Park, USA
- Canyonlands National Park, USA
- Mesa Verde, USA (WH site, criteria C iii)
- Colorado National Monument, USA
- Canaima National Park, Venezuela (WH site, criteria i,ii,iii and iv)
- Jameson Land, Greenland.

The additional information seeks to demonstrate that the site is unique in terms of: sedimentology and stratigraphy, morphology of rock surfaces and brittle tectonic structures. Various evidence is advanced in support of this claim, though much of it is somewhat technical in nature and deals with relatively refined distinctions. Studies on the site are limited and neither its geomorphological or geological values are well known at an international level. It is thus difficult to substantiate the claims that are made for the nominated site in relation to other sandstone landscapes, or the sedimentary features within the sandstones.

In relation to the claim for importance under category (i), the main values ascribed to the site relate to the exposure of Cretaceous sandstones, and in particular, the three-dimensional exposures that allow the sedimentary bodies to be studied in detail. These are claimed as the 'best outcrops of coarse detrital sediments of Late Cretaceous age in Europe'. Whilst this clearly represents at least a national, and probably regional level of scientific interest, these values are of a specialised nature, and insufficient to be regarded as of outstanding universal value.

In relation to the site's geomorphological values, the site is advanced with regard to the diversity and quality of its erosional landforms, and it is suggested that, in particular, 'the diversity of microforms of sandstone relief is not paralleled elsewhere in the world'. There are a number of sites on the World Heritage List against which the site can be compared, and others have also been identified by reviewers. The site is assessed of lesser significance than Purnululu National Park in Australia, and Meteora in Greece; it is also much smaller in both scale and relief than the Wulingyuan Scenic and Historic Area in China (the latter two inscribed under natural criterion iii). Other sandstone sites in the world, such as Zion National Park, USA, and a number of other sites in China have more significant geomorphological values. The claim in relation to the diversity of microforms of sandstone relief would require considerable scrutiny to establish, but in principle is considered too specialised an interest to be the basis for World Heritage listing in its own right.

On the basis of comparative analysis, and noting the limited scientific attention to both the geomorphological and geological aspects of the RCBP nomination, it is considered that it is of regional importance in relation to earth science values.

In respect to criteria (ii) and (iv), which relate to ecological processes and biodiversity, the RCBP lie within the Middle European Forest biogeographical province. At present only three other World Heritage sites are found within this province: the transboundary Belovezhskaya Pushcha National Park (BPNP) in Belarus (with Bialowieza Forest in Poland, which falls within the Boreonemoral biogeographical province); the Caves of Aggtelek and Slovak Karst in Hungary and Slovakia (however, in this case it is only the subterranean elements that are listed); and the Srebarna Nature Reserve in Bulgaria, which is a wetland site. Although the RCBP contain valuable ecosystems and biological processes at national and sub-regional levels, they are not unique to the nominated sites nor are they on sufficient scale relative to, for example, the 876 km² BPNP with its diverse fauna of endangered species (bison, wolf, etc) and large tracts of ancient forest; this is the case even though the BPNP itself was not inscribed under Criterion (ii). The combined Belovezhskaya Pushcha-Bialowieza Forest has 25 forest associations, 725 vascular plants, over 3,000 fungi species, 277 lichen species, 200 mosses, 54 mammal species, 120 species of breeding birds and over 9,000 insect species. A higher faunal diversity and/or number of endemic and endangered species are also found in other European World Heritage sites, for example: Pirin National Park, Bulgaria and Plitvice Lakes National Park, Croatia. Similar comparisons can be made with World Heritage sites in China and Australia, although the biogeographical provinces and biota are different.

The small area of the nominated sites (ranging from 0.13 to 4.23 km²), and the close proximity - and intermingling - of surrounding plantation forests of non-endemic species with the remnant natural ecosystems, mean that the ecological and biodiversity values represented at RCBP are limited to national and sub-regional levels.

In respect of criterion (iii), concerning natural beauty, the towers, ridges, canyons and forests of the RCBP present a striking landscape, rising from the undulating rural terrain of the northern Czech Republic. They are impressive at national and European levels. Much of the landscape value of the area can only be appreciated from within the intricate network of canyons in the larger sites and the views from vantage points among the eroded towers across the surrounding landscape of the BPPLA. In Europe, the only comparable area is Meteora in Greece, which is very similar in geomorphological and geological aspects - although, in terms of landscape impact, Meteora commands a more impressive sight, accentuated by its dramatically positioned monasteries. However, at the global level, other sandstone sites, including Purnululu National Park in Australia, Wulingyuan Scenic and Historic Interest Area and Three Parallel Rivers Protected Areas of Yunnan in China, and the Zion, Arches and Canyonlands National Parks in the USA, have greater scale and more outstanding landscape values. In terms of the aesthetic attributes of the associated habitats, the small areas - even combined at the landscape scale - do not compare therefore with these other sites.

4. INTEGRITY

4.1 Legal Status

The ten RCBP sites are legally designated as seven Nature Reserves and three National Nature Monuments, and the expanded BPPLA buffer zone was designated in 2002. The different parts of the nominated site have been protected through a range of designations and legal instruments, commencing with the designation of Prachovske Skaly as a nature reserve in 1933.

These legal instruments, in conjunction with other relevant national Acts such as the Environmental Impact Assessment Act, provide adequate protection for the RCBP and the BPPLA. The overarching administrative authority is the Administration of the BPPLA, under the Ministry of Environment. The Administration imposes penalties for illegal activities, issues decrees designating nature reserves and monuments and undertakes management planning. In addition, three regional councils and three district councils have management authority under Act No. 114/1992 on Nature and Landscape Protection, in particular over activities such as tree cutting and the maintenance of roads and public footpaths.

Land ownership is complex. About 50% of the RCBP and BPPLA area is State-owned, 30% is owned by municipalities (Sokol and Suché Skály) and 10% is privately owned (Prachovské Skály and Údolí Plakánek). The remaining 10% of holdings are the property of hundreds of small landowners, but these are all within the BPPLA buffer zone.

4.2 Management

In terms of overall management capacity, the RCBP/BPPLA is one of the most important environmental and tourist regions in the Czech Republic and has the support of national, regional and district levels of government. The BPPLA Administration has ten professional staff with qualifications in geology, botany, zoology, landscape architecture, forestry, agriculture, environmental education and economics. However, it currently has only one ranger, relying on twenty voluntary guards to ensure adherence to Act No. 114/1992 - mainly in the tourist season. The nomination document notes that the number of professional guards will be increased to four. Land owners are obliged to maintain their property on the basis of approved plans. Owners and municipalities regularly clean their respective areas and the RCBP sites.

A management plan was prepared in 2002 for implementation during the period 2003-2012. This plan divides the protected landscape area into four zones (with a decreasing scale of protection: IUCN Categories I-IV). Other relevant plans include the 1996 *Territorial-Technical Document for the National and Regional System of Ecological Stability of the Czech Republic*, and forest management plans and guidelines. Finance for management is provided through various programmes, including the State Environment Fund of the Czech Republic, River System Revitalisation Programme and the Landscape Management Programme administered by the Ministry of Environment. In 2001 expenditure on the BPPLA and RCBP was 14,450,000 CZK (≈ US\$552,000 at 2003 exchange rates).

4.3 Boundaries

The boundaries of the nominated sites closely follow the extent of the rock formations, resulting in long and complex boundaries for six of the sites, relative to their size. This is ameliorated to some extent by the surrounding Level I and II zonation of the BPPLA buffer zone at a number of the sites. However, some sites, notably Prihrazské Skály, Apolena and Prachovské Skály have much of their boundaries directly abutting Zone IV (i.e. category IV protected area). This need not be of concern provided that adequate management controls are consistently applied in the protected landscape. However, the delineation of the boundaries highlights that conservation is focussed on the geological formations as natural monuments. From an ecological perspective, the small size of the sites, their relative isolation in a modified landscape and the prevalence of plantation forests surrounding, and extending into, the Rock Cities is quite inappropriate for natural ecosystem conservation. The boundaries are therefore adequate to protect only the values that have been nominated under Criterion (i).

4.4 Human Impact

As noted, the RCBP exist as islands in a humanised rural landscape. They have been affected over the centuries by human occupation and modification through hunting, logging and plantation forestry, creation of ponds for water supply and fisheries and, within the buffer zone, mining of glass sands and gravel. The nominated sites themselves have few inhabitants while approximately 8,000 people live in the buffer zone.

Many of the adverse impacts are historical, and arise largely outside the nominated areas; the BPPLA management plan aims to redress them. The RCBP have traditionally been a centre of tourism and outdoor activities, especially since the 19th century, and the area receives thousands of national and international visitors every year, contributing to the regional economy. A survey undertaken by the BPPLA Administration in 2001 showed daily visitor numbers of nearly 13,000 in June and almost 22,000 in July. The larger sites of Hrubá Skála and Prachovské Skály, and Udolí Plakánek, were the most popular.

Within the nominated areas, tourism and recreation activities, including rock climbing, have been intensifying and require careful management. The BPPLA Administration, in consultation with stakeholders, has been implementing management activities, including closing access paths and rock faces and restoring eroded areas. Climbers come from throughout Europe and beyond to climb the rock formations. An agreement has been reached between the Administration and the Czech Mountaineering Federation on guidelines for climbing activities in the RCBP. A programme for sustainable tourism development has also been prepared by the Bohemian Paradise Association.

Some formations at a number of sites suffer from graffiti engraving into the sandstone (some have historic significance, being engraved by 18th-19th century explorers and notable visitors, such as Goethe). This is a worldwide problem that occurs in all conservation areas containing soft rock formations that are publicly accessible. Although difficult to control, it is important that rock faces are protected from this kind of degradation, as the impacts are cumulative, cause permanent damage and detract from the natural value of the sites. The solution lies in a more effective management enforcement presence and improved public education and awareness. The appointment of additional full time ranger staff is essential.

4.5 Other Management Issues

Generally, visitor infrastructure is adequate but many walkways, steps and railings need upgrading to a uniform standard of safety and aesthetic presentation. A number of these existing facilities are old, especially at the most prominent viewing points, and form intrusive elements in the natural landscape. Some of the sites have good interpretative information, while many do not. There needs to be a consistent approach in dealing with all sites.

5. ADDITIONAL COMMENTS

The landscape that exists today, and the elements within it, is the outcome of thousands of years of human interaction with, and modification of, the natural environment. Consequently, the RCBP and the surrounding BPPLA also have high cultural heritage and social values spanning several thousand years. The rock formations formed natural refuges: Palaeolithic tools, Neolithic cave settlements, and Bronze Age forts have been found, and occupation by Iron Age Celtic tribes has been proven. In the 6th century Slavic tribes settled in the area. Medieval border castles were built on some of the cliffs, and forests and fishponds established. In the 15th-17th centuries Renaissance hunting lodges developed into country houses, and villages took their present form. In the 19th century rich businessmen laid out romantic prospects and created plantations of pine and spruce. Tourism developed, spas were created and in the 1870s, the name the "Bohemian Paradise" was adopted. The area has been an important element in national art and literature, and has important cultural aspects.

Justification for Serial Approach

When IUCN evaluates a serial nomination it asks the following questions:

a) What is the justification for the serial approach?

The RCBP nomination is comprised of ten individual sites that together represent particular processes in the evolution of sandstone phenomena, and in relation to Cretaceous sedimentology. Individually, each site displays subtly different geological and geomorphological formations and processes that fit within the overall framework. The remnant natural vegetation communities and ecosystems associated with these sites combine to display a range of habitat types characteristic of the underlying geology, soils and hydrology found within the region. The whole site as nominated is therefore distinctly more than the sum of the parts.

b) Are the separate elements of the site functionally linked?

Each of the sites in the RCBP nomination evolved in similar climatic and geological conditions and there is therefore evidence of strong functional linkage across the landscape associated to the nominated site.

c) Is there an overall management framework for all the units?

As noted in section 4, point 4.2, a management plan exist for guiding the overall management of all units forming the nominated site. This plan is under implementation and it is funded through different national programmes.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Rock Cities of the Bohemian Paradise have been nominated under all four natural criteria.

Criterion (i): Earth's history and geological features

The RCBP contain a diverse range of interesting and important geomorphological features resulting from the erosion of sandstone, including towers, needles, ridges, canyons, caves and other large-scale phenomena dispersed across the landscape. The scale of these features is markedly less than those within sites already inscribed on the World Heritage List, as well as a number of other well-known examples elsewhere in the world. The level of study of the nominated site is limited, and neither its geology nor its geomorphology has attracted significant international attention. The site is of regional significance in relation to its geomorphology, and national / regional significance in relation to its geology. IUCN, therefore, considers that the nominated site does not meet this criterion.

Criterion (ii): Ecological processes

The RCBP contain excellent examples of ecosystems developed in association with the underlying geology and sandstone geomorphology, with variations in species and biological processes relating to specific formations and micro-climates, such as canyons, caves and the summits of outcrops. However, although important at national and regional levels, the sites are not outstanding in a global context. The small scale of the remnant natural ecosystems is further compromised by the proximity, and integration, with modified and man-made forest ecosystems. IUCN considers that the nominated site does not meet this criterion.

Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance

The towers, ridges, canyons and forests of the RCBP comprise a striking and beautiful landscape at the national and European levels. However, at the global level they do not compare to a number of other listed and unlisted sites that are considered outstanding in their scale and presentation of sandstone phenomena and forest and wetland landscapes. IUCN considers that the nominated site does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

While important at national and regional levels, the RCBP do not compare at the global level with a number of other sites for conservation of significant biodiversity and threatened species. IUCN considers that the nominated site does not meet this criterion.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee **not to inscribe** the Rock Cities of the Bohemian Paradise on the World Heritage List under natural criteria.

IUCN recognises that the RCBP represent a regionally important series of earth science sites that deserve greater scientific recognition than they have attracted to date. IUCN considers such recognition should be considered through the emerging Geoparks initiative, supported by UNESCO and international earth science unions.

IUCN also recognises that the site possesses significant values as both an associative and an organically evolving landscape, as noted in section 5 above. Although the lead for cultural landscapes lies with ICOMOS, IUCN believes that these values may support the nomination of a representative area within the BPPLA as a cultural landscape World Heritage Site.

IUCN also recommends that the State Party critically examine the options for recognition under the Man and Biosphere Programme of UNESCO, and, if not already proposed, the possible future protection of the area within the Natura 2000 series.

IUCN notes that there are number of management issues in relation to the site that need to be addressed, and urges the State Party to:

- 1) enhance the level of ranger staff within the BPPLA, in particular to address threats arising from visitor pressure on the area; and
- 2) renew, and raise to consistent standards, the visitor and interpretative facilities available within the area.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

ILULISSAT ICEFJORD (DENMARK) ID N°: 1149

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet** : 1 reference (Bibliography in nomination includes 267 references)
- ii) **Additional Literature Consulted:** Born, E.W. and Bocher, J. 2001. **The Ecology of Greenland**. Ministry of Environment. Nuuk. 429p.; Hansen, Kjeld.2002. **A Farewell to Greenland's Wildlife**. Copenhagen. 154p.; Nowlan, L. 2001. **Arctic Legal Regime for Environmental Protection**. IUCN Environmental Policy and Law Paper 44; Nordic Council of Ministers. 1996. **The Nordic Arctic Environment-Unspoilt, Exploited, Polluted?**; AMAP. 1997. **Arctic Pollution Issues**. Oslo; CAFF. 2002. **Protected Areas of the Arctic-Conserving a Full Range of Values**. Ottawa; CAFF. 1994. **Protected Areas in the Circumpolar Arctic**. Directorate for Nature Management, Norway; Nordic Council of Ministers. 1999. **Nordic Action Plan to Protect the Natural Environment and Cultural Heritage of the Arctic**. Oslo. 95p.; IUCN. 2003. **Global Strategy for Geological World Heritage sites**. Draft.
- iii) **Consultations:** 8 external reviewers contacted. Government officials from Ilulissat, Nuuk and Copenhagen. Staff of Geological Survey of Denmark and Greenland.
- iv) **Field Visit:** Jim Thorsell, August, 2003.

2. SUMMARY OF NATURAL VALUES

Ilulissat Icefjord is located within the Arctic Circle on the west coast of Greenland in the bay of Disko Bugt (bight) in the Municipality of Ilulissat. The size of the site is 4,024 km², comprising 3,199 km² of glacier ice, 397 km² of land, 386 km² of fjord and 42 km² of lakes. The Ilulissat Icefjord is a tidewater ice-stream which drains into the bay of Disko Bugt, which is partially blocked by the large island of Disko. The Icefjord (locally called Kangia) is the sea mouth of Sermeq Kujalleq, one of the few glaciers through which the ice of the Greenland ice cap reaches the sea. It is the most prolific and second 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. Surrounding geology includes heavily glaciated Precambrian gneiss and amphibolite rocks extending some 50 km inland to the ice cap with flanking lateral moraines and ice-dammed lakes. Also common are glacial striations, roches moutonnées, and perched erratics typical of glaciated landscapes.

The Greenland ice cap is the only remnant in the Northern Hemisphere of the continental ice sheets from the Quaternary Ice Age. The ice cap 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 cap's oldest ice is estimated to be 250,000 years old, maintained by an annual accumulation of snow matched by loss through calving and melting at the margins. The ice cap 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. This ended around 11,550 years ago, since when the climate has been more stable. Around Ilulissat Icefjord, the evidence of glaciation is mainly from the last 100,000 years. This culminated in the "Little Ice Age" 500–100 years ago when the ice expanded in pulses to a maximum during the 19th century. A glacial recession has occurred during the 20th century. In 1851 the ice front across the fjord was 25 km east of the sea. By 1950 it had retreated some 26 km further east.

Sermeq Kujalleq is a river of crevassed ice with a catchment area of about 6.5% of the Greenland ice cap (~110,000 sq. km). The ice stream is a narrow well-defined channel approximately 3-6 km wide. It stretches from the nose of the glacier to the 1,200m contour (about 80–85 km inland) which is just below the point where ice accumulation is balanced by ablation. Near the ice sheet, it has a hummocky smooth surface with relatively few crevasses. The extensive summer melt is drained by large meltwater rivers often running in deep canyons and disappearing through moulins (glacial holes) into a sub-glacial drainage system sometimes termed ice karst. 50 km from the glacier front the ice becomes increasingly rugged; lakes and water-filled crevasses disappear. Marginal crevasses extend 5 km or more to each side of the ice stream. About 45 km inland from the front, the surface funnels towards the main outlet. At the grounding line the glacier is consistently moving at the unusually fast rate of 19m a day or about 7 km a year.

The calving front of the glacier has an average height of 80m while the mean ice thickness in the fjord is approximately 700m. The outermost 10km of the glacier is mostly a floating mass of ice. The floating part of the glacier moves up and down with the tide, with a maximum range of 3m, decreasing towards the grounding zone. This tidal variation results in a diurnal fluctuation of the grounding line, and ice-quake activity, varying in intensity with the tidal cycle, can be felt up-glacier about 8 km from the glacier front. The fjord is frozen solid in winter and covered with floating brash and massive ice in summer. The annual calving through Ilulissat Icefjord of over 40 cu. km of ice is 10% of the production of the Greenland ice cap and more than any other glacier outside Antarctica. Occasionally, large tabular icebergs of up to 0.4 cu. km break off. Calving is continuous and one estimate of the calving rate is around 35 cu. km a year. Generally bergs take 12 to 15 months to push through the ice-brash cover of the fjord and if sufficiently deep, accumulate over a sill in the bedrock at the fjord mouth until pushed or floated off. They are extremely variable in size and shape from small pieces to mountains of ice more than 100m above sea level, often with pointed peaks. The whitish ice is often cut by bands of transparent bluish ice formed by the freezing of melt water in the marginal crevasses. Once at sea, the icebergs travel both south and north of Disko Island before entering Davis Strait between Greenland and Canada where they are first carried north by the West Greenland Current, then towards Canada, and finally southwards with the Baffin and Labrador Currents, many not melting before they reach latitude 40°N.

As Ilulissat Icefjord is located 250km north of the Arctic Circle, the climate is characterised by sunless winters and nightless summers only two to three months long. The main plant communities of the area are heath, fell-field, snow-patch, herb-slope, willow-scrub, fen, river-bank, seashore and aquatic. 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. Twenty species of fish have been recorded in the area, the dominant species being the flatfish Greenland halibut. Sea birds are common in the area, with numerous breeding colonies of fulmars and gulls attracted by the high primary productivity of the glacier front and by fish discarded by the local fishery. Land birds include several species of geese, snow buntings, rock ptarmigan and Peregrine falcon. Land mammals are few with arctic hare and arctic fox common. Several important archaeological sites are found in the area.

3. COMPARISON WITH OTHER AREAS

Only one natural World Heritage site is found north of the Arctic Circle – Laponian Area in Sweden. Although this site contains many small remnant valley glaciers, it is primarily a vegetated mountain and plains landscape. There are no sites in the Greenland Tundra Biogeographical Realm. 17 sites on the World Heritage List contain glaciers, all of which are valley glaciers, while Ilulissat emanates from and contains part of an ice sheet. Indeed, the Greenland ice sheet is the only remnant in the Northern Hemisphere of the continental ice sheets of the Quaternary Ice Age. Several existing World Heritage sites encompass fjords, notably the St Elias mountain complex (which contains tidewater glaciers) in USA/Canada, Gros Morne National Park in Canada, and Te Wahipounamu - SW New Zealand. However, Ilulissat is an icefjord totally covered by calving ice from the Greenland ice sheet. The most comparable protected area in the arctic is the Northeast Greenland National Park, which is

much larger in size and features include fjords and ice streams but none is as active or has such high volume and velocity as that displayed at Ilulissat. Major glaciers also occur in Svalbard and Iceland but none is similar to the ice stream and icecap in Ilulissat. In Norway two fjord landscapes are being considered for nomination but glaciers are not present in either area.

The 1.7 million km² Greenland ice sheet is substantially smaller in size than the Antarctic ice sheet at 13.5 million km². The climatic regimes are also different with substantial surface melting in Greenland due to its warmer low arctic temperatures. Glacial ice in the Antarctic is much older - 700,000 years - compared to 250,000 in Greenland. The velocity and mode of discharge of ice in Antarctica is much different, being relatively slow with discharges mostly made onto surrounding ice shelves rather than continuously into fjords as seen in Ilulissat. Eight ice streams do exist in Antarctica, six of which have greater discharges (up to twice that of Ilulissat), mostly in the form of sudden calving events and with much slower annual velocities. Apart from the legal constraint of applying the World Heritage Convention in the Antarctic, no large protected areas exist on that continent.

One other site in the arctic region which has been nominated for World Heritage status is Wrangel Island Reserve in the East Siberian Sea of the Russian Federation. Wrangel Island was, however, not glaciated during the last ice age and is largely covered by tundra vegetation. Its values are primarily biological, based on its diverse wildlife population. There is thus no similarity between Wrangel Island and Ilulissat.

In summary, the Ilulissat Icefjord is the pre-eminent glacier in the northern hemisphere in terms of the annual volume of ice it produces (equivalent to 10% of the Greenland ice sheet production) and the high velocity at which the ice discharges into the sea (7 km per year). Its other distinctive characteristic is the intensive erosion caused by the ice stream which is greater than any other and provides the world's most outstanding example of large-scale valley and fjord forming processes. The dramatic setting of the Icefjord with its continuous active movement is a natural phenomenon not found to this extent elsewhere.

4. INTEGRITY

4.1 Legislation

The nominated area is protected and conserved by an established framework of government legislation and protective designations and by local planning policies. The principal of these legislative measures is the 1980 Nature Conservation Act for Greenland. This act is the foundation framework for the protection of species, ecosystems and protected areas, although a new Act is now being prepared. Ilulissat itself is protected under the Greenland Home Rule Executive Order of March, 2003, and by the management plan adopted by the Municipal Council in 2002. A strong point in this Executive Order is its prohibition of any mining in the protected area. IUCN finds the legal basis satisfactory but feels the management plan will need to be revised in the near future if pressures from tourism and resource harvesting continue to grow.

4.2 Boundaries

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 icecap, 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.

4.3 Management

Along with climatic limitations and the fact that no roads exist in the site, the area's physical features retain a high degree of natural integrity. There is extensive hunting and fishing,

however, which occurs in a portion of the site and many biological resources have been diminished (particularly nesting seabirds) through over-harvesting. As the site is not being nominated for its living resources, these concerns may seem peripheral to this evaluation but nevertheless are part of the natural attraction of the area and should be closely monitored.

The site itself is managed cooperatively by a Board consisting of representatives from the Ministry of Environment and Nature and the Municipality of Ilulissat. Relevant authorities from Denmark are involved on an advisory basis and attend the annual Board meeting. The Municipality is responsible for day to day site management and will soon hire a full time site manager. Additional staff within the Municipality are involved on a part-time basis as are Game Rangers from the Greenland government who control fishing and hunting along the coast.

IUCN's concerns over management relate to tourism and the need to update the management plan (currently valid until 2007) in light of its possible inscription on the World Heritage List. As tourist numbers are expected to grow from their current level of 10,600 visitors per year, more attention will be required to ensure that impacts are minimized. This includes the use of helicopters to access the region which will need some flight path restrictions as well as careful monitoring of the operation of the planned tourism cabins within the site. A visitor centre is also planned and, wisely, its location will be within the town of Ilulissat rather than on the edge of the site itself. Recognising Ilulissat's status as a protected area is recent and it would be useful, therefore, to request a monitoring report on implementation of the management plan in 3 years time (assuming the site is inscribed).

5. ADDITIONAL INFORMATION

5.1 Scientific Research

Scientific research over 150 years has made Ilulissat Icefjord and surrounds one of the best observed ice-streams in the world. 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 18th century onwards, the Icefjord interested many scholars who noted its fluctuations over the years. Study, especially over the last 10-20 years using aerial photography, core drilling, deep radar sounding and satellite monitoring, has 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. With the concern over monitoring global climate change, Ilulissat will have much to offer in future as well. Research into the fauna found within the site's locality has, however, been far less. Finally, understanding the area's 4500 years of human history, evident in the archaeological sites, has illustrated the interplay between glacial movements and human migration.

5.2 Nomination Document

The nomination document as presented by the Danish and Greenland Home Rule governments is very thorough and provides an excellent introduction to modern glaciology and the current understanding of the recovery of the Quaternary glaciation. The authorities should be commended for preparing one of the better examples of a natural World Heritage nomination.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Ilulissat Icefjord has been nominated under natural criteria (i) and (iii).

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

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 (19m per day) and most active in the world. Its annual calving of over 35 cu. km of ice accounts for 10% of the production of all Greenland calf ice, more than any other glacier outside Antarctica. 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-cap glaciology, climate change and related geomorphic processes. IUCN considers that the nominated site meets this criterion.

Criterion (iii) Superlative natural phenomena, scenic beauty

The combination of a huge ice sheet and a fast moving glacial ice-stream calving into a fjord covered by icebergs is a phenomenon only 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. IUCN considers that the nominated site meets this criterion.

The nomination fulfills the relevant Conditions of Integrity and the site is under no serious threat.

7. RECOMMENDATION

IUCN recommends that the World Heritage Committee **inscribe** the Ilulissat Icefjord on the World Heritage List under natural criteria (i) and (iii).

IUCN also suggests that the Committee recommend the authorities to revise the management plan to better take into account the growing pressures from tourism and to focus more attention on the biological resources of the site. Specific issues that should be taken into account include:

- ensuring that hunting, fishing and tourism activities are undertaken using principles of sustainability and environmental capacity, and
- formulating and implementing a zoning plan to define tourism limits.

A monitoring report on progress achieved should be requested for 2007.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

ILHAS SELVAGENS (PORTUGAL) ID No 1151

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 2 references
- ii) **Additional literature consulted:** Bannerman, D.A. 1963. **Birds of the Atlantic Islands** vol.1, Edinburgh; Costa Neves, H. 1995. **Analysis of the vegetation of Ilhéu de Fora, Selvagens Islands** Bol. Mus. Mun. Funchal Sup. no. 4: 505-510; Davis, S. D., Heywood, V. H. and Hamilton, A. C., eds. 1994. **Centres of Plant Diversity: A guide and strategy for their conservation**. Volume 1: Europe, Africa, South West Asia and the Middle East. Oxford University Press; Francisco-Ortega, J et al. 1995. **Genetic Divergence among Mediterranean and Macaronesian genera of the subtribe Chrysantheminae (Asteraceae)**, American Journal of Botany, 82 (10): 1321-1328.; Heath, M. F. and Evans, M. I. et al, eds. 2000. **Important Bird Areas in Europe: Priority sites for conservation**. Volume 2: Southern Europe. BirdLife International; Parque Natural da Madeira. **Annual Reports of the Selvagens Islands Nature Reserve, European Diploma Series Nr.36**. for the years 1994 to 2002; Stattersfield, A.J. et al. 1998. **Endemic Bird Areas of the World**. Cambridge; Tucker, G.M. and Heath, M.F. 1994. **Birds in Europe: their conservation status** Cambridge; Zino, P.A. 1971. **The breeding of Cory's Shearwater (Calonectris diomedea) on the Salvage Islands**. Ibis 113. pp 212-217.
- iii) **Consultations:** 2 external reviewers. Experts from the Ministry of the Environment and Natural Resources; Parque Natural da Madeira; Council for the Environment, Education and Science, Funchal City Council; Natural History Museum, University of Madeira; Botanical Garden; Director of the Madeiran branch of SPEA (BirdLife in Portugal).
- iv) **Field Visit:** John O'Sullivan, September, 2003.

2. SUMMARY OF NATURAL VALUES

The nominated site, Ilhas Selvagens (IS), lies in the eastern Atlantic, west of the North African mainland, some 160 miles to the south-east of the island of Madeira and 80 miles north of the island of Tenerife in the Canary Isles. The Ilhas Selvagens (or wild islands) are made up of three main islands. In decreasing order of size they are: Selvagem Grande (SG), Selvagem Pequena (SP) and Ilhéu de Fora (IF). There are also many small outlying rocks and stacks. SG is the easternmost island, with SP lying 11 miles to the south-west and IF less than one mile west again.

The nominated site consists of the entire land area of the islands and associated sea area to a depth of 50m. There is also a surrounding buffer zone, which extends to a sea-depth of 200m. Since the deep waters between SG and SP/IF do not form part of the site, the nominated area is in two physically separate parts. The details of the nominated area are set out in Table 1 below.

Table 1: Size of nominated area and buffer zone

Island	Land area (ha)	Sea area (ha)	Total nominated site (ha)	Buffer zone (ha)
Selvagem Grande	245.20	1348.68	1593.88	3245.64
Selvagem Pequena	20.00	2520.02	2548.12	2067.60
Ilhéu de Fora	8.10			
Total	273.30	3868.70	4142.00	5313.24

The islands are volcanic in origin but have been heavily eroded. SG is sheer-sided, rising to an undulating plateau of about 100m in height, with two peaks standing somewhat higher. Its volcanic origin is clear from its grey and brown basalts, and its many areas of loose and broken fragments of lava. The cliffs are much eroded, with ledges, gullies and hollows; some cliffs are vertical, but others slope more gradually to the rocky shoreline. Near the north-eastern side of the island, there is an eye-catching white plain of the sub-fossil shells of terrestrial snails. SP is low and flat, with a single, striking outcrop of weathered rock some 45m high at its centre. The majority of the island is sandy and much burrowed by seabirds. IF is low, almost flat, and sandy. Around SP and IF, in particular, low tide reveals large areas of flat rocks, and many shallow pools are formed. The islands were discovered by the Portuguese in 1438, but they are so inhospitable that they have never been inhabited for long.

All three islands are vegetated, but there are no trees, and most plants are low growing. Some alien species are present alongside the natives and endemics on SG, but the only serious invasive plant, the tree tobacco, formerly abundant, has been almost entirely removed by rigorous management. Of more than 90 species of vascular plants occurring on IS, 11 species are endemic to the islands. Two others are endemic to the Madeiran islands.

There are no native terrestrial mammals on the islands. Three species, introduced only to SG, have been controlled. Goats were hunted to extinction many years ago, more recently the rabbit has been eliminated, and an intensive campaign against the house mouse appears also to have been successful.

The seabirds are the most obvious natural features of the site. There are at least 15,000 pairs of White-faced Storm-petrel and some 14,000 pairs of Cory's Shearwater and, interestingly, this bird comes to its nest in broad daylight at the site, which it is not known to do elsewhere in the world. The population of Cory's Shearwater is still recovering from the time when it was exploited, and might again reach the 30,000 pairs estimated in former times. Other seabird species present in large numbers include Little Shearwater (perhaps 2700 pairs), Bulwer's Petrel (4000 pairs) and Madeiran Storm-petrel (1500 pairs). All of these have an extremely limited distribution in Europe. Amongst the land birds of the site, the most notable is Berthelot's Pipit, a species endemic to Macaronesia. There is also an endemic subspecies of gecko.

Amongst the terrestrial arthropod fauna, some 32 taxa, including spiders, a moth and no fewer than 20 beetles are endemic to the site, whether to one island, two islands or all three. A few non-native arthropod species have no doubt come with the presence of the wardens on SG and perhaps on SP; this appears unlikely on IF, whose arthropod and other fauna may well be as pristine as its flora.

The nomination is centred on terrestrial biodiversity. It is practically silent on marine life except in so far as it comments that there are relatively good populations of Mollusca which merit further scientific investigation.

3. COMPARISON WITH OTHER AREAS

There are currently 16 sites inscribed on the World Heritage List that include island ecosystems. A number of these sites are also of volcanic origin, including Galapagos National Park (Ecuador), Hawaii Volcanoes National Park (USA), Cocos Island National Park (Costa Rica), Brazilian Atlantic Islands: Fernando de Noronha - Atol das Rocas Reserves (Brazil), and Gough Island Wildlife Reserve (UK) in the South Atlantic. All these are protecting larger terrestrial island ecosystems with higher biodiversity values than those of the nominated site. The World Heritage site of St Kilda, off the Atlantic coast of the United Kingdom, also protects large colonies of seabird species. The colonies of Little Shearwater (2700 pairs), Bulwer's Petrel (4000 pairs) and Madeiran Storm-petrel (1500 pairs) on the nominated site are of lower global importance when compared with colonies of these species elsewhere in the Mediterranean/North African/Macaronesian region, notably the 50,000 pairs of Cory's Shearwater breeding in the Azores.

The nominated site can be also compared with the Cape Verde Islands, the Canaries, the Madeira group and the Azores.

Cape Verde is a very varied series of volcanic islands, but some, particularly in the east, are small, rather flat and unpopulated, inviting comparison with the nominated site, though less remote from human influence. The seabird populations share several species with the nominated site, notably the White-faced Storm-petrel and the Little Shearwater. Cape Verde also contains a number of tropical bird species which increases its biodiversity value when compared to the nominated site.

The Canary Islands share many plant species with the nominated site. The main islands of Tenerife, Gran Canaria, La Palma and La Gomera (whose laurel forest is also a World Heritage site) are all much larger than IS and contain much more diverse plant communities than those present in the nominated site. The island of El Hierro, which shares a gecko species with IS, is also larger than the nominated site and richer in relation to plant communities.

The main island of Madeira has some plant species in common with IS, but it is large, mountainous, with much freely-available water which allows for a diversity of vegetation types. It contains a well preserved area of laurel forest (itself a World Heritage site). Three small rocky islands located off the coast of the large island of Porto Santo also have populations of several seabirds comparable to those on the nominated site. The three Desertas islands to the south-east are also unpopulated; they are of volcanic origin and, as high, steep-sided islands, their structure shows some similarities to SG, though not to SP and IF. They are of great importance for seabirds, having all the species of IS, except the White-faced Storm-petrel.

The Azores too are volcanic in origin, but much larger and with far higher elevations, conditioning a great variety of ecosystems. They contain several shared seabird species, notably the Cory's Shearwater.

In summary, the nominated site in terms of biodiversity is of less value than some other isolated island groups. While the vegetation on two of the islands is pristine this also occurs in other islands such as in Atol das Rocas (Brazil) and Henderson Island (UK). The ecological processes occurring in the nominated site, characterized by isolation and extreme climatic conditions, are also common to many islands in the Atlantic and elsewhere. There are large numbers of breeding seabirds, one of which occurs only here in Europe/North Africa. However, larger colonies of these seabirds do exist on other islands worldwide. Thus, the nominated site is important at the level of the north Atlantic, but it is not globally significant.

4. INTEGRITY

4.1 Legal status

The site is the property of the Portuguese State. It has been a Strict Nature Reserve since 1971. This provides a satisfactory level of protection. The managing authority is the Secretaria Regional do Ambiente e dos Recursos Naturais, through the Parque Natural da Madeira. The site is a holder of the European Diploma for Protected Areas in recognition of the quality of its management.

4.2 Management

SG is wardened year-round by staff living in permanent, purpose-built accommodation. SP is wardened in the summer months (approximately April to October) by staff living in a small hut of wooden construction near the middle of the island. IF is uninhabited. A comprehensive Management Plan for the site has been in operation for some years. A team of nature wardens implements the Plan: there are 37 staff working for the Parque Natural – they circulate around the various Madeiran reserves, and in small teams at the two lodgings on IS. They are managed by a Head of Division of Nature Conservation who reports to the Director of the Parque Natural. Some 20 other staff are involved in the technical and administrative management of the Parque Natural. Levels of professional qualification and experience are high, the esprit de corps is excellent, and staff have close contact with the management. There is evident determination to complete management tasks, particularly the control of alien species. The budget available for managing the site is considered to be adequate. Fishing is subject to regulation within the 200m zone which coincides with the buffer zone.

4.3 Boundaries

These appear entirely appropriate, especially as the buffer zone regulations are enforced through the agency of the Portuguese Naval Authority. There is an excellent relationship between the Park authorities and the Naval Authority which supports enforcement of fisheries regulation and transports the wardens and their supplies.

4.4 Human impact

On SG, there are a few remaining signs of the previous human occupants, including stone walls, crevices in which are of value for nesting seabirds. A very small dwelling has been reconstructed mid-island for storage etc. An old water cistern has been repaired and another has been constructed. There are a few metal fragments of shells from naval gunnery of many years ago near the high point in the middle of SG. There is a lighthouse on SG and a smaller beacon on SP: both are solar-powered and require only low levels of maintenance by the Naval Authority; very little damage is apparent owing to their presence. The permanent warden's accommodation on SG appears to have had little physical impact on the natural interest of the site, and the wooden accommodation on SP scarcely more so. Both lodgings are clearly well maintained. Electricity for lights, two-way radio etc. is from solar panels; bottled gas is used for cooking and refrigeration. Rubbish is burnt or removed from the site. Management requirements have meant the creation and maintenance of access routes across or around all three islands: these are minimal on SP and only on the rocks of IF, but more extensive on SG, where access for quad-bikes has been necessary. The damage caused by these routes is greatly outweighed by the beneficial management enabled.

There is little impact from the small number of tourists, who require permission to land and are strictly managed by the wardening staff while ashore. There appears to be no pressure from tourism development interests to increase visitor numbers to these remote islands. However, a growing number of "green" tourists may wish to visit in the future. If this happens, a well-defined protocol or visitor management plan to control their numbers and activities would be beneficial. Occasionally, during calm periods in the winter when the warden's station on SP is unmanned, some private ocean-going vessels do manage to get ashore onto the smaller islands, in the absence of permission or guidance. Visits by fishermen, again to the smaller islands in the winter season, are somewhat more worrying, and may cause

localised damage, for instance by collapsing the burrows of seabirds and through the illegal removal of late-developing young shearwaters as well as molluscs.

In common with other Atlantic islands, there is chronic low-level oil pollution of the shores, presumed to be from tank-washings and the like: at these levels, the oil does very little damage. Wardening staff remove much of the oil (and other rubbish, such as plastics, washed ashore). There remains the possibility of a major spill, including from ship collision. On SP the rusting remains of an Italian oil-tanker which struck the island in 1974 are still clearly visible on a northern beach and just offshore. The ship was empty or near-empty of cargo, and little damage was apparently done by lost oil; little or no oil is believed still to be present, and the wreck will eventually disappear through corrosion. There is a risk that similar incidents can occur in future.

4.5 Invasive Species

The elimination of rabbits has been a major success, and there is no risk of reintroduction of this species. Other species (for instance, Berthelot's Pipit and the gecko) do not seem to have been adversely affected by the poisoning programme, thanks to great care taken in its implementation. If mice have indeed been eliminated, this major advance will need consolidation. In particular, great care needs to be taken with the importation of goods and materials to support the wardens and the needs of management. A formal system of inspection of all items coming ashore should be considered in order to ensure that mice or any other invasive species are not inadvertently reintroduced. The threat from tree tobacco is long-lasting owing to the seed-bank (the length of viability of which is not known) and the very invasive nature of the species: continuing efforts will be needed to eliminate it, or at least to keep it to very low levels.

5. ADDITIONAL COMMENTS

The site, its flora and fauna have for some time been the subject of scientific research by individuals and academic institutions from Madeira, Portugal and elsewhere, including France, Germany, Spain and the United Kingdom.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Ilhas Selvagens have been nominated under natural criteria (ii) and (iv).

Criterion (ii): Ecological processes

The site provides an example of a largely pristine flora, with the two smaller islands having completely escaped the loss of plant species and colonisation by alien flora. However, as noted in section 3, this is not unique to this site and the islands are very small in extent, thus their pristine qualities are therefore of less value than would otherwise be the case. The three islands are an example of evolving ecological and biological processes; however, these are not exceptional when compared to other islands ecosystems. IUCN considers that the nominated site does not meet this criterion.

Criterion (iv): biodiversity and threatened species

The site contains a number of endemic species and undisturbed habitats. These features make the nominated site important in scientific and conservation terms. However, the number of species for which this site is important is relatively low and biodiversity and endemism levels found here do not compare with those at a number of other World Heritage island sites. IUCN considers that the nominated site does not meet this criterion.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee **not to inscribe** the Ilhas Selvagens on the World Heritage List. At the same time, the Committee may wish to commend the State Party and the Parque Natural da Madeira on the quality of conservation at the site. The State Party and the Parque Natural da Madeira deserve the highest praise for the excellent quality of management and their sustained commitment to the conservation of this site. In particular, the successful invasive eradication programme is an excellent example of what can be achieved.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

PRIMEVAL FORESTS OF SLOVAKIA (SLOVAKIA) ID No. 1133

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 4 References
- ii) **Additional Literature Consulted:** Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten. 1991. **Naturwaldreservate in Bayern.** München; Breymeyer, A. 1997. **Biosphere Reserves in Poland.** Polish National MAB Committee, Warszawa; Bublinec, E. & Pichler, V. 2001. **Slovak Primeval Forests - diversity and conservation.** Institute of Forest Ecology, Zvolen; Council of Europe. 1987. **Workshop on the situation and protection of ancient natural and semi-natural woodlands in Europe.** Environmental encounters series No.3, Strasbourg; European Committee for the Conservation of Nature and Natural Resources. 1986. **Inventory of natural Primeval and ancient semi-natural woodlands within the Council's member states and Finland.** Strasbourg. 3 volumes; Kargel, W. 1990. **Die Bergwelt Rumäniens.** Dresden; Leibundgut, H. 1982. **Europäische Urwälder der Bergstufe.** Bern.
- iii) **Consultations:** 6 External Reviewers. Representatives from the Faculty of Forestry / Zvolen, the Institute of Forest Ecology / Slovak Academy of Sciences (Zvolen), the headquarters of Slovak State Nature Conservancy, local staff of protected areas, local authorities and one local NGO.
- iv) **Field Visit:** Gerhard Heiss, July 2003.

2. SUMMARY OF NATURAL VALUES

The Primeval Forests of Slovakia (PFS) are made up of an area totalling 19,408ha, of which 5,688ha belong to the core zone and 13,720ha¹ to the buffer zone, and include 22 protected areas spread over the whole country. The name, location, and size of the core and buffer zones of each reserve are provided in Annex 1.

As the document was unclear whether the core and buffer zones were proposed for inscription on the World Heritage List, the State Party decided during the IUCN field visit that only the core zones would be proposed for World Heritage inscription. The buffer zones will remain under national responsibility for the appropriate protection of the proposed World Heritage site.

Reserve sizes range between 30ha (Badin Primeval Forest) and 855ha (Zadná Primeval Pol'ana Forest). Nineteen areas are smaller than 500ha (six do not exceed 100ha). Two of the sites are geographically linked; Koprová Valley I (298ha) and Koprová Valley II (415ha) form one unit of 713ha in total. The other sites are isolated patches without any biological links. Two of them are additionally split into several parts: Skalka (500ha) consists of three separate patches, and the Mengusovská and Mlynická Valleys (283ha) of two separate patches. All reserves are classified as category Ia, as per IUCN's Protected Area Classification System.

¹ The total size of the buffer zone given in the nomination paper is not correct as two core zones - Koprova Valley I and II - are located within the same buffer zone

The dominant geological substrates of the serial nomination are: andesite, which forms the bedrock of seven clusters; crystalline rocks found in six clusters; limestone/dolomite, sandstone; flysch and alluvial sediments.

Selected areas represent all forest associations of the Carpathians on Slovak territory, from lowland forest types starting at 129m in the Pannonian basin up to high mountain forest types at 1,979m in the High Tatra mountain range. The nomination paper lists 31 associations following a national classification system (the number of associations increases to 44 with application of the Zurich-Montpellier system). The most common forest type is beech forest, dominating 10 clusters of the serial nomination. Although beech forests are the dominant type in the biome of temperate broadleaf forests, primeval forest remnants of this type are extremely rare and mostly restricted to Eastern Europe. The level of naturalness of the nominated sites varies, and is very high for the beech and coniferous forest types. However, many of the sites proposed are not primeval forests in the strict sense as they have been affected by past cutting.

The nomination paper mentions the world's largest and most significant continuous population of yew. Between 200,000 and 300,000 specimens are estimated to grow on the territory of the Vel'ká Fatra National Park in which two clusters of the serial nomination are located. However, only a very limited number is concentrated within the two clusters (most noteworthy, Padva/Húkadlo Valley with 500 specimens).

A species list of all clusters exists only for vascular plants. The wide distribution of the 22 clusters on a broad range of geological substrates is responsible for a relatively high number of forest vascular plants (1,410). Two vascular endemic plants are listed in the nomination document. There is evidence, however, that the list of endemic species is not complete. It should be noted also that occurrence of endemic species is not limited exclusively to the area of the nomination. Species inventories for fungi exist for 9 clusters and 836 species are listed. The total number of fungi for all clusters is estimated at 1,500 species. The total number of lichens and mosses is estimated at 750 and 450 species, respectively.

Noteworthy species of mammals are brown bear, bison, wolf, lynx and otter. In total, 77 mammals are found in the nominated sites. Noteworthy birds are lesser spotted eagle, Ural owl, capercaillie, black stork, middle spotted woodpecker and white-backed woodpecker. In total, 162 bird species are found on the 22 sites (but only 109 are breeding in these areas). 14 amphibians and 11 reptiles occur within the primeval forest remnants; the Carpathian newt is endemic to the Carpathian range.

The richness of invertebrates in the nominated sites must be highlighted. However, the inventory for all sites includes only beetles and grasshoppers. In total, 1600 beetles are found in the clusters: noteworthy species are stag beetle, long-horned beetle, carabids, and the metallic woodborer. The list of grasshoppers includes 71 species (20% of the European grasshopper fauna). The total number of insects for all sites is estimated at 22,000 species.

3. COMPARISON WITH OTHER AREAS

Nineteen areas of the nominated site belong to the biogeographical province of Middle European Forest and three areas to the Pannonian province. The Middle European Forest province is represented by three existing World Heritage sites: the Belovezhskaya Pushcha (Belarus) component of the Belovezhskaya Pushcha / Bialowieza Forest, the Srebarna Nature Reserve in Bulgaria and the Caves of Aggtelek and Slovak Karst in Hungary and Slovakia. The Srebarna Nature Reserve represents a freshwater lake and is completely different to the PFS nomination. The transboundary site of the Caves of Aggtelek and Slovak Karst includes forests (mostly beech forests), but the criterion for inscription on the World Heritage List relates to the geological aspect of karst phenomena. The Belovezhskaya Pushcha / Bialowieza Forest represents a forest site which offers several points for comparison. It forms a continuous unit of 92,923ha with 25 forest associations, 725 vascular plants, over 3,000 fungi species, 277 lichen species, 200 mosses, 54 mammal species, 120 species of breeding birds and over 9,000 insect species. It represents the best example of

lowland forests within the biome with respect to area, and diversity of flora and fauna forest associations.

World Heritage sites with comparable aspects not only exist at the biome level but also at the realm level (Western Palearctic Realm). Plitvice Lakes in Croatia (biome of mixed mountain systems) has 29,482ha in one unit, of which 14,419ha are forests dominated by beech. Included in this area is the primeval forest (Corkova Uvala) of fir and beech. Durmitor National Park in Serbia and Montenegro (mixed mountain systems) with a continuous size of 32,000ha encloses 17,000ha of forests with a high diversity of different forest associations from 450m ascending to the treeline. The dominant tree species are beech, Scots pine, Norway pine, silver fir and dwarf mountain pine. The site contains a virgin forest of black pine. The Jungfrau-Aletsch-Bietschhorn in Switzerland (mixed mountain systems) forms one unit of 53,934ha with a stone pine forest of about 245ha (Aletschwald). The Danube Delta in Romania (biome of temperate grasslands) has 679,222ha of the largest continuous marshland in Europe with alluvial forest elements composed of English oak, white poplar, black poplar, Manna ash, narrow-leafed ash, silver lime and elm.

The IUCN global theme study of Forest Protected areas which may merit consideration for World Heritage nomination lists the Carpathian Forest Reserve and National Park in the Ukraine with about 20,000ha of primeval beech forests. However, the total extent of primeval forests in the strict sense is lower; they do not form a continuous unit and are not concentrated in the Ukraine only but stretch as well into Poland and Slovakia. The most important Ukrainian sites are the Uholkij reserve with 4,734ha (considered as the largest continuous area of beech primeval forest in Europe), the Borshawa reserve with about 8,000ha of which about 1,000ha can be considered as true primeval forest, and the Stushyzja reserve with 2,542ha within the transboundary Biosphere Reserve of the Eastern Carpathians (about 120,000ha in Poland, Slovakia and Ukraine) of which about 1,000ha may be classified as primeval forest in the strict sense. The Eastern Carpathian Biosphere Reserve includes primeval forests in Poland (size of true primeval forests unknown) and Stuzica reserve in Slovakia (761ha of strict primeval forest), the most well-known site of this Slovakian nomination.

Several other sites in Europe with a higher level of primeval authenticity, integrity and diversity should be mentioned. The Sutjeska NP in Bosnia-Herzegovina (17,250ha) encloses the 1,400ha largest primeval forest of the mixed mountain systems biome, stretching from 630m to 2360m. Besides oak-hornbeam forests, all vegetation zones of Dinarid mountains are represented there. The best example of untouched European oak forests is found in Muniellos, Spain. The reserve encloses 5542ha with an altitudinal range from 520m to 1685m. Below 1300m, Durmast oak and English oak are the dominant tree species. The Izvoarele Nerei Reserve in Romania is an area of 5000ha of natural beech forest but no information is available on whether or not it has a primeval character.

In conclusion, the main forest types offered by the nomination are either better represented in World Heritage sites containing forests of higher quality (Belovezhskaya Pushcha/Bialowieza for lowland forests, Danube Delta for alluvial forests, Virgin Komi Forests for spruce forests) or other protected areas may offer forests of higher quality in naturalness, diversity and area (Muniellos Nature Reserve for oak forests, East Carpathian Biosphere Reserve for beech forests, Sutjeska NP for beech-fir forests) on the level of the Western Palearctic Realm. The serial nomination does not exhibit outstanding higher variability and representivity.

4. INTEGRITY

4.1. Legal Status

All 22 nominated sites are designated as national nature reserves with core and buffer zones. Seven are part of national parks and another ten are included within protected landscape areas. Three were awarded the European Diploma, one is part of a Ramsar Site and six are within Biosphere Reserves.

Seven reserves which are found within national parks are managed by park staff. One reserve (Klenovský Vepor) is managed by the staff of the nearby national park (Muranska Plateau NP). The remaining fourteen reserves are managed by the authority responsible for the Protected Landscape Area.

Fourteen sites are totally owned by the State. In three reserves, a part belongs to the communities while the remainder is under State ownership. One reserve belongs totally to the municipality and private owners. Ownership rights still remain unclear for four reserves of the serial nomination. However, municipal and private landowners of the reserves concerned are obliged to comply with restrictions and measures introduced by legal norms on nature and landscape protection for which they are entitled to be compensated.

4.2. Boundaries and rationale for serial nomination

PFS is a serial nomination comprising 22 separate sites distributed all over Slovakia. The intention of the State Party was to select the best example of natural/semi-natural woodlands for all forest associations of the Carpathians occurring on the territory of Slovakia. This is a perfectly logical national approach but it does not coincide with the objectives of the World Heritage Convention for selection of unique natural sites of outstanding universal value.

All clusters of the nomination are very small and none exceed 1,000 ha. Some are subject to environmental impacts. In Koprova Valley I and II (713ha in total), natural disturbances take place every 20 years or so, in which 400ha - 1,200ha are 'destroyed' by wind-throw and subsequent bark beetle degradation. In Dobroc and Hroncecký Grún, conflicts with legal hunting of deer populations in the surrounding forests impact on the natural composition of tree species in the reserves. In Kováčovské Hills and Kasivárová, reserve management has no discernible influence on hunting regulations of exotic species like fallow deer and mouflon in surrounding forests. Several of the reserves show invasion of exotic plant species like Touch-me-not.

Integration of existing buffer zones would improve the situation for some of the clusters (Padva and Tlstá, Koprava Valley I, II and Mengusovská and Mlynická Valleys). Other sites are located within extensive artificial forests (Kasivárová, Dobroc, Hroncecký Grún, and Klenovský Vepor) and their buffer zones are too small to add significant conservation value to the nominated sites. In Europe, minimum size requirements for viable natural forest ecosystems cannot be adequately fulfilled in most cases, in particular for lowlands and hilly terrain. Therefore, selection of natural forest ecosystems under the World Heritage Convention must focus on those sites of outstanding universal value.

4.3. Management

At present, the sites are managed within the normal forest management plan of the forest district to which the site belongs. The State Nature Conservancy Council is preparing a new methodology for the management of protected sites which will be completed this year. This methodology shall be applied also for the preparation of management plans for National Nature Reserves (NNRs) in general, among them the nominated sites. The main objective of NNRs is to maintain the core zone in as undisturbed a state as possible without any regulatory management measures. In the buffer zone, regulatory management measures like selective cutting will be permitted.

A draft overall management plan for the serial nomination has been compiled from the legislative framework as well as specific management plans for each site. However, a legal ratification of the plan by the State Party does not exist at present. The objectives laid down in the draft are missing an overall justification and management perspective for the series as a whole.

Management capacity and qualification of staff are considered appropriate but the number of permanent staff for supervision is considered inadequate (in Velka Fatra NP, 4 rangers are responsible for 60,000 ha and among them the nominated clusters of Padva and Tlstá),

although a high number of volunteers and honorary members of NGOs support supervision of NNRs and the nominated clusters respectively. The budget is limited but adequate.

4.4. Human Impact

No people live within any of the nominated clusters. However, the surrounding area of some sites show high concentration of residents as given in Table 2 below.

Table 2: Number of residents living in areas surrounding nominated sites

Name	less than 1 km	1 - 3 km	3 - 5 km	5 - 10 km	Total
Horný Les	0	3,368	556	4,905	8,829
Súr	5,989	7,258	33,329	444,402	490,978
Kováčovské	1,300	0	12,870	9,911	24,081
Boky	301	1,731	2,848	52,692	57,572
Kasivárová	0	2,501	6,597	17,781	26,879
Sitno	0	337	2,349	17,521	20,207
Vtáčnik	0	0	918	35,849	36,767
Vihorlat	0	0	1,981	10,147	12,128
Havesová	0	0	589	3,050	3,639
Badin	0	372	866	95,618	96,856
Dobroc	0	0	1,253	5,451	6,704
Hroncecký Grún	0	0	0	0	0
Stuzica	0	0	337	740	1,077
Tlstá	0	0	1,913	11,224	13,137
Padva	0	0	0	2,657	2,657
Klenovský Vepor	0	0	0	9,919	9,919
Babia Hora	0	0	1,812	9,683	11,495
Pol'ana	0	93	724	26,034	26,851
Skalka	0	0	0	3,196	3,196
Koprová Valley I and II	0	0	0	5,247	5,247
Mengusovká and Mlynická Valleys	0	0	120	6,096	7,038

Access to NNRs is permitted to a limited extent on marked trails. One reserve (NNR Dobroc) is permanently closed to the public. The gathering of berries and mushrooms has had a serious impact on nominated sites of higher zones, in particular Skalka, Koprova Valley I and II. Several of the sites are well known among entomologists for their rare insect species. The nomination document notes damage by illegal insect collectors in NNRs Boky and Badin. However, illegal collection of rare insects is also known in other sites of the nomination (e.g. NNR Stuzica). A greater number of permanent rangers may prevent such illegal activities. Poaching occurs in eastern parts of Slovakia, in particular. However, contrary to general opinion, it may have a positive effect for nature conservation in some cases. Illegal hunting was the major factor which preserved natural tree composition in Stuzica and Havesová reserves from over-browsing by deer populations.

4.5. Conservation history and scientific research

Some of the nominated sites demonstrate a very long conservation and scientific research history. Kasivárová, for example, received protection in 1807. Badin and Dobroc reserves were established in 1913. Scientific research goes back to the 1930s and resumed after World War II by foreign scientists in Dobroc reserve, from which the oldest records are available. However, it should be noted that research in the beginning was focused on a very limited segment of forest ecology and conservation (biometric and dendrometric

measurements of forest trees). Sporadic ornithological inventories started in the 1960s. Periodic surveys for invertebrates started 15 years ago, and for birds 10 years ago in Dobroc reserve. At present, permanent survey plots for biometric and dendrometric measurements exist in all clusters except Vtacnik reserve, which will follow in the near future. Information and research on flora and fauna is weaker, however. Several sites are missing permanent survey plots and information on some groups of flora and fauna are scarce.

In conclusion, the different sites of the serial nomination demonstrate different levels of scientific research history and species inventories. In general, the level of scientific research is high but cannot be considered outstanding.

5. ADDITIONAL COMMENTS

When evaluating a serial nomination, IUCN asks the following questions in order to examine the justification for a serial approach:

a) What is the justification for the serial approach?

The landscape of Slovakia has been extensively modified by thousands of years of human settlement and resource use. The nominated sites display a range of forest types and biodiversity that are remnants of original vegetation – islands in a modified landscape – and present a cross section of altitudinal variation. In this respect, the serial approach is justified. However, as discussed above, the serial sites, taken together, are not considered by IUCN to be of outstanding universal value.

b) Are the separate elements of the site functionally linked?

Each of the sites in the PFS has evolved in similar climatic and geological conditions – taking into account altitudinal climatic variations. Many species overlaps occur between different units across the broad range of temperate broadleaf, conifer and mixed forest types, even though there are particular variations relating to variations in geology, rainfall, soil type and elevation. The sites are representative of a lowland-highland continuum that once characterised the Slovak landscape.

c) Is there an overall management framework for all the units?

Coordination of objectives and activities exist to some extent through the National Nature Conservancy Council (preparation of a new methodology of protected site management of NNRs). However, this coordination deals with NNRs in general. An overall management framework for the serial nomination has been prepared as a draft, but needs legal ratification. The actual draft is missing an overall management justification. Limited biological linkage of many elements of the nomination also constrains effective management.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Primeval Forests of Slovakia have been nominated under natural criteria (ii), (iii) and (iv).

Criterion (ii): Ecological processes

In general, primeval forests are very rare in Central and Southern Europe and remaining remnants are very small (less than 1,000ha). In particular, primeval beech forests which are the dominant forest type in this unit are completely missing in Western Europe. In the eastern part, a few still survive. However, the sites of the serial nomination are isolated areas, insufficient in size to protect long term ecological processes. At the biome and realm levels, there are forest areas within World Heritage sites which better meet this criterion. IUCN considers that the nominated site does not meet this criterion.

Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance

This criterion is met very rarely by forests alone. The tallest beech trees of Europe in one of the clusters are of some significance but this does not deserve to be called a superlative natural phenomena. All sites of the serial nomination are very limited in size and additional features are rather scarce. Only a few sites are located within rugged mountain relief and offer aesthetic features of local rather than international significance. IUCN considers that the nominated site does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

Among European forest types, beech forests, in particular, cannot offer a high diversity of species numbers. The PFS might offer a very high number of forest insects but on a European rather than a global scale. Species protected by the serial nomination cannot be considered of outstanding universal value. IUCN considers that the nominated site does not meet this criterion.

Integrity concerns in relation to boundaries, legal status (unclear landownership for some elements), and management (management plan not yet ratified for the serial nomination as one unit) exist. Thus, IUCN concludes that the serial nomination does not, at this stage, meet the conditions of integrity for serial sites.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee **not to inscribe** the Primeval Forests of Slovakia on the World Heritage List under natural criteria.

Some elements of the Primeval Forests of Slovakia are of importance for conservation at the European level. The State Party should be encouraged to propose additional National Nature Reserves of the serial nomination for the European Diploma and to set up a long-term plan for enlargement of most favorable clusters (e.g. Padva and Tlstá) into viable and self-sustaining ecological units. These units may also be considered for protection and cooperation under the scope of the Convention on the Carpathian Mountains.

IUCN welcomes the cooperation being developed between Slovakia, Poland and Ukraine and encourages the States Parties to work together to better conserve the remaining beech forest.

Annex 1: The name, location and size of the 22 nominated areas and buffer zones

No.	Name	Geographical Area	District	Core Zone (ha)	Buffer Zone (ha)	Coordinates
1	Horný Les	Záhorská nížina	Malacky	225.69	445.56	48 21'07"N 16 52'13"E
2	Súr	Podunajská nížina	Pezinok, Senec	250.00	738.68	48 14'13"N 14 13'56"E
3	Kováčovské Kopce	Kováčovské Hills	Nové Zámky	77.62	398.71	47 49'46"N 18 46'12"E
4	Boky	Kremnické Vrchy	Zvolen	176.49	81.40	48 33'54"N 19 01'17"E
5	Kasivárová	Stiavnické Vrchy	Zarnovica	49.80	32.46	48 28'19"N 18 46'16"E
6	Sitno	Stiavnické Vrchy	Banská Stiavnica	48.67	85.99	48 24'22"N 18 52'20"E
7	Vtáčnik	Slovenské Stredohorie Mts.	Zarnovica Prievidza	245.62	100.32	48 37'35"N 18 38'40"E
8	Havesová	Bukovské Vrchy Mts.	Snina	171.32	63.99	49 00'35"N 22 20'20"E
9	Vihorlat	Vihorlat Mts.	Humenné	53.40	32.44	48 53'30"N 22 06'50"E
10	Badín	Kremnické Vrchy	Banská Bystrica	30.03	123.43	48 41'19"N 19 03'04"E
11	Stuzica	Bukovské Vrchy	Snina	761.43	125.41	49 05'10"N 22 32'10"E
12	Dobroč	Veporské Vrchy	Brezno	103.85	100.44	48 41'01"N 19 41'03"E
13	Hrončevský Grún	Pol'ana Biosphere Reserve	Brezno	55.30	112.83	48 41'05"N 19 30'35"E
14	Klenovský Vepor	Saling Valley	Brezno Rimvaská Sobota	171.25	171.28	48 41'32"N 19 45'93"E
15	Padva	Veľká Fatra Mts.	Martin	325.46	39.30	48 53'45"N 19 01'30"E
16	Tlšť	Veľká Fatra Mts.	Martin	473.00	2,846.40	48 55'40"N 18 59'15"E
17	Zadná Pol'ana	Pol'ana	Detva Brezno Zvolen	855.49	193.74	48 38'15"N 19 29'00"E
18	Babia Hora	Western Beskyd Mts.	Námestovo	117.00	526.47	48 34'10"N 19 30'40"E
19	Skalka	Low Tatra	Brezno	500.00	2,403.40	48 54'46"N 19 31'21"E
20	Koprová Valley I	High Tatra	Poprad	298.07	2,818.64	49 09'57"N 19 59'16"E
21	Koprová Valley II	High Tatra	Poprad	414.91	(2,935.48)*	49 09'59"N 19 59'19"E
22	Mengusovská and Mlynická Valleys	High Tatra	Poprad	283.39	2,278.87	49 08'51"N 20 04'03"E
			Total area	5,688.29	13,719.76	

* The core zones of Koprová Valleys I and II lie within the same buffer zone.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

CORCOVADO NATIONAL PARK AND ISLA DEL CAÑO BIOLOGICAL RESERVE (COSTA RICA) ID N°1128

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 4 references
- ii) **Additional Literature Consulted:** Arce Guevara, Eliécer, 2002. **Formulario de Reporte de Campo, Monitoreo de Areas Silvestres Protegidas, Parque Nacional Corcovado;** Ministerio del Ambiente y Energía. Instituto Nacional de Biodiversidad, 2001. **Corredor Biológico de Osa, Fase I: Informe Final de Proyecto;** Sanchez-Azofeifa, G. Arturo, et al, Nov. 2002. **Dynamics of Tropical Deforestation Around National Parks: Remote Sensing of Forest Change on the Osa Peninsula of Costa Rica.** Mountain Research and Development, Vol. 22. No. 4.; Sistema Nacional de Areas de Conservación, 2001. **Informe Monitoreo, Areas silvestres Protegidas;** Sistema Nacional de Areas de Conservación, 2002. **Plan Anual de Trabajo, 2002, Parque Nacional Corcovado, Reserva Biológica Isala del Caño.** Ministerio del Ambiente y Energía; Torres, Hernan and de Mendoza, Luís Hurtado, Editors, 1988. **Parque Nacional Corcovado, Plan General de Manejo y Desarrollo.** Fundación de Parques Nacionales, Servicio de Parques Nacionales, Instituto de Cooperación Iberoamericana, Centro Agronómico Tropical de Investigación y Enseñanza. San José, Costa Rica. Torres, Hernan and Luís Hurtado de Mendoza, Editors, 1988. **Reserva Biológica Isla del Caño, Plan Maestro.** Fundación de Parques Nacionales, Servicio de Parques Nacionales, Instituto de Cooperación Iberoamericana, Centro Agronómico Tropical de Investigación y Enseñanza. San José, Costa Rica. **Dynamics of Tropical Deforestation around National Parks: remote sending of forest change on the Osa Peninsula of Costa Rica.** Mountain Research and Development, Vol. 22, No. 4, Nov 2002, 352-358pp; IUCN and WWF, 1997. **Centres of Plant Diversity.** Feininger, Andreas. Thames and Hudson Ltd, London, UK, 1968, 69-72pp.
- iii) **Consultations:** 6 external reviewers. National Government officials, park staff, scientists, local NGOs and community representatives.
- iv) **Field Visit:** Allen D. Putney. November, 2003.

2. SUMMARY OF NATURAL VALUES

The nominated site is made up of Corcovado National Park (CNP) and Isla del Caño Biological Reserve (IdCBR). CNP has an extension of 47,757ha of land and 5,375ha of marine area encompassing 500 meters of seaward extension from the coastline of the Park. CNP, which is located in the Osa Peninsula, contains important remaining areas of lowland Pacific tropical rainforest in Costa Rica that are considered as the second largest area of protected lowland Pacific tropical rainforest in Central America. Biologically, CNP functions like an "island" due to its isolation by dry forests along the Pacific coast and high mountains further inland. IdCBR is located offshore, 17 km west from the coast of CNP. IdCBR comprises 320ha of land and 5,800ha of marine areas. Although these two areas are physically separated they share ecological characteristics and have complementary natural values.

The Osa Peninsula was physically separated from the mainland millions of years ago and this has contributed to the habitat and species diversity found in CNP. The Park contains a

variety of ecosystems including tropical rain forests, rivers and lakes, beaches, coral reefs, mangrove forests and freshwater swamps. The nomination document reports 856 species of vascular plants, 54 species of mammals, 318 species of birds, 38 species of amphibians and 55 reptiles, and 9 species of freshwater fish. Endemics include 12 tree species, as well as 1 species and 17 subspecies of birds. CNP contains important endangered species such as jaguars, pumas, ocelots, white-lipped peccaries and tapirs, and significant populations of endangered birds such as scarlet macaws and great curassows. It is also an important site in terms of tree size and diversity, being characterized by a classic cathedral-like bio-architecture with very large trees and an open understory.

The inclusion of an entire watershed and a marine component within CNP and the inclusion of the island and surrounding waters of the IdCBR, help to maintain the integrity of the hydrological systems of these two protected areas. The information available on the marine environments of these two protected areas is insufficient to determine their significance and status.

3. COMPARISON WITH OTHER AREAS

An existing Natural World Heritage Site, Darien National Park in Panama, also includes significant pristine areas of lowland Pacific tropical rainforest as well as upland tropical rainforest. It is over 10 times larger (575,000ha) and rises over 1,000m higher than the nominated site, and thus has a greater diversity of ecosystems and habitats. It contains the same endangered species of mammals found in the nominated site but with larger populations that can be maintained due to the larger size of the area under protection. Los Katios National Park in Colombia of 72,000ha and adjacent to Darien National Park, also includes important areas of tropical rain forest and is home to 110 species of mammals and 450 species of birds.

Talamanca Range - La Amistad Reserves / La Amistad National Park (TR/LA) and World Heritage site (Costa Rica and Panama) is also characterized by the presence of well preserved tropical rainforest that covers most of the 500,000ha of the site. This site contains more than 1,200 species of vascular plants, 215 species of mammals, 560 species of birds, and 115 species of fish, many more than the number of species reported for the nominated site. Endemics include 13 species of mammals, 15 species of birds and 20 species of reptiles. Endangered species reported for the nominated site are also reported in TR/LA in larger and more viable populations due to the larger extension of TR/LA.

A number of important ecosystems and species present in the nominated site are also contained in Guanacaste Conservation Area (GCA) and World Heritage site (Costa Rica), which is larger than the nominated site both in land (88,000ha) and in the marine environment (43,000ha). Guanacaste protects a variety of ecosystems that goes from the Pacific coast to over 2000m above sea level and down to the Atlantic/Caribbean coast, thus it is the only conservation complex in Central America protecting a continuous transect of ecosystems from the Pacific to the Atlantic. While the significance of GCA is associated to the presence of dry tropical forest, it also contains important areas of tropical rainforest. The marine component of GCA is much richer than that of the nominated site containing over 20km of sea turtles nesting beaches. GCA also contains a greater diversity of wetlands ecosystems (37 wetlands) and protects what is considered one of the most pristine wetland forest of Central America and worldwide.

CNP and IdCBR have also been nominated for their superlative natural phenomena and natural beauty. However, GCA has significant areas of exceptional scenic beauty associated to the Cacao Volcano and the rocky coast of the Murcielago sector of Santa Rosa National Park. Cocos Island National Park (Costa Rica) has also exceptional aesthetic values associated to its coastal areas that are by far much more impressive than those present in the nominated site. Los Katios National Park includes the spectacular waterfall of Tilupo (100m high) and the impressive scenery associated to Tumaradó wetland. One of the arguments used to substantiate the natural beauty of the site is the presence of exceedingly tall trees, and the relatively clear understory of the old growth forests that allows a better observation of

them. However, the tallest trees on Earth are in Redwood National Park and World Heritage site (USA), many of them reaching over 120m high. There are also exceptionally tall trees in TR/LA (Costa Rica), Los Katios National Park and Jaú National Park (Brazil), just to mention a few examples in the Americas.

4. INTEGRITY

4.1 Boundaries and Size

The boundaries of CNP and IdCBR are clear; 75% of the boundary is demarcated in the case of Corcovado, and they are generally known by local communities. In terms of size, it is probable that Corcovado is not large enough to conserve over time the current biodiversity of the area. Research indicates that large mammals, especially cats, are threatened unless biological corridors are implemented to enable genetic interchange with other populations of the same species, and efforts are underway to establish such corridors.

4.2 Planning

The approved management plans of both CNP and IdCBR are 15 years old, and are not used to guide management decisions. The annual operational plan is considered more of a bureaucratic requirement than as an instrument for management. Annual reports and sporadic evaluations are tied neither to the management plan nor the annual operational plan. It should also be noted that management of the IdCBR does not correspond to the Biological Reserve Category as tourism is both significant and constant.

4.3 Staffing and Budget

Staffing and budget levels have varied considerably during recent years. During the late 1990's and recent years, staffing and budget levels dropped considerably but have now recuperated once again. The current level of 32 staff members and an annual budget of US\$ 460,000 (32% from the government budget) is still considered inadequate, and sustained efforts are under way to find innovative ways to increase the number of Park Guards, even though a government-wide hiring freeze is in place. Work also continues to develop alternative financial resources to further supplement Government budgets and iron out budgetary peaks and valleys between years. Senior staff are well-trained, experienced, and highly motivated. Junior staff tend to be less well trained and there is less stability in their positions.

4.4 Human Use

The most important legal uses of the area today are for ecotourism and research. Illegal uses include hunting and gold mining in CNP and commercial and sport fishing in the marine area of IdCBR. Small areas of Corcovado were farmed before the National Park was established, but these areas have now had 25 years to recuperate. Mining activity has been more recent; reaching its peak in the late 1980's when over 1,000 miners invaded the Park. They were evicted during the early 1990's. IdCBR was at one time occupied by indigenous peoples and used as a burial ground. In modern times a portion of the island was farmed, a lighthouse established and an airstrip constructed. The pillage of the archaeological sites by visitors and collectors is an on-going problem. There is a population of about 12,000 people located in villages on the Osa Peninsula outside the Park. They are dispersed in the villages and towns of Puerto Jimenez, La Palma, Bahia Drake, and Cañaza.

4.5 Visitation

Corcovado's remoteness and relatively underdeveloped facilities has historically limited visitor numbers. While those numbers remain relatively low, they have been increasing steadily since visitor data has been recorded. During the last 5 years, levels of visitation have increased by about 4% per year. CNP currently has about 18,500 visitors per year while IdCBR has about 10,000. Roughly 86% of the visitors to CNP are foreigners, while 72% of visitors to IdCBR are foreigners. Corcovado's 5 Guard Stations and the Sirena Research

Facilities have basic facilities (bunkhouses, campgrounds, and restrooms) for visitors. Small cruise ships visit the Park regularly and tour boats bring visitors for day trips from nearby towns and resorts. A network of signed trails criss-cross the Park and are well-used by visitors and scientists.

4.6 Legal and Institutional Framework

CNP was established by Executive Decree N° 5357-A of October 24, 1975, and enlarged by Decree N° 6385-A of September 30, 1976, and by Decree N° 11148-A of February 5, 1980. Both decrees and the status and boundaries of the Park were ratified by Law N° 6794 of August 25, 1982. Isla del Caño was initially included as an addition to CNP by Decree N° 6385-A of September 30, 1976, and was legally established as Isla del Caño Biological Reserve by Law N° 6215 of March 9, 1978. Both CNP and IdCBR are located within the Osa Conservation Area (ACOSA), which was established by Executive Decree N° 20790-MIRENEM, in November 1991 (see Map 1).

The National System of Conservation Areas (SINAC) was created as a part of the Biodiversity Law, N° 7788, of April 23, 1998. This law ratified the prior decree of conservation areas throughout the country and provided a nationwide legal and administrative framework for the operation of conservation areas. Thus, both CNP and IdCBR are part of the ACOSA management regime for the entire Osa Peninsula. A comprehensive conservation programme for the Peninsula is being undertaken by a coalition of local, national and international conservation organizations, working with local communities. This programme aims at establishing a permanent biological corridor linking public and private protected areas throughout the region to facilitate genetic exchange among wildlife populations.

4.7 Land Tenure

All the lands and waters of Corcovado/Isla del Caño are the property of the Government of Costa Rica and no land claims are pending.

4.8 Research

Corcovado is an important research site both for the national and international scientific community. Inventories of marine and terrestrial species are underway. Ecosystem maps of the Park have been developed, species populations are monitored, and a variety of species have been studied. The Sirena Biological Station, located in the centre of CNP, is renowned among tropical biologists for its setting, its abundance of wildlife, and its great diversity of species and ecosystems. It can lodge 15 researchers and 20 ecotourists, has laboratories and a small library, as well as an airstrip. The Organization of Tropical Studies, a consortium of North and Latin American universities, regularly holds part of its post-graduate programmes in the Station and conducts research in the Park.

4.9 Threats

The greatest threats to CNP are illegal hunting and mining, together with the deforestation and forest fragmentation on lands surrounding the Park. The greatest threats to IdCBR are illegal fishing, the loss of archaeological artefacts, and the damage to corals by recreational divers.

5. ADDITIONAL COMMENTS

5.1 Local Communities

In an attempt to better integrate Park management with the community, educate the local population about the value of the Park, and improve relations with nearby communities, the Headquarters of CNP is located outside the Park borders in Puerto Jimenez. To improve conservation in the main buffer zone and biological corridors, local communities are involved in environmental education, in forming, training and equipping volunteer protection

committees, and implementing protection measures for key sites. Other measures include the provision of assistance to local landowners to form private reserves and reward their provision of environmental services, and the resolution of land tenure conflicts in the adjoining Golfo Dulce Forest Reserve and Guaymi Indigenous Reserve. An international campaign for greater recognition and funding for Osa has also been launched by ACOSA and conservation organisations. Despite these measures, many community groups remain confused (and understandably so) about the concepts behind, and differences between, national parks, forest reserves, biological corridors, World Heritage Sites, and Biosphere Reserves. This confusion feeds an attitude of suspicion and mistrust that also surrounds the nomination of Corcovado/Isla del Caño as a World Heritage Site.

5.2 Isla del Caño Marine Environment

During the field evaluation, it was not possible to corroborate the existence of 5 fringing reefs around the Isla del Caño as stated in the nomination document. At the two locations that were checked by the evaluator, calcium carbonate reef structures were not evident, and there appeared to be upwards of 90% mortality of the corals that were growing among rock boulders.

5.3 Isla del Caño Cultural Resources

Comments received from ICOMOS note that the nomination dossier mentions 'mysterious stone spheres created by indigenous peoples, scattered throughout the island', many pottery fragments, and an abundance of the vaco tree probably introduced by the Quepos and Cotos Indian for religious reasons. One study in 1982 identified at least 17 archaeological sites and indicated that ancient peoples used the island 'exclusively for funerary purposes'. It is believed that the ancient cemeteries were developed by societies of Chiriqui between 700 and 1500BC. There is some evidence for permanent occupation by other indigenous groups, 'perhaps Quepos or Brunkas'. Although the sites have been visited by grave robbers, much apparently is still left but is now vulnerable to souvenir hunting by tourists and more systematic illegal looting by 'collectors'. Given that tourism is being actively encouraged as a way of generating income from the area, and given that the whole site is uninhabited, clearly the archaeological resource is highly vulnerable. ICOMOS recommends that this resource needs to be evaluated by qualified archaeologists in order to identify key sites for protection and determine how these resources can safely be presented to visitors.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

Criterion (ii): Ecological processes

Corcovado is an island of Central American Pacific lowland tropical forest surrounded by dry forests and high mountains, and this has made it an area of important biological richness and endemism. However, it is not large enough to assure the survival of all of the faunal elements that are essential to the continued maintenance and evolution of on-going ecological and biological processes. It is an area of great national significance, but since there are other protected areas in Central America containing tropical rainforest, that are greater in size and diversity and are already inscribed on the WH List, it is not of regional or international significance. IUCN considers that the nominated site does not meet this criterion.

Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance

The cathedral-like forests, diverse habitats, abundant wildlife, and coastal features of Corcovado and Isla del Caño are important at the national level but, as discussed in Section 3, there are other areas in Costa Rica and Central America with greater natural beauty and aesthetic importance. IUCN considers that the nominated site does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

The nominated site is important for biodiversity conservation and contains populations of large mammals that are endangered in Central America. Yet its relatively small size makes it likely that the current populations of large mammals, especially cats, will not be able to survive over the long run unless biological corridors are established that will enable genetic interchange with other populations outside of the nominated site. Also, as discussed in Section 3, there are other sites in the country and in Central America that have greater biodiversity values of global significance. IUCN considers that the nominated site does not meet this criterion.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee **not to inscribe** Corcovado National Park and Isla del Caño Biological Reserve on the World Heritage List. IUCN would also like to recommend to the Committee to acknowledge the efforts of the State Party in the management and conservation of these areas as part of the Osa Conservation Area, particularly those oriented to the establishment and management of biological corridors in this important area.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

COIBA NATIONAL PARK (PANAMA) ID N°1138

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 5 references
- ii) **Additional literature consulted:** Aguilar, A., Forcada, J., Gazo, M., Badosa, E. (1997) **Los cetáceos del Parque Nacional Coiba (Panamá)**. In **Flora y fauna del Parque Nacional de Coiba (Panamá)**. Ed. Castroviejo, S. pp. 75- 106. Spanish Agency for International Cooperation, Madrid, Spain.; Cardiel, J.M., Castroviejo, S., Velayos, M. (1997). **Parque Nacional de Coiba: El Medio Físico**. 11-31. In **Flora y fauna del Parque Nacional de Coiba (Panamá)**. Editor: Castroviejo, S., pp. 75- 106. Spanish Agency for International Cooperation Internacional, Madrid, Spain.; Castroviejo, S. & Ibáñez. A. (2001) **Origen y análisis de la diversidad biológica de la isla de Coiba**. *Quercus*, 188, Octubre, 29-32.; Cortés, J. (1997) **Biology and Geology of Eastern Pacific Coral Reefs**. *8th International Coral Reef Symposium*, pp. 57-64. Smithsonian Tropical Research Institute, Balboa, Republic of Panama.; Ibáñez, A.I. (2001) **Estudio de la composición florística y ecología del bosque tropical de la isla de Coiba (Panamá)**. Dissertation, Facultad de Biología, Department of Botany, University of Salamanca, Spain. GBRMPA/WB/IUCN, 1995. **A Global Representative System of Marine Protected Areas**. Vol. IV: South Pacific, Northeast Pacific, Northwest Pacific, Southeast Pacific and Australia/New Zealand. Washington DC, USA; Elder, D.E. and Pernetta, J. eds., 1991. **Oceans**. London,UK; UNEP-WCMC, 2001. **World Atlas of Coral Reefs**. Cambridge, UK; Biodiversity Support Programme, Conservation International *et al*, 1995. **A Regional Analysis of Geographic Priorities for Biodiversity Conservation in Latin America and the Caribbean**. Washington, DC; UNF, NOAA, IUCN and UNESCO/WHC, 2002. **Proceedings of the World Heritage Marine Workshop**. In **World Heritage Papers 4**, Paris.
- iii) **Consultations:** 3 external reviewers contacted. Foundation Natura; Smithsonian Institute, ANAM, IPAT, Jail authorities, ANCON, TNC-Panama, CI-Andean Program, Marviva, Avina, Spanish Agency for International Cooperation, Araucaria Program, Smithsonian Tropical Research Institute.
- iv) **Field visit:** N. Windevoxhel, December 2003.

2. SUMMARY OF NATURAL VALUES

The Coiba National Park (CNP) is located in the Gulf of Chiriquí, 22.5 km south-west of the Pacific Coast of Panama, in the central eastern Pacific Ocean. The park extends over 270,125ha of which 216,500 ha are marine and 53,625 ha are terrestrial. It protects Coiba Island and 38 smaller islands and islets.

Coiba Island contains remaining areas of Pacific tropical moist forest on the Panamanian coast and one of the most extensive areas of insular character on the Central American Pacific coast. Average annual rainfall is approximately 3500 mm, with a yearly mean temperature of 26° C. Geologically, Coiba is part of the system of oceanic islands of volcanic origin formed from subduction of the Caribbean and Pacific plates, subsequently rising as a result of tectonic effects from plate dynamics emerging at the end of the Tertiary. Due to its origin and proximity to the coast, Coiba presents a combination of volcanic rocks mixed with limestone and presenting patches of sedimentary soils of secondary origin. Many of the islands within CNP are of such origin and represent islets of high productivity, particularly for

the marine environment.

CNP is located in an exceptional area of Central America that is very close to the upwelling of the Gulf of Panama, thus benefiting from the greater productivity of its waters. Furthermore, due to the geographic location of CNP with respect of the mountain chain of Talamanca and the Baru Volcano, it is protected from the changes caused by cold winds and currents from upwelling between December and April, as well as the effects associated to the El Niño/Southern Oscillation (ENSO) phenomenon.

Despite its proximity to the coast, Coiba has been isolated long enough to allow the effects of speciation to occur. While few studies have been made, Coiba is known to have 1,450 species of plants (Velayos et al, 1997), 3 species of endemic plants, 2 endemic mammals, 20 endemic birds (1 species and 19 subspecies) and 1 endemic subspecies of snake. In relation to the marine environment CNP is situated in the middle of Eastern Pacific region, in the province of Panama, with high species biodiversity. With regard to coralline species, CNP has extensive prairies of rodolites, similar to in the Sea of Cortés. Twenty-four species of hard corals have also been identified in the Gulf of Chiriquí, of which 17% are exclusively from Panama and 8% are endemic, along with 14 species of sponges, of which 21% are new to science, and 34 species of soft corals, of which 18 are exclusive to Panama and 32 are new to science.

Finally, the Gulf of Chiriquí, where CNP is located, plays a very important role in terms of its value for resilience and its connectivity with other areas and islands of the Pacific. Because it is protected from the effects of the El Niño/Southern Oscillation phenomenon and from the cold currents from upwelling; it maintains a more stable marine environment than the other Pacific islands in its surroundings, thus providing larval and post larval “seeds” of many species to repopulate and colonize other sensitive zones, such as the tropical section of the Galapagos National Park.

3. COMPARISON WITH OTHER AREAS

There are currently 26 sites inscribed on the World Heritage List primarily for their globally outstanding marine values, 16 of them including island ecosystems. Out of these there are 8 World Heritage sites in the Neo-Tropical Realm that include important marine values, 5 of them also including small islands; these are Guanacaste Conservation Area (Costa Rica); Cocos Island National Park (Costa Rica); Belize Barrier Reef Reserve System (Belize); Brazilian Atlantic Islands: Fernando de Noronha and Atol das Rocas Reserves (Brazil), and; Galapagos National Park and Marine Reserve (Ecuador).

It is important to note that the information provided in the nomination document on the natural values of CNP is very limited particularly in relation to the marine environment. The nomination places most of the attention on the marine values of the Gulf of Chiriquí; however CNP occupies only a small portion of the gulf.

Guanacaste Conservation Area (GCA) includes several small islands and islets that are, as Coiba Island is, very closely linked to the coast and associated to important coral reefs influenced by upwelling currents. GCA protects a variety of terrestrial and marine ecosystems that go from the pacific coast to over 2000 meters high and down to the Atlantic/Caribbean coast, thus it is the only conservation complex in Central America protecting a continuous transect of ecosystems from the Pacific to the Atlantic. The coastal area of GCA and the small islands contained within the Park are considered of global importance for the protection of Olive Redley sea turtles and Leather Back sea turtles, both globally endangered species. The marine component of GCA protects over 20km of sea turtles nesting beaches and a high diversity of wetland ecosystems (37 wetlands), which is considered one of the most pristine wetland forests of Central America and worldwide. The marine and coastal areas associated to GCA are considered among the most pristine of the Meso-American Pacific Region (IUCN, 1999).

Cocos Island National Park (CINP), Costa Rica, is also located in the Eastern Pacific Ocean and offers protection to 2,400 ha of land 199,700 ha of marine areas. The island is covered by well-preserved dense tropical moist forest and also includes a small area of cloud forest. While the total number of plant species is lower on CINP it has by far many more endemic plant species than Coiba (70 species) due to the influence of isolation in the development of its ecosystems and species. This has also influenced the presence of 3 endemic species of birds and 2 endemic fresh water fish. CINP and the nominated site share quite a similar number of species of corals. However, CINP is outstanding for the abundance of large pelagic species such as sharks, rays, tuna, billfish and dolphins. The abundance of hammerhead sharks and white-tip sharks in CINP is considered the highest worldwide (IUCN, 1995). This makes Cocos Island distinctive when compared to Coiba.

The Galapagos Islands Marine Reserve protects 13,300,000 ha of marine areas, thus it is 61 times bigger than the marine area covered by CNP. After the Great Barrier Reef (Australia) and the NW Hawaiian Islands (USA), the Galapagos Islands Marine Reserve is the third largest marine reserve in the world. This area is a “melting pot” of marine species conditioned to the convergence of three distinct ocean currents that transported marine biota from tropical and sub-tropical regions of Central and South America and the Indo Pacific. The level of endemism in marine species is one of the highest worldwide (25%) mainly in relation to fish species. Geologically it is also a unique site being at the meeting of the Nazca, Pacific and Cocos tectonic plates. The islands have been formed by volcanoes rising out of a submarine platform at a depth of 1,300m.

CNP has also been nominated for the presence of relics of tropical moist forest in Central America. However, Darien National Park, also in Panama, includes significantly larger pristine areas of lowland Pacific tropical moist forest, as well as upland tropical moist forest. It is over 10 times larger (575,000ha) than the nominated site and rises over 1,000 m high, thus having a greater diversity of ecosystems and habitats. Los Katios National Park in Colombia (72,000 ha), adjacent to Darien National Park, also includes important areas of tropical moist forest and is home of 110 species of mammals and 450 species of birds. Talamanca Range - La Amistad Reserves / La Amistad National Park (TR/LA), in Costa Rica and Panama, is also characterized by the presence of well preserved tropical moist forest that covers most of the 500,000ha of the site. This site contains more than 1,200 species of vascular plants, 215 species of mammals, 560 species of birds and 115 species of fish. Endemics in TR/LA include 13 species of mammals, 15 species of birds and 20 species of reptiles. Moreover Corcovado National Park (Costa Rica), which is currently nominated for World Heritage status, contains what is considered the second largest remaining area of lowland Pacific tropical moist forest in Central America.

The site has also been nominated for its superlative natural beauty and aesthetic importance. However, this cannot be substantiated when compared with the scenery and aesthetic values of the terrestrial and marine landscapes associated of the Galapagos Islands (Ecuador), Talamanca Range – La Amistad Reserves / La Amistad National Park (Costa Rica and Panama), and Brazilian Atlantic Islands: Fernando de Noronha and Atol das Rocas Reserves (Brazil), all of them inscribed on the World Heritage List under criterion (iii). It is important to note that the scenery of Cocos Island, with its dramatic forest-covered precipitous slopes and waterfalls, is by far much more impressive than that associated to the nominated site. However, Cocos Island National Park was not inscribed under criterion (iii). There are a number of other islands in the Pacific, the Caribbean and elsewhere that have a similar appearance to CNP, thus the nominated site does not particularly stand out in this regard.

In summary, CNP, on available measures of biodiversity and natural processes is secondary in importance to all existing World Heritage sites in the region. It is thus seen as a site of national importance.

4. INTEGRITY

4.1. Legal Framework

CNP was created by Resolution No. 021 (1991) of the National Authority of the Environment (ANAM in Spanish). The authority for the protection and management of CNP resides with ANAM. The resolution mentioned above only established CNP at the level of ANAM but it does not represent a national law. A proposal for declaring the site under national law has been submitted to ANAM to the Legislative Assembly of the country that should first approve it before passing it for the signature of the country's President. This draft national law also calls for an extension of the site, particularly of its marine area.

4.2. Boundaries

CNP encompasses the Island of Coiba in its entirety, thus providing refuge for its endemic species as well as for species that have largely disappeared from mainland Panama. The marine area covers important coral reefs and other marine ecosystems but, according to some reviewers, it is considered insufficient to offer effective protection to marine biodiversity existing in the broader area of the Gulf of Chiriquí.

4.3. Management

Since CNP was established as a penal colony, human permanence or proximity to its waters has been limited. Very few people live on the island. The population of the penal colony reached a maximum of three thousand prisoners and prison wardens in 22 camps throughout the island. Now that an official decision has been made to shut down these facilities, there are currently less than 120 prisoners and staff, and the plan is to vacate the island completely within the next 5 years.

A management plan was prepared in 1996, with support from the government of Spain, but its implementation is limited, requiring additional financial resources for conservation activities and patrolling and strengthening human resources to manage the park. Currently the present facilities and staff are clearly insufficient for effective management and supervision of the area. However, there is sufficient interest among a number of NGOs to establish a conservation coalition for the site which, working together with the ANAM, could assist in obtaining the additional financial resources needed for the effective management and protection of CNP.

4.4. Human use

Approximately 20% of the island's original vegetation has been altered and some species have been introduced for agricultural and livestock purposes, including 2,029 head of cattle as well as pigs, dogs and buffalos, that could threaten native species of flora and fauna. There is a risk of invasion of the park by peasants once the penal colony is fully removed. This is linked to the threat associated with illegal logging as the park possesses valuable hardwood resources.

There is widespread fishing by commercial shrimp boats around the nominated site and often within its boundaries. Long lines and nylon gill nets are widely employed by the local fishermen, creating unintended by-catch of important species such as sea turtles. Other fishing activities include the extraction of conch and lobsters. Generally fishermen have showed a complete ignorance and lack of respect of park's boundaries. Dive operators have reported marked decrease in the number of sharks, billfish, rays, groupers and snappers over the past four to five years, which coincide with increased commercial fishing operations in CNP.

In 2002 there were over 4,000 visitors to CNP, the majority of them foreign tourists, but the interest for this area is growing and it is expected that the number of visitors will grow rapidly. Tourism activities include use of the beaches and coastal areas as well as underwater activities. The Panamanian Tourism Institute (IPAT) has identified the Gulf of Chiriquí as one

of its national priorities for tourism development. The IUCN evaluator learned that a tourism development plan already exists for the area but during the mission it was not possible to obtain a copy of this plan in order to assess its potential impact on the integrity of the site.

5. ADDITIONAL COMMENTS

The nomination document noted the existence of archaeological findings on various parts of CNP, indicating the presence of Pre-Columbian settlements whose populations are assumed to have disappeared shortly after the arrival of the Spaniards in the 15th Century. However the proper identification of these findings and the assessment of their significance are still to be determined.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

Coiba National Park was nominated under natural criteria (ii), (iii) and (iv).

Criterion (ii): Ecological processes

While CNP contains important terrestrial and marine ecosystems that have evolved under insular conditions, this is not unique to this site, as noted in Section 3. Other sites already included in the World Heritage List, such as Galapagos Islands National Park and Guanacaste Conservation Area, are better examples of complex on-going ecological and biological processes. IUCN considers that the nominated site does not meet this criterion.

Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance

As discussed in Section 3 the nominated site does not rank favourably when compared to other sites in the Meso-American region and worldwide that have been included in the World Heritage List under this criterion. There are a number of other islands in the Pacific, the Caribbean and elsewhere that have a similar appearance to CNP. IUCN considers that the nominated site does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

The nominated site contains an important relic of tropical moist forest, as well as a variety of threatened and endangered terrestrial and marine species. However, as discussed in Section 3, there are other sites within the same region with higher biodiversity values and with larger areas that can support viable populations of endangered species, particularly those associated to tropical moist forests. IUCN considers that the nominated site does not meet this criterion.

7. RECOMMENDATION

IUCN considers that the nominated site on its own does not meet natural criteria and recommends the World Heritage Committee **not to inscribe** Coiba National Park in the World Heritage List under natural criteria. However, once legal protection under national law is provided and the boundaries of the site are substantially expanded to provide greater coverage of the key marine and coastal areas of the Gulf of Chiriquí, the State Party may wish to consider submitting a new nomination.

The World Heritage Committee may wish to encourage the State Party to continue its participation in the development of the proposed Cocos Islands – Galapagos Marine Biological Corridor where Coiba National Park can play an important role as a stepping-stone core area for marine conservation.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

PITONS MANAGEMENT AREA (SAINT LUCIA) ID N° 1161

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 5 references.
- ii) **Additional Literature Consulted:** IUCN, 2003. **Global Strategy for Geological World Heritage** (Draft); World Heritage Committee Information Document, 2000. **Synthesis report on the Seminar on Natural Heritage in the Caribbean**, Suriname. 17pp.; Putney, Allen 1999. **Potential Natural Sites in the Caribbean**; Sullivan Sealey, K and G. Bustamente 1999. **Setting Geographic Priorities for Marine Conservation in Latin America and the Caribbean**. TNC; Wilkinson, C. 2002. **Status of Coral Reefs of the World**. Reefbase; World Heritage Centre 2002. **Proceedings of the Marine Biodiversity Workshop**, Vietnam; Landmark Environmental Consultants 2001. **St Lucia: The Pitons Management Area Landscape Analysis. Report to the St. Lucia WH Committee**, 22pp.; Wood, C. 2002. **The Geological Significance of the Proposed World Heritage Site in Saint Lucia. Report to St. Lucia WH Committee**, 24pp.; Lindsay, J. et al. 2002. **Volcanic Hazards Assessment for St. Lucia, Lesser Antilles**. 46pp. and Scientific Supplement. 34pp. **Reports to the Government of St. Lucia, University of the West Indies Seismic Research Unit.**; Bloom, A.L. 1998. **Volcanoes**. Chapter 6 in, *Geomorphology: a Systematic Analysis of Late Cenozoic Landforms* (3rd. edition), pp. 92-115. Prentice Hall; Francis, P. 1993. **Volcanoes: a Planetary Perspective**. Oxford Univ. Press; Simken, T and Siebert, L. 1994. **Volcanoes of the World (2nd edition)**, Smithsonian Institution **Global Volcanism Program**. Geoscience Press Inc., Tucson, Arizona; www.volcanoes.si.
- iii) **Consultations:** Five external reviewers. Government officials of Ministry of Physical Development, Environment and Housing, Ministry of Agriculture, and Departments of Lands, Forestry, Fisheries, Tourism and Education; National Office for UNESCO; Members of the St. Lucia World Heritage Committee, Pitons Management Area Advisory Committee, and Soufriere Regional Development Foundation; Soufriere District representatives, local fishermen, estate owners, and private sector tourism operators.
- iv) **Field Visit:** Paul Dingwall and Jim Thorsell, January 2004.

2. SUMMARY OF NATURAL VALUES

St. Lucia is an island of 617 km², located between Martinique and St. Vincent in the Lesser Antilles Islands of the Eastern Caribbean. The Lesser Antilles form a volcanic arc, 700 km long, overlying a tectonic plate subduction (under thrusting) zone. The nominated area is the Pitons Management Area (PMA), 2,909 ha in extent, located in the south-western region of St. Lucia near the town of Soufriere. Dominating the mountainous landscape of the PMA are the Pitons, two steep-sided volcanic spires rising side by side from the sea. Gros Piton (770m) is 3 km in diameter at its base, and Petit Piton (743m) is 1 km in diameter and linked to the former by the Piton Miton ridge. The volcanic complex in the PMA, known as the Soufriere Volcanic Centre, is the remnant of one (or more) huge collapsed andesitic stratovolcanoes. The Pitons are degraded dacitic cores of two lava domes formed on the flanks of the volcano. They tower above a caldera-like formation, produced by a gigantic gravity slide or structural collapse and forming the arcuate Qualibou Depression, 7 km in

diameter. Near the centre of the depression are the Sulphur Springs, an active, high-temperature geothermal field (or solfatara) with sulphurous fumeroles and hot springs. The Pitons occur with a variety of other volcanic features including cumulo-domes, explosion craters, pyroclastic deposits (pumice and ash), and lava flows. Collectively, these fully illustrate the volcanic history of an andesitic composite volcano associated with crustal plate subduction.

The Marine Management Area within the PMA is a coastal strip 11 km long and about 1 km wide. It comprises a steeply sloping continental shelf with fringing and patch reefs, boulders and sandy plains. The coral reefs, which cover almost 60% of the nominated marine area, are healthy and diverse. A survey to a depth of 20 m revealed 168 species of finfish, 60 species of cnidaria including corals, 8 molluscs, 14 sponges, 11 echinoderms, 15 arthropods and 8 annelid worms. Hawksbill turtles are seen inshore, and whale sharks and pilot whales offshore.

The dominant terrestrial vegetation is tropical moist forest grading to subtropical wet forest with small areas of dry forest near the coast and on steep slopes, and areas of wet elfin woodland on the summits. On the Pitons especially, small undisturbed natural forests remain, preserved by the steepness of the land. At least 148 plant species have been recorded on Gros Piton and 97 on Petit Piton and the intervening ridge. Among these are several endemic or rare plants, including eight rare species of tree. Some 27 bird species, including 5 endemics, are known from Gros Piton, along with 3 indigenous rodents, 1 opossum, 3 bats, 8 reptiles and 3 amphibians.

The PMA is a multiple use management area (IUCN Category VI) where agriculture, artisan fishing, human settlement (1500 residents) and tourism (4 large hotel developments) are allowed. About half the area is privately owned and about one-third of the total area is a defined conservation core zone.

3. COMPARISON WITH OTHER AREAS

The nomination document notes four distinctions of the PMA which it proposes are of universal value. These are:

- The Soufriere Volcanic Centre contains an assemblage of all the structures, landforms and rock types typical of a large collapsed stratovolcano. The great variety of its diagnostic volcanic features is of considerable scientific interest, according to volcanologists from the University of the West Indies.
- It demonstrates the character and history of this and many other andesitic volcanic systems in an island arc above a tectonic plate subduction zone.
- The stratovolcano is associated with a gigantic gravity slide (or sector collapse), forming the 7 km-diameter Qualibou Depression.
- It has two adjacent eroded lava domes - the Pitons - that are remarkably comparable in size, shape, structure and origin. In the opinion of the head of the region's Seismic Research Unit this is a phenomenon "found nowhere else in the world".

The nomination further states that "as volcanic landforms there appears to be nothing quite like them anywhere . . . they are the best formed landforms of this (lava dome) type in the world", and as such they are "of high value to geological science". The purpose of this section of the evaluation is to compare and review these claims from a global perspective.

3.1 Volcanic geology

Volcanism is a ubiquitous global phenomenon and volcanoes come in many shapes and sizes depending on their composition and mode of eruption. This makes generalisations and comparisons very difficult as every one of the world's 14,000 volcanoes is distinctive in some respect. However, for World Heritage comparative purposes it is helpful to use the dual classification that volcanologists use to distinguish the two most common forms of volcano – basalt domes and composite cones (e.g. Francis 1993). Basalt domes, also known as shield

volcanoes, are formed almost entirely from outpourings of viscous basalt lavas. Usually found at hot-spots especially on mid-oceanic ridges, with gently sloping topographic profiles, they are among the highest volcanoes in the world. The Hawaiian Islands (USA), rising almost 9 km above the ocean floor, are classic shield volcanoes, as are the smaller Icelandic shields, the Galapagos Islands (Ecuador) and Mt Etna (Italy). Composite cones, or stratovolcanoes, are formed by a combination of flow and explosion creating alternating layers of lavas and pyroclastic (ash) materials. Overwhelmingly andesitic in composition, and located either in young continental mountain chains or forming island arcs at tectonic plate boundaries, they are the world's great steep-sided volcanoes. Classic examples are Japan's Mt. Fujiyama; Italy's Mt. Vesuvius; Mt. Mayon in the Philippines, often cited as the world's most beautiful volcano; and Popocatepetl in Mexico.

The Qualibou volcano of the PMA belongs in this latter specific class of volcanoes. It is one of 18 stratovolcanoes in the 700 km-long volcanic island arc of the Lesser Antilles, on the boundary between the Caribbean and the under thrusting North American tectonic plates. In establishing the significance of the PMA in global volcanism it is appropriate to begin by limiting the comparisons primarily to andesitic volcanic systems and secondarily to those having their genesis in oceanic volcanic arcs at tectonic plate boundaries.

3.2 Comparison with other World Heritage Volcanic sites

A comparative analysis of other volcanic World Heritage sites provided with the nomination identifies 21 natural or mixed sites in volcanic terrain, a finding essentially consistent with the draft IUCN geological World Heritage strategy report (Rapa Nui/Easter Island is also identified but it is inscribed under cultural criteria only). Despite the presence of significant volcanic values, 8 of these volcanic sites are not inscribed on the World Heritage List under geological criteria. Nevertheless it is still appropriate to compare them to the PMA of St Lucia. This group of sites includes some globally important volcanic systems, including:

- Kahuzi-Biega National Park, DRC [criterion (iv)];
- Ujung Kulon National Park, Indonesia (incl. the famous Krakatoa volcano) [(iii) & (iv)];
- Komodo National Park, Indonesia [(iii) & (iv)];
- Mt. Kenya National Park, Kenya [(ii) & (iii)];
- Kilimanjaro National Park, Tanzania [(iii)];
- St. Kilda, UK [(iii) & (iv)];
- Gough Island Wildlife Reserve, UK [(iii) & (iv)]; and
- Lord Howe Island Group, Australia [(iii) & (iv)].

It is also apparent from the comments of specialists cited in one of the nomination documents (Wood, 2002) that dome structures are, in fact, quite common (and all slightly different) elsewhere (e.g. in Kamchatka - Russia, Tongariro - New Zealand, Kuriles Mt. - St. Helens, Morne Trois Pitons - Dominica, and Yellowstone - USA). Gravity collapses too are found elsewhere (e.g. Lesser Antilles and Hawaii).

The other 13 volcanic World Heritage sites are inscribed for their geological values either under criterion (i) or pre-1994 under criterion (ii), and are more directly comparable with St Lucia's PMA. This group includes four sites that are either basaltic shield volcanoes or volcanoes at oceanic hot-spots, *viz.* Hawaiian Volcanoes National Park (NP), the world's iconic shield volcanoes; Galapagos NP; Central Eastern Australian Rainforest; and Heard and Mc Donald Islands (Australia). A further six sites are large andesitic composite volcanoes, volcanic massifs or volcanic complexes in continental or large island settings. They are usually situated at major crustal discontinuities, either in mountain chains or rift valley systems. These six sites are: Sangay NP in the Ecuadorian Andes; the Volcanoes of Kamchatka in Russia, a serial site containing more than 300 volcanoes along with geothermal features, covering some 3.3 million hectares; USA's Yellowstone NP, a volcanic complex containing over 10,000 volcanic and geothermal features (including several dome structures) extending over almost one million hectares; two African volcanic massifs at rift valley sites – Ngorongoro Conservation Area (Tanzania) and Virunga NP (DRC); and New Zealand's Tongariro NP. Two of the remaining sites exhibit very specific volcanic features, *viz.* the

U.K.'s Giant's Causeway, which is a columnar basalt lava flow, and Italy's Aeolian Islands which display principally 'strombolian' volcanism, i.e. explosive bursts of basaltic material.

The World Heritage site of Morne Trois Pitons (MTP), 200km to the north of the PMA in Dominica, closely resembles the PMA in its volcanic character and origin, and in its geological and geographical provenance. MTP is a significantly larger (7000ha) and more intact area, has a single management agency, boasts associated biodiversity values, as well as containing a greater variety of volcanic features such as 5 volcanoes and a boiling lake. MTP has also attracted the attention of several hundred scientists based at the Archbold Research Station. Cumulo-domes are also found in MTP (at elevations twice as high as the PMA) but do not rise as abruptly out of the sea as they do in the PMA. PMA differs from MTP in three ways, *viz.* it has a marine component; the volcano is associated with a major caldera-forming structural collapse; and it contains twin cumulo domes, the Pitons.

Thus, of all the major World Heritage volcanic sites, MTP compares closely with the PMA of St Lucia but contains significantly greater associated natural values. The PMA still, however, differs in some details of its geological history, volcanic features and physiographical make-up.

3.3 Comparison with other island sites in the Caribbean and other world islands

In examining this nomination, IUCN has undertaken a regional and world-wide review of island sites in order to determine the full significance of the PMA.

Within the Lesser Antilles island group the Smithsonian Institution volcano database lists 16 volcanoes with the greatest concentration in Dominica. A high proportion of eruptions in the region have produced cumulo-domes including the PMA and many are of similar age and structure. Other important protected areas in this region centred on volcanic features include Mont Pelee (Martinique), Kick-em Jenny (Grenada), and the currently active volcano in Montserrat. All of these have been informally discussed as other potential volcanic site nominations in the region.

The 2003 UN List of protected areas records 953 sites in the insular Caribbean region. Three sites are natural World Heritage sites – Morne Trois Pitons NP (Dominica), Desembarco del Granma NP (Cuba) and Alejandro de Humbolt NP (Cuba). Comparisons with MTP are discussed above in Section 3.1. The latter Cuban site has no similarities with the PMA but the former is located on highly scenic coast with spectacular cliffs bordering the western Atlantic. Three additional natural World Heritage sites in the western Caribbean contain outstanding coral reefs, tropical forests and wetlands, but there are no volcanic features similar to the PMA.

Other volcanic islands which may also have significant global value (geological and scenic) exist in many areas including White Island in New Zealand, the Marqueses in French Polynesia, the Kuriles in Japan/Russia, Reunion and the Comores in the western Indian Ocean, Iceland, Palau, Alaska and Japan. La Palma in the Canary Islands is another example where 20 protected areas have been established to preserve the wide range of volcanic features found on the island. Once again, several of these have been discussed for potential World Heritage nomination and several are on the Tentative List of the relevant States Parties.

In terms of World Heritage natural sites occurring in small islands, 25 of these (17 % of all 144 natural WH sites) have been inscribed (see Table 1 below). In addition, island and coastal features also occur in 22 other natural sites that exist on larger islands (eg. Lorentz in Irian Jaya, SW Tasmania and SW New Zealand) and on continents (e.g. Kamchatka (Russia) and Atlantic Forest Reserves (Brasil). Many of these have been inscribed for both their volcanic and scenic values.

Table 1: Natural World Heritage sites on / with small islands

ISLAND / SITE	COUNTRY	VALUES
Lord Howe	Australia	volcanic scenery, species
Fraser	Australia	geological processes
Heard and McDonald	Australia	volcanics, geology
Macquarie	Australia	geological features
Fernando de Noronha/Atoll das Rocas	Brazil	landscape, species
Cocos	Costa Rica	biological processes
Desembarco del Granma	Cuba	geology, coastal scenery
Morne Trois Pitons	Dominica	volcanic features, species
Galapagos	Ecuador	all 4 natural criteria
Cape Girolata, Corsica	France	geology, scenery, species
Ujung Kulon, Java	Indonesia	landscape, species
Komodo	Indonesia	landscape, species
Aeolian	Italy	volcanic values
Sub-Antarctic	New Zealand	biology, species
Tubbataha	Philippines	biology, scenery, species
Madeira Laurisilva	Portugal	species
Aldabra	Seychelles	geological/biological
Valle de Mai, Praslin	Seychelles	all 4 natural criteria
E. Rennel	Solomon Is.	biological processes
Garajonay, Gomera	Spain	biological processes
Giant's Causeway, N. Ireland	UK	geological values, scenery
St. Kilda	UK	landscape, species
Henderson	UK	natural phenomenon
Gough	UK	coastal scenery, species
Hawaii Volcanoes	USA	geological processes
Halong Bay	Viet Nam	geology, scenery

3.4 Significance in terms of scientific research

Many other volcanic sites have been very productive for their record of scientific research (e.g. Krakatoa in Indonesia, Aeolian Islands in Italy, Tongariro in New Zealand and the Hawaii Volcanoes). In contrast, very little research has been conducted in the PMA which may be an indication of its relatively limited importance to science. Indeed, as one of the nomination documents notes, the formation of the Qualibou depression and previous activity of the Soufriere Volcanic Centre are in dispute and the theory of the origin of the depression is far from resolved (Wood, 2002). Further, as Wood (2002) notes, the mode of formation of the Pitons "has never been the subject of dedicated study." Indeed, "the Pitons could be the remnants of one of the three different types of volcanic features: cumulo-dome, plug dome or volcanic neck." Further, "if the Pitons are exhumed volcanic necks or plugs, then there are examples elsewhere in the world that are equally as spectacular...." (Wood, *ibid*). The level of scientific uncertainty is significant as the level of applicability of natural criterion (i) depends, in part, on clarification of the origin of the site. Several of the claims made in the nomination could thus be challenged and thus require further study before verification, and further consideration under this criterion.

3.5 Natural beauty and aesthetic importance.

Although it is difficult to make comparisons on the subjective values of scenery, these aspects found in the PMA commonly occur in other island and coastal regions of the world. For instance, the Lord Howe Island Group (Australia) has the two summits of the eroded remnants of a shield volcano (Mts. Gower and Lidgbird) rising up to 875M from the sea as well as the spectacular scenic feature of Ball's Pyramid. This island is also covered by tropical and sub-tropical forest and surrounded by coral reefs. Similarly, the islands that make up the St. Kilda World Heritage site (UK) are eroded volcanic remnants (as are the great majority of the world's oceanic islands) and could also be judged as having more outstanding scenic features than the PMA, as well as having a more natural setting. The same could be said of

other World Heritage island and coastal sites such as Galapagos, Kamchatka, Lorentz, SW New Zealand, Fernando de Noronha, and Heard and McDonald in Australia. Other non-World Heritage island areas with geological and scenic values listed above would also surpass those found in the PMA.

In sum, IUCN concludes that the scenic qualities of the PMA nomination, as well-known as they are in the Caribbean, are significant at the regional level but are secondary to other island/coastal settings found in other areas of the world.

As the site has not been nominated for any biological values (these are present but have been considered of national rather than international significance), no comparisons of these features are undertaken in this evaluation.

In summary, the World Heritage List has a number of volcanic sites with a wide representation of features in most regions of the world. In addition, there are a number of other important volcanic sites both in the Caribbean region and elsewhere around the globe that have been the subject of much greater scientific interest and contain a much wider variety of volcanic features than the rather narrowly focused ones found in the PMA. Within the global perspective where 14,000 volcanoes exist and where many from all regions of the world are on the World Heritage List, the PMA has some natural values but these are seen as very specific and secondary to those found elsewhere and have not been studied to the point where there is clear scientific agreement on their mode of origin. The PMA, at least with the current information available, is thus rated at the regional level of significance rather than at the international level.

4. INTEGRITY

4.1 Geological integrity

A major consideration in defining the boundaries of the PMA was the intention to include the greater part of the Soufriere Volcanic Centre, or so-called Qualibou Volcano. This would provide protection for the full evolutionary geological provenance of the area's two outstanding volcanic features – the Pitons and the Sulphur Springs. The entire landform assemblage displays the remains of one or more huge, collapsed andesitic stratovolcanoes, whose history is revealed in structures and deposits developed over 5-6 million years. Also encompassed in the PMA is most of the extensive, arcuate Qualibou Depression, formed by either a giant landslide or structural collapse some 300,000 years ago. Thus, the PMA has justifiable boundaries which encompass an extensive range of volcanic features and rock types typical of andesitic volcanism in an island arc overlying a tectonic plate subduction zone.

4.2 Site and management integrity

4.2.1 Boundaries and land tenure

The landward boundary of the PMA is a mix of natural and artificial elements, including land contour, river courses, roadways and land tenure boundaries. The outer marine boundary, located about 1km offshore, is the 75m depth contour, which circumscribes the coral reef. Boundary definition was refined during preparation of the nomination. The terrestrial component of the PMA was initially confined to a smaller core area centred on the Pitons and immediate surrounds. A 2001 landscape analysis (Landmark Environmental Consultants 2001) suggested creation of an environmental protection area as a buffer zone on the landward margin. Following the recommendations of a 2002 geological study (Wood 2002), the boundary was further extended to encompass a greater part of the Soufriere Volcanic Centre, thereby incorporating a wider range of volcanic features and rock types including the Sulphur Springs geothermal field, several small lava domes, explosion craters and pyroclastic deposits. While the townsite of Soufriere was excluded, the expanded area included a greater proportion of privately owned and rural residential land, resulting in the need for internal zoning of the PMA.

Overall, 53% of the PMA is Crown-owned land and 47% is in private ownership. In terms of IUCN classification, the PMA is a Managed Resource Protected Area (Category VI), managed for its long-term protection while providing for sustainable resource uses and the needs of a resident population. In respect of its traditional human settlement pattern and high scenic qualities, it also has many characteristics of a Category V Protected Landscape/Seascape.

4.2.2 Legal status and institutional framework

The PMA has a very recent legislative basis to govern a multiple use area which is almost half private land. Formalised by Cabinet decree in December 2002, the PMA is gazetted under the Physical Planning and Development Act 2001. Within the PMA, the Soufriere Marine Management Area (SMMA) was established in 1994 under the Fisheries Act 1984. There are some ten other statutes applying to conservation of the PMA covering, among others, agriculture, forestry, fisheries, soil and water conservation and wildlife protection.

Overall management of the PMA is directed by the PMA Management Plan, a statutory document approved by Cabinet in June 2003. An operational management plan, intended to augment and implement the management plan, is currently in preparation and is expected to be approved by Cabinet in mid-2004. The management plan is administered by the principal State conservation agency, the Ministry of Physical Development, Environment and Housing. Among the other Crown agencies responsible for managing resources and activities in the PMA are the Forestry Department, Crown Lands Department, Department of Fisheries, Ministry of Agriculture and Ministry of Tourism. A multi-sectoral co-ordinating body, the Pitons Management Area Advisory Committee (PMAAC), is established for management oversight of the PMA. It has ten members representative of Government agencies, NGOs, and community and commercial interest groups. Key among these is the Soufriere Regional Development Foundation (SRDF), a private company responsible for fostering community economic, social and cultural development on the basis of sustainable resource conservation. The PMAAC is chaired by the permanent secretary of the Environment Ministry and reports annually to Cabinet through the Minister of Planning. The SMMA is administered by the Soufriere Marine Management Association, under a formalised agreement for integrating the objectives of eleven Government, NGO and community agencies and interest groups. Both the PMAAC and SMMA have a scientific advisory committee to guide research and monitoring programmes. Established with international aid, the SMMA has also received recognition in marine conservation from UNEP and from the British Airways Tourism for Tomorrow Award (for the special protected areas class administered jointly with IUCN).

The policy framework for the PMA, though interim in some aspects, is comprehensive and based on extensive consultation. Nation-wide policies and plans exist for forestry, agriculture, lands, tourism (including heritage tourism), coastal zone and marine management, education and cultural heritage. The Pitons Charter, signed by the Governor-General in January 2003, on behalf of the Government and people of St Lucia, affirms the country's commitment to the protection of the Pitons and surrounding area as key elements of the country's heritage. Policies for management of the PMA are contained in the PMA Management Plan which incorporates an interim Land Use Plan.

To assist management of the diversity of environments, land types and tenures of the PMA, three internal management zones are designated, *viz*:

- Terrestrial Conservation Area: 467ha (16% of the total area of the PMA), three quarters of which is Crown-owned. Two such areas are designated, one focused on the Pitons and intervening high ground, the other a 60ha area including the Sulphur Springs.
- Terrestrial Multiple Use Area: 1,567ha (53%) of which 80% is privately owned.
- Marine Management Area: 875ha (30%), comprising five sectors – marine reserve, fishing priority area, yachting area, multi-purpose area and recreational area.

The Government has set a priority on either acquiring private lands or establishing stewardship arrangements over them in the Conservation Areas, which are the core protection zones of the PMA. The Government is currently budgeting for the costs of this and discussions are in progress. Activities in all zones must comply with the prevailing statutory

provisions and the policy guidelines of the management plan. A compulsory environmental impact assessment process applies to all new developments, and there are provisions for restriction and prohibition of developments. Guidelines for Buildings and Physical Development are enforced to minimise the impacts of any new buildings, physical developments such as roads, and forestry or farming operations.

On the 16 February, 2004 the Cabinet of the Government of St. Lucia agreed to the acquisition of targeted private lands on Gros Piton, subsequent to negotiated proposals with the respective landowners by the Chief Surveyor. The Cabinet further agreed to the valuation, where necessary, of other private lands within the Reserve Uplands linking the Pitons, and the related negotiations with the respective land owners and the submission of a final report on necessary land acquisitions to Cabinet.

4.2.3 Residential population

The marine zone and terrestrial conservation areas, accounting for some 46% of the total area of the PMA, have essentially no permanent inhabitants. The terrestrial multiple use zone has a residential population of about 1,500 persons in some 400 private households. This low-density settlement (approximately 1 person/ha) comprises primarily small-holder agricultural properties, though there are some moderately-sized estates. The rural population in the PMA is declining, with agriculture on the wane. Heritage and eco-tourism activities are growing and have considerable scope for expansion.

4.2.4 Agriculture and forestry

Agriculture in the PMA is largely confined to small hill-farms, though there are a few commercial estates managed mainly for cocoa and coconut production. Activities are declining rather than expanding. Impacts are generally low, except for a minor problem with feral goats, and there is a small fire risk. Forestry is a minor activity. Small-scale charcoal production occurs sporadically, and there is some timber extraction from private lands in the vicinity of Gros Piton, though Crown acquisition will halt this. There are no forest reserves and no plans to create them. Sufficient legal, planning and regulatory provisions and procedures are in place (although they have not always been enforced) to control any incompatible developments relating to land clearance, sub-division, roading, building construction, earth movement and drainage.

4.2.5 Fishing

A thriving local fishery is based in Soufriere. Despite its initial misgivings, the fishing community now has a good working relationship with the SMMA and strongly supports the marine management regime. Fishing regulations are carefully monitored and strictly enforced, and few problems are encountered. The marine reserves have proven beneficial over the past eight years, with stocks of some species trebling in numbers. For some species, such as tuna and dolphin, population numbers have increased, counter to trends elsewhere in the region.

4.2.6 Marine sedimentation and pollution

Soil erosion and runoff from adjacent watersheds have increased sedimentation in the near-shore zone, which is badly affecting the coral reef environment. Measures are being introduced to reduce the impacts, particularly from road construction and associated quarrying operations. Solid waste management remains a major problem in the coastal area. The Government has taken action to combat this through preparing a World Bank-funded waste management plan, and introducing legislation for re-cycling of products such as glass and plastics.

On the 16 February, 2004 the Cabinet of the Government of St. Lucia agreed to direct the Ministry of Communications, Works, Transport and Public Utilities to a programme of sediment abatement measures, including bio-engineering and "environmentally-friendly" slope stabilisation works. This should minimise sediment displacement to the coastal areas of the PMA from the on-going road re-development works.

4.2.7 Mining, power generation and communications

Mining of fine aggregate from river courses and estuaries in the PMA is prohibited, as are new pumice mines. A small existing pumice mine is located just inside the boundary of the nominated site. The operation is subject to stringent environmental controls. On the 16 February, 2004 the Cabinet agreed to the re-definition of the south-eastern boundary of the PMA to exclude the Pumice Mine at Etangs.

Assessments have been undertaken of the potential for geothermal energy production at Sulphur Springs, but the results suggest power generation would be uneconomic. The effect of any such development would however almost certainly be damaging to the environmental quality of the area. One or two cellphone transmission towers exist in the PMA. Also on 16 February, 2004 the Cabinet requested relevant Ministries to seek a solution to the problem caused by the location of cellular phone towers within the PMA.

4.2.8 Tourism developments

The PMA is a major national tourist destination and, with 200,000 visitors annually, the Sulphur Springs is the most visited site in St Lucia. Current visitor numbers are well within management capacity, however. Substantial existing tourism development in the PMA is confined to four resort hotels in the multiple use zone. They appear to be managed sensitively and one has Green Globe certification. For the most part the resorts are unobtrusive, though one has a private jetty and helicopter landing pad on the shoreline. Noise impacts from helicopters are intrusive in the Pitons area and require addressing through re-routing of flight paths. The St Lucia Cabinet has agreed that meetings will be held involving relevant Ministries and the owners of helicopters that fly between the Pitons to resolve the issue of noise pollution.

IUCN was informed that one hotel in the nominated area is planning a substantial expansion, but recent correspondence from the Saint Lucia World Heritage Committee has noted an understanding that the proposed expansion of the hotel has been cancelled. However a key 15 acre section of land between the two Pitons is currently being advertised for "exclusive development" on the local real estate market. Either of these proposed developments would require approval from the PMAAC and would be subject to EIA procedures and restricted by enforcement of the Design Guidelines and related planning codes. On the 16 February, 2004 the Cabinet agreed to direct the Ministry of Physical Development, Environment and Housing and the Development Control Authority not to approve any major development within the PMA until a comprehensive "Limits of Acceptable Change Study" is completed, and approved by the Cabinet of Ministers.

4.2.9 Staffing and facilities

The SMMA appears adequately staffed for administrative and field roles with a manager, two part-time administrative officers and four rangers. The nominated area, however, is inadequately staffed, having only an acting liaison officer at present, but it is intended to appoint a manager, two administrative officers and two rangers. This is a minimum requirement. While it is probably adequate to meet current demands, more staff capacity will be needed soon. The PMA lacks an office, though one is planned. There is an excellent visitor centre and well-staffed visitor programme at Sulphur Springs, and a small interpretation centre on the Gros Piton trail. Walking trails and other visitor facilities are rudimentary and in need of improvement. Research has been very minimal to date and monitoring programmes have only just begun. Expertise is available from the University of the West Indies, including its Seismology Unit, for geological research, and from the Caribbean Natural Resources Institute (CANARI). Support is also available from a range of Government agencies and from the country's largest non-Governmental conservation group, the St Lucia National Trust.

4.2.10 Financing

Funding levels for the PMA are inadequate at present. The Government recognises that more funds are required for staff and resources. It is intended to augment Government funding from revenues generated through fees derived from visitor use, research and tourist concessions, and from sales and donations. The SRDF generates revenues through visitor tolls in Soufriere.

In summary, apart from the SMMA, which has operated successfully for eight years, the PMA is still very much in its early stage of implementation and as noted by one reviewer "... its future cannot be predicted with certainty". As discussed above, there are several major concerns regarding management integrity. All of these would appear capable of eventual solution or mitigation by existing regulations. The rapid response provided by the Cabinet of the Government of St. Lucia to a number of these management issues is a positive step in the right direction to addressing a number of these issues. Nevertheless, until these and other actions are effectively taken to address the management issues at the site, including in relation to provision of necessary funds for staffing and management, IUCN would conclude that the Conditions of Integrity in the Operational Guidelines are not satisfied at this point in time.

5. ADDITIONAL COMMENTS

It is noteworthy that in terms of the global economy St Lucia is a small-island Developing State whose natural resources are vital to sustaining the country's society and economy. Most of the island is inhabited by people whose livelihood depends upon their ability to access and use the resources of land and sea. Undisturbed natural areas on the island, and within the PMA, are very limited in extent. The PMA, which occupies about 5% of St Lucia, is a typical multiple use protected area (classified as IUCN Category VI), with a low-density rural population and a range of uses from strict protection to sustainable use. In this respect it has some affinities with UNESCO/MAB Biosphere Reserves, though it lacks a clear distinction between buffer and transition zones and may not be extensive enough to include a mosaic of regionally representative ecosystems.

The Pitons have acquired very significant associations in the cultural traditions and history of the island's inhabitants through the ages. These are recorded in mythology and sacred lore, and manifest in pre-historic archaeological evidence such as cave and camp sites, petroglyphs and midden, though these are not yet well researched or documented. For modern St Lucia the Pitons are national icons, deeply embedded in the cultural, social and economic fabric of the country. The associative values of this site could well support a nomination as a cultural landscape.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

Criterion (i): Earth's history and geological processes

The PMA contains the greater part of a collapsed stratovolcano contained within the volcanic system, known to geologists as the Soufriere Volcanic Centre. Prominent within the volcanic landscape are two eroded remnants of lava domes (or possibly volcanic necks or plugs), Gros Piton and Petit Piton. IUCN notes that the scientific uncertainty regarding the origin of the site is an issue which constrains consideration of the site under criterion (i). As concluded in the comparison section, similar features are found in many other areas including existing World Heritage sites (such as including the nearby World Heritage site in Dominica). The two eroded lava domes (if that is indeed what they are) of the Pitons are an impressive feature but that would be a very narrow basis on which to justify inscription under this criterion. Given the scientific uncertainty regarding the origin of the site and because any potential inscription of this site depends on this interpretation, consideration of whether or not the site meets criterion (i) is premature. Without further in-depth geological study of the site and the processes that led to its formation.

Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance

The nominated property derives its primary visual impact and aesthetic qualities from the Pitons, two adjacent forest-clad volcanic pinnacles rising abruptly from the sea to heights greater than 700m. The Pitons predominate over the St Lucian landscape, being visible from virtually every part of the island and providing a distinctive landmark for seafarers. However,

as discussed under section 3.5 the scenic qualities of the PMA are significant at the regional level but are secondary to other island/coastal settings found in other areas of the world.
IUCN considers that the nominated site does not meet this criterion.

Finally, as noted in section 5 above, the nominated site has only recently been established and is facing a number of management issues. Thus IUCN considers that the Conditions of Integrity in the Operational Guidelines are not satisfied at this time.

7. RECOMMENDATION

IUCN recommends the Committee to **defer** the nomination of Pitons Management Area under natural criterion (i).

IUCN notes that the Committee has, since 1992, inscribed a number of remarkable landscapes under the cultural landscape category. Although the lead for cultural landscapes lies with ICOMOS, IUCN believes that the associative values of this site may support a nomination as a cultural landscape.

IUCN also notes that the site has potential to be developed as a Biosphere Reserve under the UNESCO Man and Biosphere programme. The State Party may also wish to consider an alternative way of securing international recognition for the site's earth science values through recognition under the emerging Geoparks initiative, supported by UNESCO and the international earth science unions.

Notwithstanding the recommendation above, IUCN:

- advises the Committee to commend the State Party for developing strong support among the local residential and commercial communities for the establishment and management of the Pitons Management Area.
- recommends the State Party to:
 - i) Provide adequate staff and budget for the PMA;
 - ii) Complete the process of acquiring additional private lands within the PMA;
 - iii) Complete the operational plan; and
 - iv) Ensure that power generation is not developed in the Sulphur Springs Area.

A. Nominations of Natural Properties to the World Heritage List

A2 Deferred Nominations for which additional information has been received

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE CAPE FLORAL REGION (SOUTH AFRICA) ID N°: 1007 REV

Background: In 1999 the Cape Floristic Region - Phase 1: Cape Peninsula Protected Natural Environment was nominated by South Africa for World Heritage status. The 24th session of the World Heritage Bureau referred the nomination in June 2000 requesting the State Party to “ensure that the core area of the Cape Peninsula Protected Natural Environment is under one effective and consolidated management regime. The Bureau also encouraged the State Party to complete the preparatory work associated with Phase 2 of the Cape Floristic Region nomination and to submit this when the boundaries of the complementary areas within the CFR are finalised.” The Phase 2 nomination was submitted in January 2002, but returned to the State Party to be combined in a single nomination with the Cape Peninsula National Park. The present nomination responds to these recommendations.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 14 references
- ii) **Additional Literature Consulted:** Cowling, R. M. 1990. Diversity components in a species-rich area of the Cape Floristic Region. **Journal of Vegetation Science** No. 83. pp 699-710; Cowling, R. M. and Holmes, P. M. 1992. Flora and Vegetation in **Ecology of Fynbos**. Cowling, R. M. (ed.); Cowling, R. M. & Hilton-Taylor, C. 1994. Patterns of plant diversity and endemism in southern Africa: An overview in **Strelitzia** No. 1. pp 31-52; Cowling, R. M. & P. M Holmes. 1992. Endemism and speciation in a lowland flora from the Cape Floristic Region in **Botanical Journal of the Linnean Society** No. 47. pp 367-383; Cowling, *et al.* 1996. The Cape Peninsula South Africa: physiographical, biological and historical background to an extraordinary hotspot of biodiversity in **Biodiversity and Conservation** No. 5. pp 527-550; Davis, S. D. and Heywood, V. H. 1994. **Centres of Plant Diversity: A guide and strategy for their conservation**. Oxford University Press; Goldblatt, P. and Manning, J. C. 1999. **Cape flora – A conspectus of the Cape flora of South Africa**; Groombridge, B. 1992. **Global Biodiversity – Status of the Earth's Living Resources**. Chapman and Hall; Myers, N. 1990. The Biodiversity Challenge: Expanded hot-spot analysis. **The Environmentalist**. No. 10. pp 243-255. Richardson, *et al.* 1996. Current and future threats to plant diversity on the Cape peninsula, South Africa in: **Biodiversity and Conservation**. No. 5. pp 607-648; Mittermeier R. *et al.* 1999. **Hotspots – Earth's biologically richest and most endangered terrestrial regions**. Conservation Intl. 431p.; U. of California. 2003. Mediterranean Climate Regions. (poster); Gelderblom C.M. 2003. Turning strategy into action: implementing a conservation action plan in the Cape Floristic Region. **Biological Conservation**. 112; Dallman, P. R. 1998. **Plant Life in the World's Mediterranean Climates**. Oxford University Press.
- iii) **Consultations:** 7 external reviewers; comments from ICOMOS. Relevant officials from federal and provincial nature conservation agencies.
- iii) **Field Visit:** David Sheppard, February, 2000; Jim Thorsell, September, 2003.

2. SUMMARY OF NATURAL VALUES

The Cape Floral Region (CFR) is located in the southwest corner of South Africa in the Cape Province. The nominated site of eight clusters extends from 50km south of the City of Cape Town northwards 210km to the Cederberg and 450km northeast to the Swartberg. The 553,000 ha nominated cluster of eight sites together form a representative sample of the eight

phytogeographic centres of the CFR. The eight sites and their sizes are shown in Table 1 below

Table 1: The eight clusters making up the Cape Floral Region

Cape Peninsula National Park	17,000 ha
Cederberg Wilderness Area	64,000 ha
Groot Winterhoek Wilderness Area	26,000 ha
Boland Mountain Complex	113,000 ha
De Hoop Nature Reserve	32,000 ha
Boosmansbos Wilderness Area	15,000 ha
Swartberg Complex	112,000 ha
Baviaanskloof Protected Area	174,000 ha
Total area	553,000 ha

Elevations range from 2077m in the Groot Winterhoek to sea level in the De Hoop Nature Reserve. Peaks such as Table Mountain form a scenic backdrop to the Western Cape, and much of the area is characterised by rugged mountain passes, rivers, rapids, cascades and pools. The Region has a semi-Mediterranean climate of cool wet winters and hot dry summers in the west with summers tending to be rainier in the east. Rainfall varies markedly with topography between 300-500mm in the lowlands to 1000-3300mm in the mountains where clouds and fog can persist and snow falls in winter.

The CFR has been called the world's 'hottest hot-spot' for plant diversity and endemism and has been designated as one of the IUCN World Centres of Plant Diversity. Although the smallest of the world's six principal floristic regions and in a temperate zone, it has a degree of species richness comparable with most tropical hotspots. In less than 0.5% of the area of Africa it has nearly 20% of its flora and in less than 4% of the area of southern Africa it has nearly 44% of the sub-continental flora of 20,367 species. Nearly 69% of its vascular plant species do not occur naturally anywhere else in the world. Within its 90,000 km² area there are 8,996 plant species and 988 genera, roughly half of all genera in South Africa. These include five endemic and two sub-endemic families and 1435 (70%) of all southern African threatened species. There is also a very high species-to-genus ratio of 9:1. Within the CFR, the southwest has the most diverse flora, and of these species the Cape Peninsula has almost half, with 25% of the flora of the whole CFR. This pattern of species richness is exceptional for this climatic type, not only in a single habitat but over changes of taxa with changes in habitat (*beta* diversity) and in changes of taxa in similar habitats over changes in geographic area (*gamma* diversity).

There are some 6,191 endemic species in the CFR. The Cape Peninsula has 2285 species of plants, 90 being endemic. The Cederberg has 1778, including an endemic cedar. The Boland Mountain Complex has 1600 plant species, 150 being endemic, and none of the sites has less than 1100 species. The richness is due to the wide variety of macrohabitats and microhabitat mosaics resulting from the range of elevations, soils and climatic conditions, including the co-existence of winter-rainfall species with summer-rainfall species from further east. The flora is also characterised by concentrations of relict endemics and massive still-active speciation due to its isolation in an area of very long established climatic stability which has generated the enormous diversity. The flora of each nominated area is sufficiently distinct to justify representation of the region by several sites, each of which is large enough to preserve the genetic viability of its types of diversity and to accommodate large-scale natural processes such as fire and drought. Eight phytogeographic centres of endemism have been distinguished in the Cape Floral Region, each of which is represented within the nominated site.

The distinctive flora of the CFR which comprises 80% of its floristic richness, is a sclerophyllous shrubland known as *fynbos* (fine bush), a fine-leaved vegetation adapted to both the Mediterranean type of climate and to periodic fires, and defined by the location or dominant species. Its three main components are heaths, *Proteaceae*, reedlike *Restionaceae*

and geophytes (bulb-plants), including many *Iridaceae*. Plant variety is based on soil types which vary from predominantly coarse, sandy, acidic nutrient-poor soils, to alkaline marine sands and slightly richer alluvials. There are pockets of evergreen forest in fire-protected gorges and on deeper soils; in the east are valley thickets and succulent thickets, which are less fire-dependent, and in the drier north, low succulent Karoo shrubland.

Four other characteristics of the CFR of global scientific interest are: (1) the responses of the plants to fire, (2) seed dispersal by ants and termites, (3) the high level (83%) of plant pollination by insects, mainly beetles and flies and (4) its linkages to Gondwanaland allowing reconstruction of the flora's ancient connections. Adaptation to fire include geophytes which sprout from underground and seed storage both underground and in the canopy, some species requiring fire for germination. Ants take the seeds to eat the lipid deposits; about 28% of the Region's flora, including over half of the *Proteaceae*, is dispersed by them. Most of the shrubs so dispersed are both endemic and threatened species but the latter lack a way of regenerating after fire. Pollination and nutrient-cycling by termites, and termite-mound communities are notable and the region has very high levels of bird- and mammal-pollinated plants.

3. COMPARISONS WITH OTHER AREAS

The CFR is located within the Cape Schlerophyll Biogeographical Province (Udvardy, 1975). In view of its unique floristic values, it is also recognised as a floral kingdom of its own - The Cape Floristic Kingdom. There are no natural World Heritage sites within either the Biogeographical Province or the Cape Floristic Kingdom. The CFR is among the highest biodiversity "hot spots" in the world, based on plant diversity and endemism. Table 2 shows the numbers of endemic species present in 18 "Hot Spots" (Groombridge, 1992). This clearly indicates the pre-eminent position of the Cape Region. Eleven of these 18 "Hot Spots" contain World Heritage sites.

Table 2: Numbers of endemic species present in 18 "Biodiversity Hot Spots"

Region	Higher Plants	Mammals	Reptiles	Amphibians	Swallow-tail Butterflies
Cape Region (South Africa)	6,000	15	43	23	0
Upland western Amazonia	5,000	-	-	c. 70	-
Atlantic coastal Brazil	5,000	40	92	168	7
Madagascar	4,900	86	234	142	11
Philippines	3,700	98	120	41	23
Borneo (north)	3,500	42	69	47	4
Eastern Himalaya	3,500	-	20	25	-
SW Australia	2,830	10	25	22	0
Western Ecuador	2,500	9	-	-	2
Colombian Chocó	2,500	8	137	111	0
Peninsular Malaysia	2,400	4	25	7	0
Californian floristic province	2,140	15	15	16	0
Western Ghats (India)	1,600	7	91	84	5
Central Chile	1,450	-	-	-	-
New Caledonia	1,400	2	21	0	2
Eastern Arc Mts (Tanzania)	535	20	-	49	3
SW Sri Lanka	500	4	-	-	2
SW Cote d'Ivoire	200	3	-	2	0
TOTAL	49,955	375	892	737	59

The CFR has one fifth of all the plant species of Africa, despite occupying less than 0.5% of the continent's area. The CFR has globally significant endemism levels and includes five

endemic families; by comparison the whole of southern Africa has only 12 endemic families. It has a high level of dependency, with almost 6,000 of the 8,500 plant species being endemic to the region. One of the eight clusters, the Cape Peninsula National Park, with 4,651 plant species and a level of endemism of 31.9%, has plant biodiversity unparalleled in other temperate biodiversity "hotspots" and compares favourably with other sites either on or proposed for the World Heritage List for their botanical values. In recognition of these levels of biodiversity and endemism, the CFR has been identified as a Global Centre of Plant Diversity. It is the pre-eminent area of the world's five mediterranean climate regions which in total account for 2% of the earth's land area but account for 16% of the world's plant species.

As Table 3 indicates, the CFR has by far the highest species density (plant species per sq. km.) and species rarity than any of the other mediterranean-type climate regions.

Table 3 : Plant Diversity and Rarity (Source: Dallman, 1998)

Region	Area, km ² millions	Plant species, thousands	Species Density*	Percent Rare or Endangered
World	148	250	1.7	10
Europe	5.7	14	2.5	11
Australia	7.6	22	2.9	10
USA	9.4	20	2.1	8
California	0.41	5.1	12	23
Cape Region	0.09	8.6	94	27
SW Australia	0.31	8.0	26	24

*thousands of plant species per million km²

In conclusion, the CFR is distinctive in terms of its species diversity which is amongst the highest in the world. The floral diversity compares favourably with that found in some areas of the neotropical forests. The CFR also has much higher levels of plant diversity and levels of endemism than other mediterranean-type climate regions (1.7 times that of southwest Australia, 2.2 times that of California and the Mediterranean basin and 3.3 times the diversity of Chile). Only the islands of New Zealand, Hawaii and Madagascar have higher levels of endemism.

4. INTEGRITY

4.1. Management and Planning Framework

The nominated areas are managed under a region-wide conservation framework, the Cape Action for People & the Environment (CAPE) Project, established with assistance from the GEF in 2000. CAPE coordinates the work of national, provincial and local authorities and private landowners to promote the protection of biodiversity by integrating social, financial and conservation initiatives. Acts and legal instruments affecting the area include the World Heritage Convention Act, National Environmental Management Act, Environment Conservation Act, National Water Act, Conservation of Agricultural Resources Act, Mountain Catchment Areas Act, National Heritage Resources Act, National Forests Act, National Veld and Forest Fire Act, the Sea-shore Act, the Marine Living Resources Act, Wetlands Conservation Bill, the Biodiversity White Paper and the National Coastal Management Bill. Since 1995 the well funded Working for Water Programme has dealt with alien plant infestation and has been a major source of support for Park management.

Not all of the individual protected areas in the eight clusters have completed management plans but those that do not are currently in preparation.

4.2. Boundary Issues

Cape Peninsula National Park

Apart from the Boland Mountain Complex which is surrounded by mostly rural land uses, six of the clusters have satisfactory boundaries and are bordered by other conservation lands. The situation in the Cape Peninsula National Park (CPNP), however, has potential for various boundary conflicts. Here there is considerable urban interface with Greater Cape Town and this poses significant challenges for conservation management, particularly in relation to control of access, alien species and fire. The urban edge has now been clearly defined, legislation enforced and much consolidation of ownership has taken place over the past 5 years. These efforts are continuing and there are currently proposals to develop natural corridors between sectors of the park at Noordhoek wetlands and between the high altitude zones and the coast. South African National Parks (SANP) and the City Council of Cape Town along with the many other stakeholders are making commendable progress in rationalising boundaries of the park as envisioned in the management plan and policy documents and in response to IUCN concerns expressed in the 2000 evaluation.

Kirstenbosch National Botanical Garden

It is noted that the Kirstenbosch National Botanical Garden (KNBG) is included in the nomination. KNBG covers approximately 200ha (out of the total nominated area of 550,000ha) and is focused on research and public education relating to *fynbos* vegetation. It includes significant infrastructure (restaurant, car parks, visitor centres, etc). There is no other Botanic Garden in the world which is included within a natural World Heritage site although some are included under cultural criteria. IUCN considers the KNBG an exceptional case and that it should be included within the nominated site, for the following reasons: (a) it is managed in an integrated way with the surrounding core area of the CPNP; (b) its research and public outreach programmes relate to and support the objectives of the nominated site; and (c) important biodiversity is included within its boundaries.

4.3 Integrity Issues

Human activities have had a significant impact on the biodiversity of the Cape Peninsula, since first European settlement in 1652. Urbanisation and agriculture have substantially transformed most of the original area of natural vegetation. Lowland vegetation has been most affected, although almost half of the transformation has occurred in only one of the 15 recognised vegetation types. However, other vegetation types have also been affected and, specifically, vegetation at higher altitudes has been impacted by alien species. Human population pressures on biodiversity are expected to grow and will particularly affect the Cape Peninsula portion of the nomination. The current population within the Cape Peninsula region of 3.5 million is projected to grow to 6.2 million by 2020. This growth poses the most significant challenge to the long-term integrity of the area, particularly through increasing pressures for access and urban development, and an increasing incidence of human induced fire. A number of innovative measures are being taken by the responsible management agencies to address social issues which are critical to the long-term survival of the site.

Five major threats to integrity are:

- Fire

The management of fire is a major issue within the CFR particularly in the CPNP. This issue was given particular prominence with a major fire in 2000 which burnt approximately 40% of the Cape Peninsula National Park. Fire is a natural component of the *Fynbos* Biome but the fire incidence is greatly increased within the CPNP, due to the proximity to the larger urban centre of Cape Town. Increasing fire incidence is also related to the presence of alien invasive species. SANP has initiated a controlled burning programme for the CPNP which includes: fire regimes which maintain biological diversity; maintenance of fire breaks along the urban edge; and development of fire education programmes. Fire management is a major issue in all other clusters as well and both the Western Cape Nature Conservation Board and

the Eastern Cape Directorate of Environmental Affairs have adequate measures in place to manage fires.

- Invasive Species

Alien plants pose the most severe threat for the continued existence of *Fynbos* ecosystems. Invasive species have invaded large areas of the nominated area particularly coastal habitats. All three responsible agencies are investing considerable efforts into the management of invasive species and significant external resources have been mobilised through the Working for Water Programme.

- Staff and Budget

The resources available for conservation management of the site are substantial. Resources available are increasingly complemented from other sources, including from the Global Environment Facility (GEF), conservation NGOs, tourism revenues and the private sector. Recently, the National Botanical Institute also received substantial funding from Norway and the Critical Ecosystems Partnership Fund to prevent the extinction of indigenous plants in the Cape Floral Region. Each of the protected areas in the nomination has at least one Reserve Manager and a varying number of support staff.

- Tourism and Infrastructure Development

The CFR, particularly in proximity to Cape Town, is a tourist destination for many international as well as local visitors. There is significant development around and within the CPNP reflecting its location adjacent to the city of Cape Town. Pressures for additional development are significant. Most of the other components of the nomination are not overused at this time but, with World Heritage recognition, visitation will grow in the future. These issues are being addressed in the individual management plans for each cluster.

- Climate Change

Predictive models to forecast potential effects of climate change have been prepared for the CFR and all the clusters. A warmer climate and a shifting rainfall regime will certainly have effects on the flora. Six of the eight units are large with steep altitudinal gradients and all are surrounded by other conservation lands. These will help alleviate the effects of climate change and a monitoring system is in place to detect what these effects will be.

5. ADDITIONAL COMMENTS

5.1. Serial sites

When serial sites, such as this one, are evaluated IUCN poses a standard set of 3 questions:

- **What is the justification for the serial approach?** Most of the natural habitat in the CFR has been transformed during 400 years of European settlement. An “archipelago” of relatively natural islands of original vegetation still exists. These separate islands combine to display a wide range of biodiversity that make up the CFR. The collection of all eight clusters adds up in a synergistic manner to present the biological richness and evolutionary story of the CFR.
- **Are the separate elements of the site functionally linked?** Each of the clusters in the CFR nomination has evolved in similar climatic and geological conditions. Many species overlaps occur between the different units while each also has a particular suite of species depending on variations in geology, rainfall, soil type and elevation. Indeed, the definition of the clusters emerged from a comprehensive ecological survey undertaken by the CAPE project which identified the optimal set of sites. This ensured that the areas nominated were indeed linked and provided coverage of the *Fynbos* Biome.

- **Is there an overall management framework for all the units?** This framework is provided under the umbrella of CAPE. Although three management regimes have responsibility for the different clusters, CAPE serves to assist in providing the CFR database and in coordinating activities of stakeholders. At the national level, the World Heritage Convention Act provides the national framework and provision to establish an advisory body for each of the sites.

The CFR nomination is thus appropriately considered a serial site. It is similar in concept to the Central Eastern Rainforest of Australia World Heritage site, also a serial site containing eight clusters (but only one-fifth the size).

5.2. Other comments

The current name of the nominated area: "The Cape Floral Region" does not reflect the true geographical extent of the nomination and the State Party should be requested to consider an alternate name such as "Cape Floral Region Protected Areas" to ensure conformity with other serial sites on the World Heritage List.

As in most natural areas in the region there is a considerable record of previous human settlement in the nominated sites. For this reason, ICOMOS has requested that their comments be included as follows:

"The nomination stresses that although the protected areas are not being proposed as cultural properties, all show evidence of early occupation by humans from the Early Stone Age, and are rich in rock art dating back over 5000 years. The cultural history of the nominated areas, as reflected in caves, burial sites and remains of houses, bears evidence to almost continuous occupation by people from at least 250,000 years ago up to the last 50-200 years.

The dossier draws attention to the way people have functioned as agents for ecological change and outlines the history of human interaction with nature in the region since people arrived 'about one million years ago'. Of particular significance is that fact that San hunter-gatherers, who appeared in the area in the late Stone Age, (around 20,000BP) and practiced controlled burning to encourage fresh plants for gathering, were still living in some of the nominated areas until as recently as 1978.

The Cape Peninsula National Park contains one of the best-known landmarks of South Africa. Table Mountain, looming over Cape Town has become an icon for the city, and arguably now has worldwide recognition for its association with South Africa.

The cultural qualities of the nominated sites are very strong, particularly for what they reveal about the pre-colonial history of the area, and for the specific iconic value of Table Mountain. For these reasons, it is suggested that it would be desirable if the State Party might consider in the future re-nominating these sites as cultural landscapes."

6. APPLICATION OF WORLD HERITAGE CRITERIA

The Cape Floral Region has been nominated under natural criteria (ii) and (iv).

Criterion (ii) Ecological processes

The Cape Floral Region is considered of outstanding universal value for representing ongoing ecological and biological processes associated with the evolution of the unique *Fynbos* biome. These processes are represented generally within CFR and captured in the eight nominated clusters. Of particular scientific interest are the plant reproductive strategies including the adaptive responses to fire of the flora and the patterns of seed dispersal by insects. The pollination biology and nutrient cycling are other distinctive ecological processes found in the site. The CFR forms a centre of active speciation where interesting patterns of endemism and adaptive radiation are found in the flora. IUCN considers that the nominated

site meets this criterion.

Criterion (iv) Biodiversity and Threatened Species

The Cape Floral Region is one of the richest areas for plants than for any similar sized area in the world. The number of species per genus within CFR (9:1) and per family (52) are among the highest given for various species-rich regions in the world. The species density in CFR is also amongst the highest in the world. It displays the highest levels of endemism at 31.9 % and it has been identified as one of the world's 18 biodiversity hot spots. IUCN considers that the nominated site meets this criterion.

The CFR has areas of high natural beauty and aesthetic importance, including Table Mountain, Cape Point and the coast of the De Hoop. However, these are secondary values to its floral ones.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee to **inscribe** the Cape Floral Region under natural criteria (ii) and (iv). A revised formal name of the site should be requested from the State Party.

The Committee may wish to commend the State Party for the progress made in preparing the management plans for the various clusters. The Committee may also wish to commend the State Party for their innovative work under CAPE and other projects to build public support for conservation of the area. The State Party should be encouraged to carefully consider developing innovative socio-economic programmes for poverty alleviation as well as public education and outreach.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION.

PALAEOHABITAT OF TARNÓC (HUNGARY) ID N° 667 REV

Background note: The Palaeohabitat of Tarnóc was nominated for World Heritage status on two previous occasions: the first time in 1986 and most recently in 1993, as the 'Fossil Findings of Ipolytarnóc'; on both occasions the Committee did not inscribe the site. IUCN assessed the site in 1993 and stated that "*Ipolytarnóc, while geologically interesting, is a relatively obscure, scientifically esoteric and unthreatened phenomenon. In this context it is neither outstanding, nor does it contain the universal value required under the Convention*". The World Heritage Committee decided not to inscribe the site at its 17th session, stating that: 'The Committee recognized the importance of this site on a national level; however, it did not meet the criteria for inscription on the World Heritage List'. A new nomination was submitted by the State Party in 2003 under the title of 'Palaeohabitat of Tarnóc'. In addition, a comparative analysis and justification for resubmission were supplied by the State Party following requests from the World Heritage Centre and IUCN during the evaluation process.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 18 references
- ii) **Additional Literature Consulted:** Various authors. 1983. **Geologica Hungarica, ser. Palaeontologica 44-46.** Hungary; Agusti, J., Rook, L. and Andrews, P. 1999. **The Evolution of Neogene Terrestrial Ecosystems in Europe.** Cambridge University Press; Wells, R.T. 1996. Earth's Geological History – a contextual framework for World Heritage fossil site nominations in **Global Theme Study of World Heritage Natural Sites.** IUCN. 43pp.; Lockley, M. and Meyer, C. 2000. **Dinosaur Tracks and Other Fossil Footprints of Europe.** Columbia University Press. 323pp.; Previous nomination documents; IUCN fossil site evaluations and previous nominations for Dorset and East Devon Coast; Miguasha and Australian Fossil Mammal Sites; Other research papers and scientific descriptions of the nominated site, or referring to it; Comparative analysis submitted to World Heritage Centre by State Party subsequent to field assessment.
- iii) **Consultations:** 5 external reviewers. Site managers, local and national authorities, and specialists from the Hungarian Geological Museum, Geological Institute and Museum of National Sciences.
- iv) **Field Visit:** Tim Badman, July 2003.

2. SUMMARY OF NATURAL VALUES

The nominated site, the Palaeohabitat of Tarnóc (PoT), comprises an area of 106 ha of fossil remains in Northern Hungary, surrounded by a buffer zone of 404ha. Together, the nominated site and the buffer zone make up the Ipolytarnóc Fossils Nature Conservation Area (IFNCA). The site lies within rolling wooded countryside, incised by the ravines of the Botos and Borókás streams, which cut down 70-80 metres through fossil-bearing rocks. The PoT is the centrepiece of the site. It comprises a sequence of rocks which preserve a good sample of an environment from the early Miocene Period (the Miocene covers c.24-5Ma before present). The most notable feature is the preserved land surface including a prehistoric forest stream or waterhole, which preserves numerous footprints of animals that lived at the time, and evidence of a range of other environmental features including ripples from the stream bed, and plant material. The surface was buried suddenly by a volcanic

eruption that occurred c.20 million years ago. The volcanic deposits that buried the land also preserved imprints of the leaves from the forests that covered the landscape (which were stripped from the trees by the volcanic ashfall), and the petrified trunks and branches of trees that were flattened by a subsequent catastrophic volcanic debris flow. The rocks recording these events are set within a rock succession that records the previous marine geological conditions in this area and the conditions that followed the volcanic eruption.

The fossils of the PoT include over 3,000 footprints from 11 species of vertebrate, 4 carnivore, 4 bird, 2 ungulate and 1 rhinoceros species. Many of the footprints are extremely sharp and precisely preserved. These are trace fossils, and no primary skeletal remains have yet been found of the animals that produced them at Tarnóc. The leaf imprints preserve 65 species of plants. One of the petrified trees, at over 60m in length, is the largest recorded fossil pine tree in the world.

The PoT has been studied since 1836, with initial interest raised by the large petrified tree, and some damage to the area occurred due to unregulated souvenir collectors in the early history of the site. To date, an area of over 300 m² of the palaeohabitat has been excavated, and is protected within two large exhibition buildings, supported by interpretive exhibitions, publications and guided tours. Some portions of the palaeohabitat have been removed and are displayed at the Hungarian Geological Institute, but the majority is intact *in situ*. The amount of the palaeohabitat exposed is a small fraction of the preserved land surface. A progressive programme of continued excavation is envisaged by the State Party which, it is expected, will continue to add to the significance of the site.

3. COMPARISONS WITH OTHER AREAS

Seen in relation to other fossil World Heritage sites, the values of the nominated site are much narrower and more specialised. The diversity, scale and time span covered are less than has been the case with sites already inscribed on the List. The diversity of the vertebrate remains (11 species) of the PoT is significantly lower than that of comparable fossil sites already inscribed on the World Heritage List (e.g. Ischigualasto – Talampaya Natural Parks in Argentina, record 56 species, Dinosaur Provincial Park in Canada has 60, Monte San Giorgio in Switzerland has 110). These sites also typically cover significant greater time periods than the nominated site. Messel Fossil Pit, Germany, provides a snapshot of Eocene life with a much larger number of species represented, ranging from plants to whole skeletons of vertebrates.

The most obvious site for comparison with the nominated site is the Australian Fossil Mammal Sites (Riversleigh/Naracoorte), inscribed in 1994, which includes a record of life from the Miocene, within a wider period. As a serial nomination, the Australian Fossil Mammal Sites (Riversleigh/Naracoorte) cover a period of over 20 million years, from the Oligocene to the Pleistocene, thus spanning the whole Miocene. Of the two localities inscribed within this serial nomination, Riversleigh is of a comparable age to Tarnóc. It is of exceptional diversity: over 200 new species of mammals alone have been discovered, more than trebling previous knowledge of Australia's terrestrial mammals. As a serial site, it encompasses significantly greater values through the inclusion of a second younger fossil site at Naracoorte. In terms of the representation of life within the remainder of the Miocene period, there are other sites with values that are more significant than the nominated site, notably the Ashfall National Monument and the Agate Fossil Beds in the USA, although neither have been proposed for World Heritage listing.

The standard that has been set by past World Heritage Site nominations is a high one, and the values of PoT are not of comparable significance to warrant inscription on the World Heritage List.

4. INTEGRITY

4.1 Boundaries

The nominated site lies entirely within the Ipolytarnóc Fossils Nature Conservation Area (IFNCA). A core area of 106ha has been identified protecting the main fossil exposures in the

Borokás and Botos ravines, with the remainder of the IFNCA making up the buffer zone for the site. In practice, the core area and buffer zone are managed as an integrated unit, and the defined core area is only of significance in relation to the development of excavation programmes. The boundaries of the core area and buffer zone adequately protect site values.

4.2 Legal Status

The nominated site is included in the Hungarian register of protected areas. Parts of the site have been protected since 1944. The present boundaries of the IFNCA date from 1987, and the whole of the PoT has been protected since 1977. The level of legal protection for the site is appropriate to its conservation needs.

4.3 Ownership

The nominated site and the buffer zone are owned by the Hungarian State.

4.4 Management

The nominated site and the buffer zone are managed in a fully integrated way by the Bükk National Park Directorate. There is a management plan for the nominated site, and adequate, well-motivated staff resources are available to implement it. The quality of environmental management at the nominated site has been recognised by a Council of Europe Diploma awarded in 1995 and subsequently extended until 2005.

Excavation of the PoT is regulated by the managing authorities, and plans are carried out in partnership with the Hungarian Geological Museum, and other national scientific experts. Long term plans are to further extend the exposure and display of the fossil remains within additional extensions of the exhibition buildings. Excavations in the meantime are reburied and kept clear of heavy vegetation to protect the surface from collectors, and, more importantly, from possible damage due to surface erosion caused by the combination of water and seasonal freeze-thaw action and root damage.

The nominated site has simple, imaginative interpretation, including a large mural reconstruction of the Miocene environment, and from the provision of access to the excavated palaeohabitat exclusively through guided tours. This successfully brings to life the fossil remains, providing visitors with a vivid impression of the past life of the area as a living ecosystem. Visitor numbers are currently 20-25,000 per year.

4.5 Human Impact

Human activity in the past, in the form of souvenir hunting, has damaged some elements of the site, in particular the large sugar pine, although substantial parts remain and the integrity of the specimen has not been lost. Previous removal of the palaeohabitat has ceased, and significant elements that were removed are curated and protected at the Hungarian Geological Institute.

The management and protection of the site under Hungarian Law provides effective protection from further human impacts. The main impact envisaged in the management plan is the programme of scientific excavation itself. The State Party monitors and acts to ensure that the exposed surfaces are preserved within buildings or through reburial. Minor deterioration of the fossil exposures has nonetheless been anticipated by the State Party, and consolidation with chemical preservatives will be considered if necessary.

5. ADDITIONAL COMMENTS

There is clear evidence of effective communication between the local community and the site managers, as well as joint work on the development of further facilities in the local area that will provide local benefit from visitors drawn to the area. This level of collaboration appears to have grown significantly in recent years and is strongly welcomed and encouraged. IUCN considers that it would be of benefit for the Bükk National Park Directorate to develop a

formalised mechanism to ensure that this regular contact and joint work is expanded in the future.

6. APPLICATION OF CRITERIA

The Palaeohabitat of Tarnóc is nominated for inscription under natural criterion (i).

Criterion (i): Earth's history and geological features

PoT has been nominated as the most significant protected Miocene tracking site. It is not, however, the most significant site for recording the Miocene life as a whole, and at least two more significant sites are known elsewhere, which are also accessible and protected. In absolute terms, the diversity of the PoT is lower than other fossil sites on the World Heritage list, and the extent of its insight into the record of life of this period is more limited. Inscription would represent a significant broadening of the application of criterion (i) in relation to fossil sites and would be inconsistent with past decisions of the Committee. IUCN, therefore, considers that the nominated site does not meet this criterion.

7. RECOMMENDATION

IUCN recommends the Committee **not to inscribe** the Palaeohabitat of Tarnóc on the World Heritage List.

IUCN recommends the Committee congratulate the Hungarian State Party on its exemplary approach to managing an *in situ* fossil resource, and its effective provision of visitor interpretation.

IUCN recommends that the State Party be invited to consider the option of nominating the site under the emerging Geoparks Initiative supported by UNESCO and the International Earth Sciences Union. Such status would seem to certainly be warranted in view of both the level of importance of the site, and the high quality of its management.

APPENDIX 1: IUCN FOSSIL SITE EVALUATION CHECKLIST

Coverage of an extended time period

The PoT includes rocks covering over 4 million years of Miocene history, and record the context for the palaeohabitat, including the shallowing of marine conditions prior to the burial of the palaeohabitat. The palaeohabitat itself, comprising the footprint sandstones, and the overlying preservation of plant material as leaf impressions and petrified tree trunks represents a snapshot of life preserved in a volcanic eruption.

Richness of species diversity

The overall diversity of the PoT comprises 11 species of vertebrates, known from trace fossil footprints, rather than body fossils. The diverse record of vegetation, with over 65 species known has been identified as a distinctive vegetation assemblage within the Tertiary. The preservation by a single volcanic event allows a confident, comprehensive reconstruction of the palaeohabitat to be made. The underlying marine deposits contain an important accumulation of shark teeth, and other fossil material of national and regional importance. The inscribed Australian Fossil Sites World Heritage Site has a diversity of Miocene vertebrate material more than ten times greater than the nominated site, but from a different faunal province and with no species overlap.

Uniquely representative of a geological time period

There are many sites worldwide producing Miocene footprints and vegetation remains, and others that produce primary fossil remains. The PoT is important within Europe, in terms of the combination of large numbers of *in situ* excavated and protected footprints, in combination with a complete record of vegetation. There are other type areas of comparable value to Tarnóc in relation to current study of Miocene life. There are other significant footprint sites within Europe and world-wide, although Tarnóc is pre-eminent amongst Miocene footprint sites.

Existence of other comparable sites

There are a number of comparable sites, particularly within America but also in Europe, that produce diverse mammal and vertebrate fossil remains from the Miocene. Riversleigh, part of the Australian Fossil Mammals World Heritage Site, demonstrates significantly greater values, though from a different faunal province. Elsewhere, both Ashfall Fossil Beds State Historic Park and Agate Fossil Beds National Monument in Nebraska, USA, provide more substantial representative values of Miocene life than the nominated site. There are numerous other Miocene footprint sites in central Europe, but the nominated site is of greater significance in view of its combination of diversity, and its protected status. A global study indicates that amongst Miocene footprint localities, the nominated site has one comparable site in terms of scientific value, at Copper Canyon in Death Valley National Park but has the additional distinction of public access and interpretation facilities.

Contribution to the understanding of life on earth

The Miocene was a time of warmer global climates. It is notable globally for the first appearance of two major ecosystems: grasslands and kelp forests, neither of which are recorded at Tarnoc, which represents a forested ecosystem. During this time mammal biodiversity on Earth reached a peak, with significant evolution of many species, including the anthropoid apes. The PoT, therefore, provides an important snapshot of part of the Miocene story of life on Earth, but not the complete picture.

Prospects for ongoing discoveries

The nominated site has considerable significance as an *in situ* protected fossil site. The extent of the palaeohabitat goes well beyond the current excavated area, and there is potential for further discoveries, which is dependant on further excavation. Excavations in the last ten years have not added further to the number of recorded species at the site, but have

significantly increased the volume of fossil discoveries that have been made. The scale of plant discoveries has enabled a distinctive new floral complex to be recognised. Review has suggested that there is scope for a more ambitious reconstruction of the ecological interactions within the site to be made.

International level of interest

The nominated site is of international interest, although is considered by reviewers to have been relatively overlooked by the global palaeontological community until recently. The site is well known in the scientific literature. It has been recognised as one of Europe's principal fossil '*lagerstätten*' by the European Palaeontological Association, and has been recognised as a 'classic' site within a recent review of footprint sites in Europe. It appears to be attracting growing recognition from scientists outside Europe. Its international interest relates partly to the quality of the Miocene fossil remains, but also to the importance as an *in situ* footprint site, which is being protected and managed in a way that appears to set international standards.

Associated features of natural value

There are other features of natural value (e.g. the contemporary flora and fauna) associated with the nominated site, and an attractive, if not particularly remarkable semi-natural landscape which supports some species of conservation importance, and is of some national importance. The ecosystem preserved in the palaeohabitat and the modern ecosystem have a superficial similarity as woodland environments with stream features, although in detail are very different.

State of preservation of specimens

Many of the footprints are superbly preserved, as vivid now as the day they were made. Surface detail of the leaves is excellent, although there is no preservation of internal structure. The petrified wood is generally perfectly preserved, including cells and tree rings.

Curation, study and display of fossils

The current management regime is based around *in situ* curation and preservation of the fossil resource, which is carried out to a high standard. Several large sections of the palaeohabitat are curated and displayed at the Hungarian Geological Museum, although this is not open to the public. There is an extensive, representative collection of vegetation at the Hungarian Museum of Natural Sciences, which is developing a major reconstruction of the forest environment as part of a new publicly accessible museum area in Budapest.

There is increasing provision of facilities to curate, study and store fossils at the nominated site itself, and the on-site display of fossils and the display and interpretation of the palaeohabitat is carried out in a very effective way, providing an accessible, vivid reconstruction of the values that the site represents.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

NATURAL SYSTEM OF WRANGEL ISLAND RESERVE (RUSSIAN FEDERATION) ID N° 1023 Rev

Background note: The Natural System of Wrangel Island Reserve was nominated in 2000 under the name of "The Natural System of Wrangel Island Sanctuary". IUCN was able to evaluate this site in 2002 when climatic and logistical conditions were favourable to send a mission. In June 2002, just prior to the 27th session of the World Heritage Committee, the State Party withdrew this nomination to review issues associated with its boundaries, particularly in the marine area. A revised nomination document was submitted to the World Heritage Centre in February 2004. This revised nomination is essentially the same as the one proposed in 2000, thus a second field mission was not considered required. However, the boundaries of the marine component of the nominated site have been revised, including only 12 nautical miles of protected marine zone around the islands, and not 24 nautical miles as proposed in the original nomination. This evaluation report considers both the information provided in the original nomination and in the revised nomination submitted in 2004.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 8 references
- ii) **Additional Literature Consulted:** Arctic Council (CAFF - Conservation of Arctic Flora and Fauna Working Group). 2001. **Arctic Flora and Fauna: Status and Conservation**; Talbot, S. Yurtsev, B. Murray, D. Argus, G. Bay, C. Elvebakk, A. 1999. **Atlas of Rare Endemic Vascular Plants of the Arctic**. CAFF Technical Report No. 3; Stishow, M. 2001. **Wrangel Island, the Arctic Enigma**. in Russian Conservation News, No. 25, Centre for Russian Nature Conservation; Beringia Conservation Programme (Anchorage) and WWF-US. (no date) **The Bering Sea Ecoregion**. Washington; Tishkov, A. J. Pagnan, *et al*, 2002. **A Review of Projects Concerning Biodiversity Conservation and the Use of Biological Resources in the Russian Arctic** (in prep.), UNEP and CAFF; Tishkov, A. J. Pagnan, *et al*, 2002. **A Data Base of Ecological Projects in the Russian Arctic** (in prep.) UNEP and CAFF; Pagnan, J., Legare, G. 2002. **Protected Areas of the Arctic: Conserving a Full Range of Values**. CAFF; OGP with Introduction and Environmental Overview by J. Pagnan. 2002. **Arctic Guidelines for Offshore Oil and Gas Exploration and Production**. International Arctic Research Policy Committee of USA. **Arctic Research**, Volume 16, Spring/Summer 2002.
- iii) **Consultations:** 4 external reviewers. Various Government officials from the Ministry of Natural Resources in Moscow; the district administrator of the Chukotka Autonomous Area; Various staff and specialists of the Wrangel Island Zapovednik; staff from the UNESCO Moscow Office and IUCN office for Russia and the Commonwealth of Independent States.
- iv) **Field Visit:** Jeanne Pagnan and Alexei Blagovidov, July/August 2002.

2. SUMMARY OF NATURAL VALUES

2.1 Geographical Location

The Natural System of Wrangel Island Reserve is made up of Wrangel Island (7608.7 km²), Herald Island¹ (11.3km²) and a marine area (11,543 km²) that comprises 12 nautical miles around each island, for a total area of 19,163 km². The Islands are located well above the

¹ sometimes written as Gerald Island due to the difference between the Russian and English alphabets

Arctic Circle at 70° N and are surrounded by the East Siberian Sea to the north and west and the Chuckchi Sea to the south and east. They lie 140 km off the northeast coast of the Chukotka mainland. Herald Island lies within the western hemisphere at 175° W whereas Wrangel Island, located from 178° E to 177° W, straddles the 180° meridian and both eastern and western hemispheres. The 180° meridian is marked only by a small pile of rocks on a hill. There is no signage.

2.2 Physical Features

Wrangel Island is mountainous with old, weathered ranges, concentrated in the lower half of the island and generally running in an east-west direction. The central "hump" is jagged and quite high (over 1000m) but gradually resolves into smoother, lower formations towards the coasts ending in the Western and Eastern Plateaux, the extensive low-lying plains of the Tundra Academy in the north and the less expansive tundra plains along the south coast. There is a variety of metamorphic, sedimentary, and shale-type rocks, with some igneous rocks indicating volcanic activity. There are also diverse geological features, including the conical, volcanic-shaped Tundra Mountain in the north, the jagged peaks of the central ridge, the softly silhouetted and heavily eroded mountains of the Mammoth range, the shale formations in the south-west and along the Unexpected River, the crumbling dun-coloured precipices of the Tundra River valley, and the fort-like sand and rust coloured structures of the north slopes. The variety and multiple-hues of these features in a relatively small geographic area, interspersed with an extensive network of valleys and river basins, is visual evidence of the island's long geological history, uninterrupted by glaciation, and is aesthetically both unusual and impressive.

The hydrographic network of Wrangel Island consists of approximately 1,400 rivers over 1km in length; five rivers over 50km long; and approximately 900 shallow lakes, mostly located in the northern portion of Wrangel Island with a total surface area of 80km². The waters of the East Siberian Sea and the Sea of Chukchi surrounding Wrangel and Herald Islands are classified as a separate chemical oceanographic region. These waters have among the lowest levels of salinity in the Arctic basin as well as a very high oxygen content and increased biogenic elements.

The terrain is not striated, which is further evidence that it was not glaciated during the most recent Quaternary Ice Age, thus confirming its uniqueness in the high Arctic. The ground is underlain with permafrost and a mosaic of tundra and steppe types co-exist in quilt-like patterns. Tundra types range from fields of dry, sparsely vegetated, rounded or shorn hummocks, (indicating an old ocean bottom), mossy hillocks, sheltered meadows with dwarf willows growing over 1 metre high, lush grasslands, numerous wet and marshy areas interspersed with tundra-ponds, various lichen dominated complexes and sections of dry, polar desert with flat, hard-packed soils and gravel.

2.3 Climate

Wrangel Island is influenced by both the Arctic and Pacific air masses. One consequence is the predominance of high winds. The Island is subjected to "cyclonic" episodes characterised by rapid circular winds. It is also an island of mists and fogs.

Average temperatures appear to be rising on Wrangel Island, extreme weather episodes have been increasing and summers are getting wetter. These observations are consistent with findings in other parts of the Arctic and are indicative of an overall Arctic warming trend. Weather conditions on Wrangel are highly variable from one location to another but are only monitored at the meteorological station at Ushakovskoe Village due to a lack of monitoring equipment to expand the meteorological network to other parts of the Reserve.

There are noticeable differences in climate between the northern, central and southern parts of the Island. The central and southern portion is warmer, with some of the valleys having semi-continental climates that support a number sub-Arctic steppe-like meadow species. This is a unique feature in the High Arctic.

According to research reports over the past several years, ice around Wrangel Island has been melting earlier in the spring and the autumn freeze-up has been occurring later. The

number of ice-free years has also been increasing each decade. The warming trend is expected to cause hardship for two of Wrangel Island's most noted species - polar bears, which travel on ice in search of prey seals, and walrus, which depend on ice as platforms to dive for molluscs, their main food. More intensive monitoring is needed to detect impacts of these ice changes to the marine environment of the site.

2.4 Biodiversity

The variety of terrain types offers a range of habitats which accounts, in part, for the higher diversity of plants and animals on Wrangel Island than in most other parts of the Arctic. Other reasons are its history and location. Wrangel Island is a vestigial part of the ancient Bering continent present during the Pleistocene era and was not glaciated during the Quaternary Ice Age. It served as a refuge for Pleistocene species, and remnant species not present elsewhere are still to be found on Wrangel. Another reason is that Wrangel Island is on the intersection of two major continental systems – Asia and North America -and has species from both.

While Wrangel Island approaches a typical tundra region, its flora is unique in terms of its species richness and number of endemic plants. Currently, 417 species and sub-species of vascular plants have been identified on the island, more than the entire Canadian Archipelago and double that of any other arctic tundra territory of comparable size. Some species are derivative of widespread continental forms, others are the result of recent hybridization and 23 are endemic. This is unmatched by any other Arctic island.

Prevailing flora include mustard, rose, buttercup and saxifrage families. Flowering plant species include pink dryads *Dryas punctata*, pasqueflowers *Pulsatilla nuttaliana*, Castilleja flowers *Castilleja elegans*, and yellow poppies *Papaver* spp. There are 17 species of Arctic poppies on Wrangel Island, five of which are endemic to the island, including *Papaver gorodkovii* and *P. lapponicum*. Additionally, 331 moss species and 310 lichen species have been identified on Wrangel Island.

The island is the northernmost destination for over a hundred migratory bird and marine mammal species from both Asia and North America. Gray whales and dolphins are present. Birds are plentiful, including various shorebirds (dunlin, Common snipe, Lesser golden and Black-bellied plovers, pectoral sandpipers, red knots, and ruddy turnstones), geese, including both Snow geese and Brent geese, Snowy owls, Eider ducks, Long-tailed and Pomarine skuas (jaegers), Black, Common and Thick-billed guillemots, Glaucous gulls and kittiwakes, Sabine's gulls, Lapland longspurs, Snow buntings, White wagtails, Peregrine falcons and Gyrfalcons.

Lemming burrows are easily observed throughout the island. Both the collared and the Siberian lemmings are present and they may have evolved into separate sub-species due to their isolation, but this has not yet confirmed by scientific studies. Lemmings are the staple diet for Snowy owls, other raptors and for arctic foxes. Unlike their mainland cousins, the lemming populations on Wrangel do not experience the same fluctuating "boom/bust" population cycles; while there are cyclical declines and increases, they are far less dramatic.

According to palaeontological evidence, muskoxen and reindeer inhabited the island in the late Pleistocene and even later, but have since disappeared. Muskoxen were introduced from Canada during the 1970's and continue to inhabit the island. Reindeer were brought to Wrangel Island in the 1940's to establish a domestic reindeer industry. That practice resulted in severe localised overgrazing, destruction of ancient nesting areas and disruption of the ecological balance. There are differing opinions on whether these two ungulate species are at or beyond the carrying capacity of the island and various options on how to maintain a balance on the populations have been proposed.

The wolf is the natural predator and a small pack used to inhabit the island until the federal government ordered its destruction some years ago to favour the fledgling reindeer herding industry, now abandoned. Since this natural ecological balance was destroyed, questions facing the reserve management are whether to re-introduce wolves, to allow themselves to re-establish themselves naturally (by ice from the mainland) or whether to use some other means of intervention to keep the large ungulate populations in balance. Staff reported that

they are concerned about the negative reaction to wolf re-introduction, since it is still generally a reviled animal in many circles, despite its important ecological role and benefits.

3. COMPARISONS WITH OTHER AREAS

Udvardy (1975) classifies the Wrangel Island complex as High Arctic Tundra of the Eastern Palearctic realm. There are no other High Arctic Tundra natural World Heritage sites at present. In fact, in the existing World Heritage List, tundra and polar systems are the least common biomes.

It is, therefore, necessary to compare this site to other protected areas in the Arctic region. For the purpose of this analysis, the definition of the Arctic accepted by the Arctic Council and by IUCN in its Arctic Strategy has been applied. It divides the Arctic into four broad zones: marine; Arctic desert; tundra; and the transition timberline forest, or "forest-tundra" zone, although there are some differences among specialists as to how each zone is delineated. Since, in total, the Arctic region covers nearly 30 million km² with over 400 protected areas, this analysis is restricted to a comparison with 12 other Arctic Islands and island complexes within the marine zone, which itself encompasses nearly 15 million km².

Of the 13 Arctic islands reviewed, 11 have some level of formal protection and there are approximately 30 protected areas. Some islands such as Wrangel, the New Siberian Islands and Franz Joseph Land are over 95% protected (as IUCN Management Category I). Others such as Severnya Zemlya or Novya Zemlya have no protected areas. Of all the islands and their protected areas, Wrangel has the highest terrestrial and marine biodiversity and productivity. Summary details are provided below.

Marine Biodiversity: There is insufficient readily available data to compare the level of marine productivity and zooplankton biomass at Wrangel with all other Arctic islands. However, based on other parameters such as the high numbers of marine-dependant species, it is reasonable to conclude that other than Iceland and the Aleutians, Wrangel marine productivity and biomass exceeds all other Arctic islands with the possible exception of some coastal areas of Greenland. There is, however, insufficient data and research on the benthic environment of the Arctic islands to do a comparative analysis.

Six marine species were surveyed among the Arctic islands: Arctic charr, Bearded seal, Narwhal, Pacific walrus, Gray whale and polar bear. Of these six, five are found at Wrangel Island, the highest number at any island. Polar bears breed on ten islands, with Wrangel and Svalbard having the highest density. However, Wrangel has a far higher number of dens than Svalbard. Their breeding grounds are fully protected within protected areas on Wrangel and parts of Svalbard, but are not on Novya Zemlya or on some Canadian Islands. The Pacific walrus is found on six Arctic islands but the largest haulouts are at Wrangel, where they are fully protected. They are also protected on Svalbard, the New Siberian Islands and Franz Joseph Land but not on Novya Zemlya or Severnya Zemlya.

Terrestrial Biodiversity: Arctic land is classified according to vegetation zones and there are several systems in use. There is a strong correlation between the vegetation zonal classification and productivity. Within the various systems, only Iceland and the Aleutians have higher primary productivity than Wrangel because they both lie within more productive zones. In terms of vegetation, Wrangel is classified either as exclusively Arctic Tundra, Southern Variant, (an anomaly among the Arctic islands), or entirely Arctic desert with more than 5% biomass. Only the New Siberian Islands also fall into this latter category but they are not protected. This classification distinguishes it from Canada's Arctic islands which are classified as Arctic desert but having less than 5% biomass.

Studies have been carried out on the Arctic's rare endemic vascular plants found on only six of the islands. These rare plants occur in the highest density relative to size on Wrangel. Two islands – Wrangel and the Aleutians - have species found only on those islands. There are 21 species occurring only on Wrangel Island whereas four occur only on the Aleutians. All rare endemic vascular plant species on Wrangel are fully protected within a Category I strict nature reserve. Rare plants are also protected on the Aleutians in a Category IV protected

area. However, the rare endemic plants located on other Arctic islands fall primarily outside protected areas, especially those on Svalbard, Greenland and Ellesmere Island.

11 species of terrestrial fauna with wide Arctic distribution were surveyed for their presence on the Arctic islands. The species were Common, King and Steller's eiders, Thick-billed and Common Murre (or Guillemot), Collared and Siberian Lemming, Snow goose, Tundra reindeer, Muskoxen and Wolf. Of the 11 terrestrial fauna species surveyed, ten are found on Wrangel Island, the highest number of any Arctic island or complex. Only the King eider is not found on Wrangel. Wrangel is also the only island where both the Collared Lemming (*Groenlandicus*) and the Siberian Lemming are found. All other islands have either one or the other but not both. Wrangel is also the only Arctic island with an Asian population of the Snow Goose.

4. INTEGRITY

4.1 Boundaries

As noted above, the proposed World Heritage site, including the marine component, is under federal jurisdiction, although there is a "work-sharing" agreement with the Chukot Autonomous Area (or Okrug). The village of Ushakovskoe, (with two resident families, several border guards and eight polar station staff), a section of the surrounding land and the marine zone between the Khistchnikov River and Cape Hawaii are outside the boundaries of the nominated site and reserve and do not come under its strict provisions, including access. However, entry is controlled by a system of permits and enforced by the resident border guards.

4.2 Legal Status

The nominated site is federal property under the Ministry of Natural Resources. Under the Russian system of protected areas, the nominated site, including its terrestrial and marine component, is classified as a "Zapovednik" (IUCN Category Ia, Strict Nature Reserve). This accords it the highest level of protection and excludes practically all human activity other than for scientific purposes. The Zapovednik was established in 1976 as the Wrangel Island State Sanctuary by the State Planning Department of the USSR. At that time all buildings, structures and the reindeer herd were transferred from the Zapovednik by the Ministry of Agriculture. To provide better protection for marine mammals, and following a joint proposal by the Governor of the Chukot Autonomous Region and the State Committee for the Environment, the Reserve was extended to the Territorial Sea (out to the 12 nautical mile limit) in 1997 by federal Decree. In 1999, the Government of the Chukot Autonomous Region recommended a further 24 nautical mile extension to the marine component of the reserve; however this proposal has not been approved at the Federal level.

4.3 Management

In July, 1997, the State Committee for Environmental Protection for the Government of the Russian Federation entered into an Agreement on protected areas with the Administration of the Chukot Autonomous Area (CAA). This delegated much of the authority for the administration of protected areas (including the Wrangel State Nature Reserve) to the CAA. In accordance with that agreement, the CAA is responsible for day-to-day operations of the nominated site, administration of non-Reserve territory, participation in the selection of the Reserve Director, protection of the marine area and enforcement of the marine regulations.

Although the Zapovednik or Reserve has annual work plans, there is no comprehensive management plan for the site. The lack of long-term management planning for the Reserve is not unusual in Russia. In fact, management planning is a relatively new concept in the country and one that needs to be nurtured. Some management tools are in place. In 1992, the Reserve authorities issued: "Rules of Behaviour" for the Reserve, covering waste disposal and including prohibitions and guidelines for the protection of the polar bear, walrus, Arctic fox, lemmings, Snow goose, Snowy owl and other tundra birds. There is no guidance given for the protection of the flora, geological formations or cultural values. In 1997, the Federal authorities approved a set of provisions for the Reserve that describe its functions and the

roles and responsibilities of the staff and scientists. There are strict regulations concerning the marine zone where, for example, shipping is not permitted.

The staff working at the nominated site are federal employees. The senior management team consists of the Director of the Reserve appointed by the Ministry of Natural Resources and the Senior Scientist, appointed by the Director. There are approximately 27 full- and part-time Reserve staff consisting of a core of 8 full-time scientists specialising in Snowy owl, lemmings, Snow geese, ungulates, polar bear, walrus, veterinary science and archaeology, 7 technical staff, 4 rangers, and 8 administrative staff. The rangers reside full-time on Wrangel Island and carry out various tasks, including monitoring, site maintenance and maintaining a watch over the island's permanent settlement. The core staff is supplemented by a number of experts from Moscow and St. Petersburg who carry out research in hydrology, meteorology, geology, botany, palaeontology and marine mammals. The Reserve also brings in university students and scientific expeditions from time to time. There is no human resource plan for the site.

The Reserve has few vehicles, often in poor condition. The staff lacks good repair kits and replacement parts, including tyres. Vehicle and communications breakdowns are a constant challenge and create serious safety concerns at the site. The Reserve also lacks adequate technical communication facilities. Communication on, to and from the island is limited and by radio signal, when conditions permit. There is also a serious problem with management communications with the Reserve's Headquarters in Moscow. The Reserve is not only physically remote, but also quite isolated from federal authorities. This situation poses additional problems for management and coordination.

The Reserve is dependent on oil and generators for all its energy. This is extremely expensive, produces noise and air pollution and supplies cannot always be guaranteed. The Reserve staff stated that wind energy and solar powered energy cells would be a better alternative but they lack adequate funds to implement these options.

Tourism is primarily by cruise ship and subject to permits, as well as strict regulations and access criteria. Ships pull into the island and disembark passengers who roam along the shores outside the Reserve but do not enter the Reserve itself. Tourism into the Reserve is tightly controlled and includes scientific expeditions led by Reserve staff. They are a source of revenue for the Reserve and a means of promoting the Reserve's values. The facilities on the island are primitive and should the island be opened up to more visitation, facilities would have to be upgraded and great care taken to avoid disturbing the wildlife which are especially vulnerable to noise and human disturbance of any kind.

4.4 Research and Monitoring

The Senior Scientist has overall responsibility for the research and monitoring programme of the Reserve. As is the case with Russia's other Nature Reserves, research is a priority on Wrangel Island and there are currently three ongoing research programmes focused on the species for which the island provides unique habitat: Snowy owls, polar bears and Snow geese. For these species there are long data time series available. Work on other species and environmental factors are spotty and very much depend on visiting experts and their interests. For example, there is neither ongoing benthic research nor plans for any, and there has been no vegetation research or monitoring during the past two seasons. One of the reasons is that funding is very limited and the priority has been to keep the Reserve functioning rather than invest in new types of research.

The Reserve could be an important "weather vane" for climate change and to detect environmental changes and adaptations. However, climate is not monitored consistently due, in part, to the lack of automated weather monitoring equipment. There is currently no long-term monitoring plan and it is imperative that both the research and monitoring at the Reserve be improved, be more comprehensive and up to date and be maintained at high quality. The lack of comprehensive research and monitoring plans contribute to the weakness in the Reserve management programme. The Reserve monitoring programme should also be better linked to other Arctic programmes such as the circumpolar caribou/reindeer monitoring programme and migratory marine mammal monitoring in North America.

4.5 Threats and Human Impacts

According to the Reserve staff and federal authorities in Moscow, the polar station and village of Ushakovskoe with its surrounding non-Reserve buffer zone lying just outside the Reserve poses the greatest immediate threat to the Reserve. There has already been damage and the potential for more serious disturbance to the island's ecosystem and wildlife is very real. For instance, the staff at the polar station are rotational and their behaviour is not always sensitive to the vulnerabilities of the island. The Reserve rangers currently spend much of their time observing the activities at Ushakovskoe to minimise environmental damage. There are plans to close down the polar station and to move non-reserve residents off the island.

Enforcement is the main problem since the Reserve has no patrol boats and the Chukot administration enforcement capability is limited, thus unauthorised hunting and poaching is always a serious threat. Other existing or potential threats to the Reserve include activities on the Chukot mainland such as oil slicks from ice-breakers and trawlers, tourism, industrial development on the mainland and the resulting pollution especially from coal burning, chronic lack of funding, lack of adequate technical and communications equipment and weak management systems and planning.

In June 1994, Russia and the United States signed a Memorandum of Understanding for a joint oil and gas lease sale in the Chukchi Sea. The proposed lease sale area came within a short distance of Wrangel Island and surrounded Herald Island. According to federal authorities, the agreement and proposed lease sale have been cancelled. Nevertheless, the situation could change if Russia amends its policy on oil and gas exploration and exploitation. Therefore, should drilling occur in the Chukchi Sea in the future, it needs to be subject to very stringent regulations to protect the Reserve and wildlife migratory routes.

Present day human impact in the Reserve is minimal. The most serious human impacts occurred during the period of settlement prior to the establishment of the Reserve in 1976 and the signs are still visible and will remain so given the climate. During that time, all-terrain vehicles were used indiscriminately and their tracks and a few broken down vehicles are still present on parts of the tundra. The policy now is to use existing tracks and not make new ones. The earlier presence of about 100 residents in Doubtful village and at the neighbouring air strip caused great disturbance to the wildlife and terrain from, for example, noise, pollution, motorised vehicles and hunting pressure. Walrus disappeared from their traditional haul-out on Doubtful Spit during the time the village was inhabited but have recently begun hauling out again and up to 70,000 walrus now use the site.

Another impact has been debris, especially discarded oil drums, used to import the island's main energy supply. Most have now been cleared from the tundra in an ongoing clean-up programme and have been stockpiled near research stations to await removal. The current policy is to remove a drum for every one brought in. There is some unsightly debris and abandoned construction material around Doubtful and the airstrip but it poses no real problem. The Reserve is considering how to clean up the area while preserving the deserted site for its cultural values.

By far the most serious and pervasive human impact has been domestic reindeer herding which caused severe damage to the vegetation and nesting areas, especially Snow geese, which are making a slow recovery now that the herding industry has been closed down. Deserted reindeer herder shacks are now used as research stations and stopovers for reserve staff and expeditions.

A potential threat to the site is associated to an influx of too many people to the island or opening it to activities such as hunting as a means of getting additional funds. Its vulnerable wildlife are already at the upper limits of their species ranges and are unable to compete with high-powered rifles, indiscriminate use of all-terrain vehicles or the disruptive noise and bustle that accompanies most human activity.

5. ADDITIONAL INFORMATION

The nominated site has important palaeontological values. Wrangel Island was home to the last mammoths and according to the staff, tusks and skulls are regularly washed up in river basins. Staff also reported finds of the primeval bison, Prjesalski's horse, the furry rhinoceros and other species. According to the staff, there is palaeontological evidence of a large lake over 100,000 years ago near the Tundra Mountain which would provide an historical incentive for the present-day abundance of Snow geese in the area. Bones left by ancient palaeoeskimo hunters about 2400 years ago can still be observed on the island, as well as bones left in distinctive patterns by native hunters earlier this century.

It is also important to note the cultural values associated to this site. These include a palaeoeskimo site as well as several small deserted reindeer herder's settlements with artefacts intact, and also the deserted village and airfield of Doubtful in which many houses and buildings with all the previous inhabitants' personal belongings, including hand-written letters, books and other objects, are well preserved and quite undisturbed. They tell an interesting story about the inhabitants themselves and their efforts to settle in a remote and very challenging environment. Another interesting aspect of the island's cultural history is that it served as the refuge for the survivors of the great Canadian Arctic Expedition of 1914 and the harrowing journey by their leader, Robert Bartlett, to procure a rescue ship – the *King and Winge*.

6. APPLICATION OF WORLD HERITAGE CRITERIA

The Natural System of Wrangel Island Reserve has been nominated on the basis of natural criteria (ii) and (iv).

Criterion (ii): Ecological process

The nominated site is a self-contained island ecosystem and there is ample evidence that it has undergone a long evolutionary process uninterrupted by the glaciation that swept most other parts of the Arctic during the Quaternary period. The number and type of endemic plant species, the diversity within plant communities, the rapid succession and mosaic of tundra types, the presence of relatively recent mammoth tusks and skulls, the range of terrain types and geological formations in the small geographic space are all visible evidence of Wrangel's rich natural history and its unique evolutionary status within the Arctic. Furthermore, the process is continuing as can be observed in, for example, the unusually high densities and distinct behaviours of the Wrangel lemming populations in comparison with other Arctic populations or in the physical adaptations of the Wrangel Island reindeers, where they may now have evolved into a separate population from their mainland cousins. Species interaction strategies are highly-honed and on display throughout the island, especially near Snowy owl nests which act as protectorates for other species and beacons for migratory species and around fox dens. IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

The nominated site has the highest level of biodiversity in the high Arctic. Wrangel Island is the breeding habitat of Asia's only Snow goose population which is slowly making a recovery from catastrophically low levels. The marine environment is an increasingly important feeding ground for the Gray whale migrating from Mexico (some from another World Heritage site, the Whale Sanctuary of El Vizcaino). The islands have the largest sea-bird colonies on the Chukchi Sea, are the northernmost nesting grounds for over 100 migratory bird species including several that are endangered such as the Peregrine falcon, have significant populations of resident tundra bird species interspersed with migratory Arctic and non-Arctic species and have the world's highest density of ancestral polar bear dens. Wrangel Island boasts the largest population of Pacific walrus with up to 100,000 animals congregating at any given time at one of the island's important coastal rookeries. Since Wrangel Island contains a high diversity of habitats and climates and conditions vary considerably from one location to another, total reproductive failure of a species in any given year is practically unheard of.

Given the relatively small size of the area, this is very unusual in the high Arctic. IUCN considers that the nominated site meets this criterion.

7. RECOMMENDATIONS

IUCN recommends that the Committee **inscribe** the Natural System of Wrangel Island Reserve on the World Heritage List under natural criteria (ii) and (iv).

The Committee may wish to recommend the State Party to urgently prepare a management plan and implementation strategy, supported by adequate financial resources, that incorporates *inter alia*: technical and management communications; a tourism and visitor strategy; options for alternative energy supply; transportation; a monitoring and research programme; options to preserve the site's cultural and palaeontological features; a human resources policy for the staff working at the site; and a plan to remove unwanted debris from Doubtful Village. The Committee may wish to encourage the State Party to submit, if it wishes to do so, an international technical assistance request to help undertake the actions proposed above. The Committee is advised to request the State Party to invite a mission in 2-3 years time to report on the status of the management plan and to review its implementation.

Finally the Committee may wish to encourage the State Party to consider the possibility of extending the marine component of this site a further 12 nautical miles as proposed in 1999 by the Government of the Chukot Autonomous Region. This extension would add significantly to the protection of the marine biodiversity of the Wrangel Island Reserve.

A. Nominations of Natural Properties to the World Heritage List

A3 Extension of Properties inscribed on the World Heritage List

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

WESTERN CAUCASUS - EXTENSION TO INCLUDE THE TEBERDINSKIY RESERVE (RUSSIAN FEDERATION) ID N° 900 Bis

Background note: The Western Caucasus (Russian Federation) was inscribed on the World Heritage List in 1999 under natural criteria (ii) and (iv). The site includes: the territory of the Caucasus State Biosphere Reserve (CSBR) with the exception of the Khosta Yew-Box Grove but including the entire Lagonaki plateau. The Committee noted that “*The Western Caucasus has a remarkable diversity of geology, ecosystems and species. It is of global significance as a centre of plant diversity. Along with the Virgin Komi World Heritage site, it is the only large mountain area in Europe that has not experienced significant human impact, containing extensive tracts of undisturbed mountain forests unique on the European scale.*” Although IUCN had recommended for this site to be deferred due to the threat of road construction through the site, at the time of inscription the State Party provided assurances to abandon this route for the road and this was key to the site being inscribed.

In addition, IUCN recommended at the time of inscription of the Western Caucasus that the State Party elaborate a master management plan for all the protected areas included in the nomination. To date, this management plan has not been prepared and submitted. In 2001 the Bureau noted that there was significant illegal trespassing taking place, that there had been a weakening of conservation controls, and that a part of the area was proposed to be deleted to allow for tourist development and construction of a road. The State Party is yet to respond to these concerns on the integrity of the site.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 7 references
- ii) **Additional literature consulted:** V. Akatov et al. (eds.) **Adygea: Nachhaltige Entwicklung in einer Bergregion des Kaukasus.** Grüne Liga/NABU, Berlin, 1999. A.M. Amirkhanov et al (eds.) **Biodiversity Conservation in Russia.** State Committee of the Russian Federation for Environment Protection, Moscow, 1997; I.V. Chebakova (ed.) **National Parks of Russia: A Guidebook.** Biodiversity Conservation Center, Moscow, 1997; S.D. Davis et al. (eds.) **Centres of Plant Diversity: A Guide and Strategy for their Conservation, Volume 2, Asia, Australia and the Pacific.** WWF/IUCN, Gland, 1995; V. Krever et al. (eds) **Conserving Russia’s Biological Diversity: An Analytical Framework and Initial Investment Portfolio.** WWF, Washington DC, 1994; N.M. Zabelina et al. (ed.) **Zapovedniks and National Parks of Russia.** LOGATH, Moscow, 1998; documents relating to review of Kavkazskiy State Biosphere Reserve by UNESCO Advisory Committee on Biosphere Reserves, 1998; maps of geology, soils, and forest taxa in Kavkazskiy State Biosphere Reserve; J. Thorsell, L. Hamilton, **A Global Overview of Mountain Protected Areas on the World Heritage List,** IUCN, September 2002.
- iii) **Consultations:** 4 external reviewers, regional and federal government agencies and institutions.
- iv) **Field visit:** H. Lethier, July 2003.

2. SUMMARY OF NATURAL VALUES

The nomination proposes an extension to the *Western Caucasus* World Heritage site (WCWH), which currently covers an area of 351,620 ha, to include the Teberdinskiy State Biosphere Reserve (TSBR). TSBR is located 40 km east of the Kavkazskiy or Caucasus State Biosphere Reserve (CSBR), part of the current World Heritage site, in the Republic of Karachayev-Cherkess and provinces of Karachayevskiy and Zelenchukskiy. The nomination is in the form of a serial nomination as it comprises two parts, both of which are geographically separated from each other and the existing WCWH site. The two parts are the Teberda (65,792 ha) and Arkhyz (19,272 ha) valleys, surrounded by buffer zones, which are excluded from the nomination (see table 1 below). The settlement of Dombay (104 ha) and the camp of Alibek (6 ha) which are completely surrounded by the reserve, as well as the small town of Teberda (242 ha) situated at the entrance of the reserve, are outside the reserve and consequently excluded from the nominated site.

Table 1. Size of the area (Strict Nature Reserves) nominated for an extension of the Western Caucasus World Heritage site.

Area of TSBR	Strict Nature Reserve (ha)	Buffer zone (ha)
Teberda valley	65,792	20,300
Archyz valley	19,272	10,050
Total	85,064	30,350

The nominated area is a mostly undisturbed mountainous system, with higher altitude on average than the WCWH site; more than 80% of the territory is over 2,000m in altitude. The highest summit culminates at 4,042 m. Both sections of TSBR include the uppermost parts of the Teberda and the Kyzgych rivers watersheds, running down from more than 100 small cirques and valley glaciers at the border with Georgia. The nominated area has the same geological origin as the WCWH, however there is a predominance of alpine and sub-alpine ecosystems. There are 157 ice fields and glacial lakes in TSBR, 30 tributary streams and hundreds of avalanche sites. In the large majority of the site, the landscape consequently has a typical glaciated relief, with sub-alpine meadows at lower elevations. The TSBR climate is drier and more continental than that in the WCWH site, and is divided in four different sub-climates related to the wide range of elevation represented, going from moderate warm forest in the lowest elevations to cool sub-alpine, then cold alpine, and finally to permanent snow line in the highest elevations.

TSBR's undisturbed, mostly primary; forests and its sub-alpine meadows host many relict and endemic species from the Tertiary period of 20-40 million years ago. The reserve combines the western Caucasus section of the European forest to the Caucasian mountain meadows of the Asian biome. Its more eastern location within the west Caucasus than the WCWH site makes it of very high biodiversity value, characterized by a greater variety of old coniferous forests, meadows and permanent snow line communities and a higher number of endemic species than the CSBR, thus complementing the WCWH site. A total of 701 vascular plant species have been recorded in TSBR. The ecosystems represented in TSBR include broadleaf and boreal forests (35% of the area), mountain meadows, partly grazed in the past (28%), and glaciers (10%), with rocky, permanent snow line heaths and the valley bottoms making up most of the remainder. More than three-quarters of TSBR shows no sign of human impact.

The fauna associated with the nominated site is also very rich including 262 vertebrates, (of which there are 47 mammal species, representing 36.2% of Caucasian species), 202 birds (of which some 90 species breed in the reserves, representing 80% of western Caucasian avifauna and 56% of all Caucasian avifauna), 6 reptiles, 4 amphibians and 3 fishes. Six species of mammals are listed in the Red Data Book of Russia. The prominent species of mammals are the brown bear, Caucasian otter, European mink, European wildcat, lynx, Caucasian deer, and roe deer, as well as the endemic Caucasian tur, chamois and the introduced sika deer. Anatolian leopard is possibly an occasional visitor, but the presence of this species has still to be confirmed.

The bird biodiversity is representative of the boreal forests of the Eurasian high mountains and some of the Mediterranean biome. The Teberda valley and the Klukhorskiy pass (2,743m) attract great waves of seasonally migratory birds, especially raptors. Many nesting species of raptors are observed in TSBR; the imperial eagle, golden eagle, peregrine falcon, bearded vulture, cinereous eagle, tawny eagle, Egyptian vulture and two species of great vultures are well represented. High numbers of Caucasian snowcock and the endemic Caucasian black cock are also recorded.

3. COMPARISON WITH OTHER AREAS

There are 51 sites inscribed on the WH List in the various mountain ranges of the world. These includes Huascarán National Park (Peru) which is generally accepted to encompass the most outstanding group of peaks in the Andes, and Sagarmatha National Park (Nepal) which represents the best of the Himalayan range. Similarly, the most outstanding portions of many other mountain ranges have been given World Heritage status. In the case of TSBR it should be compared to the existing WCWH, located in the same mountain range. This extension is proposed under all four natural criteria, for which comparison should also be made in relation to other important World Heritage sites in mountain ecosystems, as described below.

With a total length of 1,100km, the Greater Caucasus is the third longest mountain range in Europe, exceeded by the Scandinavian mountains (1,500 km) and the Urals (2,000 km). It is longer than the Alps or the Carpathians. The WCWH site is located in the warmer-humid western Caucasus sub-region, range in altitude from 250m to peaks over 3000m. TSBR is also located in the same sub-region, varies in altitude from 1,260m to more than 4,000m; thus adding altitudinal diversity to WCWH. However both WCWH and TSBR do not rank highly when compared with the Golden Mountains of Altai World Heritage site (GMAWH) which reaches an altitude of 4,605m and includes what is considered one of the most complete sequence of altitudinal vegetation.

TSBR has been nominated as an example of Earth's history and geological features. However it shares almost the same geological characteristics and processes as those represented in WCWH. Moreover the glacial landforms found in TSBR are quite common in other mountain ranges in Europe, and elsewhere. These features, and the landscapes associated with them, are not comparable to those that occur in Jungfrau-Aletsch-Bietschorn World Heritage site; this latter site includes the largest, longest and deepest glacier in Europe, the Aletsch Glacier, and also has spectacular landscapes, particularly associated to the Trummelbach canyon and waterfall.

The number of vascular plants that are present in TSBR (701) is almost half of that reported for GMAWH site, which includes 1,400 species of vascular plants. The number of plant species is also exceeded by WCWH which has 1260 species of vascular plants. The level of plants endemism in GMAWH (18%) is very close to that reported for the whole Caucasus range (20%). However GMAWH includes a major global centre of origin of plant diversity in mountain ecosystems of northern Asia, from which species have subsequently spread into Central Asia. The number of vertebrates, when compared with TSBR, is also higher in GMAWH with 401 species, including 72 mammals and 310 bird species. However the number of vertebrate species in TSBR is higher when compared with WCWH. TSBR also provides core habitat for endemic species like the Caucasus tur for example, and for the endangered mountain sub-species of the European bison, even though these derive from hybrid populations.

In conclusion, the nominated site is distinct from WCWH in relation to its altitudinal and landscape variations as it contains a more complete sample of alpine and sub-alpine features which are not seen in the WCWH site. In addition TSBR is characterised by a very high degree of naturalness, containing extensive tracts of undisturbed mountain forests and sub-alpine meadows which are only grazed by native animals. While TSBR in its own right is not of outstanding universal value it would add value to the conservation objectives of WCWH in the context of the Western Caucasus Mountain range. However, due to the physical

separation (40 km) between TSBR and WCWH that this proposal should not be treated as an extension but as a new serial nomination.

Finally it is important to note that the IUCN Global Theme Study on Mountain Protected Areas (IUCN, 2002) has identified boundary extensions/modifications to several existing mountain World Heritage sites. In relation to the Caucasus Mountains it suggests that the Prielbrusky National Park has strong potential for consideration for nomination, along with Mount Elbrus at 5,633m, the highest peak in Europe.

4. INTEGRITY

4.1. Ownership and legal status

As early as 1914 a reserve was established in the upper Teberda valley with partial forest protection. The "Teberdinskiy Reserve" (64,000ha) was later established in 1936 with strict protection (decree no.40). Its strict protection status has preserved the site, to date, from significant degradations and disturbance. In 1981 a ban was put in place on unregulated tourism outside the enclaves of Teberda town, the Dombay tourist complex and the Alibek camp. The European Diploma was attributed to the Reserve in 1994 (Council of Europe, Res. 94-23), and then renewed in 1999. Following this, the Federal Law on Specially Protected Natural Areas (no. 33 of 1995) reinforced the protection status of the Teberdinskiy Reserve. The Regulations of the TSBR were also confirmed by the State Committee of the Russian Federation in 1997. A buffer zone to the TSBR was created in 1998 by decree of Karachayevo-Cherkess Republic government (decree no. 203), and regulations enacted for its protection.

4.2. Management

TSBR is managed by the Russian Federal Administration. The total staff of the Reserve numbers 184 (11 administrative; 23 scientists; 52 guards, 9 educationalists and 89 maintenance staff); 28 employees have higher education and most have secondary and specialized training. The total budget of the Reserve, for the years 2000 and 2001, is respectively the equivalent of US\$ 292,000 and US\$ 387,000.

The buffer zones are managed by the Reserve Authority itself, in cooperation with the Karachayevo-Cherkess Republican government (sections for Agriculture, Natural Resources, and Conservation, Control and Management of Game Animals) and the Karachayevskiy and Zelenchukskiy district administrations.

Considerable pressure on the ecosystems comes from natural phenomena, e.g. avalanches (530 sites), mud-flows, wind-throw, rock falls, fires and periodically destructive storms. These occurrences contribute to the natural dynamics of the site but require an adaptive management regime.

Protection is achieved by regular field inspections. According to the regulations, all human uses (particularly logging and hunting) are forbidden; peripheral hunting and fishing are controlled, as well as peripheral grazing which exists but is not intrusive at present. Commercial tourism and encroachment are controlled. A detailed management plan has been drawn up. Illegal hunting and fishing are always a potential threat for wildlife in protected areas. However, it does not seem that poaching has had significant effects on the fauna of the nominated site, and both the size and the remoteness of TSBR provide guarantees in this regard. There has been no forestry activity in TSBR since 1936. Logging is forbidden and illegal logging does not appear as a high risk for forests of the Reserve. At present, those resources are not easily accessible, as the terrain is very rugged and there is no access.

It is important to note that WCWH and TSBR are physically quite separate (by 40 km). Also the proposed TSBR falls within another Republic, with no indication in the nomination document of collaborative management arrangements between these two areas. The Reserve authorities, however, are working in a proposal to establish a "*biosphere polygon*"

(100,000 ha), which would extend from the west side of Mount Elbrus to TSBR, thus joining the WCWH site and the nominated area through buffer zones. This is aimed at relieving tourist pressure around Dombay and ensuring wider economic returns to the local people. It is also intended to facilitate a more collaborative and coherent management of the site. However, if this is only meant to take care of spill-over tourism and meet the socio-economic needs of local populations, its contribution to protection and coherent management will be rather limited. The nomination document does not provide any information on the state of implementation of this proposal.

4.3. Human use of the area

Human use of most of the nominated site is very limited; mainly by the employees of TSBR and some scientists who use nine wooden cabin shelters. A very small area is also allocated to employees to grow crops and graze livestock and they are allowed to remove small quantities of wood for fuel. These activities are limited and restricted to easily accessible sites situated at the edges of the Reserve; they have no significant effect on its integrity at present.

The western limit of TSBR marks the boundary with Georgia and only the Reserve's rangers, the army and customs employees can visit this part of the Reserve without a special permit given by customs, in addition to the authorization required from TSBR authorities for entering the Reserve.

4.4 Threats

Overall, the site is characterised by a very high degree of naturalness. However, six hotels currently exist in the bordering towns of Teberda and Arkhyz accommodating 1,000 and 800 visitors respectively. The resort town of Dombay, at the heart of TSBR although outside its boundaries, currently includes a funicular, a series of ski lifts, built in the 1960's, and seventeen hotels and camps accommodating 1,200 visitors. The pressure of tourism, which seems to be under control by the TSBR management for the moment, will, no doubt, increase at Dombay, in the near future. To date the impact of this infrastructure has remained moderate although the road to the resort increases the risk of disturbance to the strictly protected area. It appears that mass tourism is developing locally and the potential extension of the resort and development of winter tourism at Dombay is cause for concern.

No camping or fires are allowed within the Reserve itself and fees are charged for the use of natural resources. In 2000 and 2001 the Karachayevo-Cherkess Republic decreed measures to control tourists and develop a programme of Environmental Education and Environmental Tourism. The Museum of Local Nature is visited by 8,000 to 9,000 tourists every year and a regional Environmental Education Centre has been built nearby the headquarters of the reserve with funding from the Global Environmental Facility (GEF). Fourteen environmental education trails, totalling 74 km, are available for the tourists.

It is essential that the Russian authorities give their total commitment that both the limits and the legal protection of the strict nature reserve is to be conserved in the long term. A detailed map of the limits of the site, especially in the parts adjacent to the towns of Dombay and Teberda is required to clearly show the areas that are vulnerable to such pressure.

5. ADDITIONAL COMMENTS

The nomination of TSBR is proposed as an extension to the WCWH site which is expected to give a high priority to the management issue of the whole area. As mentioned in the WCWH site evaluation report in 1999, the complexity of the situation created by a site composed of several clusters requires that the State Party integrate its planning efforts at regional level, to better implement the objectives, not only of the Biosphere Reserve concept, but those associated to the World Heritage Convention. This will require a better coordination and greater levels of involvement of the different stakeholders, including public agencies, the private economic sector and the local population. In this sense, the delimitation of the

"*biosphere polygon*" previously mentioned should be conceived to facilitate the conservation and sustainable development of this area.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The Teberdinskiy State Biosphere Reserve has been nominated under all four natural criteria, whereas the existing WCWH site was inscribed under natural criteria (ii) and (iv) only.

Criterion (i): Earth's history and geological features

TSBR shows all the effects of quaternary glaciations and hosts many remnant glaciers and nival systems remaining from this period. However, the extent of glaciation and the geological periods represented within the nominated site are much less than some other mountain sites in Eurasia, notably the Golden Mountains of Altai in Russia and the Jungfrau-Aletsch-Bietschhorn site in Switzerland. IUCN considers that the nominated site does not meet criterion (i).

Criterion (ii): Ecological processes

The TSBR includes a diversity of complete and undisturbed ecosystems including open sub-alpine meadows that is not common in WCWH. However the ecological values and processes occurring in the nominated site are not dissimilar to those occurring in WCWH and are not comparable to that existing in other world heritage sites in mountain ecosystems. IUCN considers that the nominated site does not meet criterion (ii).

Criterion (iii): Superlative natural phenomena, scenic beauty

The nominated site includes mountain landscapes which are typical of glaciated and alpine and sub-alpine areas. However, fine as these are, such landscapes are also found in other mountain ranges in Europe; globally those in TSBR are of lesser significance to others inscribed on the World Heritage List. IUCN considers that the nominated site does not meet criterion (iii).

Criterion (iv): Biodiversity and threatened species

As discussed in section 3 the biodiversity values of the nominated site are secondary in importance when compared with WCWH and with other sites within the Caucasus mountain range identified in the IUCN Global Theme Study on Mountain Protected Areas. IUCN considers that the nominated site does not meet criterion (iv).

7. RECOMMENDATION

The two sites are physically quite separate (40 km) and the assessment of their values points more to the concept of a serial nomination than an extension to the existing property.

The proposed TSBR falls within another Republic, with no indication of collaborative management of the two areas. In addition it is unclear how the proposed mechanism of the "biosphere polygon initiative" would establish a functional ecological and landscape linkage between the two sites while promoting collaboration to effectively manage these two areas in an integrated way.

Therefore, IUCN would like to recommend to the Committee to recommend the State Party to carry out a comprehensive assessment of the Western Caucasus to identify all potential sites that may merit inclusion in a serial World Heritage site that would represent all the outstanding universal values of the region. Such a study should be supported by a clear programme on how to integrate the management of all potential sites so as to meet the conditions of integrity required under the Operational Guidelines of the Convention. In doing

this assessment the State Party may wish to consider the recommendations from the IUCN Global Theme Study on Mountain Protected Areas.

Finally IUCN also notes that the State Party has not responded to concerns expressed by the 2001 Bureau of the World Heritage Committee over the management problems of the existing WCWH site. Thus IUCN recommends that the World Heritage Committee invite the State Party to:

- Provide information on integrity concerns which have been previously raised with the State Party in relation to the existing WCWH site, including reported illegal trespassing, a weakening of conservation controls, impacts of proposed tourism infrastructure development, including potential changes in the boundaries of the World Heritage site, and the construction of a road.
- Prepare and implement a management plan for the existing Western Caucasus World Heritage site that includes a visitor management plan and a clear policy on tourist development.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

Gough Island Wildlife Reserve – Extension (United Kingdom) ID N° 740 bis

Background note: The IUCN technical evaluation of Gough Island Wildlife Reserve (United Kingdom) was presented to the nineteenth session of the World Heritage Committee (Berlin, 1995). Based on IUCN's advice the site was inscribed on the World Heritage List at that time under natural criteria (iii) and (iv). The IUCN report noted that:

“Gough Island is one of the least disturbed major cool-temperate island ecosystems in the South Atlantic Ocean, and is also one of the most important seabird colonies of the world (criterion iv). The island has high scenic qualities with spectacular sea-cliffs around much of the coastline (criterion iii). Two endemic land birds are found at Gough, the Gough moorhen and the Hough finch. Gough is included in the Tristan da Cunha Priority One Endemic Bird Area, as defined by Birdlife International. The island is home to 12 endemic plant species in addition to other threatened species. Gough's undisturbed nature makes it particularly valuable for biological research, with weather monitoring being the only other activity permitted on the island. The nomination meets all conditions of integrity...”

IUCN also noted that:

“Although removed by 350km from Inaccessible Island in the Tristan da Cunha island group, Gough's values are in many ways complemented by those of this island. Inaccessible is also largely undisturbed and has a large seabird population. The prospect of considering an extension of the site to also include Inaccessible was thus a logical suggestion made by reviewers. However, IUCN feels that it is not opportune to seriously propose that at this time as the reserve was only created in 1994 and there is no management plan as yet. Gough Island can stand on its own but the long-term prospects of adding Inaccessible to this site should be registered.”

By letter to the World Heritage Centre dated 20 January 2003, the State Party officially requested that the boundaries of the World Heritage site be extended to include the neighbouring Inaccessible Island. However, there were a number of clarifications sought by IUCN and the World Heritage Centre at that time and the State Party subsequently requested that the nomination not be examined at the 27th session of the World Heritage Committee in order to fully respond to those requests for information.

ADDITIONAL INFORMATION

The World Heritage site currently includes a terrestrial area of 6,500 ha and a marine limit extending to 3 nautical miles. In October 1999 IUCN reported on the state of conservation of the site highlighting concerns relating to illegal fishing in the waters around Gough Island and recommending the expansion of the boundaries to 12 nautical miles. The boundaries of the Reserve were subsequently extended to 12 nautical miles in 2000, as confirmed by the State Party at the 24th extraordinary session of the Bureau (Cairns, 2000), and the name of the site changed to Gough Island Nature Reserve.

On the 27 February 1997, Inaccessible Island and its surrounding waters out to 12 nautical miles (22.2km) were also proclaimed a Nature Reserve in terms of the Tristan da Cunha Conservation Ordinance (Amendment) 1997, and a management plan was finalised in 2001.

By letter to the World Heritage Centre dated 20 January 2003, the State Party officially requested that the boundaries of the World Heritage site be extended to include the neighbouring Inaccessible Island. Following requests for further information, the State Party responded on 5 November 2003 with an official request to also extend the marine area

around Gough Island World Heritage site from 3 nautical miles to 12 nautical miles to bring the boundaries of the World Heritage site in line with those of the Nature Reserve, and to change the name of the site to *Gough and Inaccessible Islands* World Heritage site.

The State Party also provided responses to the following questions asked by IUCN:

- i) *What policies are in place to monitor and ensure the sustainability of the surrounding fisheries?* – The State Party noted that the Fishery at Gough is for lobster only and is controlled by quotas and size limits and monitored by Fishery Observers.
- ii) *What is the current status of the whale population in the marine zone?* – The State Party confirmed that the whole of the Tristan da Cunha group was made a whale sanctuary at the 290th meeting of the Island Council on 28th February 2001.
- iii) *Are albatross populations being monitored?* - The State Party stated that Albatrosses are being monitored by the Percy Fitzpatrick Institute of African Ornithology, University of Cape Town. However, no statistics were provided on their current state of conservation.

The State Party also noted that they hope to submit a revised Management Plan by February 2004, but this has not yet been received.

The United Kingdom recently ratified the *Agreement on the Conservation of Albatrosses and Petrels* (ACAP), which seeks, in particular, to reduce the seabird deaths caused by longline fishing, as well as the destruction of their habitat. However, the Tristan da Cunha Archipelago is not yet included under this agreement.

BRIEF DESCRIPTION OF NOMINATED EXTENSION: INACCESSIBLE ISLAND

Inaccessible Island (37°18'S, 12°41'W), with an area of 14km², is a cool-temperate, uninhabited island of volcanic origin in the central South Atlantic Ocean, midway between the southern tip of Africa and South America. It is one of three main islands forming the United Kingdom Overseas Territory of Tristan da Cunha, and together with Tristan, Gough and Nightingale islands is administered by an Administrator (appointed by the UK Government on a three-year basis) and an elected Island Council. The main island of Tristan lies 40km to the northeast, while Gough Island lies about 400km south-southeast of the Tristan group.

Inaccessible Island is characterised by steep cliffs around the entire coastline, and an undulating plateau that rises from some 100m at the eastern end to over 500m at the western end. The island's plateau is dissected by several watercourses that terminate in spectacular waterfalls down the coastal cliffs. Access is by sea with no wharves or jetties, only mooring buoys for Tristan's fishery patrol vessel.

The island remains in a largely pristine condition and is one of the few temperate oceanic islands free of introduced mammals. It supports 10% of the global population of Northern Rockhopper Penguins and, together with Nightingale Island, is the most important breeding site for Great Shearwaters with a population of at least two million pairs. It is home to some 300 native plants and animals, including 2 birds, 8 plants and at least 10 invertebrates endemic to the island. The island also supports more than 70 other plant and animal species restricted to the Tristan-Gough island group. More than 250 species have been recorded from the marine environment, including 60 species endemic to Tristan-Gough. The island's natural history nonetheless remains little studied due to the difficult access and the lack of systematic research by any single agency.

Waters within 200 nautical miles (370km) of the islands are protected by the Tristan da Cunha Fishery Limits of Ordinance of 1983 (amended 1991, 1992, 1997). This area was declared a whale sanctuary in March 2001. Fishing rights within 50 nautical miles of the coastline currently are restricted to one concession holder, subject to quota controls, a size limit and a closed season for main target species, the Tristan Rock Lobster. The presence of a fisheries

patrol vessel based at Tristan and the initiation of observer programmes aboard licensed vessels help to control fishing practices. However, it is noted that some illegal, unreported and unregulated fishing activities still take place within the 200 nautical mile zone, as highlighted in the IUCN State of Conservation report in October 1999.

To date no tourists have landed at Inaccessible Island although there are several cruise ships landing at Tristan each year, with an increasing number ever since the first tourists landed at Nightingale Island in 1995. All native animals and plants are protected and the importation of alien species prohibited, as well as any agricultural or horticultural activity. Construction of any infrastructure needs a permit.

RECOMMENDATION

The proposed extension is in line with the recommendation of IUCN and the World Heritage Committee at its 19th session (Berlin, 1995). IUCN, therefore, recommends the World Heritage Committee:

- (i) **to extend** the World Heritage site to include the neighbouring Inaccessible Island and the surrounding marine zone extending out to 12 nautical miles, and
- (ii) **to extend** the marine zone around Gough Island from 3 nautical miles to 12 nautical miles, to bring the boundaries of the World Heritage site in line with those of the Nature Reserve.

The extended World Heritage site would thus include a terrestrial area of 7,900ha and a marine area of 390,000 ha.

IUCN also recommends the World Heritage Committee to approve the proposed name change as proposed by the authorities of the UK; that is to *Gough and Inaccessible Islands World Heritage Site*.

The World Heritage Committee may wish to commend the State Party on its policy of conservation-based fishery management in the waters around Gough Island, invite it to maintain current tight regulations in this respect and endeavour to enforce these over illegal fisheries. The State Party should be:

- encouraged to extend its ratification of the *Agreement for the Conservation of Albatrosses and Petrels* to include the Tristan da Cunha Archipelago, and
- invited to draw the Committee's attention to any factors that might affect the World Heritage site in future.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

Area de Conservacion Guanacaste (Costa Rica) – Extension to include the Santa Elena Sector, ID N° 928 Bis

Background note: The IUCN technical evaluation of the Area de Conservación Guanacaste (Costa Rica) was presented to the twenty-third session of the World Heritage Committee (Morocco, 1999). Based on IUCN's advice the site was inscribed on the World Heritage List under natural criteria (ii) and (iv). The site includes 88,000 terrestrial hectares and 43,000 marine hectares, extending 12 miles into the Pacific Ocean. In its evaluation report, under Section 4 on Integrity, IUCN noted that:

“The one major area (over 15,000 ha) still in private hands, which should be added to the Area de Conservation Guanacaste (ACG) sometime over the next 1-2 years, is the Santa Elena Property. This contains unique geological features and a highly conserved dwarf tropical dry forest, which will add significant conservation value to ACG”.

Furthermore in its recommendation to the World Heritage Committee IUCN recommended that:

“Both the central government authorities and the ACG continue to intensify their efforts to incorporate the lands known as the Santa Elena Property into the ACG as soon as possible”.

1. ADDITIONAL INFORMATION

By letter to the World Heritage Centre dated 19 February 2003, the State Party officially requested the inclusion of the Santa Elena Sector in the Area de Conservación Guanacaste (ACG) World Heritage site. This follows the successful resolution of the international expropriation case (ICSID Case No. ARB/96/1) between the landowners of the Santa Elena Sector and the State of Costa Rica. In the same letter, the State Party noted that conservation and management activities have started in this sector in order to fully incorporate it in the overall management of ACG. The State Party also provided a location map of ACG showing the boundaries of the Santa Elena Sector, as well as a vegetation map and a geological map of this sector. Finally, technical information was provided on the natural values that support the extension of ACG to include the Santa Elena Sector.

2. BRIEF DISCRIPTION OF NOMINATED EXTENSION: SANTA ELENA SECTOR

The Santa Elena Sector (SES), of 16,000 ha, is an important part of the Area de Conservación Guanacaste (ACG) and constitutes a major part of the Peninsula Santa Elena. Because of its location in the centre of the ACG, SES is critical to maintain the integrity of the site as it contains important areas of Pacific Tropical Dry Forest that characterize the site.

SES represents an ancient habitat that has been above the sea for 85 million years, and was an island in the eastern Pacific long before the Central American isthmus formed and connected North and South America. The SES eastern connection with the mainland is buried beneath young white volcanic materials that were deposited about a million years ago. Thus, SES is a unique geological area representing major stages of the Earth's history. This area is also exceptionally rich in plants that occur only here and are highly specialized to live on the very dry and extremely aged serpentine soils. SES contains exceptionally intact mangrove forests (containing eight species of mangroves) associated with well preserved coastal and marine areas. This leads to a unique association of wetland ecosystems and a very dry area separated by only 10 meters. Most of the vertebrate species occurring in ACG are also found in SES.

Punta Respingue, of approximately 75 ha and located in the coastal area of SES, is the only freshwater wetland on the entire Pacific coast of Costa Rica, formed by eroded alluvial soil washed down from the slopes behind. It forms a soggy swamp in the rainy season with open water in the centre. The flat is held in place by a distinctive steep, fragile, and raised cobble beach that is the barrier against the high waves that roll in off the open Pacific throughout the rainy season. The very strong south-westerly dry season winds in January-March push these waves back out to sea. These winds have created the highest and thickest sand dunes to be observed along the Guanacaste coast. The dunes are in pristine condition and demonstrate clearly the interaction between the coastal forest and the shifting sand system.

3. RECOMMENDATION

IUCN recommends the World Heritage Committee **to extend** the Area de Conservación Guanacaste to include the Santa Elena Sector as part of the natural World Heritage site. Thus, the total area of the Area de Conservación Guanacaste would be 147,000 ha, comprising 104,000 ha of terrestrial area and 43,000 ha of marine area.

The World Heritage Committee may also wish to commend the State Party for its commitment and efforts in solving the legal process concerning the inclusion of this important sector in the Area de Conservation Guanacaste and encourages the State Party to fully integrate this sector in the overall management of this World Heritage site.

B. Nominations of Mixed Properties to the World Heritage List

B1 New Nominations

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

Cajas Lakes and the Ruins of Paredones (ECUADOR) ID N° 1124

1. DOCUMENTATION

- (i) **IUCN/WCMC Data Sheet:** 3 references.
- (ii) **Additional Literature Consulted:** **Convenio para la Descentralización entre el Ministerio de Turismo y Ambiente y la Municipalidad de Cuenca de la Gestión y Manejo del Parque Nacional Cajas.** Anon., 2000. Conservation International *et al.* **A Regional Analysis of Geographic Priorities for Biodiversity Conservation in Latin American and the Caribbean.** Washington, DC, 1995. Davis, S.D. *et al.* **Centres of Plant Diversity. Volume 3, The Americas.** IUCN and WWF, London, UK, 1997. Long, M. & Wege, D. **Key Areas for Threatened Birds in the Neotropics.** BirdLife International, Cambridge, U.K., 1998. Stattersfield, A.J. *et al.* **Endemic Bird Areas of the World: Priorities for Biodiversity Conservation.** Birdlife International, Cambridge, U.K., 1998. **World Heritage Forest: The World Heritage Convention as a mechanism for conserving forest biodiversity.** CIFOR and UNESCO, Indonesia, 1999. **A Global Overview of Protected Areas on the World Heritage List of Particular Importance for Biodiversity.** UNEP-WCMC and IUCN, Cambridge, U.K., 2000. **A Global Overview of Mountain Protected Areas on the World Heritage List.** The Banff Centre, IUCN and UNESCO, Gland, Switzerland, 2002.
- (iii) **Consultations:** 6 External reviewers. Representatives of the local government of Cuenca, the Park Authority, National Institute of Culture and TRAFFIC-South America.
- (iv) **Field Visit:** Jim Barborak (IUCN) and Dr. Nelly Robles (ICOMOS), August 2003.

2. SUMMARY OF NATURAL VALUES

The nominated site, located within the Southern Andean Biogeographical Province, includes part of the Cajas National Park (CNP), with an area of 17,598 ha, the Ruins of Paredones covering 222ha., as well as a narrow band of land (168 ha.) connecting Cajas and Paredones along a stretch of ancient Inca trail. It is nominated for World Heritage status as a mixed natural-cultural site and as a cultural landscape. This evaluation report focuses on CNP.

CNP is located in the Ecuadorian Andes in Azuay Province, just 24 km from Ecuador's third largest city, Cuenca, a colonial city which is itself a World Heritage Site. The elevations of the park range between 3150m and 4445m, along both sides of the continental divide in the western range of the Ecuadorian Andes. Just 50 km separate the park from the Pacific Ocean. CNP includes a high altitude glaciated plateau and associated wetlands, including approximately 235 permanent and additional seasonal lagoons of glacial origin up to 80 ha in area.

The park includes three life zones: (a) Premontane Moist Forest, covering under 300 ha or less than 1% of the lowest portions of the park; (b) Wet Montane Forest, covering about 2500 ha or about 8 % of the park, located between 3000m and 4000m, and; (c) Paramo, a high altitude herbaceous ecosystem covering approximately 90% of the park area. Average annual precipitation in all three life zones is between 1000 mm and 2000 mm. with a park-wide average estimated at 1200 mm.

The two ecosystems considered to be the most fragile within the park are the wetland and lagoon ecosystems within the paramo life zone and the forested Andean slopes in the lower reaches of the park. The headwaters of the Yanuncay and Tombebamba Rivers and a number of smaller streams are found in the park.

CNP contains some endemic species, particularly of aquatic invertebrates in the lakes, bogs and streams of the paramo. It is a centre of endemism for the tree genus *Polylepis*, and is home to over 900 species of plants in more than 120 families. The Red Book of endemic plants of Ecuador lists 71 plant species out of 145 species endemic to Ecuador, occurring within the park. There are 21 plant species unique to CNP, most of which are considered to be endangered. Approximately 144 species of birds are found in the park, including at least 10 northern Andean endemics and 1 species endemic to the park, the hummingbird *Metallura baroni*, as well as 9 endangered species. While levels of endemism are highest within the paramo and associated wetlands, the highest total species diversity of both plants and animals within the park is found in the montane and lower montane forested life zones on the slopes below the paramo, most of which was not included in the nomination but in its buffer zone.

CNP is considered “irreplaceable” in a national study of important bird areas. Many of the most unique bird species depend at least partially on the high altitude wetlands within the park, which was one of the justifications for listing it as a Ramsar Site. 38 species of mammals have been found in the park, including one endemic, the fishing mouse. 13 species of medium to large sized mammals are also found, but it is too small and isolated to guarantee protection for genetically viable populations for some of these, such as the spectacled bear, puma, and mountain tapir.

3. COMPARISONS WITH OTHER AREAS

Sangay National Park and World Heritage site, located some 120 km from Cajas on the opposite, eastern slope of the Ecuadorian Andes, is almost 10 times the size of the nominated site and has higher altitudinal and ecological diversity than CNP. Thus, it can better maintain viable populations of many wide ranging species of fauna found in both areas (e.g. spectacled bear, puma, mountain tapir) than the much smaller, more isolated, and altitudinally homogeneous CNP. While a number of endangered and nationally or northern Andean endemic plant and animal species are found in CNP, the park is not nearly as critical to survival of many of these species as is the existing Sangay National Park or other, much larger existing protected areas along the Andes.

Sangay National Park also covers all major ecological systems of Ecuador and is of outstanding geological interest as Sangay is considered to be the volcano which has been continuously active for the longest period of time in the world. It is also considered a Global Centre of Plant Diversity and Endemism (WWF and IUCN, 1997) as well as a Global Endemic Bird Area (BirdLife International, 1998).

At the top of Chirripo National Park and the highest peaks of La Amistad National Park, within the Talamanca Range - La Amistad Reserves / La Amistad National Park World Heritage site (Costa Rica and Panama), there is much better representation of paramo at the northernmost extent of that life zone, and a small area with features derived from recent glaciation, including moraines and a small number of glacial lakes. Within Ecuador other protected areas, such as the Cayambe-Coca Ecological Reserve, Cotacachi-Cayapas Ecological Reserve and Cotopaxi National Park also include paramo habitats.

While CNP has been identified as an Important Bird Area by BirdLife, the park itself has just one endemic bird and by comparison, the Talamanca Range has approximately fifty endemic birds, as well as large numbers of other unique plants and animals in a total area of over 500,000 ha, over twenty times the size of CNP, and with altitudinal diversity ranging from near sea level to 3800 meters. Cotopaxi National Park is also considered globally important for bird's conservation (BirdLife International, 1998).

The Río Abiseo National Park World Heritage site in northern Peru contains a quite distinct montane community and, like Sangay and La Amistad, has a much greater area and altitudinal and ecological diversity than CNP and is located in the transition area to Puno high altitude vegetation.

In summary, there are other World Heritage Sites containing similar paramo ecosystems, with much greater diversity of species, habitats, altitudinal variation and natural features than the nominated site.

4. INTEGRITY

4.1. Legal Status

CNP was initially protected as a national recreation area in 1977 by the Ecuadorian government. In 1996 the management category of the area was upgraded to National Park (Category II, IUCN). In 1990 the cooperative agreement for municipal co-management of the park was signed between the municipal government of Cuenca and the Environment Ministry of Ecuador. The site was recognized as a Wetland of International Importance in 2002.

A municipal land use plan, which has legal status at the local level, provides some direction to land use on private lands surrounding the park, part of which is included in the proposed buffer zone for the nominated site. Enforcement, education and incentives are being used to promote good land use practices in this area, but tourism development, reforestation with exotic species, and trout aquaculture in the water bodies appear to be growing problems in this area.

4.2. Boundaries

The nominated site includes an area of 17,598 ha. Within CNP (28,544 ha.), including the lake and wetland zone, 222 ha. of Paredones Ruins, and a narrow band covering 168ha. connecting Cajas and Paredones along a stretch of ancient Inca trail. A buffer zone of approximately 13, 501 ha. is also proposed, some of which is beyond the park, but much of which includes the forested ecosystems on the lower slopes of the park itself.

4.3 Management

In 2000, management of CNP was devolved to the Municipality of Cuenca through a cooperative agreement with the Ecuador's Environment Ministry. The municipality has entrusted management to the Municipal Water, Sewer, and Telephone Company, a progressive public utility with an annual budget of over US \$70 million. Since that time, the quality of management of the park has improved dramatically. With the exception of Galapagos National Park, CNP is undoubtedly one of the best managed protected areas in Ecuador, and one of the most successful examples of municipal-level co-management of a nationally protected area to be found in Latin America. An environmental services fee charged to water users helps cover the operational costs of the park, as do entrance fees and direct budget allocations by ETAPA. An advisory council now exists for the area, and leading local citizens make up a "volunteer ranger corps" that provides political (not ranger-level) support for the area. The annual budget for CNP is approximately US \$500,000, greater than for other Ecuadorian continental national parks. Its technical staff of 5 university graduates and its corps of nearly 20 rangers are uniformed, with adequate equipment and infrastructure, and backing from police check points for monitoring road access.

An initial management plan was prepared for the area in 1993 and was updated in 2000 as part of the environmental mitigation strategy for the major road crossing the park, with financial assistance from the Inter-American Development Bank. The updated plan, prepared by a multidisciplinary team and in a participatory fashion, called for creation of six management zones within the park (water catchment, recreation and tourism, development and administration, conservation, strict protection, and recuperation) as well as two zones within a buffer area for sustainable agriculture and community grazing. The plan provides

strategic guidance on issues such as protection, research and monitoring, environmental education, tourism, social development, and land use planning and management. However, the plan itself is overwhelming and too complex to be an effective day-to-day management tool. Biological research and monitoring is undertaken by local universities in coordination with the park administration.

Public infrastructure is also quite good, including information and interpretive signs, parking lots, picnic areas, a new visitor center with excellent interpretive displays, trails, overlooks, etc. Additional improvements in trails, recreation areas, research infrastructure, and camping/hostels are anticipated. The park has an active environmental education and outreach programme for local schools and communities, and is an important recreational resource for the urban population of Cuenca. Recreational activities include bird watching, rock climbing, sport fishing in lakes and rivers for trout, and hiking on a network of 20 trails ranging from short loops to multi-day trekking routes. Over 10,000 tourists, primarily Ecuadorians, visit the park annually, and visitation levels are increasing due to the new access road, the global and national booms in ecotourism and adventure travel, and improvement of visitor facilities at the park.

4.4 Human impacts

Most of CNP cannot be considered to be pristine, as it has been affected by grazing and associated fires for centuries, even if these problems are now nearing total resolution through improved management and protection. The naturalness of CNP has suffered greatly through these activities, as well as through the construction of a major highway which crossed the park creating a high visual impact in its overall landscape that is visible from a great distance.

While original fish species diversity was extremely limited, the widespread introduction of brown and rainbow trout has undoubtedly impacted both the limited native fish fauna and aquatic invertebrates. While there are small populations of threatened and endangered species such as the spectacled bear, puma and Andean condor in the park, their continued existence is not dependent upon the park. Llamas, which might have been present in the park during pre-Columbian periods, have recently been reintroduced even though the archaeological evidence for their presence (or particularly for their presence in considerable numbers over a long period of time) has not been documented. Hunting, firewood extraction, and other activities still occur at a minimal level but are not major threats to park resources or integrity at this time. Mining claims have been eliminated and tenure has been consolidated. Tourism impacts are minimal at present but may be closely monitored due to the increasing level of visitation.

In summary, CNP contains physical features (the high altitude glaciated mesa and associated lakes and wetlands) and an associated life zone (Paramo) of great natural beauty that is poorly represented in other World Heritage Sites of northern Latin America. While the national park is of a size and management regime sufficient to protect the integrity of these landforms and of the much of the paramo vegetation and its associated fauna, its long-term ecological integrity is compromised due to its small size, isolation, and limited altitudinal and ecological diversity compared to that which is found in the southern Ecuadorian Andes in general. Its naturalness has been seriously compromised by past human activities, particularly due to grazing and associated fires during the past few centuries and to recent activities such as road construction and the introduction of exotic fish species.

5. ADDITIONAL COMMENTS

There is currently a regional initiative, assisted by UNESCO's Montevideo office, backed by national governments of the Andean nations, and supported by a number of international conservation organisations, to conserve the network of Inca Trails and associated archaeological sites stretching from Ecuador to northern Argentina.

As in the case of CNP, the network of Inca Trails often traverses a number of protected areas. One goal of the Camino Inca initiative is the eventual inscription of part of it in the World

Heritage List. This would provide international recognition to those segments of the trail and clusters of associated cultural and natural sites of outstanding universal value.

However, the need for an integrated management regime will be essential to ensure the integrity of such large nomination. For example, the Paredones Archaeological Site and the stretch of Inca Trail connecting CNP and Paredones currently lacks legal protection, on site management, clear tenure, adequate research, or minimal management programs to control major threats to the sites. Paredones Archaeological Site and the stretch of Inca Road linking it with CNP lack specific on-site management or protection and are subject to constant grazing, periodic fires, and no supervision of the occasional tourist groups that visit the site.

There is no infrastructure, except for small areas of consolidated and partially restored building walls, and a visually impressive stretch of several hundred meters of Inca Trail that has been cleared, with the paving stones aligned. Most pre-Columbian structures on the site are no more than piles of worked stones, though a few walls are still partially standing and even several windows can still be seen. From a distance, the trail looks like a two-dimensional “Great Wall” and there is no doubt that if extensive stretches were to be cleaned and consolidated, the visual impact would be awe-inspiring. Further research is needed to clearly document the relationship between cultural vestiges in CNP, Paredones, and the connecting segment of Inca Trail.

6. APPLICATION OF WORLD HERITAGE CRITERIA

The site has been nominated under natural criteria (i), (iii) and (iv).

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

The nominated site contains important geomorphologic or physiographic features, in particular of the glacial landforms, lakes and wetlands. However there are similar examples of these forms in other high mountain ecosystems elsewhere in the world including in a number of existing World Heritage sites. IUCN considers that the nominated site does not meet this criterion.

Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance

CNP undoubtedly has natural beauty associated to its glaciated mountain scenery. However, this is a common feature in many protected areas in the Andes and worldwide and there are a number of World Heritage sites, such as Huascarán National Park and Río Abiseo National Park, both in Peru, showing greater aesthetic importance and thus inscribed on the World Heritage List under this criterion. IUCN considers that the nominated site does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

While the nominated site is of national importance for biodiversity conservation, the total number of species and that of park-specific endemics is relatively low. There are concerns over the long term viability of the park to maintain viable populations of many wide-ranging species, particularly large mammals, due to its small size, limited altitudinal range and isolation. In addition the naturalness of the site has been seriously compromised by human activities. IUCN considers that the nominated site does not meet this criterion.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee **not to inscribe** Cajas National Park in the World Heritage List on the basis of natural criteria. IUCN would also like to recommend the Committee to acknowledge the pioneering and highly successful co-management agreement developed for managing this site at the municipal level. The Municipality of Cuenca should be praised for exemplary management of the park, and for the substantial investments they have made in improving infrastructure and management programmes.

B. Nominations of Mixed Properties to the World Heritage List

B2 Extension of Properties inscribed on the World Heritage List to include additional Natural Criteria

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

Saint Kilda (Hirta) (UK) ID N° 387 Bis

Background note: St. Kilda was inscribed on the World Heritage List in 1986 under natural criteria (iii) and (iv). At the time IUCN noted that:

The scenery of the St. Kilda archipelago is particularly superlative and has resulted from its volcanic origin followed by weathering and glaciation to produce a dramatic island landscape. The precipitous cliffs and sea stacks as well as its underwater scenery are concentrated in a compact group that is singularly unique.

St. Kilda is one of the major sites in the North Atlantic and Europe for sea birds with over one million birds using the Island. It is particularly important for gannets, puffins and fulmars. The maritime grassland turf and the underwater habitats are also significant and an integral element of the total island setting. The feral Soay sheep are also an interesting rare breed of potential genetic resource significance.

IUCN also noted: *The importance of the marine element and the possibility of considering marine reserve status for the immediate feeding areas should be brought to the attention of the Government of the UK.*

The State Party presented a re-nomination in 2003 to:

- a) seek inclusion on the World Heritage List for additional natural criteria (i) and (ii), as well as cultural criteria (iii), (iv), and (v), thus re-nominating St. Kilda as a mixed site; and
- b) to extend the boundaries to include the marine area.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 25 references.
- ii) **Additional Literature Consulted:** Stattersfield. A.J. *et al.*, 1998, **Endemic Bird Areas of the World: Priorities for Biodiversity Conservation**. Birdlife International, Cambridge, U.K; UNESCO, 2003, **Draft UNESCO World Heritage Marine Strategy**; S. Palumbi, 2003, **Marine Reserves – A tool for ecosystem management conservation**, Pew Oceans Commission; **MPA News** related to spatial MPA design for marine ecosystems: (Vol4#6 Channel Islands lessons; Vol5#4 High Seas Targets; Vol5#6 Fisheries yields in reserve design; Vol5#3 Open Ocean MPAs); **OSPAR Quality Status Report 2000 – Celtic Seas**; JNCC Dec. 2003 website (www.jncc.gov.uk/marine/), DEFR, 2000, **Deep Water Demersal Fisheries**; Scottish Coastal Forum, 2003, **A Strategy for Scotland's Coasts and Inshore Waters** - Tourism and Recreation Task Group; Discussion Paper by the Scottish Executive, 2003, **The Sustainable Development of Scotland's Marine Resources: Towards New Management Framework Options?**, CORDAH Ltd.; **St. Kilda World Heritage Site Risk Assessment**, 2003, for the Scottish Executive.
- iii) **Consultations:** 4 External reviewers.
- iv) **Field Visit:** J. Thorsell, June 1986.

2. SUMMARY OF NATURAL VALUES

The St. Kilda Archipelago (SKA) is a remote Atlantic island group lying 64 km west of the Outer Hebrides off the west coast of Scotland. Currently, the St. Kilda World Heritage site (IUCN Category IV Protected Area) includes the terrestrial area of the archipelago totaling 854.6 ha above the Mean High Water Spring Mark, with four islands (Hirta, Boreray, Soay and Dun) and numerous sea stacks (the three largest being Levenish, Stac an Armin and Stac Lee). This re-nomination proposes to extend the boundary into the marine area surrounding SKA, thus including an additional 23,346.8 ha, from the Mean High Water Spring Mark out to the boundary. The total area of the proposed site is therefore 24,201.4ha, an increase of 96% to the World Heritage site. No buffer zone is proposed.

From an oceanographic and geomorphologic perspective, SKA is near the western margin of the Hebrides Shelf, and further west is located the Rockall Basin. SKA is considered an oceanic North East Atlantic archipelago in the Palaeartic realm. It reveals a rich fabric of interlinked natural features that reflect the 50-60 million years of geological history. The oceanic islands character of SKA creates many complex and different ecological niches given the combination of steep rock formations, wave exposure, water depth, water clarity, isolation and limited disturbance that have resulted in a highly specialized marine and terrestrial biodiversity.

The marine biodiversity is associated to three key zones: (a) the intertidal (high-low water) or 'eulittoral' marine zone, generally 5 metres between mean high and low tides, is highly variable with wave and tide changes and is dominated by limpets, barnacles, mussels and fucoid algae; (b) the infralittoral zone are between – 5m > 60 m, and are dominated by kelp beds, very thick in the upper areas, but spreading to a 'forest or park' further down with less light. Some of the more 'intertidal' kelps extend into the beginnings of this zone due to the high water clarity that occurs in SKA, and; (c) the Sublittoral or Circalittoral zone extends down from about – 60 m to – 80 m and spreads out to the continental shelf. Encrusting animals dominate this zone, including scavenging and grazing sea slugs, gastropods, crabs and echinoderms.

As for many islands, the terrestrial fauna and flora show low species diversity but the islands have large breeding populations of seabirds. The flora, impoverished due to the small size of the islands, nonetheless presents 184 species of ferns, flowers and grasses and 170 species of fungi. St. Kilda is, however, rich in some lower plants with 194 species of lichen and 160 species of bryophyte.

The SKA is Europe's most significant seabird colony and major seabird breeding station in the NE Atlantic. During the summer months the SKA is home to over a million seabirds, including 700,000 breeding pairs. The four main islands and associated sea stacks and rocky cliffs provide a rich diversity of breeding habitat. Oceanic vegetation on the islands provides nesting materials. The island of Boreray and its 'sea stacks' support the world's largest colony of gannets, and one of the largest colony of northern fulmars. It is also the most important breeding station of Leach's storm-petrel in the NE Atlantic. The key species in the SKA include: northern fulmar, manx shearwater, European storm-petrel, leach's storm petrel, northern gannet, European shag, arctic skua, great skua, mew gull, lesser black-backed gull, herring gull, great-black backed gull, black-legged kittiwake, common guillemot, razor bill, black guillemot, atlantic puffin.

Ten species of cetaceans have been sighted with minke and killer whales, harbour porpoises, Risso's dolphins, Atlantic white-sided dolphin and white-beaked dolphin as regular visitors. Between 300 and 400 Atlantic Grey seals are present at the SKA throughout the year, with approximately 50 breeding pups due to limited haul out sites.

3. COMPARISONS WITH OTHER AREAS

In relation to criteria (i) on geological considerations, the re-nomination claims global importance significance for the St Kilda site on the basis of the significance of on-going

geological processes and significant geomorphic or physiographic features. More specifically, the claim for outstanding universal value is focused on coastal and submarine geomorphology. It is noted that the primary geological significance of the St Kilda archipelago in a global context is that it is an eroded remnant of an ancient (Palaeocene) volcanic massif. However the great majority of the world's oceanic islands (including several World Heritage sites) are eroded volcanoes of one form or another. St Kilda is neither unique nor exceptional in relation to this aspect.

The re-nomination document claims that the archipelago exhibits “a complex terrestrial landscape extending uninterrupted into the submarine zone” and that “such a combined terrestrial and marine landscape in an island setting is unique in the Palaeartic Realm.” This is questioned, since on all islands (and all continents) the terrestrial landscape extends in an uninterrupted manner below sea level. A case is also made for the exceptional coastal landforms, including “the most spectacular cliff scenery in Great Britain” – but these attributes are already recognised in World Heritage terms by the property's inscription under criterion 44(a)(iii).

In the marine zone, the two conspicuous submerged former coastlines and associated landforms, subsequently “drowned” by post-glacial rise in sea level, are noted as exceptional in the nomination document. In fact, this phenomenon is commonplace and globally ubiquitous around islands and continents. The seabed sediments are highlighted (and were re-mapped for the nomination), but no attempt is made to relate their contribution to outstanding geological value – and they are referred to as having regional significance only.

On land, the evidence of Pleistocene glaciation and associated landforms, and the periglacial deposits are unexceptional in global terms, including on islands. Macquarie I., Heard & McDonald I. and the NZ Subantarctic Islands are among the existing World Heritage island sites that display classical and widespread glacial and periglacial processes and forms (despite the NZ islands not being listed for their geological values).

In relation to biodiversity values there is only one other island site with marine features in the ‘Palaeartic Realm’ - the complex of Cape Girolata-Cape Porto, Scandola Nature Reserve in Corsican France. However it is typical marine fauna of the Mediterranean, which is extremely different from that of the North Atlantic for a range of climatic, ocean and geographic reasons. This Corsican site is only 12,000 ha total, of which only 4,200 ha is marine, in comparison to the ~24,000 marine hectares proposed for the nominated site.

The rest of the island-marine site complexes that have any ecological similarity to SKA are in the southern hemisphere – one in the ‘Australian Realm’ (Lord Howe Island); two in the Antarctic realm (e.g. Heard and McDonald Islands in Australia, New Zealand Sub-Antarctic Islands in NZ and the Gough Island Wildlife Reserve on Tristan de Cuna in the South Atlantic under UK jurisdiction) and three in the Neotropical Realm (Fernando de Noronha/Atol das Roca in Brazil, Cocos Island in Costa Rica and the Galapagos in Ecuador.) Hence the SKA site is unique in the Northern Hemisphere from a WH perspective.

From a seabird perspective, the SKA proves critical and has some of the world's highest densities for small area size for some species. For example – the Brazilian Atlantic Islands site has the largest concentration of tropical seabirds in the western Atlantic, with over 150,000 breeding birds, while the SKA has over 700,000 breeding birds in an area less than ½ the size of the Brazil site. The NZ Sub-Antarctic site has 40 species of breeding seabirds, while the SKA has 17 species in an area less than 1/3 the size of the NZ site. It is clear that St. Kilda is unique due to the very high bird densities that occur there, conditioned by the complex and different ecological niches existing in the site.

More detailed comparisons for SKA with other World Heritage Islands are shown in Table 1 below:

Table 1: Comparisons with other World Heritage island sites

WH Site	Land Area	Marine Area	Overall context	OUV significance for marine-island evolution
SKA,UK	854.6 ha	Proposed: 23,346.8ha (16km ²)	North Atlantic UK, warm temperate, seabirds, fishes, invertebrates, plants	Southern-northern range limits, undisturbed, High insularity
Heard and McDonald Islands, Australia	36,800 ha	Out to 12 nm limit	Southern Ind. Ocean, Aust. Limestone and volcanic accumulations on submarine plateau, cool maritime,	5 sps seals, 15 birds, no discussion of marine in WCMC sheet, but all terr waters out to 12 nm is included, no est. given.
NZ Sub-Antarctic Islands, New Zealand	76,458 ha	Out to 12 nm limit	Five island groups, between Antarctic and Subtropical convergence zones,	Pelagic seabirds and penguins, no data on marine ecosystems in WCMC report
Gough Island, UK	6,500 ha	Out to 3nm (extension requested out to 12nm)	South Atlantic, cool temperate zone, undisturbed	Seabirds, seals, endemic land plants 3 paras on marine, 2 algal zones; fishing limits/juridis 200 nm
Scandola, Corsica	7,800 ha	4,200 ha	Mediterranean, warm	Marine algae, birds.

4. INTEGRITY

4.1. Legal Status

The SKA was designated a National Nature Reserve as early as 1957. From 1976 to 2002 it was designated a UNESCO Biosphere Reserve for the coastal and terrestrial ecosystems. The site was however delisted in 2002 due to changing Man and Biosphere (MAB) criteria. In 1981 it became a National Scenic Area, and in 1984, a Site of Scientific Interest and site for Geological Conservation Review for its tertiary igneous geology, quaternary geology and coastal geomorphology. This latter status facilitates regular review by government authorities to conserve national and international sites of geomorphologic significance. In 1992 it was designated a Special Protection Area (SPA) under the European Wild Birds Directive.

The site is currently a candidate as a Special Area for Conservation (SAC) and European Habitats Directive Marine Site. In the UK 'candidate' sites are managed with the same level of authority as fully implemented sites. According to allowable EU SAC categories, SKA is nominated for the vertical reef communities on the underwater parts of the islands, the sea caves and the vegetated sea cliffs.

At present an extension is being proposed to coincide with the proposed World Heritage marine area boundaries, as well as management scheme to complement the WH marine management plan elements. The site is also at present a Marine Consultation Area (Scotland), a site deserving special attention due to its marine environments. There is no statutory authority but the designation requires a consultative process on marine issues.

There is currently a UK Department of Trade and Industry (DTI) oil and gas moratorium on the site, a temporary moratorium on oil and gas explorations licences within a 70 km radius of the SKA.

First of all, the above suite of instruments covers the needs of all of the physical and biological areas/species in question. Additionally, all of these designations are backed up by supporting legislation.

The National Trust for Scotland (NTS), a conservation charity, owns the archipelago of St. Kilda with barony title to the low water mark. The UK government owns the sea bed and mineral rights from the mean low water mark to the 12 nm. The sea itself is 'commons' through which there is free right of passage.

4.2. Boundaries

The re-nomination effectively expands the World Heritage area by 96%, all marine area. This boundary is the same as the EU Habitats Directive SAC area which highlights marine features. It also takes into account the boundaries of all of the other designations (largely terrestrial) and the Marine Consultative Area. However, it is not clear why these boundaries were selected, as they do not reflect ecological/geological features.

A formal buffer zone has not been delineated, and, as the dossier highlights, there are many over-riding legal and conservation protection measures already in place for the World Heritage proposed 're-nomination' area. Most noteworthy and influential is the candidate SAC designation, addressing in-situ and ex-situ activities that could impact the site. Since this is a European law which can over-ride Scottish planning law, it is hence more powerful than national designations.

There are also other 'de facto' buffers in place. For example there is a 70 km radius around the SKA restricting oil or gas research. There is a 30 km radius for shipping near St. Kilda. There are EIA requirements under Scottish Planning Law apply to this area. There are also EU compliance requirements for SAC sites relating to impacts, both within the site and outside it.

From a geological perspective, the enlarged marine area enables inclusion of submarine elements of the eroded sub-aerial (terrestrial) volcanic landscape, and the full diversity of rock types. It also provides for inclusion of bathymetric features such as ancient shorelines that tell a more complete story of Pleistocene sea level changes and associated glacial and coastal landform development both on land and on the formerly exposed sea floor. However, as noted above, the geology and landforms of St Kilda are not rated by IUCN as universally outstanding.

4.3 Management

There has been cooperative management between the National Trust for Scotland (NTS), Scottish Nature Heritage (SNH) and the Ministry of Defence for the past 50 years. These organisations meet as needed as well as during annual tripartite meetings. Previously the Trust managed the cultural and archaeological elements while SNH the natural heritage. However, the Trust recently enhanced its cadre of conservation professionals and will be overseeing both the natural and cultural heritage aspects, although the partnership approach developed during the past 50 years will be continued, as well as with Historic Scotland, and the Western Isles Council (CNE Siar).

There is a very high level of interest from various stakeholders, the SKA. The management capacity is very high, as is the overall nature conservation capacity of the UK. As detailed in the SK 2003-08 management plan, there will be: a) Full-time permanent NTS staff including an Area Manager for Western Islands with line management to the St. Kilda Ranger and St. Kilda Archaeologist. The Area Manager, based in the Outer Hebrides (Benbecula) will frequent SKA regularly, as well as oversee the NTS properties on the rest of the Western Isles (4 properties). There are also St. Kilda work parties – (supervised by the Area Manager) which are highly coordinated volunteer teams for carrying out various maintenance and monitoring programmes.

A fully comprehensive and highly consultative management plan has been prepared. Both this plan and the re-nomination document have been publicly available on the internet. Additionally as part of this process a comprehensive 'Risk Assessment' was conducted to inform the process and the plan and clarify any issues especially with relation to the marine resources. The assessment is clear, concise and well documented and details a number of concerns and opportunities touched on below in items 4.4, 4.5 and 5.

4.4 Human impacts

The Risk Assessment for predominately marine issues and features reviews the case of existing and potential threats from humans, in particular: fishing, oil and gas, tourism, defence, scientific research, management, renewable energy and multiple activities. They characterise, analyse and rank risk types, e.g. oil spills, chemical spill, effluent, trampling/climbing, fishing, alien species, visual impacts etc. They provide a management gap analysis and a range of recommendations related to the 'delivery of World Heritage Marine Management'.

4.4.1. Impacts of development

There are very strict guidelines through the cultural and nature windows designed to maintain the 'SKA experience' as a remote, living museum, hence it is highly unlikely any would be allowed. It is accepted that there are no commercially viable hydrocarbon reserves in the 70 km radius around SKA. The present moratorium for the 70 km radius should be continued.

4.4.2. Alien species

There are measures in place to work with the shipping and tourism industries regarding ballast water and effluent, and this is an area with very rough water conditions, thus hospitable to few species.

4.4.3. Tourism pressure/visitor experience

The remoteness and climatic conditions limit most visitors to only the summer months and to a few businesses and a few private boats. If technology changes in the near future, restrictions would be needed.

4.4.4. Fisheries

By letter dated 27 February 2004 to the World Heritage Centre and in response to questions from IUCN, the State Party noted that: "*Only limited fishing activity takes place in and around the islands. This is mainly lobster creeling during the summer months, undertaken by a very small number (2-3) of local Western Isles boats. This fishery has very little impact on the sea bed or associated benthos, other than the target species, and at current levels of exploitation appears to be entirely sustainable. Although this is a very low-level, seasonal activity, it is none-the-less important for the few fishermen involved and a vital part of their livelihood in an area that offers very few other economic opportunities for them. It is not anticipated that any restrictions on such activities are necessary at current levels, but we will continue to monitor the situation. There is also a small amount of mid-water trawling in the vicinity of the islands that is undertaken by non-UK vessels. At present there is no known impact from this mid-water trawling but, again, this will be monitored and if it should become necessary then steps could be taken through the management plan to control such activities. In addition, the lee of the islands is used as a 'sheltered' anchorage on occasions by vessels seeking refuge in particularly stormy conditions*". IUCN notes and agrees with this assessment.

4.4.5. Renewable Energy

The SKA is too deep for current off-shore wind farm technologies. If this situation changed, the visual impact, and impacts associated with noise and bird safety, would have to be assessed in relation to their impact on world heritage values.

4.4.6. Shipping/Risk of oil spills

There is some risk of accidents to SKA in that most large ships use a route between SKA and the Western Isles rather than the Minches (between the Scotland mainland and outer islands). Vessel tracking is needed here and elsewhere and alternatives for smaller boats to

go through inner waters. A full oil response strategy is in effect for Scotland and one is needed for SKA.

The letter of the State Party (27 February 2004) stated: *“The UK Government commissioned an independent assessment of risks to the proposed extended site from Royal Haskoning, including the risk from oil spills from maritime traffic. In carrying out this exercise, Royal Haskoning engaged CorrOcean Ltd to determine the shipping traffic pattern in an area 200Km x 200Km centred on St Kilda.*

In their final report submitted in May 2003, Royal Haskoning differentiated between the risks of oil spillage of up to 1000 tonnes (small) and those greater than 1000 tonnes (large). In their summary of conclusions they noted: “The moderate risk of small oil spills from merchant shipping accidents is the most pressing risk to St Kilda WHS. The risk increases from slight to moderate with decreasing distance from St Kilda.”; and “A large oil spill whilst an extremely low probability, would represent a severe impact on the WHS during seabird breeding season. Risks from large oil spill reduce from minor to slight with distance from St Kilda.”.

The reason the risks posed by even a small oil spill is assessed as no higher than moderate is that the deep water route passage round St Kilda lies to the east of the archipelago and the prevailing winds and currents mean that any spillage is far more likely to be directed towards the Western Isles thus avoiding St Kilda. In addition, it is proposed that Comhairle nan Eilean Siar and the Highland Council (the adjacent local authority) and the Department for Transport will carry out a feasibility study later this year to include the waters to the West of the Hebrides, which will analyse weather patterns and traffic movements and take account of response times to an incident and the risks to marine resources and the local economy. The study will recommend changes or improvements to navigational aids in the area.

It is also important to note that the effect of any oil spill that did reach St Kilda is likely to be relatively small due to the extremely exposed nature of the islands. In such conditions it is unlikely that oil would remain on the shores for any length of time and the animals and plants that might be affected are adapted to survive periods of high stress, be that natural or anthropogenic.”. IUCN notes and agrees with this assessment, while emphasising the need for effective contingency planning for potential oil spills in this area.

5. ADDITIONAL COMMENTS

The ‘island isolation’ element coupled with the considerable geological history make a compelling case for SKA as a ‘living marine laboratory’. The potential of such study could have other conservation benefits elsewhere, particularly in relation to marine science, climate change, nature-based ship tourism, oil and gas and fishing industry dialogues.

6 APPLICATION OF WORLD HERITAGE CRITERIA

St. Kilda, already inscribed under natural criteria (iii) and (iv), has been re-nominated under natural criteria (i) and (ii).

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

As noted in Section 3, IUCN considers the geological values of the site to be important at a national and regional level but does not consider they are of Outstanding Universal Value. IUCN considers that the nominated site does not meet this criterion.

Criterion (ii) Ecological Processes

As noted in Section 3, St. Kilda is unique in the very high bird densities that occur in a relatively small area which is conditioned by the complex and different ecological niches existing in the site. There is also a complex ecological dynamic in the three marine zones

present in the site that is essential to the maintenance of both marine and terrestrial biodiversity. IUCN considers that the nominated site meets this criterion.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee **inscribe** St Kilda in the World Heritage List on the basis of natural criterion (ii), as well as the existing criterion (iii) and (iv), and **extend** the boundaries of the site to include the surrounding marine area of 23,346.8 ha.

IUCN also recommends that the State Party be encouraged to:

- a) prepare a five year business plan and budget;
- b) develop initiatives for collaborative marine research and conservation management for offshore island-marine area workshops with colleagues in New Zealand, Australia and the USA and others in the North Atlantic that are involved with site based design and marine conservation as well and national based strategic planning for offshore areas.

C. Comments on Cultural Landscape Nominations

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

THE MADRIU-PERAFITA-CLAROR VALLEY (ANDORRA) ID Nº 1160

The Madriu-Perafita-Claror Valley has been nominated as a "Cultural Landscape".

1. DOCUMENTATION

- i) **Additional literature consulted:** Comu d'Escaldes-Engordany, 2002, **Diagnostic: propostes d'Accio per fer d'Escaldes Engordany una parroquia sostenible**, internal report, 252 p.; Associacio per a la Defensa de la Natura, 2002, **Atles dels ocells nidificants d'Andorra**, A.D.N, 355 p.; Jordi Palau Puigvert i Josep Argelich Baro, 1996, **Natura i Ecoturisme a Andorra : una opcio de futur**, project Horitzo, 308 p.; Government of Andorra, 2000, **La Vall del Madriu: un patrimoni per a tots**, Banc internacional d'Andorra, 79 p.; Associacio per a la Defensa de la Natura, 1994, **IBA action report 1994 for Andorra**, A.D.N., 16 p.; Coordinadora "Si al Madriu", 1995, **L'accés rodat a Ramio: les raons de la coordinadora**, internal report, 13 p.; Butlleti Oficial del Principat d'Andorra, 2000, **Llei d'Agricultura i Ramaderia**, Principat d'Andorra, 7 p.; IUCN, 1997, **Pyrénées – Mont Perdu: IUCN technical evaluation**, unpublished, pp. 85-91.
- ii) **Consultations:** 2 external reviewers. The mission met: the Prime Minister and other Ministers, government officials, local representatives, as well as NGOs and other local interested parties.
- iii) **Field visit:** Mrs Susan Denyer (ICOMOS) and Dr Gerard Collin (IUCN), October 2003.

2. SUMMARY OF NATURAL VALUES

The nominated site, the Madriu-Perafita-Claror Valley (MPCV), is located in the Pyrenees, in the South East part of the Principality of Andorra, which lies between France and Spain. It is made up of a core area of 4247 ha, surrounded by a buffer zone to the north and west of 4092 ha. The highest point is the Pic de la Portelleta (2905 m), the lowest is at the confluence of the Madriu and Valira Rivers at 1055 m; this altitudinal range of 1850 m occurs over a distance of only 10 km. The easternmost limit of the buffer zone forms the national border with France. On the southern side, the nominated site and parts of the buffer zone border with Spain. The rest of the buffer zone borders with others parts of Andorra.

The nominated area fits precisely within the basin of the Madriu River, giving it a natural coherence. This river starts its course at high level in an area of plateaus, glacial lakes and rocky glaciers, and then flows west through a large glacial valley. A secondary valley, the Perafita-Claror, enters the Madriu Valley from the south-east at Entremesaigues.

The MPCV is situated in the axial zone of the Pyrenean range. The main geological structure is grano-diorite (dating back 300-350 millions years). The Claror area is dominated by schists.

The geomorphology of the whole area is characterised by a typical range of glacial phenomena (cirque, moraines, glacier lakes, rocky glaciers etc.). The plateau of Calm de Claror is an unusual example of a surface impacted by pre-glacial erosion: the landscape is similar to those of sub-polar and tundra regions. The glacial cirque of Estanyons (in the south-east of the Madriu Valley) provides evidence of the short ice age that occurred in five periods

between the 14th and 19th centuries: this is the only surviving proof of its occurrence in the Pyrenees.

Three main bio-climatic regimes are found in the area: mountain formation (1000 – 1700 m), sub-alpine formation (1500 – 2400 m), and alpine formation (2300 – 2900 m). However, because of the main valley's east-west orientation, the contrasts between shaded side (ubac) and the sunny slopes (adret) generate a mosaic of landscapes which obscure these bio-climatic regimes.

The geographical situation of Andorra makes the place an area of interest for migratory birds crossing the Pyrenees (20 % of the birds listed in the Birds Atlas of Andorra are passage migrants).

3. HUMAN – NATURE INTERACTION

The MPCV has been used by people for centuries, and the evidence of interaction with nature continues to this day. For example, glacial activity left lakes in the valley floors; when these filled up, ideal conditions were created for growing crops of cereal and hay. The high mountain meadows, grazed by local and transhumant sheep, are an adaptation of the natural grasslands that arise from the geological and climatic conditions.

Forests also bear the imprint of human activities. Wooded areas have long been used for firewood as well as for furniture, tools and construction. Substantial areas have been affected by charcoal production, which supported iron manufacture in the Catalan Forges, produced in combination with iron ore from the Claror slopes and water power from the Madriu River.

Water resources have also been harnessed for centuries as drinking water, for irrigation and as energy for forges. More recently the area has become the major water supplier to the city of Escaldes. The electricity producer is currently obliged under contract to ensure that at least 10% of the original water flow in the Madriu river at Ramio is maintained.

The lie of the land favours east-west passage through the mountains from and to the main Valley of Andorra (Valira). Several mountain passes also provide access to the high altitude pastures of Catalunya. Shepherds, charcoal burners, miners, blacksmiths, farmers and even smugglers have used these footpaths over the centuries. Their present day counterparts are hikers.

4. COMPARISON WITH OTHER AREAS

The MPCV is the only surviving unspoilt landscape within Andorra. Much of the rest of the principality has been affected by large-scale and unregulated development since 1960. 70 % of all species of birds in Andorra are found here, in only 10 % of the total surface area of the country.

At the regional level of the Pyrenees as a whole, the nomination dossier includes a comparison with the World Heritage site of Mt Perdu, France/Spain. This is also a pastoral landscape reflecting an agricultural way of life that was once widespread in the upland regions of Europe, but now survives only in this part of the Pyrenees. It provides exceptional insights into past European society through its landscape of villages, farms, fields, upland pastures and mountain roads. However, the landscape of the MPCV, with its underlying granites and schists, contrasts with that in many other parts of the Pyrenees (including the Mt. Perdu), where the rocks are mainly sedimentary. Another unusual feature of the nominated area is the evidence of the recent short ice age, which is at the present time demonstrated only in the Madriu Valley.

The nomination also includes a brief comparison with four other valleys in the Pyrenees (three in Spain, one in France). It considers that none of these includes such a rich heritage of natural or cultural features, arguing that the distinctive history of Andorra helps to account for

the claimed unique qualities of the MPCV. It is appreciated that a comparative analysis of this kind is hard to carry out and that there is probably insufficient information to make a definitive comparison. On the other hand, a wider comparison with other upland valleys – such as those in the Alps or further afield - is necessary to demonstrate that the MPCV is of outstanding universal value.

At the broader international level, the Pyrenees is a lesser mountain range than other mountain ranges formed around the same time, such as the Caucasus and the Alps. However, as a possible cultural landscape, the question is whether the MPCV demonstrates a relationship between humanity and nature that is of outstanding universal value rather than a comparison of mountain systems as would be the case with a nomination for a natural site.

5. INTEGRITY

5.1. Legal Status and Ownership

At present no special protection is given to the area but the authorities of Andorra confirm that under the Andorran law on cultural heritage of 12 June 2003, the area will normally be declared a cultural landscape by June 2004. This would provide the necessary level of protection for the site. It is also expected that a national law on natural heritage and nature protection will be adopted in 2004. Though both developments are in the right direction, it is of concern that neither of the required measures for the protection of the area is yet in place at present, and that there is a risk that the necessary action may not have been taken by June 2004 at which time the World Heritage Committee will examine the nomination.

Most of the nominated area is owned by the municipalities: 99 % of the core area and 99.5 % of the buffer zone. The municipalities tend to manage the territory through mutual agreements. This is also foreseen for the protected cultural landscape (a charter of the MPCV was signed in 2003 by the four municipalities and the Ministries of Culture and of Agriculture and Environment). The remaining territory is divided between 32 private landowners and this requires careful collaborative management to ensure the conservation of the site.

5.2. Boundaries

In general, the boundary of the core area is satisfactory as the limits correspond to the watershed basin of the Madriu River, which can be considered as an ecological unit. However, there seems to be some doubt as to whether the interesting plateau within the core area of the Claror zone, west of Pic Negre, is adequately protected by its buffer zone. This is an area to which all-purpose vehicles have access, an activity that should be controlled (see section 5.4). It is notable that there is no buffer zone on the Spanish side of the border, but since this southern boundary coincides with a mountain ridge, the need for a buffer zone is less pressing. The area to the north, lying entirely within Andorra, is in the buffer zone.

5.3. Management

The State Party has prepared a Management Plan for the nominated site but it is not yet being implemented; this is awaiting declaration of the site as a cultural landscape according to Andorran laws. The proposed management structure will include the four communities affected and the Ministries of Culture and of Agriculture and Environment. Since the municipalities own 99 % of the land, their participation is essential. The organisation will be made up of three components: a consultative council, an administrative council and a board of assessors.

This structure seems rather complex and would see merit in creating a single decision-making body with executive functions. This would need to consult with a range of interests, as represented in the proposed consultative council. At the same time an independent scientific council should be set up with advisory functions, drawing on expertise in fields relevant to the cultural landscape, (this would be in place of the proposed board of assessors).

The zoning proposed in the Management Plan is based on four types of zone: moderate use zone, restrictive use zone, ecological reserve and special use zone. In general, this makes good sense, though there is reason for some concern over the rules for the ecological reserve. The proposal is for strict preservation of ecosystems with a consequential prohibition on all traditional activities. Because of the characteristics of the nominated site, it would be preferable to moderate that regulation. The conservation or the balanced evolution of some ecosystems would be impossible without the controlled maintenance provided by certain traditional activities, such as grazing. This applies to parts of the proposed ecological reserve. Therefore, that zone should be subdivided into two categories: one where traditional activities are maintained and one where any human activity is prohibited.

A great deal of scientific research needs to be carried out in many fields in order to strengthen the knowledge base for the management of the area. Some research is proposed in the Management Plan but a gap is the need to compile an inventory of invertebrates.

The Management Plan correctly encourages the revival of agriculture and livestock breeding, since this is the main tool for managing the MPCV cultural landscape. The law on agriculture and breeding, the subsidies proposed by the Ministry of Agriculture and the aims of national agricultural policy are wholly supportive of activities that respect the qualities of the environment. This is welcomed as are proposals for keeping the forest free from commercial exploitation.

It is reasonable to permit the continuation of hunting of game, providing a hunting plan is developed and implemented in accordance with the results of scientific research. Similarly, there is no reason to prohibit fishing but the management of fish stocks should be based on scientific assessments and linked to monitoring programmes.

Proposals in the plan for accessibility are very restrictive, which is consistent with the aim of conservation of the cultural landscape. A former proposal to build a road in the valley was rejected in face of public opposition. This is welcome but regulations may still be needed to control vehicular access along the rough track in the valley, for example by excluding certain kinds of vehicle, identifying groups entitled to use them and defining the times when access is allowed. Such questions will be of particular relevance to owners of private properties in the valley, who still use their farms as secondary residences.

In conclusion, with some small amendments, the Management Plan, when implemented, will help guarantee successful conservation of the MPCV cultural landscape.

5.4 Threats

Overall, threats to the natural resources of this area seem to be few and could be easily resolved within the national laws and the Management Plan.

Currently, hunting regulations permit the killing of one chamois for each group of four hunters during one single week of hunting in the MPCV. This seems to be based on the precautionary principle rather than scientific foundations. The policy in the Management Plan to permit continued hunting should be followed, subject to a separate management regime. Drawing this up will require scientific studies and monitoring. There is an urgent need to collect the base line data so that the new regime can come into operation when the cultural landscape is established.

Access by motorbike to the valley should be prohibited, with some kind of barriers installed at the entrance. The same should be done for access to the top of Claror, where all-purpose vehicles have damaged the fragile sub-arctic vegetation.

The values of the cultural landscape could be threatened by both over-grazing and under-grazing. Too many animals can cause a loss of floristic interest and soil erosion; too few animals would mean that some vegetation increases at the expense of others. The density of grazing animals should be determined not only by economic considerations but also by ecological ones. A study on livestock breeding in the MPCV is already underway; its

completion should be a priority to help secure a sustainable balance between grazing and vegetation.

Helicopters flying over the valley cause serious noise nuisance, and may also affect some species and the successful introduction (or re-introduction) of others.

The current level of tourist visitation appears to be within the capacity of the valley. The nomination of the site as a national cultural landscape - and its possible status as a World Heritage site - could lead to a considerable increase in visitor numbers. As the Management Plan recognises, a tourist management plan is required, with associated policies for zoning, access and interpretation.

6. IUCN SUMMARY

The MPCV can be considered as a “continuing organically evolved landscape” (Operational Guidelines, July 2002, 39, ii, b).

The length of the valley bears the imprint of human use over many centuries. Only a few small areas have not been used at some time, namely the rocky glaciers, cliffs and screes. The land uses that are associated with the cultural landscape have contributed, and still contribute, to the protection of biodiversity. For example, the grazing of the upper area has contributed to maintaining mat grasses and fescues.

Forests in the valley have not been subject to industrial scale exploitation and this has helped to protect the slopes from erosion or avalanches. Even though forest management has favoured some species over others, there are no plantations or introduced species. The result is a mixed forest of great beauty.

In terms of biodiversity, the area contains some vulnerable, rare or endangered species at the international, regional (Pyrenees) or national level. The mixed forests are classified under the European Union Habitat Directive as a priority habitat of community interest. Finally the MPCV is also part of an International Important Bird Area (IBA AD 001 Pirineo de Andorra) which holds significant populations of several species of European importance.

The site is an excellent example of humanized ecosystems, unique in Andorra, and interesting at the scale of the Pyrenees. These values should be preserved and interpreted for public benefit.

7. CONCLUSION

The association of natural and cultural values makes the MPCV an area of exceptional interest. Moreover, the Andorran authorities and public seem committed to their protection, and indeed the enhancement, and if necessary restoration, of these values.

IUCN has advised ICOMOS that even if the natural qualities of the nominated site are not of outstanding universal value, the state of conservation of the MPCV's humanized ecosystems is extremely important.

IUCN, however, recommends that two key actions are necessary before the World Heritage Committee is asked to consider this nomination:

- the necessary legal protection and institutional arrangements should be put in place; and
- there is a need for a fuller comparative analysis that sets the nominated site alongside other high valley agricultural communities of this kind, so as to establish beyond doubt its claim to be of outstanding universal value.

IUCN would also suggest that the State Party be requested to:

- confirm that the limit of the buffer zone in the South West of the nominated site includes the area reaching as far as Camp Ramonet in order to protect the Claror Plateau , and that this will provide effective controls over off-road vehicles;
- develop a visitor management plan with associated policies for zoning, access and interpretation.
- modify the policies attached to the management zones so as to permit certain forms of traditional agricultural uses for ecological purposes;
- review the structure of the management body, and specifically to establish an advisory scientific council with human/social science experts as well as earth/life sciences experts;
- to consider how problems with helicopters over-flying the valley might be addressed;
- to review the regulations on access, taking into account that access is required by those who are involved in the management and conservation of the cultural landscape;
- initiate as soon as possible an inventory of invertebrates in the meadows and high altitude pastures (this study could be part of the research to be carried out by the Direction of Agriculture).

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ÞINGVELLIR NATIONAL PARK (ICELAND) ID Nº 1152

The Þingvellir National Park has been nominated as a “Cultural Landscape”.

1. DOCUMENTATION

- i) **Literature consulted:** Daníelsson H., 2001, **Þingvellir** Edda Media and Publishing, Reykjavik; Jónasson P. M. (ed.), 1992, **Þingvallavatn** Oikos Press (this contains numerous scientific papers); Lugmayr H., 2002, **The Althing at Þingvellir** Edda Media and Publishing, Reykjavik; Þorsteinsson B., 1986, **Þingvellir – Iceland’s National Shrine** Örn og Örlygur Publishing House.
- ii) **Consultations:** 8 external reviewers. The mission also met with National Park Authorities, Representatives of the National Museum of Iceland, the Ministry of Environment, and the Ministry of Education, Science and Culture, the Director of the Environment and Food Agency of Iceland, the Chairman of the Icelandic UNESCO Committee, The Chairman and members of the Þingvellir National Park Commission and a number of local Academics and Scientists.
- iii) **Field Visit:** Henry Cleere (ICOMOS) and Adrian Phillips (IUCN), August 2003

2. SUMMARY OF NATURAL VALUES

Þingvellir National Park (IUCN Management Category II) is strikingly situated on top of the Mid-Atlantic Ridge, which arises from the splitting of the North American and European tectonic plates. The site is bounded to the south-east and the north-west by parallel lines of fissures. These occur where very recent lava fields have been faulted down as the underlying plates pull apart, creating a classic instance of a ‘graben’ or ‘trough fault’. This is still subsiding, with periodic earthquakes. To the north, volcanic mountains can be seen rising towards the permanent icecap of Langjökull.

Most drainage from the area to the north-east is subterranean, but the River Öxara flows through the historic centre of the park. It joins massive cold springs from the subterranean sources to drain into Lake Þingvallavatn to the south-west, Iceland’s largest lake. This lake system is also of considerable scientific interest, with four distinct forms of Arctic charr in existence that have developed since the end of the ice age, only 10,000 years ago.

Þingvellir’s physical setting helps to give the site its unusual and beautiful quality – as well as a distinct unity. These qualities take on an added significance in light of the central part played by Þingvellir in the history of Iceland for well over a thousand years, as the place where nearly all the great events in the country have taken place (see ICOMOS report).

Þingvellir’s importance to the people of Iceland was recognised by legislation to create Iceland’s first national park as early as 1928, making it one of the earliest parks in Europe. It formally came into being in 1930; the area was greatly enlarged in the 1950s and somewhat further extended in 1998. The present area of the park, 92.7 km², is the area nominated as a World Heritage site. It includes the north east corner of Lake Þingvallavatn.

Three points in particular should be noted about Þingvellir National Park:

- It shows very clearly a strong link between natural and cultural factors. Natural values are certainly higher at this site than in most other Cultural Landscapes on the World Heritage List;

- These natural values are very well documented: they relate not only to the area's history and archaeology, but also to its geology, drainage, fauna, flora and the lake system, which have been the subject of more than a hundred scientific papers; and
- The site has a unique cultural significance to the Icelandic people as in effect a national shrine, and this should be reflected in the very highest standards of management and design, though this also needs to be sensitive to the wishes of people to have access to the area.

3. COMPARISON WITH OTHER AREAS

The nomination claims that there is only one other place on earth where tectonic splitting can be seen at the surface: Djibouti in East Africa, (though of course there are many other spectacular examples of rifting to be seen).

4. INTEGRITY

4.1 Boundaries

Since the boundaries of the nominated site are those of the national park, the site is far larger than the historic core itself, which covers only a few hectares. This is appropriate for the following reasons:

- The nomination is not of a historic site alone but of a cultural landscape with high natural values;
- It respects the unity of the landscape created by the faulting on two sides, with mountains and a lake system on the third and fourth;
- It provides a sensible unit for management purposes; and
- There were functional connections between the historic core and the wider area around, which was the focus of a network of converging routes and important as grazing lands for the horses of those attending the ancient assembly at Þingvellir.

The buffer zone around the nominated site includes land protected against development by various local plans and – in some parts - arrangements that give the national park powers to veto unacceptable development. Given the long history of land degradation in Iceland, mainly consequent on the removal of natural vegetation and grazing pressure from sheep, such safeguards are important to guarantee protection of the watershed around Þingvellir. This is soon to be strengthened through a new national nature conservation strategy. These powers generally appear sufficient, especially as much of the watershed is virtually unusable for any economic purposes.

It is not clear that sufficient control exists to protect the quality of Lake Þingvallavatn. While only a small part of the lake is within the nominated site, it is of course a single ecological unit, and any problems arising elsewhere in the lake could therefore impact on the site's integrity (see also the section on Management Issues below). However, based on recommendations from the Advisory Bodies, the State Party agreed in a letter dated 15 March 2004, to include the rest of the lake in the buffer zone of the site.

4.2 Management and Resources

Þingvellir National Park is administered under its own legislation (all other parks in Iceland are run as part of the national park system) which provides for a three-man board of Parliamentarians to act as the governing commission. This reflects the importance of the site to the Icelandic nation. While cutting the park off to some extent from other protected areas in the country, it does ensure a high level of political interest and support, and priority for funding.

Day-to-day management is undertaken by the Park Director, supported by the Interpretive Manager. There is one other permanent staff member, but up to ten or a dozen people are

employed in the summer months as temporary wardens to assist in managing the large number of visitors. The staff appear highly professional, though they might benefit from closer contact with others working in the field, e.g. through the IUCN World Commission on Protected Areas (WCPA).

There is an annual government-funded operating budget of US\$800,000, on top of which funding for specific projects (e.g. the newly-opened visitor centre) has been secured from time to time. Some sponsorship has been obtained from the Iceland National Bank for interpretive provision for visitors. In general, the funding for the park appears adequate at present.

The arrangements for management planning are under development. A development plan was adopted for the park by the Þingvellir Commission in 1988. This covers the park and the buffer zone. With the help of consultants, work is now underway to prepare 1) a "Master Plan" (i.e. a statutorily required physical land use plan); and 2) a revised Management Plan to take account, *inter alia*, of hoped-for World Heritage status. It is intended that the Management Plan should be adopted by May 2004 at the latest, before the next World Heritage Committee meeting. It will be supported by a subsequent implementation plan or annual work plans. These arrangements, which include provision for stakeholder participation, appear appropriate, though there seems to be some confusion over plan terminology.

4.3 Threats

Though Iceland has a relatively low population and Þingvellir National Park occupies a relatively large area, there are some complex management issues nonetheless. Some of these arise from the focus of most visitation being concentrated in a small part of the National Park, that is the historic core of the innermost Assembly site, which requires very careful management. Others arise because of the extreme sensitivity of sub-Arctic ecosystems to pollution and other impacts. Others again result from the implications of the area's status as a National Park and possible World Heritage site.

4.3.1 Management issues related to visitation

Þingvellir National Park receives about 300,000 visitors a year, more than the population of the country. In fact, 68% of all foreign visitors to Iceland visit the site, as do many Icelandic nationals. They travel by car and coach, and there are three car parks for these vehicles at present: one overlooking the site at the visitor centre to the south west, one immediately east of the historic core, and a third about 400 metres to the north. In addition, there is more parking at the service centre (which includes shops, restaurant etc.) about 1.5 km to the north-east of the historic core. People are free to park elsewhere, e.g. along the lake shore, but do not appear to do so in large numbers.

In summer months, many hundreds of people may be on the site at the same time. A network of paths is in place for them to circulate around the site on foot, with platforms for viewpoints and board walks over sensitive ground. Most visitors come from the west, from Reykjavik, and the first point that they encounter is the visitor centre with an excellent interpretive presentation. From here, there is a superb view of the site below. The 'walk in' down a gorge of faulted lava blocks is truly spectacular.

Issues that need to be addressed include:

- The central parking place, immediately east of the historic core, is intrusive and unnecessary; it directly affects the integrity of the area, and should be removed. There are two other parking areas nearby and with imaginative use of park-and-ride services and limited access for people with disabilities, no loss of public access need occur.
- A bridge over the River Öxara on the pedestrian access route in the gorge is an eyesore, and quite inappropriate in such a beautiful setting of rather lurid historic importance (it overlooks a pool in which a number of women were drowned as a punishment in the Middle Ages). It is a heavy, over-engineered concrete legacy from the time that vehicles used the route. It should be replaced by a lighter structure.
- There is a national cemetery near the small church at Þingvellir; however only two people have been interred there, and none for many years. The feature is large and

somewhat insensitive in design. It seems that there is uncertainty as to what its future should be. This matter should be resolved in the management plan.

- At present, information is made available for visitors in the audio-visual presentation at the visitor centre and in leaflets, as well as through guided walks. There are plans for signs on site. Provided these are designed and positioned with sensitivity, this would be beneficial. The use of electronic 'wands' for self-guided tours is to be encouraged.

4.3.2 Management issues relating to pollution

The key concern here relates to threats to the quality of water in Lake Þingvallavatn. This ecosystem is very sensitive to the impact of any artificial inputs, especially nitrogen. It is therefore of concern that there are many summer houses around the lake, some with - it is reported - rather poor controls over effluent discharge. Urine in particular can raise nitrogen levels. Relatively few summer houses are found in the national park and these are subject to ten year leases which stipulate appropriate controls over use and waste discharge. However, it would be best if these leases were not renewed when they expire.

In addition, there are several hundred summer houses around the shores outside the park. As the lake is a shared system with part of the nominated site, it is essential to introduce and enforce strict controls over pollution from all the summer houses, not just those in the park. It should be added that the park goes to considerable lengths to avoid pollution from visitors at concentration points within the site (e.g. by pumping out sewage from lavatories at both the visitor and service centres).

4.3.3 Management issues relating to the National Park and potential World Heritage status

Bearing in mind (i) the importance of integrity issues in a potential World Heritage site, (ii) the importance of sustaining or restoring natural systems in Category II protected areas like Þingvellir National Park, and (iii) the general good practice standards associated with protected areas, there are two areas of concern:

The existence of some plantations of exotic coniferous planting

Wherever possible, these should be removed (there is one area of memorial planting that should be respected). Native trees, such as rowan, birch and Arctic willow, should be encouraged in their place. Such an eradication programme is underway now and should continue, despite some public concern. Continued education about the importance of natural systems is needed to ensure better public understanding. Also the watershed should be protected against any such planting which has been shown to increase nitrogen run-off and acidification of water systems.

Plans to upgrade a road through part of the nominated site

The existing Road 365 through the eastern part of the National Park is planned to be 'improved' to become a fast highway, constructed for traffic at 90 kph. Three alternative routes are currently under consideration: two would involve about 3-5 km of new or upgraded road (roughly half of this in the park itself, and half in land to the east). At their western limit, the alternatives would connect to the existing cross-park Road 36 at Gjabakki, where a 50 kph speed limit is in force. A third option was proposed by the State Party by letter to ICOMOS dated 2 February 2004, whereby a 1 km section of the road would run through the south corner of the nominated area. ICOMOS proposed removing that southern corner from the nomination but at the time of writing this report IUCN is not aware of a final decision by the State Party on this issue.

Various reasons are given to create a new fast, all-weather road in place of the existing 'summer' road. These are (i) to provide a better route for tourist traffic going to and from the popular sites of Gullfoss and Geysir to the east, (ii) to reduce the journey time to Reykjavik for summer house users in land to the east side of the park, (iii) to improve communications within the new municipality of Bláskógabyggð, and (iv) to improve access to the capital for vegetable farmers to the east of the park area.

The proposal to build what is in effect a new road in part of the park and nominated site is troubling; especially since the scheme was due to begin in spring 2004, before the World

Heritage Committee considers the nomination. This appears to be the case even though an environmental impact assessment (available only in Icelandic) has been prepared and is presently under consideration. The benefits of a new road in terms of improved access are clear, but good practice these days would favour alternatives that avoid such a sensitive area altogether. If it is built, it is inevitable that more traffic will pass through the park, though avoiding the most sensitive historic core. The proposed new Road 365 will be in principle out of place in a World Heritage site, cut across the eastern (European plate) fissures, and cause some increased pollution discharge; it may also lead to increased pressure to upgrade Road 36, and raise the speed limit on it.

Ideally, the road should not be proceeded with and alternative routes around the park explored. However, if the decision is taken to build it, then there should be (i) a speed limit imposed of 50 kph on all parts of it within the park, (ii) a complete ban on the use of the road by any vehicle carrying hazardous materials, (iii) no upgrading of Road 36. In other words, if the road has to be built, its design and management should respect the special qualities of the site.

5. ADDITIONAL INFORMATION

Pingvellir National Park was not nominated under natural criteria. The question whether it should be was raised during the evaluation and also by some reviewers. It seems that the Icelandic authorities would like to nominate Pingvellir as a natural site in due course. Without prejudice to the evaluation of any such future nomination, the case may be made stronger if Pingvellir were part of a serial nomination that illustrated the significance of the Mid-Atlantic ridge as a whole – a global feature that occurs in several islands or island groups, other than Iceland.

6. IUCN SUMMARY

Pingvellir National Park has been nominated as a Cultural Landscape. The area has impressive natural qualities that are an integral part of the site's values. In particular:

- The nominated site shows inter-continental rifting in a spectacular and readily understandable manner;
- The site is of great natural beauty, with an impressive variety of landforms;
- There is a close interaction between natural and cultural/historical aspects of the site; and
- Lake Þingvallavatn is of great limnological interest.

Moreover, with some exceptions, the site is well managed and at present broadly maintains its integrity. IUCN would recommend, nonetheless, that the State Party be requested to address the following issues in relation to the management of the site:

- the central parking place, immediately east of the historic core, should be closed;
- the concrete bridge over the River Öxara should be replaced with a lighter structure;
- the Management Plan should provide clarity about the future of the national cemetery;
- care should be taken in the design and positioning of information signs on the site;
- there should be strict controls to avert possible pollution discharges from all summerhouses around Lake Þingvallavatn;
- consideration should be given to not renewing the leases over those summerhouses that are within the national park;
- the programme for removal of exotic conifers should continue; and
- proposals for the upgraded Road 365 should be reconsidered. If that is impossible, then a speed limit of 50 kph should be imposed on all traffic using it throughout the National Park, along with safeguards over the transport of hazardous goods and an agreement not to carry out improvements to Road 36.

7. CONCLUSION

IUCN has advised ICOMOS that, based on its assessment of the natural values of Þingvellir National Park, this site merits inscription on the World Heritage List as a cultural landscape.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

VEGAØYAN - THE VEGA ARHIPELAGO (NORWAY) ID N° 1143

Vegaøyen - The Vega Archipelago of the Norwegian Coast has been nominated as a "Cultural Landscape".

1. DOCUMENTATION

- iv) **Additional literature consulted:** Nordic Council of Ministers, 1996, **Proposals for new areas for the UNESCO World Heritage List**, Nordic Council of Ministers, Copenhagen; M. Heath, M. Evans eds., 2000, **Important Bird Areas in Europe: Priority Sites for conservation**, Vol. 1: Northern Europe, Birdlife International; G Kelleher, C. Bleakley and S. Wells, Eds. 1195, **A Global Representative System of Marine Protected Areas**, Vol. 1, GBMPA, IUCN, WB.
- v) **Consultations:** 1 external reviewer. The IUCN mission met with the Mayor of Vega Municipality, a representative of the County Governor of Nordland, representatives of the Directorate of Nature Management, and a number of local inhabitants.
- vi) **Field visit:** M. Helminen (IUCN), August 2003, and B. Johansson (ICOMOS), September 2003.

2. SUMMARY OF NATURAL VALUES

The nominated area, the Vega Archipelago, consists of 96,880 ha of sea and 6,930 ha of land. The land area is made up of the mountainous and some coastal parts of the main island of Vega, but excludes most of the farmed part of the island (which forms part of the buffer zone). The rest of the nominated land area includes about 6500 islands, islets and skerries. Thus the dominant natural element is the sea, more particularly the productive shallow sea of the Strandflat, which provides rich fish and bird populations, which have been available for human use. The distinctive features of human life that have evolved during millennia are adaptations to these ecological conditions.

The Norwegian Strandflat is essentially a broad wave-cut platform cut out of the bedrock, ranging between 100m in altitude and 100m in depth. It is found along the Atlantic coast of Norway between the 59th and 72nd latitudes. According to the information provided, it is most typically developed in the Helgeland coast, and the largest continuous block is located around the island of Vega.

An important feature of the Strandflat is the many small islands and skerries, which typically form sub-archipelagos. The markedly uneven distribution of islands has had important implications for terrestrial flora and fauna as well as for human occupation. This is because islands in these sub-archipelagos provide some shelter to each other, so creating conditions suitable for a single family to occupy certain islands and use adjacent ones. The cultural and ecological significance of these sub-archipelagos is demonstrated by the fact that they have been given a specific Norwegian name: "oyvaer".

A notable and valuable feature of the Vega Archipelago is the wedge-shaped mountains or "monadnocks"¹. There are two of them on the main island of Vega and a third one forms the

¹ Monadnocks are isolated hills that stand above the surrounding plane.

island of Sola. The highest of them, Gullvågssellet (737m) on Vega, remained uncovered by the continental ice mass during the Quaternary era, even when the westernmost margin of the glacier was far out to sea; accordingly it retains deep layers of eroded material not moved by ice. The southwestern slopes of the monadnocks provide sheltered sites for some plant species, which generally occur only in more southern latitudes; examples are hazel and wych elm, which are found in the Eidemslia nature reserve on Vega – this is one of the most northernmost sites in Norway (as well as in Europe).

The Vega Archipelago contains important biodiversity, although there are no endemic species. Bird fauna is especially rich both in species diversity and numbers of individuals. Some 110 bird species have been reported as breeding, or are presumed to be breeding, in the area. It is most famous for its large eider duck population. Eiders have been traditionally used sustainably for eggs and down, and specific techniques were used to attract the birds to nest in close groups under purpose-built shelters. This traditional way of eider management is culturally important and demonstrates the bird's unusual ability to adapt to artificial nesting sites. It is interesting that the breeding success of the eiders utilizing the nesting shelters has been better than that of the birds breeding in the open.

About 4000 pairs of cormorant breed within the area. Nordvaeret, in the outermost part of the archipelago, contains the largest ground nesting colony of cormorants in the world: the entire treeless island is coloured white by the faeces of the birds. There are also 450 pairs of breeding greylag geese, while up to 10,000 barnacle geese utilize the Vega Archipelago as a resting and feeding area on their migration route between Scotland and Svalbard. There are also significant populations of grey seals, water voles and otters.

The beautiful scenery of open sea, small islands and magnificent monadnocks is essentially a natural one, the cultural element being an important additional factor. The area has correctly been nominated as a "cultural landscape". Moreover, both the terrestrial and marine areas are essential parts of the nomination.

3. COMPARISONS WITH OTHER SITES

It is claimed in the nomination that no similar geological, hydrological and ecological conditions are to be found anywhere else on earth. There are, however, several other North Atlantic island groups with some similar characteristics. For example, the Lofoten Islands to the north have a broadly similar position off the main Norwegian coast but they are far more mountainous, and differ in terms of economy and their cultural and social history. There are also a number of archipelagos in the Baltic off the Swedish and Finnish coasts, but the Baltic is a very different environment from the Atlantic, and the island groups are much less exposed to the elements. Superficially similar features can be found in the island groups off the north and west of Scotland (Hebrides, Shetlands, Orkneys), but none has the Strandflat topographical feature. Island groups elsewhere in the world have very different physical and/or cultural characteristics. Therefore, taking into account its glacial history, the high latitude, the exposure to oceanic storms, and the warming influence of the Gulf Stream, it would seem that the natural values of the Norwegian Strandflat – so well exemplified in the Vega archipelago - are indeed very distinctive.

4. INTEGRITY

4.1 Boundaries and the buffer zone

The boundaries of the nominated area follow mostly the administrative boundaries of the Vega municipality. In the southern and western edge of the area there is an ecological justification for this proposal. However, the ecological case for using the administrative boundary of the nominated area is less convincing toward the north-eastern limit.

The present nomination covers only part of the area proposed by the Nordic Council of Ministers in the report, "Proposals for new areas for the UNESCO World Heritage List"

(1996). This had proposed that a large "North Norwegian Archipelago" be nominated to include both the presently nominated area and additional areas to the south and extending north to the Lofoten Islands, totaling about 2500 km². The present nomination is, however, more convincing and practical, and better designed to ensure effective management and to meet integrity conditions.

As noted, the present nomination proposes a buffer zone in the eastern inhabited part of Vega Island and also in the archipelago between Vega and the continental coast. It would seem that the need to keep within the boundaries of the Vega municipality is the reason for there being no proposed buffer zone elsewhere, notably towards the northeastern margin of the site. The boundary separating the buffer zone and the nominated area on Vega Island seems appropriate, since the eastern farmed and settled part of the island differs sharply from the western mountainous part: for instance, it contains fairly large plantations of exotic Sitka spruce. On the other hand, including some smaller protected areas on the northern coast of the main island would increase the biodiversity value of the nominated site.

4.2. Management plans and threats

The nomination explains that only traditional means of livelihood or other low impact methods of resource utilisation will be allowed within the nominated area. However, all economic activities that cause an appreciable change in the landscape should be directed to the buffer zone, where the regulations will be less strict. This should apply in particular to aquaculture, which has been the cause of well-documented environmental damage elsewhere in Norway. A revision of the current management plan began in the beginning of 2003 and was due to be completed by the end of 2003.

Land tenure and legal protection are a cause for some concern. 90-95 per cent of the area is in private ownership. While this is not necessarily incompatible with effective conservation, natural heritage protection must then depend on a strong legal base, effective management planning and wide public support. After some recent additions, about 29 per cent of the area is legally protected for biodiversity reasons with related regulations: in effect this means that over more than two thirds of the property, management must rely on voluntary cooperation.

This is of concern because there is a general trend of people moving away from more remote areas towards urban areas. This trend has already resulted in many people leaving the Nordic archipelagos. Holiday use of former permanent homesteads cannot create the right conditions to maintain traditional land uses and related man-made habitats. The effect of such emigration is already readily visible in the outer islands of the Vega Archipelago, with formerly grazed vegetation returning to more natural condition, a process which leads to a loss of floristic biodiversity. As a result, the grass-eating wild geese are losing part of their feeding grounds.

The decline in the number of permanent human inhabitants also erodes the traditional eider duck's production. The spring collection of the eggs is no longer essential and has in fact been prohibited. Although the eider duck is at no risk if the traditional use of them ceases, it is highly desirable that the management of the eider populations should be continued, at least on a limited scale, since it is a classic example of sustainable utilization of a renewable natural resource.

A potential threat arises from increased tourism and other leisure time activities. The municipality aims to encourage a growth in tourism as a source of income. Existing buildings and harbours provide good opportunities for quality tourism, based on the natural and cultural heritage of the site. The Vega Sea Hotel and the accommodation provided in the old fishermen's houses in the Nes harbour are examples of the type of touristic development appropriate to the local conditions. The existing Eider Museum "E-Hus" should be maintained broadly in its present form. The planned "World Heritage Center" on Vega Island could also provide valuable information to tourists and help to promote low-impact tourism in the archipelago.

Although less than a third of the nominated archipelago area is legally protected for biodiversity reasons, this is to some extent compensated for by strong local commitment, which is fully supported by the regional and national authorities. An ambitious management plan is now under preparation, and actions have already been taken to build local support for the protection of natural heritage values.

5. IUCN SUMMARY

The landscape of the Vega Archipelago has great aesthetic value, with a shallow sea, scattered groups of low-lying islands and skerries, and three magnificent monadnocks appearing as dramatic visual features in the otherwise flat maritime scenery. The Strandflat is also an internationally significant geological and geomorphological feature. Finally the area's biodiversity is of great interest.

There are strong links between the particular natural conditions of the area and its cultural development. The human influence does not dominate the scenery but has contributed interesting small-scale features on the inhabited and formerly grazed islands. In the past, all utilization of natural resources has taken place within the carrying capacity of the area. Traditional management of the eider population is of particular interest from the biological point of view as well as culturally. A similar combination of the particular natural and cultural values cannot be found elsewhere.

Despite its great aesthetic and natural values, the nominated Vega Archipelago does not fully meet any one of the four natural criteria. Nevertheless, IUCN believes that those values are sufficiently high to add significantly to the case for inscribing the area as World Heritage Cultural Landscape.

While therefore supporting any recommendations from ICOMOS to inscribe the site, IUCN has several concerns and would advise ICOMOS and the State Party as follows:

- The State Party should be encouraged to consider extending the nominated area to include islands and marine areas to the north and north east, or at least to include these in the buffer zone;
- As an urgent action, it should extend the areas where biodiversity is subject to legal protection. This should apply to both marine and land areas.
- The new management plan should make clear how private owners will be encouraged to co-operate in its implementation, in terms of responsibilities, regulations and compliance arrangements;
- Aquaculture should be regulated so as to avoid or minimise environmental impact;
- It should develop or strengthen measures to support traditional forms of land management, notably grazing, in parts of the privately owned islands;
- Abandoned islands should be acquired for public ownership and managed to protect biodiversity;
- Nature-based tourism should be strictly regulated so as not to disturb bird and mammal populations;
- Interpretation of the area's natural and cultural values should be offered to all visitors; and
- There should be enhanced programmes of biodiversity-related research and monitoring, including the establishment of a seasonally active research station, to help in the better management of the site.