

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

*Report to the Twenty-third ordinary session of the World Heritage
Committee, Marrakesh, Morocco*

29 November-4 December 1999

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OCTOBER 1999

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*

World Heritage Committee
Twenty-third ordinary session
29 November – 4 December 1999 – Marrakesh, Morocco

Prepared by
IUCN – The World Conservation Union
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15 October 1999

Cover photograph: St. Paul Subterranean River National Park (Philippines)

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THE WORLD HERITAGE CONVENTION

IUCN TECHNICAL EVALUATION REPORTS

15 October 1999

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. 1999 is the first year in which the PPA has been directly responsible for World Heritage.

1999 has been an extremely challenging year for IUCN, with the number of site files reviewed increasing from 8 in 1998 to 24 in 1999; the largest number in the history of the World Heritage Convention. This has meant a large increase in the volume of work associated with technical reviews. Resources have been stretched to the utmost but IUCN has strived to fulfil its responsibilities in a professional and efficient manner.

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 “flag ships” for biodiversity conservation; and
- (iv) The need to increase the level of effective partnership between IUCN and the World Heritage Centre, ICOMOS and ICCROM.

There has been a change in the approach to technical evaluations in 1999. This year members of the expert network of WCPA have carried out the majority of missions. This has allowed for the involvement of regional natural heritage experts and has broadened the capacity of IUCN with regard to its work under the World Heritage Convention. Reports from the field missions were then comprehensively reviewed by a working session of the IUCN World Heritage Operational Panel at IUCN Headquarters. PPA then prepared the final Technical Reviews which are outlined in this document.

IUCN also has 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 and vice versa.

The WCPA membership network now totals over 1300 protected area managers and specialists from 120 countries. This network has provided much of the basis for conducting the IUCN Technical Reviews. In addition, the Protected Areas Programme has been able to call on experts from IUCN's other five Commissions (Environmental Law, Education and Communication, Ecosystem Management, and Environmental, Economic and Social Policy), from other specialist officers 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 its partner institutions.

2. FORMAT

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

3. SITES REVIEWED

Twenty-four site files were reviewed by IUCN in 1999. These comprised:

- ◆ Seventeen (17) natural sites nominations (including one deferred site for which additional information had been received and one extension of an existing World Heritage Site);
- ◆ Five (5) mixed sites (including one deferred site for which additional information had been received); and
- ◆ Input to one (1) cultural landscape and one (1) cultural site which has important natural values.

Of the files reviewed it was not possible to review five (5) sites for presentation to the July Bureau meeting due to climatic reasons. In each case the delayed evaluation date was at the request of the State Party. These five (5) sites are included in this evaluation report to be reviewed by the 1999 November Bureau.

The specific files reviewed by IUCN are as follows:

Identification Number	Name of Property	State Party
A. Nominations of natural properties to the World Heritage List		
A. 1 New nominations		
937	Península Valdés	Argentina
892	Brazilian Discovery Coast	Brazil
893	"Paranapiacaba" - Upper Ribeira Group of Protected Natural Areas and Notable Landscapes	Brazil
894	Estuarine Lagoon Complex of Iguape - Cananéia - Paranaguá	Brazil
828	Area de Conservacion Guanacaste	Costa Rica
889	System of Marine Terraces of Cabo Cruz and Maisi	Cuba
839 Rev	Alejandro de Humboldt National Park	Cuba
955	Lorentz National Park	Indonesia

909	Parco Nazionale Del Gran Paradiso	Italy
652 Rev	St. Paul Subterranean River National Park	Philippines
934	The Laurisilva of Madeira	Portugal
900	Western Caucasus	Russian Federation
914	Greater St. Lucia Wetland Park	South Africa
898	The High Coast	Sweden
951	Phong Nha Cave	Viet Nam

A.2. Deferred nominations for which additional information has been received

686 Rev	Miguasha Provincial Park	Canada
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A.3. Extension of properties inscribed on the World Heritage List

33-627 Bis	Belovezhskaya Pushcha/Bialowieza Forest – Extension	Belarus / Poland
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B. Nomination of mixed properties to the World Heritage List

B.1 New nominations

917	The Greater Blue Mountains Area	Australia
911	Mount Wuyi	China
908	Isole Eolie (Aeolian Islands)	Italy
417 Rev	Renaissance bastioned fort and historic intramural complex of Dalt Vila; and Phoenician-Punic cemetery of Puig des Molins; and Listed Phoenician archaeological deposit of Sa Caleta (8th century BC).	Spain

B.2 Deferred nominations for which additional information has been received

769 Rev	Uvs Nuur Basin	Mongolia / Russian Federation
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C. Nominations of cultural properties to the World Heritage List

C.1 New nominations

936	Area Arqueológica y Natural Alto Río Pinturas - Santa Cruz	Argentina
840 Rev	Viñales Valley	Cuba

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 the World Conservation Monitoring Centre;
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. 150 outside reviewers provided input in relation to the sites reviewed in 1999);
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 Operational Panel Review.** The IUCN World Heritage Operational Panel intensively reviews all field inspection reports and associated background material and agree a final text and recommendation for each nomination; and
5. **Final Recommendations.** After the World Heritage Bureau has reviewed the evaluations, clarifications are often sought. Changes based on the Bureau's recommendations and on any further information from State Parties are incorporated into the final IUCN evaluation report which is sent to the World Heritage Centre eight weeks prior to the 1999 November Bureau and 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 selected on this criterion. World Heritage Sites are seen as the most universally outstanding areas and their selection is not made on the basis of biogeographic representativeness alone.

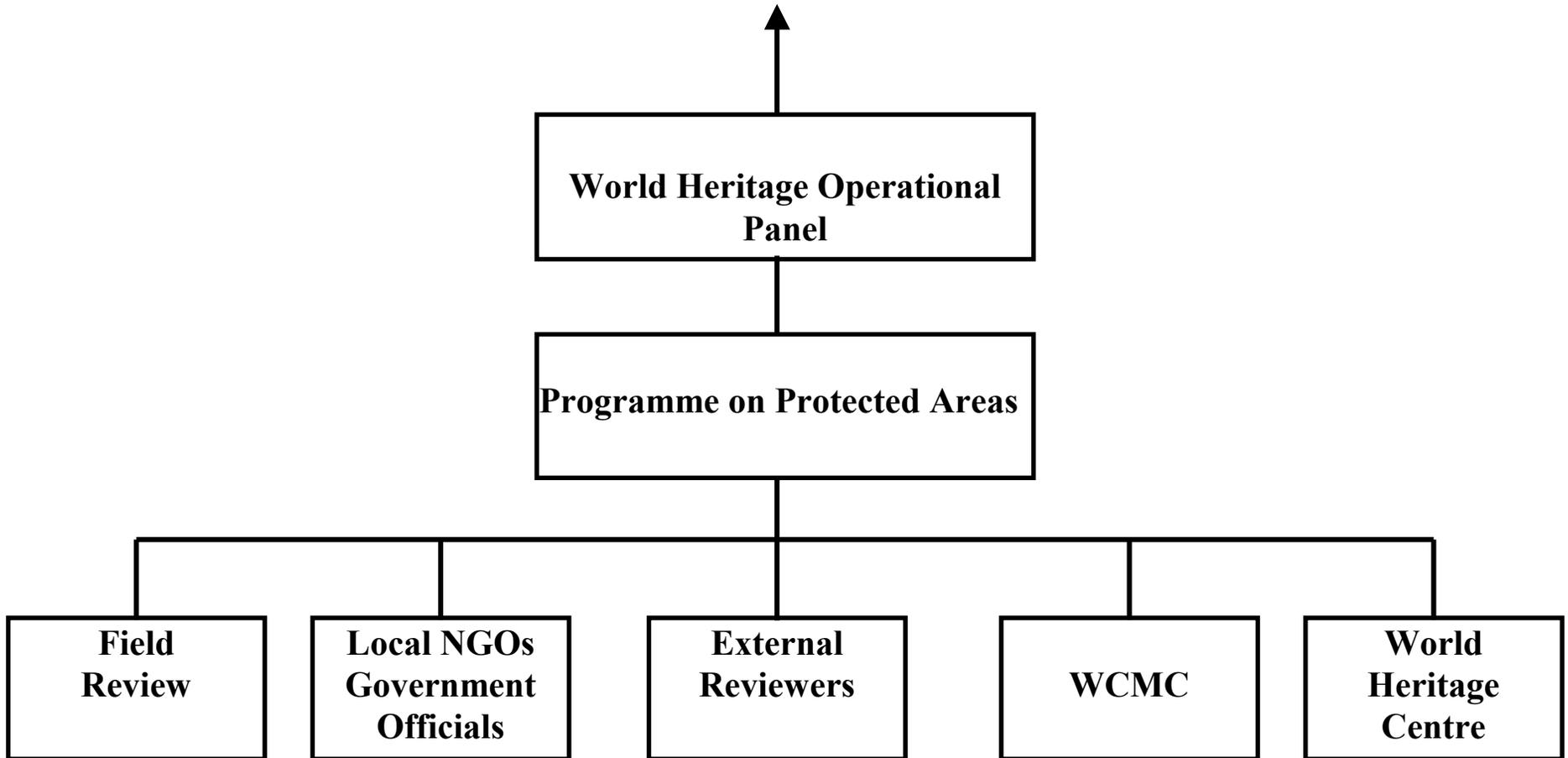
Finally, it is noted that the evaluation process is aided by the publication of some 20 reference volumes on the world's protected areas published by IUCN, UNEP, WCMC and several other publishers. These include: (1) Reviews of Protected Area Systems in Oceania, Africa, and Asia; (2) the four volume directory 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 potential World Heritage sites 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.

Figure 1

IUCN REPORT TO WORLD HERITAGE BUREAU AND COMMITTEE



TECHNICAL EVALUATION REPORTS

A. NOMINATIONS OF NATURAL PROPERTIES TO THE WORLD HERITAGE LIST

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

PENINSULA VALDES (ARGENTINA)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet (11 references).**
- ii) **Additional Literature Consulted:** Davis, S. ed. 1997. **Centres of Plant Diversity.** Vol. 3. IUCN/WWF, pp 549-542; Kelleher, Bleakley & Wells. ed. 1995. **A Global Representative System of Marine Protected Areas.** Vol. 2. IUCN/ WB/GBRMPA, pp 76-83; Stattersfield, Crosby, *et al.* 1998. **Endemic Bird Areas of the World: Priorities for Biodiversity Conservation.** Birdlife Conservation Series No. 7, pp 256-258; Reeves & Leatherwood. 1994. **Dolphins, Porpoises and Whales – Action Plan for the Conservation of Cetaceans.** IUCN/SSC Cetacean Specialist Group, pp 26-30; Bubas. 1996. **Orcas de la Península Valdés.** 13 p; Conway, R. & K. Payne. 1976. Patagonia: A wild shore where two worlds meet. **National Geographic.** 3/1976, pp 290-322; Erize. 1966. Sea Mammals of Patagonia. **Animals.** Vol. 8. No. 18, 4/1966, pp 479-481; CPPS/PNUMA. 1992. **Plan de Acción para la Conservación de los Mamíferos Marinos en el Pacífico Sudeste.** Informes y Estudios del Programa de Mares Regionales del PNUMA (UNEP), pp 110-155; Administración de Parques Nacionales de la Argentina. 1998. **Las Areas Naturales Protegidas de la Argentina.** APN/IUCN/FAO, 65 p; Leitch. 1990. **South America's National Parks: A Visitor's Guide.** The Mountaineers, pp 73-89.
- iii) **Consultations:** 5 external reviewers, National Parks Administration of Argentina, National Secretary for Tourism, National Commission of Co-operation with UNESCO, Patagonia Natural Foundation, Direction of Conservation and Tourism of the Chubut Province, EcoValdés Foundation, Superintendent of Península Valdés, National Centre for Patagonia, Association of Landowners of Península Valdés, Association of Artisan Fishermen, University of Patagonia, representative of Puerto Pirámides community, Whale watching tour operators, landowners
- iv) **Field Visit:** January 1999. Pedro Rosabal

2. SUMMARY OF NATURAL VALUES

Península Valdés is located in the Argentinean province of Chubut. It is a 4,000km² promontory, protruding 100km eastwards into the South Atlantic Ocean. The 400km shoreline includes a series of gulfs, rocky cliffs (some over 100m), shallow bays and lagoons with extensive mudflats, sandy and pebble beaches, coastal sand dunes, and small islands. The coastal zone of the peninsula is dynamic, including shifting coastal lagoons and an active sand dunes system with some dunes over 30m high. The Ameghino Isthmus, which links the peninsula to the rest of South America, has an average width of only 11km; the Golfo San José lies to its north and the Golfo Nuevo to its south. Effectively this gives the area an island quality. While the predominant vegetation is Patagonian desert steppe, 18 different communities can be found, representing a high diversity in such a small area. The number of communities represented in the area demonstrate its importance from the phyto-geographic point of view, considering that in the whole Patagonian region 28 communities have been described. Some 130 plant species from 41 families have been reported, with 38 species endemic to Argentina.

Península Valdés has important faunal values. A population of southern right whales uses the protected waters of Nuevo and San José gulfs as mating and calving areas from April to June. Recent surveys indicate that the population of southern right whales has been growing at an estimated annual rate of 7.1% and every year over 1,500 whales visit the Península. The southern elephant seal forms a mating and calving colony on Punta Norte, reaching peak numbers of over 1,000 individuals. This is the most northern colony of the species and the only one in the world reported to be on the increase. The nominated site is also very important as a breeding point for the southern sea lion.

In addition to the above, 33 other species of marine mammals are found in the area including a stable population of orcas. Favoured by the coastal geomorphology of Península Valdés, these orcas have developed a particular and spectacular approach to hunting: they chase young or adult sea lions or elephant seals into the shallow surf, in the process often stranding themselves on the beach; they then grab the prey in their jaws. This is a unique hunting strategy for orcas.

Terrestrial mammals are abundant, with 33 species being reported. Large herds of guanaco can be seen throughout the peninsula. Other species present include the mara, an Argentinean endemic, and the red fox, both endangered in other parts of the country.

Península Valdés has a high diversity of birds. There are 181 species of birds, of which 66 are migratory species, including the Antarctic pigeon, which is considered Vulnerable. The wetlands of the peninsula, some associated with inter-tidal mudflats and coastal lagoons, are important staging sites for migratory shorebirds and have been identified as a potential Ramsar site for the variety of migratory species that can be found in this area. The Magellanic penguin is the most numerous with almost 40,000 active nests distributed among five different colonies.

3. COMPARISON WITH OTHER AREAS

Península Valdés has many unique geographical and biological features. The nominated site is representative of the Udvardy Patagonia Desert Biogeographical Province, where there is currently no natural World Heritage site. It is also representative of one of WWF's Global 200 Ecoregions (Patagonian desert plains) which is considered to be of outstanding biological diversity, while its conservation status is considered vulnerable - so the area has high priority for conservation. The site is also representative of the Patagonian Centre of Plant Diversity and has an important biogeographical value as an "island" of the Patagonian desert region within the Patagonian Shrub-steppe. There are only two other protected areas in Argentina within the Patagonian desert biogeographical province: Talampaya National Park and Laguna de los Pozuelos, but both areas are far inland and do not compare to Península Valdés.

In relation to the global network of World Heritage sites, there are 40 natural sites with coastal and marine components, most of them in tropical and sub-tropical regions. In view of the geographic location of Península Valdés, below 42° South, it is appropriate to compare it with World Heritage natural sites that protect southern ocean and sub-Antarctic environments. This limits the comparison to few sites: New Zealand Sub-Antarctic Islands (New Zealand), Te Wahipounamu (New Zealand), Tasmanian Wilderness (Australia), and Los Glaciares (Argentina).

However there are important differences in the landscapes and biodiversity protected by some of the above mentioned sites. The Tasmanian Wilderness protects temperate rain forests in Australia. Los Glaciares National Park includes extensive ice fields and fresh water lakes of high hydrological importance and outstanding beauty. Te Wahipounamu contains New Zealand's highest mountains, longest glaciers and important examples of ancient flora and fauna of Gondwanaland.

The New Zealand Sub-Antarctic Islands World Heritage natural site was inscribed partially for the protection of the southern right whale with a stable population. According to recent reports on the status of this species, its total population is now about 7,000 individuals and is still heavily depleted

from whaling. The southern right whale population of Valdés is around 38% of the total Southern Hemisphere population. While 120 bird species are reported for New Zealand Sub-Antarctic Islands, 181 species are reported for Península Valdés, 66 of them migratory species. The peninsula character of Valdés means that a number of species of terrestrial mammals occur which are representative of the continent of South America – this obviously has no parallel in the case of the New Zealand Sub-Antarctic Islands.

The Whale Sanctuary of El Vizcaino (Mexico) also contains a combination of desert and coastal features, and also offers protection for whales and other marine life. However El Vizcaino protects a key site of Baja California for grey whales, thus its comparison with Península Valdés is very limited. Other World Heritage sites with important whale populations are Fraser Island and Shark Bay, in Australia, and Glacier Bay Alaska. However none of these provides equivalent protection to southern right whales, and they lack the impressive seal, sea lion and orca populations.

4. INTEGRITY

The pressures on Península Valdés are relatively light. The total number of people living in the area are 220, with 56 private farms and 8,000 sheep. There are 100,000 visitors annually (80% from within Argentina). However, the following stand out as potential or existing issues:

- ◆ conflict with sheep farming which competes for grazing with the lamas and is associated with the shooting of foxes. With the current decline in the prosperity of sheep farming, some farmers are turning to tourism as an income substitute, which would ease pressures associated with sheep farming;
- ◆ tourist pressures on marine mammals, either at sea or on beaches, though it is reported that most of the whale watching enterprises are responsibly operated. These pressures are likely to grow, particularly if the site is inscribed as a World Heritage site, and should be addressed in a more strategic way, ideally through a tourism management plan;
- ◆ potential threats of pollution from Puerto Madryn (a town on the south west side of Golfo Nuevo and outside the nominated World Heritage site); and
- ◆ potential threats of marine pollution from passing oil tankers. To counter this, there should be effective anti-pollution contingency planning in place in the area of the peninsula.

Official protection of Península Valdés has a long history, but has only recently been undertaken in a strategic and integrated way. In 1967, the first Provincial Reservations were created on Isla de los Pajaros (in the Golfo San José) and Punta Nortes by the Provincial Government of Chubut, aiming to protect the wildlife and scenic values of these two key areas in the peninsula. In 1974, the Marine Park of San José Gulf was created and the law for the Conservation of the Tourism Patrimony was sanctioned: this regulates tourism development in Península Valdés. In 1983, Península Valdés was declared a Natural Reservation for Integrated Tourism Development, which ensures that any tourism development takes place within ecological limits.

In relation to the conservation of the southern right whale, an Argentinean National Law declares this species to be a “Natural Monument”. This legislation was reinforced in 1985 with specific regulations to plan and control whale watching and observation of other marine mammals. In 1995, a strict reserve area (Category Ia, IUCN) was created in Golfo Nuevo to strengthen the protection of the southern right whale.

In all, there are now six wildlife reserves within Península Valdés which together should help ensure the protection of key sites on the peninsula and in the immediate surrounding waters. However there is a need to enhance the management of the peninsula and surrounding seas as a whole, in an integrated manner. It is also desirable to involve all landowners and cover all land use practices,

particularly sheep farming and tourist-based activities. These requirements were considered in the preparation of a management plan (The Integrated Collaborative Management Plan) which re-defined the peninsula as a Managed Resource Protected Area, following the definition of such an area under IUCN protected area management category VI. Provincial Law has endorsed this management plan, which establishes the zonation and management regulations for the entire area. Under this plan, the Provincial Tourism Authority will be responsible for the protection of the area, but decisions will be agreed with representatives of all stakeholders. The new management plan also expands the boundaries of this area, extending the limits in the Isthmus of Ameghino to incorporate new coastal areas. The area protected in Golfo Nuevo has been also expanded to provide additional protection to the southern right whale. In addition a buffer zone of five nautical miles has been established around the peninsula, thus expanding its previous marine component. There is also a buffer zone to the west, of varying width but protecting the isthmus from development pressures from that quarter. These areas coincide with the nominated site.

Since the 1970's, there has been a corps of Wildlife Guards in the peninsula controlling activities which might affect wildlife. Local police and the National Coast Guards support enforcement. New provincial legislation allows for the reinvestment of part of the revenue from tourism activities to manage this area. This provides additional resources to supplement those allocated by the Provincial government, and the National and Provincial Tourism Authorities. As a result, in 1998 the number of wildlife guards increased by 30%. Also equipment for communications and patrols, including vehicles and boats for marine patrols, has been renewed. These now number five new terrestrial vehicles and two new boats. Three visitor centres exist in the peninsula and are now undergoing renewal.

Management of the site includes a research component, addressing different natural features (climate, geomorphology, soils, vegetation and flora, wildlife). Research programmes have been implemented through the National Centre for Patagonia, Smithsonian Institution, and a number of Argentinean Universities.

5. ADDITIONAL COMMENTS

None.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

Península Valdés has been nominated under all four World Heritage natural criteria. In respect of criteria (i), (ii) and (iii) IUCN considers that there is inadequate evidence to support the case that the site is of outstanding universal value. However, it is certainly of regional importance in relation to: the aeolian and marine processes that generally shaped the peninsula during the Miocene period and aesthetic quality.

Criterion (iv): Biodiversity and threatened species

Península Valdés contains very important and significant natural habitats for the in-situ conservation of several threatened species of outstanding universal value, and specifically its globally important concentration of breeding southern right whales, which is an endangered species. It is important too because of the breeding populations of southern elephant seals and southern sea lions. The area also exhibits an exceptional example of adaptation of hunting techniques by the orca to the local coastal conditions. IUCN considers that this site meets criterion (iv).

7. RECOMMENDATION

At its twenty-third ordinary session, the Bureau recommended that the Committee **inscribe** Península Valdés on the World Heritage list under criterion (iv). The Bureau commended the government of the

Province of Chubut for promoting the preparation of an Integrated Collaborative Management Plan for this site.

The inscription of the site on the World Heritage list provides an opportunity to reinforce measures to ensure the future integrity of the site. The Bureau recommended that the State Party, along with responsible regional and local bodies, should:

- ◆ ensure that effective controls are in place over any possible pollution threat from the town of Puerto Madryn to the waters of Golfo Nuevo;
- ◆ support the efforts of the relevant authorities to secure the equipment needed to respond quickly to any oil hazard from passing shipping so as to protect the marine conservation values of the area;
- ◆ produce a tourism management plan as an integral element of the overall management plan;
- ◆ encourage implementation of the Integrated Collaborative Management Plan, and in particular to ensure that farmers and other private owners of land can play a full part in the development of environmentally responsible tourism; and
- ◆ work at the international level to ensure that the marine mammals concerned are protected throughout their range.

IUCN noted that this may require the State Party to draw the nomination of Península Valdés as a World Heritage site to the attention of such international fora as the International Whaling Commission and the Convention on Antarctic Marine Living Resources.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

BRAZILIAN DISCOVERY COAST (BRAZIL)

Note: this evaluation is based on a revised nomination of the site as submitted by Brazil on 9 April 1999.

1. DOCUMENTATION

i) **IUCN/WCMC Data sheet** (7 References)

ii) **Additional literature consulted:**

Bibby et al, 1992. **Putting Biodiversity on the Map. Priority Areas for Global Conservation.** Cambridge, UK. Biodiversity Support Program, Conservation International et al, 1995. **A Regional Analysis of Geographic Priorities for Biodiversity Conservation in Latin America and the Caribbean.** Washington, DC. Brown, KS, 1987. **In Biogeography and Quaternary History in Tropical America.** pp 175-96. Whitmore and Prance, eds. Oxford: Clarendon Press. Duellman, WE (ed), 1979. **The South American Herpetofauna: Its Origin, Evolution, and Dispersal.** Univ Kansas Museum Natural History Monogram 7. Fundacao SOS Mata Atlantica, 1892. **Dossie Mata Atlantica.** Sao Paulo: Fundacao SOS Mata Atlantica. Fundacao SOS Mata Atlantica and Instituto Nacional de Pesquisas Espaciais, 1993. **Atlas da Evolucao dos remanescentes florestias e ecossistemas associados do Domino da Mata Atlantica no periodo 1985 - 1990.** IUCN Tropic Forest Program/Conservation Monitoring Centre, 1998. **Brazil Atlantic Coastal Forests: Conservation of Biological Diversity and Forest Ecosystems.** IUCN, 1996. **Centres of Plant Diversity and Endemism.** Chapter IV. Mata Atlantica. Lynch, JD. 1979. University Kansas Museum Natural History Monogram 7. pp189-215. Mori, SA. 1989. Eastern Extra-Amazonian Brazil, **in Floristic Inventory of Tropical Countries: The Status of Plant Systematics.** The New York Botanical Garden, New York. Padua, Maria Thereza Jorge, 1998. **The Atlantic Forest in Brazil.** Prance, 1987. **Biogeography of Neotropical Plants.** In *Biogeography and Quaternary History in Tropical America.* Whitmore and Prance, eds. pp 46-65. Oxford: Clarendon Press. Thomas, et al, 1998. Plant endemism in two forests in southern Bahia, Brazil. **Biodiversity and Conservation**, 7, p311-322. Zelinda Margarida de Andrade Nery Leau, 1996. **The Coral Reefs of Bahia - Morphology Distribution and the Major Environmental Impacts.** An. Acad. bres. Ci. 68 (3). CIFOR/UNESCO. 1999. **The World Heritage Convention as a Mechanism for Conserving Tropical Forest Biodiversity.** 54p.

iii) **Consultations:** Local parks staff; staff of IBAMA Brazil; local NGOs; staff at Veracruz station; C Maretti, IUCN-CMAP-Brazil and Forest Foundation; local and State Government representatives and external reviewers.

iv) **Field visit:** Warren Nicholls, March 1999.

2. SUMMARY OF NATURAL VALUES

The Brazilian Discovery Coast (BDC) is located in the States of Bahia and Espirito Santo in NE Brazil. The nomination consists of 8 separate protected areas which contain 111,930.5 ha of Atlantic forest and associated shrub (restingas). Elevation ranges from sea level to Monte Pascoal (536 m). Of the original 3.5 million hectares of Atlantic Forest in this region, it is estimated that less than 0.5% are intact. The nominated site comprises 78% of that which remains. Outside of the nominated area, the only remaining areas of original Atlantic forests in Bahia are scattered remnants of less than 400 ha in size.

The nominated property consists of 8 separate areas ranging from 1,145 - 24,000 ha in size and include, from north to south: Una Biological Reserve (11,400 ha); Pau Brazil CEPLAC Experimental Station (1,145 ha); Veracruz Station (6,069 ha); Pau Brazil National Park (11,538 ha); Discovery National Park (21,129 ha); Monte Pascoal National Park (13,872.5 ha); Linhares Forest Reserve (22,777 ha); Sooretama Biological Reserve (24,000 ha).

The two privately owned areas (Veracruz and Linhares) are managed totally for conservation and research and provide full protection for the forests. Both these areas are managed in accordance with arrangements appropriate for IUCN Category I reserves.

The nominated area is enclosed within a buffer zone that is mostly privately owned and used primarily for pastoral activities and forest plantations. The buffer zone is a UNESCO Biosphere Reserve of nearly 1 million ha and provides an overall management framework for the nominated core zones.

Atlantic forests are the world's richest rainforests in terms of biodiversity (along with the Choco Forests of the lower Colombian Amazon basin and the Yanomomo forests of Peru) and they are restricted to the Brazilian coastal region. Unfortunately, in Northeast Brazil the forests have suffered from clearing and abusive soil practices and only a few disjunct fragments remain (see map). Of the original Atlantic forest, which comprised over 1,250,000 square kilometres and occupied some 15% of Brazil, less than 8% (or 90,000 km²) still remain. Partially isolated since the Ice Age, the Atlantic forests have evolved into a complex ecosystem with exceptionally high endemism (70% of the tree species, 85% of the primates and 39% of the mammals) and are considered to be among the world's richest forests for tree species (almost 300) per hectare (particularly for Myrtaceae species). It is also the region in Brazil with the greatest number of endangered and threatened species. Brazil's Atlantic forests are perhaps the most endangered forest ecosystem on earth (Mori, 1989) and have been given the highest priority for biodiversity conservation (Bibby et. al. 1992, Biodiversity Support Program 1995). It is one of the "Global 200" ecoregions and one of the "Focal 25" priorities of WWF. The exceptionally high biodiversity and level of endemism may be explained by high tropical humidity (due primarily to the oceanic influence and hillside condensation effects), and the range of altitude and geographical extension leading to the creation of a wide range of climatic and ecological conditions.

Biogeographically, the Atlantic forests have recently been split into two distinct areas: the Northeastern (Discovery Coast) and Southeastern regions. This nomination is focussed on the Northeastern region in the Bahia/Espirito Santo States. A separate nomination for the Southeast Atlantic Forests in the States of Parana and Sao Paulo has been submitted by Brazil and is the subject of a complementary evaluation.

This nomination of the BDC comprises all those protected areas that contain Atlantic forest in this NE region and which are in an intact, or near intact, condition and with appropriate and effective management arrangements in place. The site is one of 6 Atlantic forest clusters recommended as potential World Heritage forest sites at the 1998 CIFOR/UNESCO World Heritage forest meeting in Indonesia.

3. COMPARISON WITH OTHER AREAS

Despite sharing some of its flora and fauna with the Amazonian forest (Brown, 1987; Mori, 1989), the Atlantic forests have long been considered a distinct neo-tropical forest type (Mori, 1989; Lynch, 1979) and are in a different biogeographical province (Serro do Mar). Despite five centuries of severe human impact, the Atlantic Forests of Brazil exceed other tropical rainforests in their high biodiversity and the very high level of endemism. The suite of species makes it difficult to compare it with other tropical rainforests.

The BDC nomination comprises 8 protected areas within the northeast region of Atlantic forest. A separate nomination covers the southeastern region of Atlantic forest. Each nomination is complementary to the other and they reinforce each other. Each has a distinct suite of species as demonstrated by their high levels of endemism. The Atlantic forests are not homogeneous and comprise separate centres of endemism with the SE and Discovery Coast (NE) regions each containing quite a distinct suite of species. They are also considered separately in light of differing deforestation history.

The physiognomy of the Atlantic forests is similar from north to south, with high trees (20 - 30 m), rich in epiphyte orchids and bromeliads and dense undergrowth. The vegetation, on the contrary, is highly endemic and species composition changes radically along the range. Hence the submission of two separate nominations, each having distinct species compositions. Each group of forests represents an important, but highly individual, aspect of the Serro do Mar biogeographic province.

4. INTEGRITY

As a serial nomination, the BDC has many issues in common with other serial nominations, particularly the “Central Eastern Rainforest Reserves” in Australia (CERRA) which contains eight clusters of protected areas spread over a 600 km distance with a total size of 108,450 ha. The BDC area consists of six clusters spread along a 450 km distance with a total size of 111,930 ha.

The main question on the integrity of each property is the small size of most of the protected areas that make up the nomination. Five of the eight individual protected areas in the BDC are less than 15,000 ha. It is a general principle of the field of conservation biology that there is a minimum critical size if a reserve is to retain its biological diversity. It is known, however, that minimum size for long term maintenance of floral communities is much smaller than for that of faunal communities. Since the nomination areas’ values are focussed on floral values the question of small size becomes less of a concern. Moreover, four of the sites are contiguous and found in clusters which effectively adds to their viability.

Related to the question of size is the distance between the isolated fragments on the complex ecological relationships of the total rainforest ecosystem. According to the theory of island biogeography, small separated protected areas isolated by modified habitats will behave like “islands” and will lose some of their original species until the new equilibrium is reached. All of the six clusters except for two have their separate units in reasonable proximity and are joined by corridors of semi-natural habitats and buffers. In all cases, compensation for small size and scattered fragments will have to be made through intensive management. Though management plans for all sites are

completed, implementation needs to be strengthened. It is particularly important to address the need for maintaining corridors and effective buffer zones in two of the parks established in 1999.

A second point relating to integrity is the coordination of management and planning for the property as a whole. In the case of BDC, there are several management authorities responsible, but all 8 sites fall under the umbrella of the Federal Program for the Preservation of the Atlantic Forests. The nominated property is also the core of the Mata Atlantica Biosphere Reserve which is intended to facilitate buffer zone management and regional integration.

Finally, the Minister of Environment of Brazilian has written the Director of the World Heritage Centre (9 August 1999) noting the following actions relating to the BDC:

- ◆ Formation of an Executive Working Group to address conservation issues in the region;
- ◆ New initiatives to control deforestation and burning practices in the buffer zone;
- ◆ Develop an environmental education campaign;
- ◆ Provision of a R\$ 13 million (around 6,7 million USD) budget for the two new parks;
- ◆ Initiate cooperation with the local Pataxo Indians;
- ◆ Implement recommendations of recent specialist meeting of the Brazilian Primatology Committee; and
- ◆ Develop a Plan of Action for all the Atlantic Forest in order to obtain increased donor support.

All of the initiatives suggest that the Brazilian authorities are giving increased attention to the Atlantic Forests and that further losses to their remaining extent will be decreased.

In conclusion, as the Brazilian conservationist Ibsen de Gusonao Camara has written, “the immense Atlantic forests in all their glory are a thing of the past, and they can never be brought back. However, wisdom and common sense can still preserve significant samples of their former splendor and we can thus avoid the future label of irresponsible vandals”.

5. ADDITIONAL COMMENTS

5.1. Cultural Values

The Discovery Coast was also the first contact point with the Indians in Brazil for Europeans in 1500. It was the site of the first eye contact (Monte Pascoal), first exchange of gifts, first open air mass, first church and first colony. The name of the tree that provided the first economic wealth for the new country is Pau Brazil, the plant that gave the country its name. The region thus has significant great historical and cultural values as well.

5.2. Name

The name of the property is in need of review to be in conformity with other multi-unit sites. Brazil should be asked if they would agree to “Discovery Coast Atlantic Forest Reserves”.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The nominated areas contain the best and largest remaining examples of Atlantic forest in the NE region of Brazil. The eight protected areas that make up the site combine in a forest archipelago context to reveal a pattern of evolution of great interest to science and importance for conservation. No one forest remnant would be adequate on its own. Rather, it is the collection of all six clusters

that adds up in a synergistic manner to display the biological richness and evolutionary history of the few remaining areas of Atlantic forest of northeast Brazil.

The property therefore, merits inscription under criterion (ii) for the evolutionary processes of this exceptionally diverse region as well as natural criterion (iv) for the high numbers of rare and endemic species that occur there. The fact that only these few scattered remnants of a once vast forest remain, make them an irreplaceable part of the world's forest heritage.

7. RECOMMENDATION

That the Bureau recommend to the World Heritage Committee that the "Discovery Coast Atlantic Forest Reserves" be inscribed on the World Heritage List under natural criteria (ii) and (iv). The Bureau may also wish to encourage the Brazilian authorities to complete the "Plan of Action for the Atlantic Forest Region" and other initiatives mentioned in section 4 above.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ATLANTIC FORESTS (SOUTHEAST) (BRAZIL)

Note: this evaluation is based on a revised nomination of the site as submitted by Brazil on 9 April 1999.

1. DOCUMENTATION

- i) **IUCN/WCMC Data sheet** (4 References)
- ii) **Additional literature consulted:** Bibby et al, 1992. **Putting Biodiversity on the Map. Priority Areas for Global Conservation.** Cambridge, UK. Biodiversity Support Program, Conservation International et al, 1995. **A Regional Analysis of Geographic Priorities for Biodiversity Conservation in Latin America and the Caribbean.** Washington, DC. Brown, KS, 1987. **In Biogeography and Quaternary History in Tropical America.** pp 175-96. Whitmore and Prance, eds. Oxford: Clarendon Press. Duellman, WE (ed), 1979. **The South American Herpetofauna: Its Origin, Evolution, and Dispersal.** Univ Kansas Museum Natural History Monogram 7. Fundacao SOS Mata Atlantica, 1892. **Dossie Mata Atlantica.** Sao Paulo: Fundacao SOS Mata Atlantica. Fundacao SOS Mata Atlantica and Instituto Nacional de Pesquisas Espaciais, 1993. **Atlas da Evolucao dos remanescentes florestais e ecossistemas associados do Domino da Mata Atlantica no periodo 1985 - 1990.** IUCN Tropic Forest Program/Conservation Monitoring Centre, 1998. **Brazil Atlantic Coastal Forests: Conservation of Biological Diversity and Forest Ecosystems.** IUCN, 1996. **Centres of Plant Diversity and Endemism.** Chapter IV. Mata Atlantica. Lynch, JD. 1979. University Kansas Museum Natural History Monogram 7. pp189-215. Mori, SA. 1989. Eastern Extra-Amazonian Brazil, **in Floristic Inventory of Tropical Countries: The Status of Plant Systematics.** The New York Botanical Garden, New York. Padua, Maria Thereza Jorge, 1998. **The Atlantic Forest in Brazil.** Prance, 1987. **Biogeography of Neotropical Plants.** In Biogeography and Quaternary_History in Tropical America. Whitmore and Prance, eds. pp 46-65. Oxford: Clarendon Press. Thomas, et al, 1998. Plant endemism in two forests in southern Bahia, Brazil. **Biodiversity and Conservation**, 7, p311-322. CIFOR/UNESCO. 1999. **The World Heritage Convention as a Mechanism for Conserving Tropical Forest Biodiversity.** 54p.
- iii) **Consultations:** Local parks staff; staff of IBAMA Brazil; local NGOs; WCPA-Brazil; local and Parana State Government representatives and external reviewers.
- iv) **Field visit:** Warren Nicholls, March 1999.

2. SUMMARY OF NATURAL VALUES

The Southeast Atlantic Forests (SAF) are located in the States of Parana and Sao Paulo in SE Brazil. The nomination consists of 468 193 ha of Atlantic forest and associated shrubs (restingas). Elevation range is from sea level to 1,100 metres. The nominated property consists of 25 areas and comprises the following 6 IUCN Category I protected areas: Jureia - Itatins Ecological Station (79,270 ha); Chauas Ecological Station (2,699 ha); Guaraquecaba Ecological Station (13,638 ha); Ilha do Mel

Ecological Station (2,241 ha); Xitue Ecological Station (3,095 ha); Guaraguacu Ecological Station (1,150 ha).

The other 19 units are IUCN Category II: Superagui National Park (37,000 ha); Pariquera - Abaixo State Park (2,360 ha); Jacupiranga State Park (part of) (119,000 ha); Ilha do Cardoso State Park (22,500 ha); Carlos Botelho State Park (37,644 ha); Pico do Marumbi State Park (2,342 ha); Intervales State Park (42,926 ha); Lauraceas State Park (27,524 ha); Alto Ribeira Touristic State Park (PETAR) (35,884 ha); Salto Morato Private Reserve (1,716 ha); Serras do Cordeiro, Paratiu, Itapua, e Itinga Wild Life Zone (5,000 ha); Serras do Arrepiado e Tombador Wild Life Zone (5,125 ha); Mangues Wild Life Zone (11,070 ha); Serra do Itapitangui (e Mandira) Wild Life Zone (3,437 ha); Ilhas oceanicas Wild Life Zone (93 ha); Roberto E Lange Turistical Preservation Zone & State Park (2,698 ha); Serra da Graciosa Turistical Preservation (1,189 ha); Zone & State Park Pau Oco Turistical Preservation Zone & State Park (905 ha); Ilha Comprida Wild Life Zone (7,687 ha).

Biogeographically, the Atlantic forests of Brazil are divided into two distinct areas: the Northeastern (Discovery Coast) and Southeastern regions (Bibby et al, 1992). This nomination is focussed on the Southeastern region. The nominated area lies entirely within a much larger buffer zone of 1,223,557 ha which is managed as a UNESCO Biosphere Reserve. The buffer zone is protected by Federal legislation and provides an important corridors function.

Atlantic forests are the world's richest rainforests in terms of biodiversity (along with the Choco forests of the Colombian Amazon basin and the Yanomono forests of Peru) and they are restricted to the Brazilian coastal region. Unfortunately, the Atlantic forests have suffered the impacts of colonisation, farming, cattle grazing and urbanisation since the discovery of Brazil. Of the original Atlantic forest, which comprised over 1,250,000 square kilometres and occupied some 15% of Brazil, less than 8% (or 90,000 km²) still remain (see map). Partially isolated since the Ice Age, the Atlantic forests have evolved into a complex ecosystem with exceptionally high endemism (70% of the tree species, 85% of the primates and 39% of the mammals) and are considered to be among the world's richest forests for tree species (almost 300) per hectare (especially for Myrtaceae species). It is also the region in Brazil with the greatest number of endangered and threatened species. Brazil's Atlantic forests are perhaps the most endangered forest ecosystem on earth (Mori, 1989) and have been given the highest priority for biodiversity conservation (Bibby et al 1992, Biodiversity Support Program 1995). It is one of the "Global 200" ecoregions and one of the "Focal 25" priorities of WWF. The exceptionally high biodiversity and level of endemism may be explained by high tropical humidity (due primarily to the oceanic influence and hillside condensation effects), and the range of altitude and geographical extension leading to the creation of a wide range of climatic and ecological conditions.

The SAF nomination comprises 25 discontinuous protected areas that contain Atlantic forest from the SE region and which are in an intact, or near intact, condition and with appropriate management arrangements in place. The nominated area is the largest continuous area of Atlantic forest with related littoral ecosystems in Brazil. From mountains covered by dense forests, down to wetlands, coastal islands with isolated mountains and dunes, the SAF comprises a natural environment of rich biodiversity and scenic beauty. Caves, waterfalls, rugged mountain ranges and sweeping coastal vistas contribute to the outstanding aesthetic values of the region.

Both the flora and fauna are extremely diverse, with over 55,000 species of plants (22% of the total found on Earth), of which some 18,000 are endemic. There are 524 species of mammals (131 endemic), 1,622 bird species (191 endemic), 517 species of amphibians (294 endemic), 468 species of reptiles (172 endemic), over 3,000 species of freshwater fish and between 10 and 15 million estimated species of insects..

The Atlantic Forest is also the place where about 80% of Brazilian mammal species are threatened with extinction. Among the rare and threatened species are the woolly spider monkey, Southern muriqui, Southern Brown Howling monkey, four species of tamarin, the ocelot, Jacutinga, Harpy eagle and the Brazilian red-tailed parrot. The SAF protects the majority of these threatened species. The site is one of 6 Atlantic forest clusters recommended as potential World Heritage forest sites at the 1999 CIFOR/UNESCO World Heritage Forest meeting in Indonesia.

3. COMPARISON WITH OTHER AREAS

Despite sharing some of its flora and fauna with the Amazonian forest (Brown, 1987; Mori, 1989), the Atlantic forests have long been considered a distinct neo-tropical forest type (Mori, 1989; Lynch, 1979) and are in a different biogeographical province (Serra do Mar). Despite 500 years of severe human impact, the Atlantic Forests of Brazil exceed other tropical rainforests in their high biodiversity and the very high level of endemism. The suite of species makes it difficult to compare it with other tropical rainforests.

The SAF nomination comprises 25 protected areas within the Southeast region of Atlantic forest. A separate nomination covers the Northeast region of Atlantic forest. Each nomination is complementary to the other and they reinforce each other. Each has a distinct suite of species and high levels of endemism. The Atlantic forests are not homogeneous and comprise separate centres of endemism with the SE and Discovery Coast (NE) regions each containing distinct species. They are also considered separately in light of differing deforestation history.

The physiognomy of the Atlantic forests is similar from north to south, with high trees (20 - 30 m), rich in epiphyte orchids and bromeliads and dense undergrowth. The vegetation, on the contrary, is highly endemic and species composition changes radically along the range. Hence the submission of two separate nominations, each having distinct species compositions. Each group of forests represents an important, but highly individual, aspect of the Serra do Mar Biogeographic Province.

There are few similarities between the SAF and the existing World Heritage site of Iguazu in southwestern Parana State. Iguazu is an inland subtropical forest focussed around spectacular waterfalls. It is also in a different biogeographical province.

4. INTEGRITY

As a serial nomination, the SAF has many issues in common with other serial nominations, particularly the "Central Eastern Rainforest Reserves" in Australia (CERRA) which contains eight clusters of protected areas spread over a 600 km distance with a total size of 108,450 ha. The SAF area consists of six clusters spread along a 180 km distance with a total size of 468,193 ha.

The main question on the integrity of each property is the small size of most of the protected areas that make up the nomination. Twelve of the 25 individual protected areas in the SAF are less than 5,000 ha. It is a general principle of the field of conservation biology that there is a minimum critical size if a reserve is to retain its biological diversity. It is known, however, that minimum size for long term maintenance of floral communities is much smaller than for that of faunal communities. Since the nomination areas' values are focussed on floral values the question of small size becomes less of a concern. Moreover, seven of the sites are contiguous and found in clusters which effectively adds to their viability.

Related to the question of size is the distance between the isolated fragments on the complex ecological relationships of the total rainforest ecosystem. According to the theory of island biogeography, small separated protected areas isolated by modified habitats will behave like "islands" and will lose some of their original species until the new equilibrium is reached. All of the seven clusters have their separate units in reasonable proximity and are joined by corridors of semi-natural

habitats and buffers. In all cases, compensation for small size and scattered fragments will have to be made through intensive management. Though management plans for all sites are completed, implementation needs to be strengthened. It is particularly important to address the need for maintaining the corridors and effective buffer zones.

A second point relating to integrity is the coordination of management and planning for the property as a whole. In the case of SAF, there are several management authorities responsible, but all 25 sites fall under the umbrella of the Federal Program for the Preservation of the Atlantic Forests. The nominated property is also the core of the Mata Atlantica Biosphere Reserve which is intended to facilitate buffer zone management and regional integration.

Being a serial nomination, it is important to note that all elements of the nomination are included solely for their composition of Atlantic Forest and that they are all functionally linked and each one contributes to the overall unity. The different areas are core areas that all lie within a much larger area that is a UNESCO Biosphere Reserve. With so little Atlantic Forest left, it is considered important to include all those areas that add to the significance of the nominated area (and which have appropriate management arrangements in place), hence there are some areas of small size included because of their significance and the fact that they add to, and do not simply duplicate, the other areas.

The smallest of the nominated areas (93 ha) is an island and hence is not able to be enlarged in size while restricting the nomination to forested areas. The second smallest area (905 ha), along with the other 14 areas that are of less than 10 000 ha, all contain very significant and individually different examples of Atlantic Forest. The inclusion of each of the 25 sites is important to ensure as complete as possible representation of the full spectrum of examples of Atlantic Forest in the region.

A particularly significant area of Atlantic forest that is not included in the nomination is the Serra do Mar National Park. Unfortunately the Park is being impacted by human activities in the intensively populated corridor between Sao Paulo - Santos. This Park would make an appropriate and significant addition to the nomination when the management is able to cope with the adverse affects of the impacts.

In conclusion, as the Brazilian conservationist Ibsen de Gusmao Camara has written: “the immense Atlantic forests in all their glory are a thing of the past, and they can never be brought back. However, wisdom and common sense can still preserve significant samples of their former splendor and we can thus avoid the future label of irresponsible vandals.”

5. ADDITIONAL COMMENTS

The name of the property is in need of revision to be in conformity with other multi-unit sites. Brazil should be asked if they would agree to “Southeast Atlantic Forest Reserves”.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The nominated areas contain the best and largest remaining examples of Atlantic forest in the SE region of Brazil. The 25 protected areas that make up the site combine in a forest archipelago context, to reveal a pattern of evolution of great interest to science and importance for conservation. No one forest remnant would be adequate on its own. Rather, it is the collection of all clusters that adds up in a synergistic manner to display the biological richness and evolutionary history of the few remaining areas of Atlantic forest of southeast Brazil.

The property therefore, merits inscription under criterion (ii) for the evolutionary processes of this exceptionally diverse region as well as natural criterion (iv) for the high numbers of rare and endemic species that occur there. The fact that only these few scattered remnants of a once vast forest remain, make them an irreplaceable part of the world’s forest heritage. With its “mountains to the sea”

attitudinal gradient, its estuary, wild rivers, karst and numerous waterfalls, the SAF has exceptional scenic values and is also considered to meet natural criterion (iii). Although the geological history of the area is also interesting, these values are considered secondary to SAF's biological features and the case for criterion (i) is less convincing.

7. RECOMMENDATION

That the Bureau recommend to the World Heritage Committee that the "Southeast Atlantic Forest Reserves" be inscribed on the World Heritage List under natural criteria (ii), (iii) and (iv). The Bureau may also wish to encourage the Brazilian authorities to make efforts to restore natural conditions in the Serra do Mar State Park which could eventually be incorporated in the site.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

MIGUASHA PROVINCIAL PARK (CANADA)

1. DOCUMENTATION

- i) **WCMC Data sheet:** (17 references)
- ii) **Additional literature consulted:** Richard and Lelievre, Herve, 1998. **Comparative Study of the fossiliferous sites of the Devonian.** Ministry of Environment and Fauna, Government of Quebec, Cloutier; Wells, R.T. 1996. **Earth's geological history - a contextual framework for assessment of World Heritage fossil site nominations.** Working Paper No. 1 of Global Theme Study of World Heritage Natural Sites, IUCN. **Reglement sur les Parcs (Park Regulations).** Government of Quebec. Selection of newspaper articles, media reports, tourist documents and popular science writings, including: Grescoe, T., 1997. Where Fishes Walked. **Canadian Geographic.**
- iii) **Consultations:** 1 external reviewer. Director-General, Parks Quebec. Director, Miguasha Provincial Park. Officials from Parks Canada, Department of Parks & Wildlife and Quebec Department of Environment. Park palaeontologist and other park staff.
- iv) **Field Visit:** May 1999. Paul Dingwall and Associate Professor David Elliott.

2. SUMMARY OF NATURAL VALUES

Miguasha Provincial Park is located on the north shore of the Ristigouche River, which also forms the southern coast of the Gaspé Peninsula in south-eastern Quebec, Canada (see Map 1). The Park, covering some 87ha, was established in 1985 to protect the coastal exposure of the Escuminac Formation. This Formation (see Map 2), which is Upper Devonian in age and contains a unique vertebrate fossil fauna, is 8km long and 1km wide. It attains a maximum height of 100m and is represented by four distinct outcrops. The most important of these extends for 3km, rises to 30m and essentially constitutes the park. Dating from 370 million years ago, the Escuminac Formation is composed of alternating layers of sandstone, silt and schists, and is overlain by the Carboniferous-age Bonaventure Formation whose reddish colour is the origin of the term "Miguasha" in the language of the native Micmac people.

The fossil assemblage at Miguasha is particularly important for representing fishes of the Devonian Period. Of the eight groups associated with this period, which is commonly referred to as the "Age of Fishes", six are found at Miguasha - this degree of representation being rare among sites of the same age throughout the world. Furthermore, the site is remarkable for the exceptional condition of fossil remains, including 3-dimensional specimens and allowing for observation and study of soft body parts such as gill imprints, digestive traces, blood vessels and cartilaginous elements of skeleton. Of great importance is the presence of the crossopterygian group of fishes, which share many characteristics with the tetrapods: (four-legged land animals). It was the discovery of one of these, the Eusthenopteron (the so-called "Prince of Miguasha") which focused the attention of the international scientific community on the Escuminac Formation, giving rise to the modern conception of evolution from fish to land dwelling vertebrates.

The site is also distinguished by fossil invertebrates, plants, and spores including the first terrestrial scorpion, 10 species of plants belonging to the first vascular flora of the primitive Devonian forests, and some 80 spore species. These allow a picture of the Devonian ecosystem to be constructed.

3. COMPARISON WITH OTHER AREAS

Miguasha is included on the Global Indicative List of geological sites as compiled by the World Heritage Geological Working Group. Sites with important fossil values on the World Heritage List include the Canadian Rocky Mountain Parks (which contain as one of their many features the famous Burgess Shales), the Dinosaur Provincial Park (with 60 species of Cretaceous dinosaurs) and the Grand Canyon National Park (where exposed horizontal strata display fossil remains over 2 billion years of geological time). The Australian Fossil Mammal Sites (Riversleigh/Naracoorte) are considered to be among the world's ten greatest fossil sites (Wells, 1996). They illustrate the evolution of Australia's mammal fauna. Many other World Heritage sites contain notable fossils as one element of their total value but there is no site on the list for its fossil values alone.

The State Party commissioned a study, published in 1998, to establish the relative scientific and conservation significance of the world's Devonian fossil sites. The scientifically based methodology for this comparative assessment takes careful account of the 10-question checklist developed by IUCN for evaluating the significance of fossil sites (see Annex 1), and the nine recommendations in the 1996 report of Wells for establishing the World Heritage standing of a fossil site. The authors derived seven criteria for addressing the relative significance of sites: vertebrate biodiversity; faunal representativeness; evolutionary representativeness; environmental representativeness; palaeobiological representativeness; quality of fossil preservation, and abundance of specimens. An initial evaluation was made of 61 of the world's Devonian vertebrate fossil sites, selected by a process of extensive bibliographic search and consultation with other scientists. The list was then reduced to 15 key sites, including Miguasha, by eliminating those not meeting at least one of five qualifying criteria, viz.: more than 10 vertebrates species; more than three major groups of fishes; more than one environmental component; macroremains of vertebrates; and more than 100 vertebrate specimens.

These 15 sites were then evaluated using a scoring system, awarding either an arbitrary score or an absolute score based on actual numbers. From this evaluation, Miguasha is ranked as being:

- ◆ 6th in overall vertebrate biodiversity, its lower ranking due mainly to the absence of sharks, and some other minor groups;
- ◆ 1st in representativeness of evolutionary events particularly because of the presence of many first and last representatives of animal groups, and organisms of unusual anatomical interest;
- ◆ 3rd in palaeobiological representativeness, measured from features such as ingested prey, or growth series;
- ◆ 1st in quality of fossil preservation, especially on account of the existence of 3-dimensional and soft anatomy specimens; and
- ◆ 1st in abundance of specimens, due in particular to the accessibility of the site and extensive collections by museums and research institutions over the past century.

A final, overall rating places Miguasha first in seven of the 10 significance categories assessed, and either second or third in the remaining three categories. The study, therefore, concludes that among more than 60 of the world's most important Devonian fossil sites, the Escuminac Formation of Miguasha is outstanding as the most representative of the Devonian Period. Furthermore, Miguasha is revealed as globally paramount in representing evolutionary events, the exceptional quality of specimen preservation and the abundance of vertebrate fossils.

The comparative assessment report is considered a fair reflection of Miguasha's primary ranking among the world's Devonian fossil sites. The report is authoritative and its authors have impeccable credentials in palaeontology for undertaking the study with internationally recognised expertise in Devonian fossil vertebrates including sarcopterygian fishes - the group from which land animals developed; and placoderms - a group of jawed vertebrates confined to the Devonian.

There are some qualifications that should be borne in mind, however. The comparative assessment report highlighted some of the inherent methodological difficulties in undertaking comparisons among fossil sites. For example, deciding what features to evaluate and how to score them.

Devonian fish sites, being marine in origin are relatively widespread and consist of many of the same species. Miguasha, thus, is not the only such site of renown for fossil fishes. Two of these, Gogo Station and Canowindra, both in Australia, were included among the 15 key sites evaluated in the comparative study. In the final analysis, the Gogo site is ranked fifth and Canowindra fourteenth. Gogo, though globally significant, is more restricted than Miguasha in its representation of Devonian environments, and is less exceptional in terms of vertebrate anatomical preservation. Canowindra is comparatively low-ranked in all respects among the 15 key sites. The other significant site, Rhynie Chert in Scotland, is significant only for preservation of terrestrial plants and lacks the vertebrate faunas necessary for it to represent the Devonian as the "Age of Fishes".

4. INTEGRITY

The long-term security of protection and management of the site are not in question, and all relevant conditions of integrity are satisfactorily met. This site fully meets World Heritage Integrity criteria where other sites fail to do so. The comparative study mentioned above shows that of the 15 key Devonian age fossil sites assessed in the world, only Miguasha enjoys formal protection.

The nominated site is a Provincial Park within an extensive protected area system in the Province of Quebec. It has statutory protection in perpetuity under Quebec law, with legislative provision both for park management and for protection against mining activities. The land tenure is public property under the jurisdiction of the Quebec Government. The administrative system for parks in Quebec is currently being restructured under a new Ministry of Fauna and Parks. Responsibility for park operations has been transferred to the State-owned Societe des etablissements de plein air du Quebec (SEPAQ), while legal, policy and planning functions will be conducted by a new Societe de la faune et de parcs (SFP).

There is a legally binding management plan for the Park which establishes the paramount protection objectives of management while providing for compatible recreational, education and research uses through use of a zoning system. The plan prohibits all forms of exploitation, modification or exploitation which might detrimentally affect the park environment and natural values.

The park boundaries are appropriately located to encompass a substantial proportion of the Escuminac Formation, including its most continuous surface expression. There are plans to extend the park boundaries in future.

Annual visitation is approximately 40,000 with use restricted to low-impact observation and appreciation of the park environment. The collection of fossils is strictly prohibited except for approved scientific and educational purposes. There is remarkably very little experience of illegal collection, but many instances of visitors adding valuable fossils to the collections. The entire area of the park and a surrounding privately owned 775ha Peripheral Zone are protected from mineral exploration and excavation activities. There are no permanent residents in the Park and the Park headquarters are located in the Peripheral Zone, which also has about 120 residents. The park is

adequately staffed and financed to ensure security of protection and meet the educational and recreational needs of visitors.

5. ADDITIONAL COMMENTS

The 1993 nomination of Miguasha Provincial Park for inscription on the World Heritage List was withdrawn by the State Party pending development of a contextual framework for assessing World Heritage fossil sites, and further examination of the comparative significance of Miguasha in relation to the natural values of other Devonian fossil sites. IUCN has since developed this contextual framework, including a checklist of criteria for measuring the World Heritage significance of sites (see Annex 1). These have been carefully taken into account in the new nomination as well as in the comparative study (Section 3 above).

The Committee have previously rejected three earlier fossil nominations (*Jixian* (Permian exposures in China), the *Petrified Forest on Lesbos* (Greece), and the *Fossil Findings of Ipolytarnoc* (Hungary)) as they did not meet natural criteria. Despite this the rigorous comparative assessment applied to this nomination should be seen as a significant step forward in objectively assessing the outstanding universal value of fossil sites.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

Miguasha is nominated in accordance with World Heritage natural criterion (i), as an outstanding representative of a major stage in the earth's history, including the record of life.

Its claim is based upon the site's international scientific reputation as the most outstanding place in the world for preserving fossils that characterise the Devonian Period as the "Age of Fishes" (360-410 million years ago).

Miguasha is of paramount importance in having the greatest number and best preserved fossil specimens found anywhere in the world of the lobe-finned fishes that gave rise to the first four-legged, air-breathing terrestrial vertebrates - the amphibians. In fact, Miguasha's extensive fossil assemblage includes the oldest known specimen of the world's amphibian ancestors.

Of all the world's Devonian fossil sites that contain significant representation of the fishes, Miguasha stands out as the most significant in terms of its representation of evolutionary events, the exceptional quality of fossil preservation and the abundance of vertebrate fossils. It also ranks highly among all other sites in terms of overall representation of biodiversity.

There are about 60 important Devonian fossil sites in the world, of which 15 are regarded as key sites in revealing the vertebrate animal life of that geological time period. Rigorous comparative analysis of these sites, using a wide range of significance criteria, has revealed that the Escuminac Formation of Miguasha Provincial Park is clearly the most outstanding, particularly in respect of its representation of evolutionary events, the quality of fossil preservation and the abundance of fossils. The reviewers are satisfied that this analysis is scientifically sound and that the conclusions are valid.

Miguasha cannot claim, however, to represent all elements of Devonian life and environments - but no one site anywhere in the world can do this. The best one can expect is optimum representation of key biotic and palaeoenvironmental elements. In its representation of vertebrate life, Miguasha is the most outstanding fossil site in the world for illustrating the Devonian as the "Age of Fishes". In this respect, Miguasha has an unequivocal claim to being of universal value in terms of natural criterion (i).

In addition Miguasha satisfies the World Heritage integrity criteria where other sites fail to do so. The comparative study shows that of the 15 key Devonian age fossil sites assessed in the world, selected from a total of 61, only Miguasha is formally protected.

7. RECOMMENDATION

It is recommended that the Miguasha Provincial Park be **inscribed** on the World Heritage List under criterion (i). The Committee may wish to note the rigorous comparative assessment applied to this nomination, in order to establish its outstanding universal value, as a model methodology for future fossil nominations.

ANNEX 1

IUCN FOSSIL SITE EVALUATION CHECKLIST

In evaluating prospective fossil sites for inscription on the World Heritage List, IUCN has prepared the following ten questions which provide some indicative measures of significance. These questions are not meant to be binding, but for evaluation purposes it would be expected that fossil sites of truly outstanding universal value would rate highly in most, if not all, of the following:

1. Does the site provide fossils which cover an extended period of geological time? ie. how wide is the geological window?
2. Does the site provide specimens of a limited number of species or whole biotic assemblages? ie. how rich is the site in species diversity?
3. How unique is the site in yielding fossil specimens for that particular period of geological time? ie. would this be **the** type locality for study or are there other similar areas that are alternatives?
4. Are there comparable sites elsewhere that contribute to the understanding of the total "story" of that point in time/space? ie. is a single site nomination sufficient or should a serial nomination be considered?
5. Is the site the only or main location where major scientific advances were (or are being) made that have made a substantial contribution to the understanding of life on earth?
6. What are the prospects for on-going discoveries at the site?
7. How international is the level of interest in the site?
8. Are there other features of natural values (eg. scenery, landform, vegetation) associated with the site? ie. does there exist in the adjacent area modern geological or biological processes that relate to the fossil resource?
9. What is the state of preservation of specimens yielded from the site?
10. Do the fossils yielded provide an understanding of the conservation status of contemporary taxa and/or communities? ie. how relevant is the site in documenting the consequences to modern biota of gradual change through time?

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

AREA DE CONSERVACION GUANACASTE (COSTA RICA)

1. DOCUMENTATION

- i) **IUCN/WCMC Datasheet:** not available as at 8 April 1999.
- ii) **Additional Literature Consulted:** Cordoba, R. *et.al.* 1998. **Inventario de los humedales de Costa Rica.** UICN-MINAE. San José, Costa Rica. 380 p; Janzen, D. 1983. **Costa Rican Natural History.** University of Chicago Press. Chicago. 816 p; Janzen, D. 1986. **Guanacaste National Park: tropical ecological and cultural restoration.** Editorial UNED. Costa Rica. 103 p; Janzen, D. 1995. Neotropical restoration biology. **Vida Silvestre Neotropical.** Vol. 4(1). pp. 3-9; Janzen, D. 1998a. Gardenification of wildland nature and the human footprint. **Science.** Vol. 279. pp. 1312-1313; Janzen, D. 1998b. **Conservation analysis of the Santa Elena property, Península Santa Elena, northwestern Costa Rica.** Philadelphia, USA. 129 p; Jiménez, G. 1998. **Proyecto manejo y tratamiento natural de cascadas de naranja. Area de Conservación Guanacaste.** Guanacaste, Costa Rica. 25 p; Molina, Maria de los Angeles. 1995. **Inducción del proceso de restauración del Bosque Seco Tropical en el Area de Conservación Guanacaste.** ACG, MINAE. Guanacaste, Costa Rica. 16 p; Morales, D. *et al.* 1997. **Informe técnico: Proyecto de Restauración del Bosque en el Corredor Biológico Rincón-Cacao.** ACG, MINAE. Liberia, Costa Rica. 25 p; Thorsell, J. *et al.* 1997. **A global overview of wetland and marine protected areas on the World Heritage List.** IUCN. 63 p; Thorsell, J. 1997. **A global overview of forested protected areas on the World Heritage List.** IUCN. 58 p.
- ii) **Consultations:** High level Costa Rica government officials; almost 40 persons in and near GCA; other local resource user group/local community representatives; and visiting scientists.
- iv) **Field Visit:** February 1999. Craig MacFarland and Juan Carlos Godoy.

2. SUMMARY OF NATURAL VALUES

The nominated site (GCA) comprises 88,000 terrestrial hectares (ha) and approximately 43,000ha of marine area. The entire area extends from 19km (12 miles) out in the Pacific Ocean to the coast of north-western Costa Rica and then inland through lowland Pacific dry tropical forests, up into the mountains to over 2,000 meters elevation (montane humid and cloud forests), then down on the Atlantic/Caribbean side into the upper portions of lowland rain forests. The GCA is located between 10° and 11° North latitude and 85° and 86° West longitude in Costa Rica's most northern and western province (see Map 1).

The GCA is a complex of almost entirely contiguous protected areas forming a single larger protected area, as follows (see Map 2):

- ◆ Santa Rosa National Park (terrestrial) 4,558ha
- ◆ Rincon de la Vieja National Park 14,084ha

- ◆ Guanacaste National Park 37,365ha
- ◆ Junquillal Wildlife Refuge 439ha
- ◆ Horizontes Forestry Experiment Station 7,317ha
- ◆ Marine Area (part of Santa Rosa National Park) approximately 43,000ha

Approximately 60% of all species present in Costa Rica are found in the GCA, or from a global point of view approximately 2.4% of all the biological diversity (species level) of the planet. In addition, the GCA's fauna and flora are characterised by a major intercontinental convergence of species with their origins in the Nearctic and Neotropical Realms. Many species in the GCA range as far north as the region of Mazatlan and Tampico in Mexico and others as far south as Brazil and Bolivia. Current estimates are that the GCA contains approximately 230,000 species (not including bacteria and viruses).

Three elements are fundamental determinants of the great biological richness of the GCA:

- ◆ The most intact inshore Pacific marine ecosystem between the Panama Canal Zone and Mexico, with major nutrient-rich upwelling currents, causing high productivity in the surface layers;
- ◆ The only remaining significant area of Central American to northern Mexican (Mesoamerican) Pacific dry tropical forest, i.e. a complete dry forest ecosystem;
- ◆ A major altitudinal transect (relatively wide in almost all of its length) of 105km, including 8 Life Zones (*sensu* Holdridge), within which there is a continuous band from mangroves on the Pacific coast, Mesoamerican Pacific dry tropical forest, humid montane tropical forest, cloud forest, and finally on the Caribbean/Atlantic slope tropical rain forest. This transect includes complete river basins from their origin to the Pacific Ocean.

The marine area includes various near shore islands and islets (mostly uninhabited), open ocean marine zones, beaches, rocky coasts, and approximately 20km. of sea turtle nesting beaches. More specific surface habitats include coral reefs, rocky reefs, sandy bottoms, rock fields, deep water, algal beds and upwelling currents. The GCA possesses, among other marine features, a beach (Nancite) of 1.7km length, where thousands of Olive Ridley sea turtles nest simultaneously in major waves, called "arrivals", or "arribadas" in Spanish. This is one of the few protected arribada beach for this species in all of Mexico and Central America. Also, the GCA contains two nesting beaches of the highly threatened Leather Back sea turtle.

The GCA contains 37 wetland areas, among which are included major ones for Central America such as Puerto Soley, Cuajiniquil, Santa Elena, Potrero Grande, Nancite and Playa Naranjo mangrove complexes; Limbo Lagoon; Iguanito Estuary; and, Rincon de la Vieja Volcano Lagoon (freshwater in this last case). Its mangrove forests contain eight species of mangroves and are exceptionally intact.

The GCA's dry tropical forest, totalling approximately 60,000ha, is a complex mosaic of old growth patches and regenerating areas varying up to 400 years in age. It is characterised by an annual average total precipitation of 800 - 2,800 mm, and because of a well-defined dry season with a virtual total absence of rainfall from mid-December to mid-May. Because of this dry season, hot and with strong winds, climax conditions are a dry deciduous tropical forest, with at least 20 recognised vegetative associations. This dry forest consists of the only large stands (old growth plus regenerating) of pristine and semi-pristine old-growth lowland dry forest on the Pacific coast of Costa Rica. It is the only fully protected complete dry forest ecosystem in Mesoamerica.

The GCA contains important and apparently healthy populations of many of Central America's most typical vertebrates, with a grand total of 940 known vertebrate species. It is estimated to possess more than 50,000 species of fungi, 12,000 species of nematodes, 20,000 species of Coleoptera (beetles), and 13,000 species of Hymenoptera (ants, bees, wasps and relatives). The intact altitudinal transect contained within the GCA protects an entire elevational and east-west seasonal migratory route from the Pacific coast to 2000 meters above sea level, from dry forest to cloud forest and down to Atlantic rain forest, which is critical for the range and life histories of many species of animals.

The geological diversity is also of interest. It has 24,000ha of a serpentine barren (peridotite) on the Santa Elena Península, which has existed for more than 85 million years above sea level (Jurassic - Eocene). It has pyroclastic areas in Santa Rosa NP (Miocene) and Pleistocene volcanic complexes in the region of the Orosi and Cacao volcanoes (Guanacaste NP).

3. COMPARISON WITH OTHER AREAS

In summary the GCA can best be compared with other similar areas at worldwide, Neotropical and Mesoamerican (Central America and southern Mexico) levels, as follows:

- ◆ The sample of dry tropical forest protected in the GCA is the third largest in the world, after Kakadu NP in north-eastern Australia and Thungyai-Huai Kha Khaeng Wildlife Sanctuaries in Thailand;
- ◆ The GCA contains a complete dry forest ecosystem. Tropical dry forest is the most severely threatened of all the major tropical habitat types, with less than 0.02% remaining of the tropical dry forest that once constituted more than half of the woody vegetation of the planet's tropical regions. The GCA is the only conserved dry forest in the Neotropics large and contiguous enough to sustain its full complement of species indefinitely; The GCA would be the only World Heritage Site in the Neotropical Realm which protects dry tropical forest;
- ◆ Its 60,000ha of dry tropical forest is the largest and by far the best protected of such forests in the Americas (the coastal and near inland dry and semi-dry tropical coastal and scrub thorn forests of northern Peru and southern Ecuador are fundamentally a different complex than typical dry tropical forests of Central America, plus they have been severely deforested, grazed and/or otherwise disturbed over almost all their extension);
- ◆ All the other protected areas including dry tropical forests of the Central American to northern Mexican type in the region are far smaller in size (circa 5,000ha and smaller), scattered widely and with no biological corridors connecting them, and subject to much greater edge effects;
- ◆ The GCA is the only protected area in all of Central America and southern Mexico which includes a continuous transect from Pacific marine areas, to dry tropical forest, and then with altitudinal variation, a variety of adjacent forests onwards almost to the Caribbean coast (humid forests, cloud forests and wet lowland tropical forests). This 105km long transect is the only one in the region that contains such a broad range of contiguous habitats, with sufficient elevational and climatic diversity to include the ranges of a wide variety of types of seasonally migrating species;
- ◆ This complete altitudinal transect will become even more critical as global warming impacts reach Central America. The heating and drying of the dry forest ecosystem, i.e. a human-generated "desertification" of the western part of the GCA, will mean that a cooler and wetter area (refugia) will be needed to which the dry forest complex of species can retreat in order to survive. The vast majority of protected areas in the tropics do not have such altitudinal gradients and almost certainly will lose many of their ecosystems and complexes of species under current climate change scenarios;

- ◆ There are currently two marine World Heritage Sites in the Neotropical Realm (the Belize Barrier-Reef Reserve System and Cocos Island National Park in Costa Rica). The GCA would add significantly to these areas. In addition, the sea turtle nesting beaches in the GCA are considered of global significance; and the marine zone of the GCA is the most pristine of all the continental coastal marine areas of the Central American and Mesoamerican Pacific region.

The GCA is internationally significant and it represents the only remaining possibility of protecting and conserving a large-sized and ecologically complete dry tropical forest ecosystem (and in contiguous association with its nearby coastal marine and humid montane, cloud and wet lowland Atlantic/Caribbean rain forests) left in the Americas.

4. INTEGRITY

The GCA has the greatest amount of its area in government ownership within Costa Rica. It is noted that some portions of Guanacaste National Park are currently owned by the Costa Rican National Parks Foundation and this is currently being passed to the government. In other words, almost 100% of the terrestrial and all the marine area of the existing, decreed protected areas which make up the GCA are in government ownership.

The one major area (> 15,000ha) still in private hands, which should be added to the GCA 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 the GCA. The case is now being mediated through an international legal civil process and it appears that it will be resolved favourably.

The borders of the GCA are well-defined, protected and in virtually all areas relationships with bordering land owners are good, or at least civil and peaceful. Moreover the current strategy calls for the current 88,000ha of terrestrial habitat and 43,000ha of marine zone in the GCA to be gradually expanded to approximately 110,000ha of contiguous land and 50,000ha of marine areas. The major addition will be the Santa Elena Property, but negotiations for the Del Oro (1,500ha at present, to be greatly enlarged) and Rincon Rainforests (6,000ha) areas (see Fig. 1) are well advanced.

In general the GCA has widespread and solid local support from its neighbours and the public in general in Guanacaste Province. That in large part is due to the extensive efforts of the GCA to incorporate local leadership into the process of GCA management. A Local Committee was established 10 years ago with a 5-6 representatives of major local social and economic interests as members, along with the GCA's leadership. It mainly acts at advisory level, but does take part in major budget allocations decisions for the overall program. Under the new Biodiversity Law in Costa Rica and other legislation, the Conservation Areas will be required to promote and establish Regional Committees for essentially this same purpose. The GCA will be gradually converting its already well-functioning Local Committee into the Regional Committee. Support also comes from the fact that the GCA is reaching some 2,500 school children in all of the primary schools and several high schools surrounding its borders, with its basic biological/ecological literacy campaigns (Biological Education Program). Moreover, the GCA itself, the extensive biological inventory programs within the area and many visiting scientists which use its five biological research stations, have been providing new sources of employment for a nationally already marginalized region, which also is suffering the effects of a major economic downturn over the past 1.5 decades (due to general collapse of the cattle industry).

In terms of its economic sustainability, the GCA is in far better condition than the majority of protected areas in the developing world. This is due to the strategy and activities of the GCA leadership and its advisors. Its core budget is mostly covered by interest produced from investment of a US\$ 12 million endowment (trust fund), supplemented by user fees for environmental and other services. It also obtains additional funds for specific projects from international and national sources.

This guaranteed income allows the GCA to project at least several years ahead when making plans and strategic decisions as well as effectively plan its annual program of activities. The GCA is actively pursuing alternative revenue generation strategies. It is suggested that the GCA leadership and relevant authorities prepare a revised financial strategy for the next 15-20 year period. If needed, outside specialist advice should be sought.

There appear to be three potential conflicts for future biodiversity and natural resources conservation in the GCA, which have been recognised by the GCA administration and strategies are being developed.

(1) Ecotourism

Ecotourism, if planned and managed properly, could become a main economic force in the GCA and its surrounding rural and semi-urban region. Ecotourism is already growing in the region, but most of it is resort beach oriented and the main economic investments and flows are to companies outside of Guanacaste (and partly foreign in many cases). The much smaller part of it is nature tourism to wild areas and for wildlife viewing, and with only very limited local benefits so far, although that is growing slowly. The GCA has begun to promote and facilitate such development and activities with local communities and interest groups through a series of initial contacts, technical meetings and workshops. However, most of its efforts have still been within its protected areas borders, representing a reactive rather than a proactive process. Instead of always trying to “catch up” to commercial development interests (as in the vast majority of Latin American protected areas) the GCA could explore proactively a process of participatory evaluation, design, planning and development of the type of nature-oriented tourism it really wants to offer within the GCA. This also would provide for helping local communities and resource user groups to participate in the entire process, setting realistic goals and gradually developing alternative and supplemental sources of work and income. Relevant experience from elsewhere should also be sought and applied as necessary.

(2) Marine Area Use

Harvests of traditional products (snapper mainly, sometimes crabs and other species) by local fisherman are showing decreases in sizes of individual animals and increases in effort required for the same catch. Moreover, outside fishing interests (mainly shrimpers for Punta Arenas, Costa Rica) are causing damage by use of small-mesh nets and resulting capture of a vast array of species which are simply dumped. Conflicts between outside fishing interests and local fishermen are growing. The GCA has established good relations with local fishermen and has started a program of applied research and participation with them. However, these are complex social-economic-ecological problems and trends, without easy prescribed formulas for solution; they are cutting edge. The recommendation is to share information with and study examples of other attempts to deal with similar trends and problems in other areas of the world, in order to get additional input for the development of a comprehensive strategy and process for management of the Marine Area. One suggestion is to explore staff and information exchanges with the Galapagos National Park/Marine Reserve, as well as seek advice from specialists and additional training for GCA marine area staff.

(3) Agro-landscape

Use of the land in areas around the GCA protected areas is gradually evolving, due to economic market forces mainly. Large scale extensive cattle ranching is being replaced by smaller scale cattle ranching, large to medium scale tree crops (e.g. citrus juice production) and other forms of agriculture. However, local communities and resource user groups, i.e. some of the main neighbours of the GCA, are still not receiving much technical aid to improve their land and resources use, because the Ministry of Agriculture and others responsible for such are virtually absent in Guanacaste province. The GCA has good relations with those neighbours and is employing some of them in various GCA programs. Likewise, the GCA is creating some new technology through its forestry

work in the Horizontes Forestry Experiment Station. The recommendation is that the GCA become more actively involved in promotion and facilitation of innovative approaches to new land and resource use alternatives in the agro-landscape, where such involvement will result in clear benefits for the values of the GCA, through ensuring compatible land and resource uses around the GCA area.

5. ADDITIONAL COMMENTS

In general, management of the GCA appears to be very effective. The limited staff is well-distributed throughout the area, patrolling interaction with neighbours through educational programs and management of facilities and programs for visitors are all extensive. Management is guided by an annual detailed Management Plan (referred to as an Operations Plan). This is a very necessary, well-organised and conducted process. However, there is a need for a longer-term plan, as well as a detailed zoning scheme and process for regular evaluation and revision as conditions change and/or knowledge increases.

The recommendation for approaching both the needs for improved planning and monitoring, which are totally interrelated, is the following: establish a process of regular, medium-term planning, implementation and monitoring, using a method such as Limits of Acceptable Change, or the Recreational Opportunity Spectrum (ROS).

Finally, there are two other issues:

- ◆ That the GCA could be considered to be so well financed, compared to the rest of the conservation areas in SINAC, that it needs no more financial support. This is, of course, not true at all. If other areas have financial problems those will be solved by improving their management capacity and funding support, not by reducing the GCA's management capacities and funding; and
- ◆ That there is a potential risk that designation as a Conservation Area may be translated as meaning that much of the effort must be focused on the agroscape around and between the Protected Areas which make up the GCA, rather than on management and protection of those areas themselves. It is essential to clarify that the primary functions of the conservation areas is conservation of biodiversity for perpetuity. The emphasis in the surrounding agroscares should be to stabilise and improve biodiversity/resources/land uses, in order to decrease pressure on the protected areas and promote peaceful coexistence, not development per se.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The nomination in this case complies well with the four criteria established by the World Heritage International Committee because:

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

It contains significant ongoing geological processes and major stages of the earth's history represented by the formations of the Santa Elena Peninsula, the Santa Rosa Plateau (Tableland), and its Quaternary volcanoes, including the thermal features of Rincon de la Vieja volcano.

Criterion (ii): Ecological processes

It demonstrates significant, major biological and ecological processes in both its terrestrial and marine-coastal environments, as exemplified by: a) evolution, succession and restoration of Pacific Tropical Dry Forest; b) altitudinal migration and other interactive biogeographic and ecological processes along its dry forest - montane humid forest - cloud forest - lowland Caribbean rain forest

transect; and, c) the major upwelling and development of coral colonies and reefs in regions long considered to not have either (marine area near the coast of the Murcielago sector of Santa Rosa NP);

Criterion (iii): Superlative natural phenomena, scenic beauty

It has significant areas of exceptional scenic beauty such as Cacao Volcano with its lush cloud forests, the rocky coasts of the Murcielago sector of Santa Rosa NP, and large areas of dry forest with their incredible displays of bright flowering trees at certain seasons of the year; and

Criterion (iv): Biodiversity and threatened species

It contains important natural habitats for in-situ conservation of biological diversity, including both the best dry forest habitats and communities in Central America to northern Mexico and key habitat for notable threatened or rare animal species such as the Saltwater Crocodile, False Vampire Bat, Olive Ridley Sea Turtle, Leatherback Sea Turtle, Jaguar, Jabiru Stork, Mangrove Vireo, Mangrove Hummingbird, and threatened or rare plant species such as Mahogany, Guyacan Real (*Lignum Vitae*), five species each of rare cacti and rare bromeliads.

7. RECOMMENDATION

At its twenty-third ordinary session, the Bureau recommended that the Committee **inscribe** the Guanacaste Conservation Area on the World Heritage list under criteria (ii) and (iv).

The Committee may wish to commend the Costa Rican authorities for submitting such a well- and thoroughly-presented nomination and for the overall excellent strategy prepared and well-executed for expanding and consolidating the GCA and its management. At the same time, the Committee may wish to recommend that:

- ◆ GCA authorities place attention on: a) reviewing the long-term financial strategy for guaranteeing further consolidation and long-term management of the protected area; b) refining the planning, zoning and monitoring process for management of the GCA; c) improving marine biodiversity and resources protection and management; d) improving nature tourism development and management in and around the GCA for the benefit of the protected area and local communities/resource user groups; and e) promoting and facilitating improved agro-landscape management; and
- ◆ via legislation, policies, government financial appropriations, international efforts and any other possible means the Costa Rican Government authorities support the GCA's efforts to: a) expand its financial base and broaden its sources of international and national financial and technical support; b) guarantee the consolidation and recuperation of the GCA's contiguous complex of protected areas and biological corridors to ensure its ecological integrity and protection of its biodiversity; and c) promote and facilitate more harmonious land and resource uses in the interstitial areas lying between and around the GCA protected areas (terrestrial and marine).

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

SYSTEM OF MARINE TERRACES OF CABO CRUZ (CUBA)

1. DOCUMENTATION

- i) **IUCN/WCMC Datasheet** (6 references).
- ii) **Additional Literature Consulted:** Anon. 1998. **Proyecto Decreto Ley de Areas Protegidas (Cuba)**; Centro Nacional de Areas Protegidas/Agencia de Medio Ambiente, Ministerio de Ciencia, Tecnologia y Medio Ambiente. 1999. **Plan de manejo-Reserva Ecologica Maisi/Elemento Natural Destacado Caleta, Cuba**. Havana: Agencia de Medio Ambiente, CITMA; Gaceta Oficial de la Republica de Cuba. 1997. Ley No. 81 del Medio Ambiente. July 11, 1997; Ministerio de Agricultura de Cuba. 1986. **Parque Nacional Desembarco del Granma. Plan de Manejo**. La Habana; Thorsell, J. & T. Sigaty. 1997. **A global overview of forest protected areas on the World Heritage List**. IUCN; Thorsell, J., R. Ferster-Levy & T. Sigaty. 1997. **A global overview of wetland and marine protected areas on the World Heritage List**. IUCN.
- iii) **Consultations:** 7 external reviewers; Senior officials of the National Council for Cultural Patrimony; the National Protected Area Centre, Ministry of Science, Technology, and Environment (CITMA); and officials of the NPAC/CITMA Central Office. Provincial level officials and field staff.
- iv) **Field Visit:** February 1999. Jim Barborak.

2. SUMMARY OF NATURAL VALUES

Following the recommendation from the Bureau the new nomination only covers the area of Desembarco del Granma National Park (DGNP) that comprises 41,863ha of terrestrial and marine areas on the south-western corner of the Republic of Cuba. The nominated area is made up of 26,180ha of terrestrial area, 6,396ha of marine area, and 9,287ha of terrestrial buffer zone.

DGNP is located within the western part of the mountainous massifs of Sierra Maestra and comprises a series of elevated limestone marine terraces extending from 360m above sea level to 180m below. The nominated area lies within a tectonically active zone between the Caribbean and North American plates. The nominated area is considered representative of semi-arid ecosystems with annual precipitation of between 700 and 1,200mm. The annual average temperature is 26° C.

According to still incomplete data 500 flora species have been recorded within the area with 60% endemism from which 12 species are only to be found within this area. The nominated area is considered one of the most important centres of floral endemism within Cuba. Fauna records include 13 mammals (23% endemism), 110 birds (23% endemism), 44 reptiles (90.9% endemism), and seven amphibians (87.5% endemism).

The area of Cabo Cruz, within the Desembarco del Granma National Park (DGNP), is also characterised by a system of coral formations in very clear water including deep front reefs and coral crests. Associated fauna includes four species of marine chelonians and colonies of queen conch.

DGNP contains physical features, the system of elevated ancient reef terraces and associated biological formations, are of outstanding scientific and conservation value and which contain unique ecosystems and globally significant levels of endemism. Specific features in this area include:

- ◆ globally significant uplifted marine terraces that range from a depth of 180m to 360m above sea level. The terraces which were formed by tectonic uplift, global climate change and sea level fluctuations are well conserved;
- ◆ globally significant levels of endemism, particularly in groups like reptiles and amphibians;
- ◆ outstanding pristine scenic vistas from land and sea with cliffs up to 100m high;
- ◆ unique xerophytic coastal ecosystems on uplifted marine terraces;
- ◆ deep front reefs and coral crests in extremely clear waters on old submarine terraces;
- ◆ karst features including caves, canyons, and sinkholes (up to 77m deep);
- ◆ sizeable areas of intact tropical island forest with considerable altitudinal diversity stretching from altitudes of a few hundred meters to sea level;
- ◆ a number of important archaeological sites; and
- ◆ interesting contemporary cultural values as it includes the nationally important site of Fidel Castro's "desembarco" in 1956 where he and a group of 82 revolutionaries landed after sailing from Mexico. At the site there is a replica of his boat (the Granma, which gives the park its name).

3. COMPARISON WITH OTHER AREAS

At present there is only one natural heritage property from the insular Caribbean listed on the World Heritage List: the Morne Trois Pitons National Park in Dominica. That site (6,857ha), while possessing important volcanic features not shared by DGNP, is smaller, with much lower total species diversity or total numbers or percent of endemic species. While Morne Trois Pitons has higher peaks at 1,200m, the altitudinal diversity of DGNP, which stretches from coastal waters to a few hundred meters, is similar. Morne Trois Pitons is extremely wet (rainfall over 7,000mm per year), whilst DGNP contains semi-arid ecosystems plus offshore coral reefs found on ancient marine terraces. The reef-derived karst at DGNP is totally distinct from the volcanic rocks at Morne Trois Pitons. For these reasons, DGNP compares favourably on biological terms with the only natural World Heritage Site in the insular Caribbean, and with other potential World Heritage Sites that might be nominated for their terrestrial biodiversity from anywhere in that same region.

The site compares favourably in terms of total diversity or endemism with the recently inscribed (1997) Cocos Island World Heritage Site in Costa Rica, and with the Galapagos Islands, which although located in the Pacific Ocean, are the only other comparable World Heritage Sites in tropical America located on islands. Both Cocos and Galapagos have outstanding marine resources and evolutionary, ecological and geologic features that make them unique and globally significant; however, neither has the levels of biodiversity or endemism of DGNP. The reefs of DGNP are much smaller and less diverse than those of the Belize Barrier Reef and Sian Kaan World Heritage Sites in Belize and Mexico. However, the marine component of the DGNP is not the major focus of this nomination, and the unique aspect of the DGNP reefs, like its terrestrial ecosystems, is that they are growing on a system of ancient reef terraces.

The caves are not comparable in size or known dimensions to those of World Heritage Sites like Mammoth Cave or Carlsbad Caverns in the United States. However, the karst phenomena found in the park are important based on their associated flora and fauna, their archaeological importance, and also for the diversity of karst phenomena, including giant sinks, cliffs, dolines, canyons and caves.

In summary, the DGNP is considered to possess globally significant examples of limestone marine terraces and high levels of endemic flora and fauna.

4. INTEGRITY

4.1. Boundaries

DGNP contains most key and interrelated natural elements present in the region, including the coral reef of Cabo Cruz, sea grass beds and mangroves near Pilon, and the western part of the Park, and old sub-marine terraces up to 30m deep. DGNP has sufficient size, altitudinal and climatic diversity and ecological elements necessary for the long-term conservation of the park's terrestrial ecosystems and in-shore marine ecosystems and their biological diversity, including endemic and migratory species. The current legislative framework for the park is adequate and include marine ecosystems within the regulations on boundaries of the National Park.

4.2 Management Plan

DGNP has an old master plan, under implementation since 1986, and an updated management plan was recently finalised (1997) that provides a good level of detail for management activities. However, it might require strengthening in the area of internal zoning, marine and coastal limits, financial strategies, and planning for public use in the face of probable increases in coastal tourism to the park.

4.3. Staffing and Budget

DGNP has a well-trained and motivated staff, one of the largest of any protected area in the greater Caribbean (nearly 200 staff members, including 16 professionals). The park's operational budget is of 600,000 Cuban pesos/year plus 60,000 USD of international support from WWF-Canada. The location nearby of major existing and planned tourism development sites increases potential for at least modest levels of self-financing through visitor fees.

4.4. Invasive Species

Exotic species, while less of a problem than in other smaller islands, are nevertheless present and new introductions could have unknown consequences for native flora and fauna. Several aggressive introduced thorny trees make natural regeneration of forest cover difficult without induced reforestation; for this reason the park has an active nursery and reforestation program.

4.5. Visitation

Tourism, while currently extremely limited, has potential for significant growth at Pilon as new hotel rooms at nearby beaches are built, posing special challenges to the park staff, who up to now have not had to deal with significant visitor management issues.

4.6. Human Use

Ongoing environmental education and outreach programs with the limited local rural population in the area appear to be succeeding. There appears to be little pressure from landowners or cooperatives ringing the park to encroach on forested areas and the surrounding agroforestry systems are among the

most environmentally benign land uses in the tropics. Rural population density is low and growth rates are minimal. While logging took place some decades ago in more accessible parts of the park, it has been eliminated since the park was established. The Management Plan made a provision to allow traditional fisheries by local people near the Boca del Toro canyon mouth and in Cabo Cruz. This may have some impact on coastal and reef ecosystems but this is undetermined at present. Also effluent from nearby towns could threaten the reefs, but this impact is undetermined at present.

5. ADDITIONAL COMMENTS

The Bureau at its twenty-third session (July '99, Paris) noted that the Desembarco del Granma National Park meets natural criteria (i) and (ii). The Bureau however decided to refer the nomination back to the State Party seeking their concurrence to the adjusted boundaries, including the need for a marine extension, and inviting the State Party to update the relevant information and detailed maps focusing on the Desembarco del Granma National Park. Following this recommendation of the Bureau, the State Party submitted a new nomination document containing the additional information requested. This information adequately addresses the concerns of IUCN.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

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

The uplifted marine terraces of DGNP, and the ongoing development of karst topography and features on them, represent a globally significant example of geomorphologic and physiographic features and ongoing geological processes. IUCN considers that DGNP meets criterion (i).

Criterion (ii): Ecological processes

While the park is an important regional example of the evolution and development of species and ecosystems on recently uplifted marine terraces and resultant karst, it is not considered to have the universal or truly exceptional value to meet criterion (ii).

Criterion (iii): Superlative natural phenomena, scenic beauty

DGNP contains superlative natural phenomena and areas of exceptional natural beauty and aesthetic importance. These include the spectacular stair-step terraces and cliffs and the ecosystems that have evolved on them, which even to the untrained eye are visually extremely attractive. They also include what are perhaps some of the most pristine and impressive coastal cliffs bordering the Western Atlantic between the Canadian Maritimes and southern South America. IUCN considers that DGNP meets criterion (iii).

Criterion (iv): Biodiversity and threatened species

DGNP contains important natural habitats for in-situ conservation, including many threatened and endemic species, which are of regional importance. However, it is not considered to attain the global importance necessary to meet criterion (iv).

7. RECOMMENDATION

That the Bureau recommend to the Committee that the System of Marine Terraces of Cabo Cruz be **inscribed** on the World Heritage list under criteria (i) and (iii). For reasons of consistency with national legislation of Cuba, the Bureau may wish to recommend to the Committee inscription of the site under the name of Desembarco del Granma National Park. The Bureau may wish to commend the government of Cuba for the efforts to conserve this site in difficult economic times. The Bureau may

also wish to recommend to the State Party to submit a request to the World Heritage Fund for technical assistance to produce a tourism management plan as an integral element of the overall management plan.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

LORENTZ NATIONAL PARK (INDONESIA)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet** (10 references)
- ii) **Additional Literature Consulted:** Conservation International. 1997. Irian Jaya Biodiversity Conservation Priority Setting Workshop. Map.; Davis, S.D. *et. al.* 1995. **Centres of Plant Diversity**. Vol. 7. IUCN; P.T. Freeport Indonesia 1998. **Biodiversity Surveys – Compilation Report**. 702p.; Mealey, G.A. 1996. **Grasberg**. Freeport; Deutsche Forst Consult. 1992. Preparation Report on Lorentz. Asian Development Bank.
- iii) **Consultations:** 8 external reviewers, Provincial Government officials, church and military representatives, WWF, local NGO's, Freeport Mine representatives.
- iv) **Field Visit:** February 1999. Jim Thorsell, Peter Hitchcock, Jeff Sayer.

2. SUMMARY OF NATURAL VALUES

Lorentz National Park (LNP) stretches for over 150km from the equatorial glaciers of New Guinea's Central Cordillera, the highest mountains in South East Asia, to the south coast bordering the Arafura Sea. It is the largest protected area in Southeast Asia (2.5 mil. ha.), extending from sea-level up to 4,884m at the summit of Puncak Jaya (also known as Mt Carstensz), the highest mountain in New Guinea and Indonesia. There are 3km² of ice in the summit region, one of only three regions in the world where glaciers are to be found in equatorial latitudes. The park which includes part of the Sudirman Range, has a large number of streams and rivers which have cut deep valleys in the mountains and foothills as they drain south to the coastal plain. Here they form extensive areas of swamps with numerous permanent and seasonal lakes. A marine component extends into the Arafura Sea to the 10m depth boundary. At the meeting point of two colliding continental plates, the area has a complex geology. In the north, moraines overlie an extremely rugged karst limestone topography; the Central Cordillera mountains are folded and metamorphosed oceanic sediments of Cretaceous (100 million years BP) and Eocene (40 million years BP) origin. Alluvial deposits cover the southern coastal plain. Extensive fossils of ice age plants and animals are found in four highland caves. Climate is humid tropical with rainfall of 5000mm/year recorded at the higher elevations.

All the main natural land systems found in Irian Jaya occur within Lorentz National Park. Some 34 vegetation types and 29 "land systems" have been identified. The coastal plain has extensive areas of wetlands, including mangroves along the coast, tidal and freshwater swamp and riparian forests, sedgeland, *Pandanus* and sago palm formations, and permanently and seasonally flooded peat swamp forests. Lowland rain forest, the richest community, occurs up to 1,000m. Lower montane rain forest, which is less rich in tree species than lowland alluvial and hill forests, occurs between 1,000m and 3,000m. An abrupt change in vegetation occurs at 3,000m. Tree ferns, bogs, grasslands and heath vegetation predominate, until at 4000m the alpine zone is reached.

Some 123 mammals have been recorded from the reserve, representing 80% of the total mammalian fauna of Irian Jaya. The swamplands are home to two species of crocodile, both of which are threatened: the estuarine crocodile (Endangered) and the New Guinea crocodile (Vulnerable). The

avifauna is likewise extremely rich, with 411 species recorded, including at least 20 species endemic to Irian Jaya. Notable species include 2 species of cassowary, 4 megapodes, 30 parrots, 20 birds-of-paradise and 6 species of bowerbirds.

LNP has been inhabited for more than 25,000 years. A total of 6,300 people from 8 indigenous groups live inside the park. Some are agriculturalists cultivating bananas, taro and sweet potatoes. Others also raise pigs with hunting providing additional protein. Subsistence use by the coastal groups is focused on sago palms and fish. The Freeport gold/copper mine is adjacent to the northwest boundary of the park.

3. COMPARISON WITH OTHER AREAS

The island of New Guinea (of which Irian Jaya makes up almost half) is home to the most physiographically and biotically diverse assemblages in the Australo-Pacific region. Some 60-90% of the flora is endemic and the island has the highest mammalian diversity in the Oceanian Realm. All the main environments of Irian Jaya are represented in LNP including 29 “land systems” and 34 vegetation types that extend from the coastal plain through lowland rain forest, montane rain forest, conifer forest, heath, grassland and the alpine zone. The range of altitudinal, life zone and temperature variation in LNP is probably the greatest of any protected area in the world (with the possible exception of Santa Marta/Tayrona in Colombia).

LNP is in the Papuan Biogeographical Province which has in it one existing natural World Heritage site – East Rennell in the Solomon Islands. East Rennell is a small raised coral atoll and has no geographic or species similarities with Lorentz which is part of a continental island and is a mountainous area with an icefield.

Indonesia has an extensive protected area system consisting of 105 IUCN Category I and II areas totalling 15 mil. ha. Irian Jaya, however, is in a different Biogeographic Realm (Oceania) from the rest of Indonesia (Indomalayan Realm). Wallace’s Line (as modified by Huxley) separates the two and splits the predominantly Oriental biota of Asia and the Australasian biota to the south. As Table 1 indicates, Irian Jaya is the richest biogeographical region of Indonesia with the highest level of endemism in the country. LNP is by far the largest protected area in Indonesia and indeed of all the region, with the next closest areas only reaching half its size. For comparative scale, LNP is 25% larger than Kakadu National Park (Australia).

Table 1 - Comparative biotic richness and endemism in the biogeographical regions of Indonesia

Island	Resident Bird Spp.	% Bird Endemism	Mammal spp. Richness	% Mammal endemism	Reptile spp. richness	% Reptile endemism	Relative plant spp. richness	% Plant endemism
Sumatra	465	2	194	10	217	11	820	11
Java	362	7	133	12	173	8	630	5
Borneo	420	6	201	48	254	24	900	33
Sulawesi	289	32	114	60	117	26	520	7
Lesser Sunda	242	30	41	12	77	22	150	3
Maluku	210	33	69	17	98	18	380	6
Irian	602	52	125	58	223	35	1030	55

In Irian Jaya itself, there are 47 protected areas (not including 8 recreation parks). Several other very important sites exist (for example the Arfak Mountains and the Mamberamo-Foja National Park), but these are smaller, have less diversity, are not as varied altitudinally and do not provide the “mountains to the sea” spectrum of habitats that are found in LNP.

The geology and geomorphology of LNP is also distinctive. Its main mountain range is at the collision point on the leading edge of the Australian tectonic plate and the Pacific plate. While there is graphic evidence of the plate collision along the length of New Guinea, nowhere is it better expressed than within LNP. Although the mountains of Lorentz are located on the Australian plate, there are no mountains of age or genesis on the adjacent Australian continent which is mainly an ancient tectonically stable surface.

LNP is also one of three areas where equatorial glaciers are still found – the others being in eastern Africa and in the Andes. All these tropical glaciers are in retreat but LNP retains vestigial glaciers as well as classic evidence of past glaciation such as glacial lakes and moraines. Mount Kinabalu on Borneo illustrates evidence of past glaciation as well but glaciers are no longer found there and it lacks the cordilleran physiography of Irian Jaya which causes greater snow accumulation.

In conclusion, LNP is distinctive in the region and in the world for its biogeographically strategic position between Asia, Australia and the Pacific, its geological history at the junction of two tectonic plates, its exceptionally rich biodiversity, its large size and its steep “mountains to the sea” gradient which is unmatched anywhere on the planet.

4. INTEGRITY

One of the outstanding features of LNP is its large size (2.5 mil. ha.) making it a globally significant large tract of intact tropical forest. Only one road enters the park and that is on the north-east edge to Lake Habbema. An additional aspect of the integrity of the site is that it protects a whole sequence of river catchments from their source in the mountains to the Arafura Sea. Despite its large size, LNP still faces a number of threats and a number of management issues need to be addressed if its stewardship is to be assured. These relate to boundaries, development pressures, human residents and management constraints.

4.1. Boundaries

Protection of the Lorentz area dates back to 1919 when the colonial government gazetted a 300,000 nature reserve around the main peaks. Boundaries and legal status changed several times before the current national park was established in 1997 encompassing 2.5 mil. ha. Boundary details are still being negotiated with a small section of community land near Wamena soon to be excised.

The main boundary issue is on the western side where LNP borders the Freeport mine “Contract of Work” (COW) area. A series of straight lines which delineate the COW have no regard for the topography and, although there is no drainage from the mine into the LNP, it certainly can be seen from vantage points in the park. Although all mining activity has been excluded from the park, the limit of the Grasberg mine lease extends to within several hundred metres of the summit of Mount Jaya. It is unlikely that mining will take place any closer than it already does to the park (except underground). Freeport, however, could take full advantage of their surface rights to mine or place infrastructure right up to the boundary. The agreed western boundary buffer zone, however, should assist in minimising further conflicts.

Another boundary issue is in the southern foothills in the east where a pre-existing petroleum exploration lease extends into the park and forestry concessions have been excluded. Similarly, the human settlements in the Illaya and Beoga on the northern boundary have been excluded from LNP and result in the convoluted shape. The integrity of the marine boundary to the 10m depth mark is dependent on awareness and law enforcement.

In sum, the boundaries of LNP are a realistic compromise between existing land uses and human population distribution. There are no major features of the system lacking and, apart from minor adjustments, boundaries are ready for final proclamation.

4.2. Resident human population

The 2.5 mil. ha. of LNP's pristine forests are occasionally interrupted by small settlements of indigenous peoples several of which are serviced by missionary airstrips. These small settlements (some 50 in all) are accessible by foot-trails and their impact is limited to cultivation on steep slopes, removal of forests for subsistence uses, and fishing. Some 8 indigenous groups with a total of 6,300 people (one estimate gives 10,000) are involved. The greatest portion of the park is uninhabited though partly visited by local subsistence hunters and gatherers. Health, nutrition, security, land tenure, education, and loss of traditional customs are issues being faced by these park residents.

Given the number of indigenous people living in the park and in proximity to it, it is essential that park management work in partnership with them. The various indigenous groups have much to offer in contributing to the management of the park and the park could bring significant benefits to them in return. WWF have undertaken some excellent work with the local communities here and the Asian Development Bank (1992) has also studied what types of projects are needed to address community issues. The process of preparing the management plan for LNP has also involved representatives from the different stakeholders and this involvement needs to be encouraged and further expanded.

4.3. Development pressures

Threats to LNP come from mining activity, petroleum exploration, proposed road construction and illegal logging. Adjacent to the western boundary of the site, P.T. Freeport Indonesia (PTFI) has been producing huge volumes of copper ore and gold since it began operation in 1972. In 1997, the mine generated sales of 1.2 billion pounds of copper and 1.9 million ounces of gold making it one of the largest and most profitable mines in the world. Current reserves within the mining lease are estimated to last another 40 years. Opencast mining has created a number of social and environmental problems including displacement of the indigenous Amungme people, river pollution, oil spillages, forest clearance and construction of support services for the 14,000-strong workforce. It is important to note that all of these impacts occurred outside the current boundary of the LNP and that the mine drains to a catchment outside the park.

A part of the mining area was once inside the Lorentz reserve but in 1997 when the LNP was created the new boundary excised the portion affected. Nevertheless, the Suridman range is highly mineralised and mining exploration concessions exist all around the western and northern borders of LNP (see Map). Mining exploration concessions formerly within the LNP have been withdrawn and national park legislation does not allow new mining in parks. PTFI has stated that it supports the World Heritage site nomination and also that they do not intend to expand their activities inside the park (a formal letter confirming this has been received). It is also noteworthy that one of the four government ministers to sign the World Heritage nomination was the Minister of Mines and Energy.

Despite the progress in the re-drawing of the boundaries to exclude the mine, the current intention not to expand into the park and the considerable effort that PTFI has put into environmental restoration and research over the past 5 years, IUCN remains concerned over the influence on the park of such a dominant neighbour. In this regard, the 9 point list of actions (Table 2) given in Freeport's Biodiversity Survey Report (1998, p.575) form a strong basis for cooperation. IUCN is also aware that a Trust Fund to support the management of LNP (and to which Freeport would contribute) is now being established. The Bureau may consider it essential for the future integrity of the site to encourage both the Government of Indonesia and PTFI to implement these actions which will establish an effective management regime for the LNP and enhance the well-being of local indigenous residents.

The second threat from proposed development comes from oil exploration permits which predate the national park inside the east boundary. In this case, IUCN was informed that investors in the CONOCO oil company's proposed US\$40 million investment which would have been inside LNP had been voluntarily withdrawn and that no further activity on this lease will take place. Negotiations with CONOCO to forfeit lease areas in the park have resulted in agreement. Exploration will, however, proceed outside the LNP and once again cooperation between private interests and the Government of Indonesia such as underway with PTFI should be encouraged. The Bureau may wish to point out the incompatibility of oil extraction within the LNP.

Table 2. - P.T. Freeport Mine Assistance in LNP Management

<p>The GOI is responsible for the conservation of biodiversity in the Lorentz National Park, and PTFI will assist GOI by:</p> <ul style="list-style-type: none">i) working with PHPA to rationalize the boundaries of the Lorentz National Park;ii) providing logistical support for field studies in the Lorentz National Park;iii) carrying out ecological research in ecosystems which occur in both the PTFI COW Mining and Project Area and the Lorentz National Park;iv) working with GOI to establish biodiversity research sites and permanent monitoring plots within the Lorentz National Park which can provide ecosystem management data for ecosystems within the park, and also serve as "control" sites for biodiversity research sites and permanent monitoring plots established within the PTFI COW Mining and Project Area;v) preparing and distributing field guides which summarize the results of PTFI biodiversity research to agencies (government, universities, NGOs) who are involved in the management of the Lorentz National Park;vi) developing an integrated GIS and mapping system which can be adapted for use in the Lorentz National Park, as well as in the PTFI COW Mining and Project Area;vii) carrying ethnobotanical studies for indigenous groups living in ecosystems within the PTFI COW Project Area and the Lorentz National Park, and assisting these groups to develop potential income generating activities based on the sustainable use of local plants and animals;viii) developing the PTFI COW Mining and Project Area as a "buffer" between the Lorentz National Park and development activities to the west of the PTFI COW Mining and Project Area; andix) working with government agencies, including PHPA, and other private sector companies operating in the area, for bioregional/ecosystem conservation of biodiversity.
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(Source: P.T. Freeport Indonesia 1998. Biodiversity Surveys in the PTFI COW Mining and Project Area, Irian Jaya, Indonesia, p.575.)

Three proposed road developments in LNP are discussed in the nomination. The new road to Lake Habbema along the northern boundary was constructed with little regard for the environment and is now in an unstable condition. During the field inspection, IUCN expressed concerns over reduction of the impacts of this road with government officials and greater care to protect the fragile highland life zone was encouraged.

A proposed road that would link the Freeport Mine site with Beoga has also been under study but is unlikely to be seriously considered for some years. Of greater concern would be a proposed road across the width of the park between Timika and Merauke (via Agimuga) (see Map 3.).

Such a road would severely disrupt the forest and catchment integrity of the park and, although unlikely to proceed (for financial and security reasons), strong cautionary warnings should be given by the Bureau.

Logging concessions border LNP on the east. These pose a threat to the park as they include long-term changes to traditional lifestyles of some inhabitants (i.e. dependency on a consumer economy and shortage of suitable trees for making canoes). Already, some of the Nakai tribe are engaged in logging activities, some of them illegal. There is currently no management presence by the Forestry Department in this region.

The final issue affecting integrity is the need for a more adequate management regime to be put in place. The LNP does not have a headquarters, a resident Director or a management plan. It does have a person nominally responsible based in Jayapura and forest department rangers based in several locations nearby but all these people have other responsibilities. A beginning has been made towards preparing a management plan by bringing together a meeting of stakeholders but work has not progressed since then. LNP has been largely supported to date by WWF-Indonesia with funds from the German and US Governments. The Government of Indonesia is intending to establish a local headquarters and staff early next year but a capital budget to support site management has not yet been estimated.

A particular requirement will be for the managers of LNP to make a concerted effort to build a partnership with the local people both within and outside the park. Close liaison through the Tribal Councils, a cooperative management approach and the establishment of staff community liaison positions are three suggested actions. A commitment to strengthening local managerial capacity is another high priority task.

The availability of resources for management of LNP is seen as the main issue facing the park in future. There are proposals to establish a special foundation to independently raise funds for the park. PTFI has indicated an interest in participating in such a project as has CONOCO. The regional offices of UNESCO and WWF are both acting to facilitate the setting up of a "Friends of Lorentz" following the model of the Friends of Kutai National Park in Kalimantan. Completion and adoption of a management plan thus becomes ever more important as a means of demonstrating the commitment of the park authorities and establishing funding priorities.

Another proposal discussed during the field inspection is the establishment of a partnership between LNP and the Wet Tropics World Heritage Area in tropical Australia. Preliminary inquiries of both agencies suggests a positive interest. Such a pairing of these two large tropical rainforest areas could be particularly beneficial to Lorentz in the short term and eventually should be mutually beneficial.

In conclusion, all the above issues will require a concentrated effort in the years ahead. Although LNP has been affected by human activity along its periphery, its size and rugged terrain have helped maintain it in a relatively pristine state to date. With various regional pressures now mounting and with social concerns with local residents in need of attention, the Government of Indonesia and its partners in LNP need to take a proactive stance. The initial management planning process now needs strong follow-up to prepare a programme of action.

5. ADDITIONAL COMMENTS

The field inspection found strong levels of support for the nomination from many sectors. In particular, it is apparent that there is a good level of support for the nomination in the indigenous communities which were consulted. Notwithstanding, it is apparent that there is still a significant level of concern about protection of their traditional rights and questions about how the Government might impact on their lives. Indigenous groups voiced the need for greater efforts by all levels of Government in building trust with the local people. This needs to be addressed by a communication programme by the park managers and others, including regular community liaison and information.

The official positions presented by Central and Provincial government agencies were highly supportive of the nomination and future management of LNP as a World Heritage area. The fact that the nomination was signed by the President and three senior ministers was taken as a strong sign of commitment from the Government of Indonesia. This provides a timely opportunity to press for this commitment to be translated into more adequate management.

The non-government environmental and community welfare organisations, including the church, indicated strong support for the nomination. The Dani Tribal Council indicated support but also showed some concern about possible restrictions on access to resources in their traditional lands. Again, they expressed the need for better relations with government agencies.

PTFI also indicated their strong support for the nomination. The company is already actively involved in sponsoring social development programmes with the local indigenous programme and shows interest in a more direct role in helping the park.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

All assessments conducted on the biological priorities of protected areas in Asia/Pacific by FAO, UNEP, IUCN, ADB, Conservation International, WWF as well as the Government of Indonesia, rank LNP at the top. With its size, variety of habitats and the combination of numerous additional natural values, LNP is a clear candidate for inscription on the World Heritage List on the basis of the following three criteria:

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

The geology and geomorphology of LNP provides extraordinarily graphic evidence of major elements of the earth's evolution. The main mountain range is the direct product of the collision of the leading edge of the Australian tectonic plate with the Pacific plate. Massive marine sediments, comprising mainly limestone and sandstone, have been rapidly uplifted to produce a major cordillera, albeit of very recent origin. The uplift is on-going.

Whilst the graphic evidence of the plate collision is evident along the length of the island of New Guinea, there is no doubt that Lorentz represents the most outstanding example, containing as it does the highest points on the mountains and the only remaining glaciers on the island. Furthermore, it is the only intact mountains-to-sea transect on the island which has been incorporated in a protected area.

LNP also graphically illustrates a remarkable response to the last glacial and the post-glacial period. The main range shows all the classic evidence of glaciation, including glacial lakes and moraines. Furthermore, Lorentz retains vestigial direct evidence of the last glacial with 4 or 5 small remnant glaciers, all retreating rapidly. None of the two other tropical glacier fields in the world exhibit the features of Lorentz. Indeed, there appears to be no better example of the combined effect of collision of tectonic plates with the secondary major sculpting by glacial (glaciation) and post-glacial events

(shoreline accretion). Analogues of this do extend across much of the southern side of the island of New Guinea but only Lorentz retains its glaciers and is in a protected area.

In response to global warming, as the glaciation of the mountains was receding, the sea level was rising. Almost the whole of the southern lowlands of Lorentz National Park post-date the last glacial as the massive amounts of debris eroded from the mountains, including the products of glaciation, contributed to rapid accretion of the southern coastline. Most of the southern lowlands are inundated during high tide, both in the estuarine and freshwater zones, attesting to their very recent origin.

LNP thus meets Criterion (i) in representing a major stage of the earth's history, in particular the mountain building associated with collision of tectonic plates, overlaid with the impact of glacial and post-glacial events, including the rise of sea level in response to global warming. Furthermore, there is an abundance of known fossil sites in the nominated area which provide a major resource recording the evolution of life on the island of New Guinea. Some of the fossils and fossil sites are of international significance, including many now extinct New Guinea endemic species, such as the *Protomnodon hopei*, a large extinct member of the kangaroo family.

Criterion (ii): Ecological processes

The geophysical processes at work in LNP (mountain building and tectonic plate collision and accretion of erosional materials in the lowlands) along with high rainfall have led to coincident development of significant on-going ecological processes. LNP's climatic gradient represents the most complete climatic gradient for the island of New Guinea, indeed for the whole of the Australian tectonic plate, from nival zones and glaciers to lowland equatorial with an equally extreme range of plants and animal species and communities. LNP is the only protected area in the world which incorporates a continuous, intact transect from snow cap to tropical marine environment, including extensive lowland wetlands. The combination of these two geophysical processes, mountain building and coastal accretion, has created climatic and salinity gradients along which ecological processes have sieved the regional biota in an outstandingly graphic way.

The rapid and expansive growth of the lowlands from the many parallel rivers flowing from the mountains, means that the altitudinal change over much of the lowlands is minimal and is mostly at or below high-tide level, even in freshwater areas. The result is that tidal influence in LNP extends well into the freshwater areas towards the base of the mountains. The biota of the lowlands have therefore been sieved into a complex array of species. These occur along a salinity gradient, from mangrove communities in the lower estuaries, giving way upstream to nipa palm and sago palm forests which in turn give way to open freshwater swamps, freshwater swamp forest and peat forests further upstream.

The mountain building process has provided temperate refuges in the tropics for ancient Gondwana species of plants during climatic warming since the last ice age. For example, LNP's *Nothofagus* beech forests are well represented, although their closest relatives are otherwise confined to the cool temperate regions of south-eastern Australia, New Zealand and the southern Andes.

The refugial effect or local genetic evolution, or both, are manifest as local endemic species or restricted range species. Although research to date has been limited, it is apparent for example, that a number of mammal species, including some newly discovered species such as the Dingiso tree kangaroo, have evolved to utilise the specialised habitats of the sub-alpine and upper montane climatic zones. The mammal fauna of the mountains is distinguished by the predominance of marsupials and monotremes indicating a Gondwanan origin, the Asian origin placentals being limited to rodents and bats.

LNP provides evidence of a highly developed endemism in both plants and animals, at least for the higher altitudes of the mountains. This is what would be expected in a region combining on-going uplift and climatic warming.

LNP thus also meets criterion (ii) as an outstanding example of on-going ecological and biological processes in the development of terrestrial, freshwater, coastal and marine systems and communities of plants and animals.

Criterion (iv): Biodiversity and threatened species

Biological research in LNP to date has been very restricted and relatively little is known about the species composition of the area. However, research undertaken by Freeport and others in specific localities has been extrapolated to some extent across altitudinal zones of the LNP and confirm that the park supports the highest biodiversity of species in the region. The greater part of the case for meeting criterion (iv) is based on detailed information available for several montane, sub-alpine and alpine areas on the main range. Here a high level of local endemism is apparent, including many newly discovered species.

Much of the rich biota of LNP is new to science and some of special interest to science. For example, the newly described tree kangaroo is of special interest given the hypothesis that it has entered on an evolutionary reversal, re-evolving from an arboreal species to a mainly ground dwelling animal. LNP contains substantial portions of two Endemic Bird Areas with a total of 45 restricted range birds and 9 endemic bird species. Two of the restricted range bird species, Archbold's bower bird, and MacGregors Bird of Paradise are considered rare and vulnerable.

LNP, however, is not just the habitat for many rare, endemic and restricted range species. Given the large size and exceptional natural integrity, it is an especially important habitat for these species and their on-going evolution. Given the population and development pressures that are starting to build in Irian Jaya, LNP will become increasingly important for long term conservation of the species already recorded and the many that remain to be discovered.

It is clear that LNP contains "the most important and significant natural habitats for in-situ conservation of biological diversity, including those habitats that contain threatened species of universal value from the point of view of science or conservation". LNP thus meets Criterion (iv). Furthermore, given the limited knowledge on the park, it is possible to predict that further research will reinforce the fact that LNP is a globally important protected area for the conservation of a rich biodiversity, including many local endemic and rare species.

Criterion (iii): Superlative natural phenomena, scenic beauty

The case for this criterion has not been convincingly made in the nomination. Although there are many scenic features in LNP such as waterfalls and the glaciers on Puncak Jaya, these features are secondary in importance to the park's main values under criteria (i), (ii) and (iv).

Conditions of Integrity

The LNP nomination meets all related Conditions of Integrity except (v) which notes that a nominated site "should have a management plan". In as much as the planning process has commenced with a stakeholders workshop in 1997, the plan has at least been initiated. The Bureau may wish to note that the Government of Indonesia intends to give priority attention to completing the plan and to strengthening the management presence in the coming year.

7. RECOMMENDATION

At its twenty-third session, the Bureau recommended to the Committee that the Lorentz National Park be **inscribed** on the World Heritage List under natural criteria (i), (ii) and (iv). The Centre has

informed the Indonesian authorities of concern over a number of aspects dealing with management of the site as discussed above. In particular, these are:

- ◆ the priority need to continue the process of management planning for the park with full involvement of the local stakeholders;
- ◆ encouragement for the proposed establishment of a Foundation which would assist in the management of the park;
- ◆ possible twinning arrangement with the Wet Tropics World Heritage site in Australia;
- ◆ appointment of a Park Director and support staff (as planned for 2000);
- ◆ the concern over development projects that would affect the park, for example the proposed Timika/Merauke road and any expansion of mining activity towards the park boundary so as not to conflict with LNP's nomination as a World Heritage Site.

The Indonesian authorities have subsequently responded positively to all the above concerns in a 1 October 1999 letter to the Centre.

The Committee may also wish to commend the Government of Indonesia for acting to ensure that the former existing mining and petroleum exploration leases in the park were withdrawn. Finally, the Committee may wish to recommend that a monitoring mission be undertaken to gauge progress three years after inscription.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ST. PAUL SUBTERRANEAN RIVER NATIONAL PARK (PHILIPPINES)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (4 references).
- ii) **Additional Literature Consulted:** Middleton, J. & T. Waltham. 1986. **The Underground Atlas.** 239 p; Olsen, D.M. and E. Dinerstein. 1998. **The Global 200: A Representation Approach to Conserving the Earths Distinctive Ecoregions.** WWF-US; Protected Area Management Board, Palawan. 1996. **Saint Paul Subterranean National Park Management Plan, 1996;** IUCN. 1996. **Red List of Threatened Animals;** Davis S. *et al.* eds. 1995. **Centres of Plant Diversity,** IUCN/WWF; IUCN. 1997. **A Global Overview of Forest Protected Areas on the World Heritage List.** IUCN; Villalon, A. 1999. **Profile of National Parks in the Philippines.** Protected Areas and Wildlife Bureau, Department of Environment and Natural Resources. Quezon City. 174 p; Republic of the Philippines. 1991. **An Act Providing for the Establishment and Management of National Integrated Protected Areas Systems.**
- iii) **Consultations:** 5 External reviewers, relevant officials from government and non government organisation in Philippines.
- iv) **Field Visit:** J. Thorsell, January 1993; D. Sheppard and H. Friederich, February 1999.

2. SUMMARY OF NATURAL VALUES

The nominated site, the St. Paul Subterranean River National Park (SPSRNP), is located in the Saint Paul Mountain Range. It is north-west of Puerto Princesa, the capital of Palawan province. Palawan itself is 490km south-west of Manila (see Map 1). The SPSRNP lies within the jurisdiction of the government of the city of Puerto Princesa. The nominated site is a revision of an earlier one deferred in 1993, due to questions about inadequate size. The 1993 IUCN Technical Evaluation noted that, while the site was suitable for World Heritage listing, the area was too small to adequately protect its underground river watershed and to ensure the long-term viability of its significant biodiversity. The original 1993 nomination, of 5,753ha was thus revised, and an expanded nomination was considered by the World Heritage Bureau in July 1999. This was further referred back to the Philippine authorities for final modification and legal definition of boundaries. The State Party submitted a draft Presidential Proclamation declaring a nominated area of 20,202ha and this adds a 14,449ha buffer zone (hereafter called the buffer zone) to the original 1993 core nomination area. The draft Proclamation noted several points of GPS coordinates, but no map was included.

SPSRNP consists of various landforms, the most impressive of which is the karst mountain landscape of the Saint Paul Mountain Range. The topography varies from flat plains to rolling hinterlands and hills to mountain peaks. More than 90% of the park comprises sharp, karst limestone ridges around Mount St. Paul which is itself part of a series of rounded, limestone peaks aligned on a north-south axis, along the western coast of Palawan. The area's natural values are significant, and have been previously assessed by IUCN as meeting World Heritage natural criteria (iii) and (iv). quality. The focus of the area is a spectacular karst landscape containing an 8.2km long subterranean river, one of the most unique of its type in the world. The underground river includes many speleotherms, and

several large chambers exist, up to 120 meters in width and 60 meters in height. The limestone mountain has extensive karst features, both surface karst (pinnacles, shafts, dolines and limestone cliffs), as well as an extensive underground river system. A distinguishing feature of the river is the fact that it emerges directly into the sea, and that the lower portion of the river is brackish and subject to tidal influences. The underground river (the Cabayugan River) arises approximately 2km southwest of Mount Saint Paul at an altitude of 100m, and flows underground for almost its entire length to an outflow into St. Paul's Bay. All rivers and associated tributaries are within the SPSRNP nomination, which is important in relation to catchment impacts on the water quality of the Cabayugan River.

Three forest formations are present: lowland, karst and limestone. Approximately two-thirds of the nomination is forested, dominated by hardwood species. The karst forest is restricted to small pockets where soils have developed. In the coastal area, mangroves, mossy forest, sea grass beds and coral reefs are also found. The significance of forest biodiversity within the nomination is discussed in Section 3 of this report. The Alugan Bay component of the SPSRNP has been noted by a number of reviewers as having national significance for its mangrove forest. The faunal diversity in the SPSRNP is moderate, especially with respect to invertebrates. Endemic mammals include the Palawan tree shrew, Palawan porcupine and Palawan stink badger. Dugong have been recorded in the marine component of the park. Monitor lizard and marine turtles are also present. The Palawan Peacock Pheasant has also been recorded in the SPSRNP (recognised as an internationally threatened species). The subterranean fauna has not been studied in detail, but comprises fish, prawns, snakes and insects. The tunnel and chambers of the subterranean river are home to abundant populations of swiftlets and bats. Eight species of bats are also found in the cave, and cave swiftlets nest on some of the underground boulder piles. Further studies are required to determine the extent and diversity of the underground fauna.

3. COMPARISON WITH OTHER AREAS

St. Paul Underground River has similar geomorphological qualities as some other limestone areas in South and Southeast Asia, notably Gunung Mulu National Park in Sarawak, Phong Nha Nature Reserve and Ha Long Bay in Vietnam, Lorentz National Park in Irian Jaya and Gomantong in East Malaysia.

The vast majority of existing World Heritage karst sites are in temperate regions. Within the tropical karst region the following comparisons can be made. Ha Long Bay in northern Vietnam contains significant karst topography and caves, in a spectacular coastal setting. This site was not nominated on the basis of these values but the potential World Heritage significance of karst values within the site has recently been reviewed. The caves in Ha Long Bay are mostly small in comparison to the St. Paul Subterranean River, but they do have ancillary value as they provide key evidence of changing sea levels on the Sunda Shelf. In Thailand, the Thungyai-Huai Kha Khaeng Wildlife Sanctuaries contains significant areas of lowland riverine forest and other forest types more typical of strongly seasonal tropical climates. This property includes low-relief limestone terrain with some caves, and karst wetlands.

The major feature of the nominated area is the 8km underground river. There are many underground rivers in other karst regions around the world. For example, the Clearwater Cave and the 37km Melinan River in Sarawak's Gunung Mulu National Park have arguably more significant underground rivers. Within the Philippines a 9km river cave exists at Callao on Luzon. The underground river in St. Paul is not as dramatic as similar features found in existing World Heritage sites in Slovenia's Skocjanske Jama, Kentucky's Mammoth Cave or the Canadian Rockies Castleguard and Maligne River Caves.

One feature that distinguishes St. Paul, however, is that the underground river flows directly into the sea amidst a tropical coastal setting. The underground river flowing into the sea, and the associated

tidal influence, makes this an outstanding feature. One reviewer also noted that St. Paul warrants special consideration simply because it is one of the few such rivers which the general public can easily experience and appreciate.

There is one other World Heritage site in the Palawan Biogeographic Province: the Tubbataha Reef Marine Park. However, this protects different values from those identified for St. Paul. Palawan is an important biogeographic province, with a rich biota drawn from both Malaysian and Pacific sources. Palawan is distinct from the rest of the Philippine archipelago as it lies on the Sunda Shelf and has derived most of its fauna from Borneo during recent geological times.

The biodiversity within this site is considered significant. The Palawan Moist Forest, which is represented within the nomination, is noted in WWF's Global 200 report as having the richest tree flora of Asia, with high levels of regional and local endemism. The Palawan Moist Forest also has the largest and richest examples of limestone forests in Asia. The St. Paul National Park is also noted, in a recent global overview of forested protected areas on the World Heritage List (IUCN, 1997), as a forested protected area which may merit consideration for World Heritage nomination. This was reinforced in an expert consultative meeting on World Heritage Forests, which was held in Sumatra in December, 1998. This meeting considered St Pauls to be a tropical forest site of high biodiversity value, with high World Heritage potential. The conservation significance of this forest at the international level is heightened when considered in the context of the high levels of past and current deforestation in the Philippines and in the region. For example, the Environmental Legal Assistance Centre (ELAC) of Puerto Princesa notes that: "in 1903, there were more than 21 million hectares of forest in the Philippines, or more than half of the country's total area. Today, less than 6 million hectares of forest are left. In 1994, there were only 800,000 hectares of old growth forest left". Palawan has, in fact, been described as "the last best hope" for forest conservation in the Philippines. The role and maintenance of St. Paul takes on a special urgency in this perspective.

The marine component of the property is a small but important feature of the nomination and the mangrove swamp, adjacent to the limestone hills, adds to the what is a spectacular natural setting.

In conclusion, SPSRNP has a number of features that combine to distinguish it from other areas. These include:

- ◆ The underground river flowing directly into the sea amidst a tropical forest setting, with its associated tidal influence;
- ◆ The forests within the nomination which are amongst the most significant in Asia, being representative of Palawan Moist Forest, and which have been identified in a number of expert reviews as having World Heritage potential; and
- ◆ The fact that this is the most important site for conservation in the Palawan Biogeographic Province.
- ◆ The coverage of a complete "mountains to the sea ecosystem", within the nomination

4. INTEGRITY

4.1. Boundaries

A Presidential Proclamation has declared that nominated area of 20,202ha as the St. Paul Subterranean Natural Park, under the Philippines NIPAS Act of 1992. The Proclamation includes specific GPS co-ordinates describing the nominated area. The area is shown in Map 2 and includes land within the boundaries of three Barangays (Barangay is an administrative boundary for local purposes).

There are two relevant points which were reinforced by the 1999 field inspection. First, the reason for the deferral of the original nomination was to ensure adequate protection of the catchment of the underground river, and thus ensure protection of the natural values, particularly those related to water quality and quantity of the underground river. This river and its tributaries are all within the Barangay Cabayugan. This is thus the critical area for protecting any potential World Heritage values in the nomination. The adjoining Barangay Marufinas also has important biodiversity values, particularly for forest conservation. The natural values of the other Barangays, while still important, are less significant in the context of potential World Heritage, as these areas are not essential for the protection of the catchment values of the subterranean river, and are less important for biodiversity conservation. IUCN thus notes that the current nomination is confined to the core area of the park and to the immediately adjacent Barangays (Tagabinet, Cabayugan and Marufinas).

It should be noted also that Ulugan Bay, while considered by IUCN to not be of World Heritage status, is very important for mangrove conservation, at a national level. This significance should be recognised, possibly through designation as a Ramsar site, if agreed by the State Party.

Second, the nomination notes that consultation with key stakeholders within the nominated area occurred in December, 1997. However, the field inspection in February, 1999 noted a lack of clear agreement by relevant Barangays to the inclusion of lands within the nominated area as World Heritage. This was addressed by the State Party through further consultation. Formal resolutions have been submitted from the three Barangays surrounding the St. Paul Subterranean River National Park noting their agreement to include their respective areas within the revised nomination boundaries.

4.2. Legal Status

The previous IUCN review recommended deferral until a legal definition of boundaries is available. Clear legal protection of natural values is essential before the area could be considered for World Heritage listing. The boundaries of the nomination have been incorporated within a Presidential Proclamation, which declares the nominated site as protected area under Republic Act 7586 (NIPAS Act of 1992).

IUCN also notes that the legal owner of the Park is the City Government of Puerto Princesa, by virtue of the Memorandum of Agreement (MOA) for Devolution, between the City Government and the National Government. Under this MOA, the City Mayor is the authority with full responsibility over the property and all management decisions for the Park are made by the Mayor in consultation with the Protected Areas Management Board (PAMB). This agreement means that the area is protected at a local rather than a national level. This arrangement appears to have worked effectively to date, largely reflecting strong support at the local political level, particularly from the City Mayor. If this area is inscribed as a World Heritage site, IUCN considers it important that the status of natural values is monitored effectively over time, to ensure that these values are not compromised by any change in local management perspectives which may occur in the future.

4.3. Management

Management can be considered at two levels: the core zone and the buffer zones. Management of the core zone (comprising the Park) is currently very effective, reflecting strong local political support as well as reasonable funding and staffing levels. Funds raised from tourists visiting the site are increasing and earnings are deposited into a trust fund, with expenditures from the proceeds allocated for park management purposes. St. Paul is the only National Park in the Philippines that earns an income from fees in this way. Staffing levels are adequate but more training in park planning and management is required. Current park management builds on the foundation of earlier work, particularly that started when the park became the subject of an internationally financed Debt-for-Nature Swap Programme in 1989, through WWF – The World Wide Fund for Nature.

There is a management plan for the Park which sets out relevant objectives and programmes to ensure effective management of the Park. The plan provides for zonation within the park boundaries. IUCN considers the management plan for the park to be a professional document, but more resources are required in order to fully implement the plan.

Management of the buffer zone is covered by management guidelines which seek to regulate activities to minimise impact on the core zone. These guidelines are presently being prepared by the PAMB with the assistance of the European Council-Palawan Tropical Forestry Programme (EC-PTFFP), which aims to establish sustainable protective measures for the agricultural land within the buffer zone. It further aims to introduce protective measures that conserve natural resources and improve the quality of life of the area's residents. IUCN considers that the existing management plans for the core zone and the management guidelines for the buffer zone should be consolidated and harmonised, in order to effectively protect the catchment of the underground river. It is noted that such harmonisation is underway at present and this is to be commended.

4.4. Threats

There are several threats to the core zone of the SPSRNP from activities in the adjacent catchment area. The main threats are from forest clearing and agricultural activities. Tourism in the area, if not carefully planned and implemented, also has great potential to adversely impact on the natural values of the core zone. At present, tourism is at low level although it is increasing. Tourism management objectives for the Park are set out in the management plan and these appear relevant and effective. It is important that a tourism development strategy be developed for the entire nomination, (core and buffer zone) which enhances visitor appreciation of nature while protecting natural values. Water quality in the underground river is invariably affected by upstream agricultural activities in the catchment area. Evidence of these activities was witnessed by the IUCN mission team in 1999. There is need for the previously mentioned management guidelines to cover issues such as removal of pollution inputs to the river.

5. ADDITIONAL COMMENTS

5.1. Regional Integration

The nominated area demonstrates the importance of integrated regional planning, if core World Heritage values are to be protected. It is noted that all of Palawan is covered by an Integrated Conservation and Development Plan. Within the nomination, the Palawan Forestry Protection Programme is currently addressing many of the issues mentioned above, within the buffer zone.

5.2. Cultural Heritage

St. Paul Cave was known to local people since ancient times, in their thoughts it was inhabited by a spirit that prevented them from entering the cave. The park's territory and surroundings are the

ancestral lands of the Batak and Tagbanua communities. The needs of the local communities are being considered through the preparation of the previously mentioned management guidelines.

5.3. Ulugan Bay

This area is located within the nominated area, and it comprises mangrove forests in various conservation states. It has been estimated that 15% of the mangroves in the Philippines are in Ulugan Bay. Possible threats to Ulugan Bay from a proposal to establish a Naval base were also noted by the IUCN mission. This area is considered nationally significant and IUCN considers that it may be suitable as a Ramsar site. This should be considered by the State Party.

5.4. Recommendation from the twenty-third ordinary session of the Bureau: July, 1999.

The Bureau noted that the site meets natural criterion (iii) and (iv). The Bureau however decided that the nomination be referred back to the State Party for amendment and legal definition of boundaries so that they include the area most important for the protection of the catchment of the underground river and for biodiversity conservation. As noted, the State Party submitted a draft Presidential Proclamation to the World Heritage Centre on 15 September, 1999, which noted a number of GPS coordinates. A map was requested but had not been received by IUCN as at 6 October, 1999.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The SPSRNP is nominated under three natural criteria. The previous IUCN evaluation report in 1993 noted that the site: “meets two natural criteria: criterion (iii) as a site with a spectacular karst landscape including its underground river and caves, and criterion (iv) with its habitat for many rare and endemic species.” This evaluation report reinforces the 1993 evaluation and notes the following in relation to the three natural criteria under which the SPSRNP was nominated.

Criterion (ii): Ecological processes

The SPSRNP provides examples of important on-going ecological processes. IUCN considers this importance to be of regional rather than international significance and considers that this nominated site does not meet natural criterion (ii).

Criterion (iii): Superlative natural phenomena, scenic beauty

The Saint Paul Mountain Range features a spectacular limestone karst landscape. The underground river, flowing into the sea, and its associated tidal influence, make this a significant natural phenomena. IUCN considers that the nominated site meets criterion (iii).

Criterion (iv): Biodiversity and threatened species

The nominated area represents a significant habitat for biodiversity conservation. The SPSRNP contains a full mountain to the sea ecosystem and protects the most significant forest area within the Palawan Biogeographic Province. IUCN considers the nominated area meets natural criterion (iv).

7. RECOMMENDATION

That the Bureau recommend to the Committee that the St. Paul Subterranean River National Park be **inscribed** on the World Heritage list under natural criteria (iii) and (iv), subject to a signed Presidential Proclamation and a map of the site being available by the time of the November 1999 Bureau Meeting. The Bureau should commend the Government of the Philippines on two issues:

- ◆ Their consultative process undertaken with relevant authorities, specifically the affected Barangays; and
- ◆ Their approaches to integrated regional land use planning which aim to ensure that the World Heritage values of the nominated site are maintained.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

THE LAURISILVA OF MADEIRA (PORTUGAL)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (10 references).
- ii) **Additional Literature Consulted:** United Nations List of National Parks and Protected Areas. 1985; Heywood. 1994. **Centres of Plant Diversity**. Vol. 1. IUCN/WWF; The European Committee for Conservation of Bryophytes. ed. 1995. **Red Data Book of European Bryophytes**; Thorsell, J. & T. Sigaty. 1997. **A global overview of forest protected areas on the World Heritage List**. IUCN; Santos, A. 1990. **Evergreen Forests in the Macaronesian region**. (Council of Europe); Syngé, H. 1991. **Which Oceanic Islands merit World Heritage Status?** A short feasibility study for IUCN.
- iii) **Consultations:** 8 external reviewers, Government officials in Lisbon, Madeira and Canary Islands and members of IUCN-SSC Macaronesian Island Plants Specialist Group.
- iv) **Field Visit:** February 1999, Hugh Syngé.

2. SUMMARY OF NATURAL VALUES

The nominated site, The Laurisilva of Madeira (LM), consists of approximately 15,000ha within the 27,000ha Madeira Nature Reserve. The nominated site conserves primary laurel forest or "laurisilva", a vegetation type that is now confined to the Azores, Madeira and the Canary Islands. The laurisilva on Madeira is the largest area of laurel forest surviving (see comparisons, next section) and is in very good condition, with around 90% believed to be primary forest.

The laurel forest has great ecological value, playing an important role in maintaining the ecological balance of the island. It provides ecological services to the island by protecting the micro-climate and maintaining water supplies by collecting and retaining water.

The forest completely covers a series of very steep, V-shaped valleys leading from the plateau and east-west ridge in the centre of the island to the north coast. Ancient trees in the valley bottoms, waterfalls and cliffs provide the visitor with an experience not found elsewhere in Europe, and more reminiscent of an African montane forest than a part of Europe. At the higher altitudes, arborescent plants in normally herbaceous genera such as sow-thistle cling to steep cliffs, again reminiscent of the African mountains, and in the valley bottom giant ferns abound.

LM is notable for its biological diversity with:

- ◆ At least 66 vascular plant species endemic to Madeira occurring in the site;
- ◆ Of its large bryophyte flora, 13 liverwort species and 20 moss species are listed as rare or threatened on a European scale; and

- ◆ Endemic animals including a species of pigeon (The Madeiran Long-toed Pigeon, which eats the laurel fruits); a lizard species; two species of bats; and endemic subspecies of chaffinch and firecrest.

3. COMPARISON WITH OTHER AREAS

Fossil evidence shows that laurisilva once covered much of Southern Europe in the Tertiary era, 15-40 million years ago, and what is now seen in Madeira is the largest surviving relict of a virtually extinct flora of great interest. As climate change brought about its demise on continental Europe, the ocean- moderated climate of the island groups of the Azores, Madeira and Canary Islands maintained relicts of this previously widespread forest type.

While there are other areas of evergreen forest influenced by coastal fog, such as on the western seaboard of North America and temperate South America, all have completely different biota. The forest of LM is similar in structure, but not in species, to the montane forest of East Africa.

The relict laurisilva areas are in the Macaronesian Islands Biogeographic Province and, as stated by a reviewer, "The Macaronesian forests are unique in their phytogeographical history and in the relict and endemic species they contain." The main comparison is therefore with the other areas of laurel forest in the Azores and Canaries:

The laurel forest in the Azores (Portugal) is less rich in species than that of Madeira and the Canaries, and is reported to be rather degraded.

The Canary Islands (Spain) contain laurel forest on the central and western islands, with the most significant being on La Gomera, where the laurel forest is protected in the Garajonay National Park of 3,948ha of which 70% is laurel forest. This was inscribed on the World Heritage List in 1986. The evaluation report for Garajonay reports that that park contains over half of the Canarian laurel forest. The key comparison therefore is between the Madeiran laurisilva and Garajonay National Park. There are differences:

The laurisilva in LM is much larger: covering some 15,000ha as opposed to just c 3,000ha in the Garajonay site. The topography is different: the Madeiran forest is on steep V-sided valleys running from the central ridge and plateau to the north coast, from 1,400m to sea-level. Garajonay is an eroded volcanic plateau with a central crater and gently sloping escarpments, the park being at 600-1,492m. The Madeiran forest is in general more luxuriant than the Canarian forest, being taller, wetter and cooler. In the lower areas there are large ancient *Ocotea* trees of up to 40m high, a feature not present in the Canary Islands where the forest is much lower and more shrubby in nature.

Although the four dominant species of trees are the same in both LM and Garajonay, most of the rest of the flora is different. The Madeiran forest has numerous rare and endemic species, especially of bryophytes, ferns and flowering plants. It also has a very rich invertebrate fauna which is only just beginning to be uncovered.

The biological value of LM is recognised by its designation as a Special Area of Conservation (SAC) under the EU Habitats Directive, specifically for the conservation of a priority habitat type and 38 named threatened plants and animals. Few other sites in Europe have so many listed species. It is also one of the Centres of Plant Diversity identified in a global WWF/IUCN project and is given special emphasis as an area of high bryophyte diversity in the Red Data Book of European Bryophytes.

When the Spanish nomination of Garajonay National Park was evaluated by IUCN in 1986 it was seen as "the singularly most unique protected area in all of Spain for the international significance of its endemic flora... and as the only major remnant of a once common ecosystem." The 1985 United

Nations List of National Parks and Protected Areas confirmed this view in relation to Macaronesian forests. Garajonay was inscribed on the World Heritage List under two criteria as "an outstanding example of biological evolution of the laurel forest ecosystem" and as a site with "habitats of rare and endemic plant species..."

It is significant that the 1985 UN List did not record any protected areas on Madeira. This reflects that, in the 1970s, the Canarian laurel forest was well known and publicised but little information was available on the Madeiran forest. It was in the mid 1980s that the Madeiran laurel forest was deemed so important for plant conservation, that it was chosen as the site for one of the 20 or so field projects developed around the world in the IUCN/WWF Joint Plants Conservation Programme. Conservation activity for the LM dates from the 1990s, following among other things an IUCN study funded by the International Dendrology Society and a field visit by WWF in 1990.

An IUCN study in 1991 on which oceanic islands merit World Heritage status, it was noted that islands have in general been neglected in conservation yet contain floras of extreme importance and very high numbers of threatened species: one in three of all threatened plants occurs on islands.

When oceanic islands were ranked in terms of the number of endemic plant species, Madeira placed at number twenty. However, many of those ranked above it are very much larger, such as New Caledonia and Jamaica while others, such as Mauritius, have floras degraded by invasive introduced species. In fact, the Madeiran laurisilva is much the largest extent of laurel forest surviving in the world, with a unique suite of plants and animals. It would be hard to think of any plant-rich oceanic island of similar size as Madeira that has such a high proportion (close to 90%) of its natural forest intact.

4. INTEGRITY

The boundaries of the proposed World Heritage site include the primary laurisilva that remains on Madeira. There was an exhaustive field study of the laurisilva from 1992 to 1995. The members of the team that implemented the study now form the core staff of the Nature Park.

The site contains no habitation, no buildings (except the occasional tiny hut for those who maintain the levadas - see section 5.) and no cultivated land.

The LM is all primary forest except for the two easterly portions (roughly 10% of the whole), believed to have been cut some 40-50 years ago but which are now recovering well. The main forest is believed never to have been felled or cut and includes some massive old trees, believed to be over 800 years old, before the island was settled. Goats and sheep, which caused some damage in the past, have now been eliminated from the park, but stray animals are occasionally found there.

4.1. Legislation

LM is protected under a range of designations. It is one of the first accepted SACs under the Habitats Directive of the European Union. This directive has the force of law in EU Member States obliging Portugal to protect the area so that both "Madeiran laurel forest" and 38 species of rare and threatened plants and animals remain at, or are restored to, "favourable conservation status". Member States such as Portugal, may receive substantial grants from the EU LIFE fund to enable them to meet this obligation but if they fail the European Commission has the power to take them to the European Court of Justice. The site is also a Biogenetic Reserve of the Council of Europe.

Conservation functions are devolved to the Autonomous Regional Government of Madeira, which is elected by the island people. Under Madeiran law, the proposed WH site is gazetted partly as a Strict Reserve ("Reserva Integral") and partly as a Partial Reserve, about half in each. Strict Reserve corresponds with IUCN Category Ia, as no access is permitted except for conservation purposes.

Partial Reserve corresponds with IUCN Category II, since ecosystem protection is the main objective; visitor access is allowed and some very small cutting of the common tree heather in the higher zones is also permitted for local people, who use it to fence their terraces; this use is declining and appears to do no harm to the forest.

4.2. Boundaries

The whole site is enclosed within the Madeira Nature Park, which was established around 1990 as a large Category V site. However, the emphasis of management is almost entirely on the laurisilva, which is managed as Category I and II. Indeed, Park boundaries were drawn widely, including many areas of regrowth and introduced Eucalyptus on the southern slopes of the island. A redrawing of the boundaries of the Nature Park is under way to exclude much of this area from the Nature Park but this will have no negative effect on the site nominated. The authorities also plan to upgrade the protection for the Nature Park at the same time.

4.3. Adjacent area

No integrity problems are foreseen from areas surrounding the nominated site. Higher altitude areas are grassland and juniper managed for conservation and there appears no future threat from exotic species as pressure grows for any future plantation forestry to use native species. However, compatible management of these areas will be important for LM.

4.4. Agriculture

Below the laurel forest, in areas where the forest does not end in steep sea cliffs, are traditional agricultural terraces. The extent of these is shrinking as young people leave the villages to work in hotels on the south coast and laurel forest is starting to reclaim part of the area. One danger is of invasive species from these terraces but under a project funded by the EU LIFE-Nature Fund, a team is removing all tubers of the ornamental ginger from the terraces. This is a precautionary measure to prevent invasion of the laurisilva.

4.5. Access

The site is presently bisected by two roads running north south. One which cuts through Ribeiro Frio is an old route and serves a Forest Station with a botanic garden of endemic species. The other road to a large excluded area south of Sao Vicente is being replaced by a tunnel that will mean vehicles do not enter the proposed World Heritage site. Along the western part of the north coast, where the proposed site reaches the coast, the coast road forms the boundary of the site, mostly cut into precipitous cliffs. There are a few tracks through the forest used for access to the forest and to maintain the levadas (see section 5) but not for tourist access.

4.6. Visitation

Visitation does not seem high, despite the growth of tourism on Madeira, which now has 18,000 tourist beds, scheduled to rise to a ceiling of 24,000. Facilities for visitors to the laurel forest are few and clearly this is a subject to which management will need to give priority. With the sheer cliffs beside narrow levadas, great care will need to be taken both to protect the forest and to provide for visitor safety, as pressure for access mounts. World Heritage status may encourage more visitors but should also help safeguard the site against the temptation of building inappropriate facilities for visitors.

In conclusion, the proposed site is well protected and all threats, except visitor pressure, seem to be diminishing not increasing. The Nature Park administration has done a good job in building up the protection of the site in a short time, through a complex set of overlapping designations, national and

international, and by work on the ground. Thanks to the 1992-5 survey, they have a remarkable knowledge of the site on the ground. The challenge is now to consider more closely the issues of interpretation, which appears lacking, and visitor access.

The LM is considered to meet the conditions of integrity.

5. ADDITIONAL COMMENTS

The settlers of Madeira constructed levadas, water channels through the forest that follow the contours clinging to the cliffs and steep-sided valleys. Typically 80-150 cm wide and constructed of stone or more latterly concrete, they carry water from the forest to hydropower stations and to the towns of the south, where they provide essential drinking water and irrigation supplies. To get through the central ridge, tunnels as long as 5km were constructed. Besides the levadas, including in the tunnels, are paths typically 1-2m wide, which allow access to the otherwise almost impenetrable forest. There is much interest in Madeira in nominating the levadas for cultural status on the World Heritage list, but they are not on the indicative list for Portugal. As far as nature conservation is concerned, they are a benefit, since they allow access to the forest on relatively flat paths and cover only an infinitesimal area of land. None has been built for 50 years, but the present ones are carefully maintained.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The site is nominated under all four natural criteria.

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

IUCN does not consider that the geology of the nominated site meets criterion (i).

Criterion (ii): Ecological processes

In parallel with the Garajonay National Park (Spain), LM is an outstanding relict of a previously widespread laurel forest type. LM is considered to fulfil criterion (ii).

Criterion (iii): Superlative natural phenomena, scenic beauty

Although the site is attractive, in IUCN's assessment, it does not qualify under criterion (iii).

Criterion (iv): Biodiversity and threatened species

The greatest natural value of the laurisilva is its biological diversity. Nearly all its plants and animals are unique to the laurel forest. The Madeiran laurisilva is not only larger but has differences biologically from laurel forest elsewhere. It therefore meets current Criterion (iv) as containing "the most important and significant natural habitats for in-situ conservation of biological diversity."

Along with the existing Garajonay site, LM would give excellent coverage of laurel forests on the World Heritage List. However, the fundamental similarities between the two sites located in the same Atlantic region suggest the logic of the relevant States Parties being encouraged to consider seeking inscription of the Laurel forest of Madeira along with the Garajonay National Park as an international World Heritage site representing the once widespread laurel forest ecosystem.

7. RECOMMENDATION

At its twenty-third ordinary session, the Bureau recommend to the Committee that the Laurel Forest of Madeira be **inscribed** on the World Heritage List under natural criteria (ii) and (iv).

The Committee may wish to: (a) compliment the State Party on the protection afforded to the forest in a protected area less than 10 years old and the commitment shown by the Autonomous Regional Government; (b) encourage the State Party to enhance interpretation of the area and encourage compatible forestry practices outside the site; and (c) encourage discussion between the Portuguese and Spanish authorities on the possibility of jointly proposing Garajonay National Park World Heritage site and the Laurel Forest of Madeira as a single World Heritage site representing laurel forest.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

WESTERN CAUCASUS (RUSSIAN FEDERATION)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (4 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.
- iii) **Consultations:** 2 external reviewers, relevant officials from government organisations in Russia, consultant from NABU, Greenpeace Russia, WWF Russia, IUCN Russian office.
- iv) **Field visit:** M. Price, June 1999.

2. SUMMARY OF NATURAL VALUES

The nominated site is at the far western end of the Greater Caucasus mountains within Krasnodar Krai and the Republics of Adygea and Karachevo-Cherkessia (see Map 1). It includes a number of units, totalling 351,620ha (see Map 2). The largest of these is the Caucasus (Kavkazskiy) state biosphere reserve (275,841ha), together with its buffer zone (6,000ha), most of which is 1km wide and runs along much of the perimeter of the reserve except in the Republic of Karachevo-Cherkessia and where the reserve abuts Georgia (Abkhazia). A further 56,910ha of the nominated site comprises the three elements of the most strictly protected zone of Sochi National Park (all in Krasnodar Krai). The remainder of the nominated site comprises four small areas in the Republic of Adygea: the Bolshoy Thach nature park (3,700ha); and the nature monuments of Buiny Ridge (1,480ha), the headwaters of the Tsitsa River (1,913ha) and the Pshecha and Pshechashcha Rivers (5,776ha).

The region is mountainous, ranging in altitude from 250m to peaks over 3,000m, of which the highest is Akaragvarta (3,360m). The geology is very diverse, including sedimentary, metamorphic, and igneous rocks from the full span of periods from the Precambrian to the Paleozoic; it is also very complex, reflecting the origin of the Caucasus mountains. The north part of the site is characterised by karst limestone massifs with many caves, including 130 in the Lagonaki massif alone. Over the majority of the site, the landscape has a typical glaciated relief, with high peaks, 60 remnant glaciers (total area 18km²), moraines, and over 130 high-altitude lakes. The main rivers on the north side are the Bol'shaya Laba and Belaya, which feed into the Kuban; on the south side, the rivers are shorter, flowing into the Black Sea. There are numerous waterfalls, up to 250m in height.

The flora of the area is characterised by clear zonation, both vertically and from west to east. The western part has oak-hornbeam and beech and beech-fir forests; the higher central parts have fir-spruce forests with birch and maples at high altitudes; and the eastern parts have both fir-spruce and pine-cedar forests. Above the timberline at c. 2,500m are endemic rhododendron thickets as well as subalpine and alpine meadows. In total, 1,580 vascular plant species have been recorded on the site, including 967 in the high mountain zone, of which about one third are endemic. Of the forest plant species, about one fifth are relict or endemic. About 10 percent (160) of the vascular plant species are considered threatened with extinction in the Russian Federation, the Republic of Adygea, and Krasnodar Krai. There are over 700 species of fungi, including 12 which are threatened in Russia.

The fauna is also rich, with 384 vertebrate species. The 60 mammal species include wolf, bear, lynx, wild boar, Caucasian deer, tur, chamois, and reintroduced European bison which is globally endangered. Signs of snow leopard are occasionally seen (globally endangered). There are 246 species of birds, including many endemics, 24 of which are threatened in Russia, and 24 which are globally threatened. There is also a high species richness of amphibians, reptiles, and fish, with many rare species. About 2,500 insect species have been recorded; the projected total is 5,000.

3. COMPARISON WITH OTHER AREAS

The site is part of one of the major mountain ranges of Europe, and needs to be compared both with these and with other mountain ranges around the world. With a total length of 1,100km, the Greater Caucasus is the third longest mountain range in Europe, exceeded only by the Scandinavian mountains (1,500km) and the Urals (2,000km). It is longer than the Alps or the Carpathians. The Caucasus rises higher than any of these other European ranges; its highest peak is Elbrus (5,642m). However, the site does not include the highest peaks of the range. Its scenery is also not as spectacular as in the higher parts of the Caucasus, being more reminiscent of the Alps or Rocky Mountains than the high mountain ranges of Asia or South America.

The Caucasus as a whole is isolated from other mountains by seas and plains, and this high degree of isolation – together with its transitional position between Europe and Asia – is responsible for a high level of endemism. The vascular plant species richness of the entire Greater Caucasus is estimated at 6,000 species, and the site includes nearly one-third of these, including Tertiary relicts, Mediterranean and Asiatic Turano-Iranian elements, and many endemic species.

The Greater Caucasus may be subdivided into three subunits, each with different ecological conditions. On the territory of the Russian Federation, there are four other reserves of national park or reserve (zapovednik) status, of which three are in the central Caucasus (Prielbrusky national park and Kabardino-Balkarsky and Severo-Osetinsky zapovedniks). The only other reserve or national park in the warmer, humid western Caucasus is the Teberdinsky zapovednik/biosphere reserve (85,000ha), at altitudes from 1,260 to 4,042m. The vascular flora includes 1,260 species and there are 224 vertebrate species. The geology includes only crystalline rocks. Before 1935, the area was used for intensive grazing, logging and hunting. In comparison, the nominated site is much larger, encompasses a greater range of vegetation zones, and has a greater species diversity and a greater geological variety. It has also had a very limited human influence. Around its edges, there have been some pressures from grazing, logging, and hunting – and these have led to some boundary changes. Some of the areas taken out of the zapovednik are now either under strict protection in Sochi National Park (established in 1983), or nature parks or monuments established by the President of the Republic of Adygea; these are all included in the proposed site. Overall, the site is remarkable because it primarily consists of natural ecosystems with minimal or no human influence.

A principal reason for the establishment of the zapovednik in 1924 was to re-establish the mountain sub-species of the European bison. Hybrids of the sub-species were reintroduced to the wild in the 1940s, and have gradually recolonised much of the northern part of the zapovednik, which provides a reservoir from which animals have spread into adjacent areas. The current population in the

zapovednik is about 350, down from a high of c. 700 in the early 1990s primarily due to bad winters. Local scientists aver that the morphological attributes of the present herd are very similar to those of the original sub-species.

In conclusion, although the site is not in the highest part of the Caucasus, it has a remarkable diversity of geology, ecosystems, and species. It is of global significance as a centre of plant diversity (WWF/IUCN, 1995). Apart from the Virgin Komi forests of the Urals, it is probably the only large mountain area in Europe that has not experienced significant human impacts, containing extensive tracts of undisturbed mountain forests that are unique at the European scale, and subalpine and alpine pastures that have only been grazed by native animals. No mountain World Heritage site in Europe has a comparable range of habitats, from lowland forests to glaciers. The forests include very large specimens, including possibly the largest trees in Europe: specimens of *Abies nordmanniana* (Nordmann fir) 85m high with a diameter of more than 2m. The site also provides core habitat for the endangered mountain sub-species of the European bison (even though these derive from hybrid populations) and is occasional habitat for snow leopards. Finally, there are no existing World Heritage sites in this particular biogeographic province (Udvardy's Caucaso-Iranian Highlands province).

4. INTEGRITY

4.1. Ownership and legal status

The site consists of land under three types of ownership and legal status:

- 1) Caucasus State Biosphere Reserve (CSBR): created in 1924 and now under federal jurisdiction through the State Committee for Environment Protection (Goskomehkologia) under the federal law on protected natural areas (15.02.95);
- 2) Sochi National Park: created in 1983 and under federal jurisdiction through the Ministry of Forestry under the federal law on protected natural areas (15.02.95);
- 3) the buffer zone of the CSBR, the Bolshoy Thach Nature Park, and the Nature Monuments of Buiny Ridge and the headwaters of the Tsitsa, Pshecha, and Pshechashcha rivers which are protected territories of regional importance, under the jurisdiction of the Forests Committee of the Republic of Adygea. The buffer zone was declared in 1981 and the other protected areas in the 1990s, by decree of the President of the Republic of Adygea.

4.2. Management

The various parts of the site are under different management regimes. Totals for staff are given for the entirety of both the CSBR and Sochi National Park, although both of these include areas outside the nominated site.

- 1) CSBR. The director-general is in Adler, with a sub-director in Maikop responsible for the part of the reserve in Adygea (about one-third of the CSBR). There are regulations for the reserve, and a management plan was prepared in 1997. The reserve is divided into six regions, each with a head ranger and other rangers under him. The total staff of the reserve is 199, including 15 administrative staff, 45 scientific workers, 95 rangers, 8 people in the department of ecological education, and 44 technical personnel.
- 2) Sochi National Park. The director is in Sochi; as well as the federal Ministry of Forestry, the Forest Committee of Krasnodar Krai has some influence over activities in the park through its complex programme of nature protection. In 1987, a project for the forest management of the park was produced, with detailed maps showing four zones: protected, landscape protection

(zakaznik), extensive use, and intensive use. A proposal has been made to change these zones, and to have a five-fold zonation. However, no decision has been made in this regard, and it was not possible to obtain a map of current or proposed zonation during the field visit or subsequently. The total staff of the park is 169, including 17 in administration, and 15 forest guards. The remainder are guards, technicians, and other workers.

- 3) Buffer zone, nature monuments and nature park in Adygea. There are no personnel allocated to the management of these areas, but they are managed to some extent by staff of the CSBR, under agreement with the government of the Republic of Adygea. While these areas have had regulations for two years, there is no management plan for any of them, though they fall within the scope of the complex programmes of social-ecological development and of tourism for the Republic. According to the regulations, all human uses (particularly logging and hunting) are forbidden in the nature monuments. No logging takes place in the Bolshoy Thach Nature Park.

During the field visit and subsequently in Moscow, the issue of formulating and implementing a single management plan for the entire site was discussed with officials from all of the agencies responsible for managing the various elements of the site. The management of the CSBR and representatives from the Republic of Adygea indicated that they did not see a difficulty with having one management plan for the land under their jurisdiction, though it was noted that the State Committee for Environment Protection would have to pay for its preparation. However, there are questions as to whether the National Park management is prepared to have parts of the park included in a management plan for the entire site and this is still unresolved. Discussion with officials of Krasnodar Krai and the federal Ministry of Forestry determined that the director has a certain degree of autonomy in making such a decision. IUCN considers that development of an integrated management strategy for the entire site is important, that it should involve all relevant agencies and that it should be undertaken as quickly as possible.

4.3. Human use of the area

Human use of most of the area is very limited, apart from employees of the CSBR and the national park and a small number of visiting scientists. Approximately 2% of the area of the CSBR is allocated to the rangers to grow crops and for grazing their animals; rangers are also allowed to remove small quantities of wood for fuel and for bridges. All of these areas are around the edges of the reserve. There are a few wooden buildings in the reserve to provide shelter for rangers and scientists.

Part of the reserve – the Lagonaki plateau (16,500ha) – was not included in the nomination because of past high levels of grazing and continuing tourist use. The area was within the initial boundaries of the CSBR but later removed. Until 1955, 50-60,000 head of livestock (cattle, horses, sheep) were grazed on the plateau each summer. This led to significant changes in vegetation as well as some soil erosion. By the end of the communist era, numbers of cattle had declined significantly, not least because of lowered primary productivity. In 1992, the area was returned to the CSBR, and currently no more than 1,000 head of cattle (and some horses) graze the area each summer, all owned by local farmers.

Lagonaki is also the starting point for Federal Trail 30. This starts at the end of the only asphalt road to enter the reserve (but only for a few hundred metres). The trail passes through the CSBR, crossing the main ridge of the Caucasus on the way to the Black Sea. In the communist era, 10-15,000 people used this trail, in organised groups. In recent years, only 1-3,000 people a year have used the trail. It is likely that the forests along this trail have been used to some extent to provide firewood and shelter. There are also other trails on the Lagonaki plateau.

Apart from the road to Lagonaki, the only other road reaching the northern part of the reserve goes to the small settlement of Guzeripl, where the reserve has a museum which attracts about 3,000 visitors a

year. On the south side of the site, the parts of Sochi National Park included in the nomination are not accessible by road. No information is available on numbers of tourists to these areas, although an official in the federal Ministry of Forestry noted their attractiveness.

4.4. Threats

Overall, the site is characterised by a very high degree of naturalness. Four types of threats can be recognised: hunting, a potential road, tourism, and logging.

Hunting. The nomination document includes a table which shows significant decreases in the numbers of game animals over the period 1990-97: deer 2500 -> 1300; tur 6331 -> 2900; chamois 2800 -> 2090; bison 733 -> 350; roe deer 300 -> 200. During the field visit, considerable time was spent in exploring these declines. The principal reason appears to have been severe winters in the early 1990s, when the majority of the losses occurred; numbers have subsequently been reasonably stable. Another reason given by CSBR staff was that funds for providing salt for animals in the reserve (formerly placed by helicopter) have decreased, so that less salt has been placed – while over the same period, the same amount (if not more) salt has been placed in hunting reserves (zakazniks) and domestic grazing areas adjacent to the CSBR. At the same time, the numbers of animals permitted to be shot each year in these reserves has increased; a decision of the Department for Hunting of the federal Ministry of Agriculture. Thus, it would seem that some animals are being drawn out of the reserve and then shot, decreasing overall populations.

There is also some illegal hunting within the reserve. This is mostly by local people from Adygea, for food; each year, rifles are confiscated and a few people are imprisoned and fined. More critical has been hunting by people from Abkhazia, who sometimes spend considerable periods in the CSBR killing animals and preparing meat to take back. There have been gunfights with CSBR staff, and some people have been killed. Another possible threat to wild ungulates is posed by wolves, which were shot from 1975 until 1982. However, there was general agreement that these pose more of a risk to the livestock of rangers than to wild ungulates. The general consensus was that populations of ungulates are stable in spite of undoubted pressure; and the size of the site is one of its guarantees of integrity in this regard.

Potential road. At present, no roads cross the site. Roads reach the northern boundary at Guzeripl and Lagonaki, where the road then becomes the one major long-distance hiking trail across the main ridge of the Caucasus to the Black Sea. A road has been proposed more or less along this route (to Dagomys on the coast), and initial technical and engineering studies have been undertaken. The Republic of Adygea has asked the Federal Road Service for funds for the economic and environmental evaluation of the proposal. There appear to be two main reasons for this proposal: 1) to provide better access from Adygea to the Black Sea coast; and 2) to facilitate the development of tourism in the mountains around the road (see section below).

With regard to the first reason, there is already a road which connects Adygea to the Black Sea coast at Tuapse. This road is serviceable, but needs upgrading. However, once upgraded, it would be usable all year, as it crosses only low mountain passes. In contrast, the road through Lagonaki would cross a high mountain pass, and would probably be open only c. 4 months a year because of the high snowfall in the area. It would run through difficult terrain, and would be likely to have substantial environmental impacts both directly (e.g., road construction, habitat loss, animal mortality from traffic, increased numbers of landslides) and indirectly through increased access potentially leading to hunting, increased tourist use, and possibly logging on the southern slope. These impacts are of concern when considered in the context of the nomination of this area as a World Heritage site.

There has been significant public outcry against the Lagonaki-Dagomys road, coordinated by the Socio-ecological Union of the Western Caucasus. The issue was raised during the field visit with the

President of the Republic of Adygea, who was not willing to give an assurance that the road would not be built. It is noted that the Republic's Minister of Environmental Protection is against the construction of the road, as is the government of Krasnodar Kray.

IUCN considers that the status of this road in relation to the nominated area should be clarified before a final decision is made on the World Heritage nomination.

Tourism. At present, levels of tourism to the site are very low, though no data are available except for the museum at Guzeripl (3,000/year). The management of the CSBR recognises that tourism can have environmental impacts, but at the same time they need financial resources, and tourism is an obvious source. In 1998, the CSBR placed a barrier at the Lagonaki entrance to the reserve. The only vehicles allowed in are those of the cattle herders on the Lagonaki plateau or those on official business. Visitors are charged an entry fee, and this provides an important contribution to the budget of the CSBR.

Given that this zapovednik suffers from the same problems of financial insecurity as all others in Russia, it is not appropriate or realistic to ban tourism; and the management of the CSBR indicated during the field visit that the development of areas on the Lagonaki plateau and in the buffer zone for tourism will be undertaken in consultation with the reserve's scientific council. Nevertheless, in at least one meeting considering the proposed Lagonaki-Dagomys road, officials of the Republic of Adygea responsible for the Fisht ecological-tourist zone immediately north of the CSBR were in favour of developing the road. Similarly, the President of the Republic has recognised the value of the road for developing tourism.

Overall, it seems likely that levels of tourism in the Lagonaki-Fisht area and some parts of the border areas of the site will increase. However, the management of the CSBR and officials of the Republic of Adygea recognise the need for appropriate development; and it must be recognised that access to the north side of the site is limited and seems likely to remain so.

No information is available regarding levels of tourism, if any, in the parts of Sochi National Park within the proposed site. Adjacent to the southern boundary of the CSBR is the summer and winter sports resort of Krasnaya Polyana. This – as well as the various resorts along the coast of the Black sea – is certainly a source of tourists, and both the management of Sochi National Park and the federal Ministry of Forestry recognise the tourism potential of the park and adjacent parts of the CSBR.

Logging. Although the site includes very large trees, only the parts in the four protected areas in Adygea have experienced significant logging. This should now effectively have stopped with their designation. At present they are not easily accessible by road.

To the south of the site, a zone designated for forestry divides the Sochi National Park in two, reaching the southern boundary of the CSBR. However, as the terrain in this area is very rugged, it appears unlikely that there would be logging near this boundary. In the parts of the site within Sochi National Park, there may be pressure for logging to supply the towns along the Black Sea coast, or for export. It was not possible to explore these issues in any detail during the field visit. The situation with logging should be kept under review.

5. ADDITIONAL COMMENTS

Regional management context. The majority of the site is designated as a biosphere reserve. Adjacent to the site is not only the remainder of Sochi National Park (to the south), but also seven zakazniks and the Fisht ecological-tourist zone of the Republic of Adygea to the north. In one way or another, all of these areas are formally devoted to the objectives of conservation and/or sustainable development; and it is notable that a sustainable development concept has recently been developed for

the part of the Republic of Adtgea north of the CSBR, to be implemented from late 1999. There is therefore considerable potential for more integrated regional planning and for fuller implementation of the objectives of the biosphere reserve concept in this region. This would require greater levels of involvement of the local population, and better coordination between the individuals and agencies responsible for managing the various areas.

Lagonaki plateau. One part of the CSBR is excluded from the nomination: the eastern part of the Lagonaki plateau which was formerly excessively grazed and now has limited grazing and some tourism. Following discussion and a site visit during the field visit, it would seem appropriate to consider this part of the Lagonaki plateau as part of the nomination, for the following reasons: 1) the high biological diversity of this area: the carabid species diversity is particularly high, and two-thirds of the site's vascular plant species, including many endemics, are found there; 2) grazing levels are now low; 3) CSBR managers plan to use the area for research on revegetation of eroded areas and on increasing species richness on heavily-impacted areas; and 4) CSBR managers are aware that tourism should be developed sustainably and in an integrated way with the site.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The site has been nominated under all four criteria.

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

The nominated site includes sedimentary, metamorphic and igneous rocks from all periods from the Precambrian to the Paleozoic. It is very complex, primarily consisting of a series of thrust sheets, with a major Triassic anticline composed of karst limestone with deep gorges and many caves in its northern part. It shows all the effects of quaternary glaciation; remnant glaciers still remain. However, none of these characteristics are of outstanding significance at the global scale, being typical of many mountain ranges around the world.

Criterion (ii): Ecological processes

Since the last glaciation, ecological succession has taken place across the nominated site, resulting in a great diversity of ecosystems. The forests are remarkable at the European scale for their lack of human disturbance, i.e., natural ecological processes have continued over millennia. Vegetation dynamics and timberline have not been influenced by the grazing of domestic animals; an unusual situation at a global scale. There are important populations of both ungulates and wolves, providing opportunities for studying both competitive interactions between grazing animals and predator-prey interactions. Given the size and untouched nature of the site, it should be considered for inscription under this criterion.

Criterion (iii): Superlative natural phenomena, scenic beauty

The nominated site includes the typical variety of mountain landscapes. Overall, these cannot be considered as being of the superlative character needed to meet this criterion.

Criterion (iv): Biodiversity and threatened species

The Caucasus are one of the global centres of plant diversity. The nominated site includes nearly one-third of the 6,000 plant species of the Greater Caucasus, including Tertiary relicts and Mediterranean and Asiatic Turano-Iranian elements. About a third of the high mountain species and about a fifth of the forest species are endemic. The fauna is also very rich. The site is the place of origin and reintroduction of the mountain sub-species of the European bison, and acts as a reservoir for its expansion through the region. There are stable populations of many other large mammals. The

avifauna is rich, and includes many endemic species. There are also high levels of species richness and endemism in the lower orders.

Apart from the Virgin Komi Forests of the Urals, the nominated site is probably the only large mountain area in Europe that has not experienced significant human impacts. Its subalpine and alpine pastures have only been grazed by wild animals. Its extensive tracts of undisturbed mountain forests, extending from the lowlands to the subalpine zone, are unique in Europe. The forests include very large specimens, including possibly the largest trees in Europe: specimens of Abies nordmanniana (Nordmann fir) 85m high with a diameter of more than 2m.

The rich biological diversity of the site, reflecting its location at the meeting place of elements from surrounding regions and its isolation; its size, including a wide range of undisturbed ecosystems over an altitude of more than 3,000m; and its importance as habitat for threatened species warrants inscription under this criterion.

7. RECOMMENDATION

That the Bureau note that the following areas (see Map 3) have potential for inscription on the World Heritage List under criteria (ii) and (iv):

- ◆ the entire territory of the Caucasus State Biosphere Reserve (CSBR) with the exception of the Khosta Yew-Box Grove, but including the entire Lagonaki plateau;
- ◆ the buffer zone of the CSBR, the Bolshoy Thach nature park, and the nature monuments of Buiny Ridge and the headwaters of the Tsitsa, Pshecha, and Pshechashcha rivers which are protected territories of regional importance, under the jurisdiction of the Forests Committee of the Republic of Adygea.

IUCN also notes the uncertainty over the future of the Lagonaki-Dagomys road and its potential impact on the integrity of the site. IUCN thus recommends to the Bureau that this site be **deferred** and that the Bureau recommends that the State Party:

- ◆ submit a revised nomination with boundaries covering the above recommended area;
- ◆ advise of the status of the Lagonaki-Dagomys road in relation to the nominated area; and
- ◆ advise on mechanisms proposed for ensuring the integrated management of this area including the preparation of a management plan.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

GREATER ST. LUCIA WETLAND PARK (SOUTH AFRICA)

1. DOCUMENTATION

- i) **IUCN/WCMC Datasheet:** (no references)
- ii) **Additional Literature Consulted:** Lubombo Spatial Development Initiative. n.d. 44p.; Bird, E.C. 1968. **Coasts**. MIT Press; Heydorn A.E.F. 1989. The Conservation Status of Southern African Estuaries, *in* Huntley, B.J. **Biotic Diversity in Southern Africa**. O.U.P.; Hockey P. and C.D. Buxton. 1989. Conserving Biotic Diversity on Southern Africa's Coastline *in*. *ibid*; Hughes, R.H. and J.S. Hughes. 1992. **A Directory of African Wetlands**. IUCN/UNEP/WCMC; Begg, G. 1978. **The Estuaries of Natal**. Town and Country Planning Commission. Natal. 657p.; Sheppard C. and S. Wells. 1988. **Coral Reefs of the World**. Vol.2. IUCN/UNEP; MacKinnon, J. & K. 1986. **Review of the P.A. System in the Afrotropical Realm**. IUCN/UNEP; Stuart S. et al. 1990. **Biodiversity in Sub-saharan Africa**. IUCN. 242p.; Ramsar Convention. 1992. St. Lucia System. Monitoring Procedure Report 28; Ramsar Bureau. Various dates. Information Sheets on Ramsar Wetlands in South Africa; Davis S. ed. **Centres of Plant Diversity**. Vol1. IUCN/WWF; Taylor, R.H. 1993. Proceedings of the Workshop on Water Requirements for St. Lucia. Dept. Environmental Affairs, 83p.; Kyle, R. 1999. Factsheet on Resource Utilisation in Kosi Bay. KZDNC. 12p.
- iii) **Consultations:** Federal and Provincial Park Agency representatives
- iv) **Field Visit:** January 1999. Jim Thorsell.

2. SUMMARY OF NATURAL VALUES

The Greater St. Lucia Wetland Park (GSL) is located along the north-eastern coast of Kwazulu-Natal Province in South Africa. The park system extends from the Mozambique border for almost 220km south to Cape St. Lucia. Width of the land portion of the coastal strip varies from 1km to 24km. A marine reserve component 5km wide extends 155km along the length of the coast. The GSL consists of 13 separate but contiguous conservation units totalling 239,566ha. The area has a subtropical climate affected along the coast by the Agulhas oceanic current. A number of river systems flow into the park and have their catchments outside GSL in the Lubombo Mountains. A rich source of marine fossils occur in upper cretaceous sediments that help explain the Gondwana relationships of the site. Five ecosystems are found in GSL:

- ◆ the marine ecosystem characterised by a warm sea, the southernmost extension of coral reefs in Africa, submarine canyons and long sandy beaches;
- ◆ the coastal dune system consisting of linear dunes up to 183m in height, sub-tropical forests, grassy plains and wetlands;
- ◆ lake systems consisting of 2 estuarine-linked lakes (St. Lucia and Kosi) and 4 large freshwater lakes;

- ◆ the Mkuze and Mfolozi swamps with swamp forest, extensive reeds and papyrus wetlands; and
- ◆ the inland western shores with ancient shoreline terraces and dry savanna woodland.

Apart from the variety that each of these ecosystems provide to the GSL, the many ecological linkages between them have been a major attraction for research on the geomorphological and biological processes that occur there. Four RAMSAR sites are included in the GSL.

Associated with this high environmental heterogeneity is a remarkable diversity of natural biota. This is reinforced by the transitional location of GSL between the tropical and subtropical African biota and its setting within the Maputoland Centre of Endemism. The flora of GSL is diverse with 734 genera and 44 endemics recorded within its mosaic of forest/grassland/wetland and marine vegetation. The marine component is rich in species as well with 53 corals, 812 molluscs and 991 reef fishes. GSL provides home to 50 species of amphibians, 109 species of reptiles, including several that are endemic or threatened. It is also the principal southern African breeding ground of the loggerhead and leatherback turtles. Birdlife is especially diverse with 521 species and the park is a major breeding area and refuge for migratory waterfowl and waders. GSL is also known for 97 terrestrial mammal species and 32 marine mammals including dolphins and whales. Threatened species found in GSL (as listed under the CITES Convention) total 147.

3. COMPARISON WITH OTHER AREAS

There are currently 42 sites on the World Heritage list with major wetland values and 40 others that contain secondary wetland values. 40 existing World Heritage natural sites have a coastal and marine component. In Africa, the only World Heritage site comparable to GSL is the Banc d'Arguin in Mauritania which contains sandy marine and estuarine waters but does not have freshwater habitats or coral reefs. The same is true of the Arabian Oryx Sanctuary in Oman as well as the Shark Bay site in Australia, El Vizcaino in Mexico and, to a lesser extent, Donaña in Spain. None of these have the same terrestrial species complement as St. Lucia which among others has megaherbivores such as rhino and hippo and predators such as leopard. GSL has some similarities with the Fraser Island World Heritage site in Australia which has significant coastal sand dune features as well as diverse marine life including turtles, dolphins, whales and abundant fish and marine invertebrates. GSL, however, is distinct terrestrially with its range of saline and freshwater wetlands, estuaries, floodplains and savanna.

Within southern Africa, the St. Lucia system extends into Mozambique as far as the Inhaca Peninsula with swamps, freshwater lakes and coastal lagoons. (The nomination documentation notes that, recognising its transfrontier nature, an extension of the site is being discussed with the Mozambican authorities.) There are other freshwater lagoons and estuaries further north along the Mozambique coast (e.g. Inharrime R.) but these do not have the range of natural values of GSL and are not adequately protected. Other important coastal wetlands in the region are found at Walvis Bay, Cape Cross and Sandwich Harbour in Namibia but these are arid systems without the range of ecosystems and biota as found in GSL.

Within the South African Woodland/Savanna Biogeographical Province there are 389 protected areas, many of large size such as Kruger, Hwange and the Okavango complex. All of these sites are inland and do not include the significant coastal features of GSL.

Finally, along the South African coast itself, there are almost 50 coastal conservation areas (see Map), one of which (Cape Peninsula National Park) is being considered for World Heritage nomination. GSL, however, is very distinctive from all of these in that it is the largest estuarine system in Africa, the most diverse and the only area with coral reefs and with such a high number of threatened species.

Distribution of coastal conservation areas between the Orange River and Kosi Bay.

(Reserve names, sizes and conservation status are detailed in Table 1 in Hockey and Buxton, 1989.)

4. INTEGRITY

The area has a history of conservation management dating back to 1895 when the first reserves were created by the Zululand Government. The major threat to the area was a sand mining proposal which was resolved by the South African Cabinet in 1996. After lengthy public debate the decision was made to not approve titanium mining anywhere in GSL and to nominate the area for World Heritage status. The following issues relating to integrity of GSL, however, remain.

4.1. Protection of catchment area and regional development

All estuaries exist in a state of dynamic equilibrium and are places of constant interaction between humans and sea. As experience in other World Heritage wetlands has shown, human-induced changes in upstream catchments can have significant effects. Changes that have affected the GSL include upstream water abstraction, agricultural practices and road construction. These issues were addressed in a 1992 Workshop on Water Requirements for Lake St. Lucia and will be an on-going concern as development in the catchment area continues.

Recognising the economic, social and environmental linkages in the region around the GSL, the Government of South Africa, Mozambique and Swaziland have initiated the Lubombo Spatial Development Initiative (LSDI). This exercise in tri-lateral regional planning will provide another mechanism for addressing GSL's catchment issues. The GSL World Heritage nomination is thus seen in a larger context of integrated development and a regional plan and Environmental Management Framework are now being prepared.

4.2. Management Structure

Recognising the need for integration of the GSL with the LSDI and the complexity of managing the 13 component units of the nomination, the national and provincial levels of government are establishing a statutory authority for the Greater St. Lucia region. This Authority will provide a mechanism to consolidate the various conservation units under a single legal designation. Importantly, the Authority will assign management to the Kwazulu-Natal Nature Conservation Service which IUCN recognises as one of the world's most effective protected area management agencies.

4.3. Land Claims

Much of the land in the GSL is under negotiation as part of the work of the Commission on Restitution of Land Rights. Settlement of the land claims are expected to be announced soon. It is expected that these settlements will be compatible with protecting the conservation status of the area but could possibly result in boundary changes in the peripheral and buffer areas. The Bureau should note that its decision on this nomination should not prejudice the land claim negotiation process.

4.4. Resource Harvesting and Local Community Issues

Parts of the GSL are managed to allow controlled extraction of some natural resources (i.e. IUCN Protected Area Category IV). This is an important source of revenue and subsistence by people who are neighbours of the park for these resources are difficult to obtain outside the park. For example, commercial fish off-take from Lake St. Lucia is about 14,000 tons per year. In the Kosi lake system use is even more intense with monitoring reports for 1997 indicating that a wide range of products are harvested. An average daily number of 488 local people use the area and gather products totalling 1.6 mil. Rand in annual value. Close monitoring suggests that most of this use was legal and sustainable and most of it is for subsistence purposes. Other products harvested is ncema grass and reeds. Some 1500 people per day are allowed to collect this for a two-week period each June. Other permits to individuals of local tribal groups also allow to harvest marine invertebrates and thatch. Wild-laid crocodile eggs are also collected on a controlled basis.

All of the above human uses of GSL are subject to intensive management, research and monitoring. They are also confined to about a third of the total area while the remainder is free from extractive uses. With some 100,000 people in 48 tribal groups surrounding the GSL, the community conservation programmes in place are key to minimising conflicts and maximising benefits. In this regard, some funds to assist in community conservation have come from WWF but budget allocations from the Province need to ensure GSL management is adequately supported.

4.5. Restoration of degraded habitats

Like most protected areas, GSL has some problems with exotic species, including some plantation forests. Many actions are underway to control this problem but, once again, continued support from government is required. Active intervention to dredge the St. Lucia estuary is also an on-going management expense.

4.6. Boundary changes

As the nomination notes, there is action underway to establish a transfrontier site with neighbouring Mozambique as well as extend the marine reserve to align with the terrestrial component for the full length of the GSL. Both these initiatives are commendable and would benefit conservation of the area. Further additions as a result of the land claim negotiations may also arise in future. The Bureau should take note of these possible extensions.

5. ADDITIONAL COMMENTS

None.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The Greater St. Lucia Wetland Park has been nominated under all 4 World Heritage natural criteria. IUCN recommends that its case for inscription strongly rests on the following 3:

Criterion (ii): Ecological processes

The combination of fluvial, marine and aeolian processes initiated in the early Pleistocene in the GSL have resulted in a variety of landforms and continues to the present day. The park's transitional geographic location between sub-tropical and tropical Africa as well as its coastal setting has resulted in exceptional species diversity. Past speciation events in the Maputoland Centre of Endemism are also on-going and contribute another element to the diversity and interplay of evolutionary processes at work in the GSL. In the marine component of the site, the sediments being transported by the Agulhas current are trapped by submarine canyons on the continental shelf allowing for remarkably clear waters for the development of coral reefs. The interplay of this environmental heterogeneity is further complicated by major floods and coastal storms, events which are regularly experienced in the GSL. The site is also of sufficient size and retains most of the key elements that are essential for long-term functioning of the ecosystem.

Criterion (iii): Superlative natural phenomena and scenic beauty

The GSL is geographically diverse with superlative scenic vistas along its 220km-long coast. From the clear waters of the Indian Ocean, wide undeveloped sandy beaches, forested dune cordon and mosaic of wetlands, grasslands, forests, lakes and savanna, the park contains exceptional aesthetic qualities. Three natural phenomena are also judged outstanding. One is the shifting salinity states within St. Lucia which are linked to wet and dry climatic cycles. The lake responds accordingly with shifts from low to hyper-saline states. A second natural phenomena of note is the spectacle of large numbers of nesting turtles on the beaches of GSL and the migration of whales, dolphins and whale-sharks off-shore. Finally, the huge numbers of waterfowl and large breeding colonies of pelicans, storks, herons and terns are impressive and add life to the wild natural landscape of the area.

Criterion (iv): Biodiversity and threatened species

The five ecosystems found in the GSL provide habitat for a significant diversity of African biota. The species lists for the GSL are the most lengthy in the region and population sizes for most of them are viable. There are also 48 species present that are listed as threatened internationally and 147 on the CITES list. The GSL is clearly a critical habitat for a range of species from Africa's marine, wetland and savanna environments.

The nomination does not make a convincing case for its inscription under criterion (i) – Earth's History and Geological Features. Certainly there are abundant invertebrate fossils found in the marine sedimentary deposits but this is by no means a rarity. The heterogeneous landforms are bound up more with the ecological processes which are the dominating natural features of the site.

7. RECOMMENDATION

At its twenty-third ordinary session, the Bureau recommended to the Committee that the Greater St. Lucia Wetland Park be **inscribed** on the World Heritage list under natural criteria (ii), (iii) and (iv). The Centre has commended the Government of South Africa on 3 issues:

- ◆ for the democratic process it went through that led to the Cabinet decision to ban sand mining in the area and to subsequently nominate the area for World Heritage;

- ◆ the long history of conservation in the area and the very professional work of the Kwazulu-Natal Nature Conservation Service in maintaining the site;
- ◆ the launch of the Lubombo Spatial Development Initiative which the neighbouring countries of Swaziland and Mozambique which provides the regional conservation and development framework for the GSL and which will further strengthen community conservation work in the area.

The Committee should also make note of the possible extensions of the GSL including a possible future transfrontier site with Mozambique. It should also urge the completion of the land claim negotiations and confirm that World Heritage site designation should not prejudice this process.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

THE HIGH COAST (SWEDEN)

1. DOCUMENTATION

- i) WCMC Data Sheet
- ii) Additional Literature Consulted: Nordic Council of Ministers. 1996. **Nordic World Heritage**. Copenhagen; Trenhaile A.S. 1997. **Coastal Dynamics and Landforms**. Clarendon Press. Oxford; Marsh, J. 1998. A Global Overview of Geological Features in Natural Heritage Sites. Draft theme study report to IUCN; Thorsell, J.R. Levy and T. Segaty. 1997. A Global Overview of Wetland and Marine Protected Areas on the World Heritage List. IUCN; IUCN. Summary and Technical Evaluation, The Lapponian Area,(Sweden), 1996; **National Parks in Sweden**, Environment Protection Board, 1984; Lofgren, 1998. **Sweden's National Parks**; Curt Freden (Ed.), 1994. **National Atlas of Sweden**, Swedish Academy of Sciences; County Administration of Vasternorrland. 1998. The High Coast, 5000 Years of Human History; Rapakivi granites and related rocks in Central Sweden, Research Papers, SGU series Ca87, Uppsala 1997; Classification of Coastal Landforms; F.C. Bird, **Coasts: An Introduction to Coastal Geomorphology**, MIT Press 1968; Pirazzoli, Paolo Antonio, 1996. **Sea Level Change the Last 20,000 years**, John Wiley & Sons.1996; Kvarken Council (Sweden/Finland). 1999. Proposed World Heritage Nomination for Kvarken – The Quark.
- iii) Consultations: Five external reviewers, relevant officials from Swedish Environment Protection Agency, country administration, State geologist and local university specialists.
- iv) Field Visit: June 15-18, 1999. Harold Eidsvik.

2. SUMMARY OF NATURAL VALUES

The nominated site lies within the specific area known as the "High Coast" of Sweden (HCS). HCS is located on the west shore of the southern Gulf of Bothnia, a northern extension of the Baltic Sea. The size of the nominated area is 1,425km² including the marine component of 800km². There are a number of off-shore islands. Two villages exist within the site which has a resident human population of 4,500 people. The HCS is a mosaic of human and natural landscapes with agriculture, fishing and tourism as the main economic activities. Approximately 9% of the total area is protected in 28 different protected areas with most of the remaining land under private ownership. The site has a long history of human use dating from late Stone Age dwellings and remains of an Iron Age village.

Physically, the archipelago has irregular topography with a series of lakes, inlets and flat hills rising to 350m. Vegetation is typical of the west Eurasian taiga with a mix of alpine, boreal forest and wetland communities. The offshore islets support small seabird populations. The main natural values of the HCS are geological and relate to the glacial history of the area. Since the retreat of the last ice cap, 18,000 – 9,600 b.p., the land began to uplift. The geomorphology of the region is largely shaped by the combined processes of glaciation, glacial retreat and the emergence of new land from the sea which continues today at a rate of 0.9m/century. Total uplift of the area since the greatest extent of the last ice age is estimated to be 800m. Since the final retreat of the ice from the HCS 9,600 years ago, the uplift has been in the order of 285-294m which is the highest evident "rebound" known.

Raised shorelines and the shifting location of glacial moraines are two of the marks left on the landscape which, in turn, gives rise to variations in soils and vegetation types. The extent of the "isostatic rebound" in the region is of scientific importance in demonstrating the original size of the ice sheets and their impact on northern Europe.

3. COMPARISON WITH OTHER AREAS

There are 200 protected areas in the West Eurasian Taiga Biogeographic Province, including one mixed site in Sweden (The Laponian Area) and one natural site in Russia (the Virgin Komi Forest). Both of these existing sites are much larger and also display a wide range of geological features. They do not, however, illustrate the isostatic uplift phenomena that occurs in the HCS. Many other protected areas in the Baltic Sea region display raised coastlines including several identified in the 1996 **Nordic World Heritage** report of proposed natural sites.

There are 47 sites inscribed on the World Heritage under geological criteria, many of which contain glacial landforms and several of which have and are experiencing uplift (e.g. Gros Morne, Los Glaciares, Macquarie Island). There are also 39 natural World Heritage sites with a coastal and marine component, some of which (e.g. St. Elias Parks, Henderson Is. Southwest New Zealand and the nominated St Lucia property) illustrate raised coastline phenomenon. The distinctiveness of the HCS site is the extent of the total isostatic uplift which, at 294m, exceeds all of the above except those that have been raised as a result of tectonic forces. The only other site with comparable isostatic uplift is found in Richmond Gulf in south-eastern Hudson's Bay (Canada) which has been measured at between 275-290m. This area is very remote and extends over a great distance while the HCS can be seen in a small and accessible area.

In conclusion, the HCS is one of many places in the world that is experiencing uplift as a result of deglaciation. Isostatic rebound is well-illustrated in this site which is among the highest of such sites known. Other natural features of the HCS are relatively common and do not stand out as particularly unique at an international level. Similarly, the HCS scenic values, consisting of a blend of farmland, coastline and hills, are harmonious, but typical of much of the rural landscape of northern Europe.

4. INTEGRITY

The HCS nomination is a region inhabited by an estimated 4,500 people who practice small-scale agriculture and fishing. One national park of 2,950ha and 18 nature reserves (size ranging from 2-934ha) are contained within the region. According to IUCN's protected area management categories, HCS is Category V-Protected Landscape. The nomination notes that 9% of the total area is under protected status with most of the rest being the marine component and private lands. About 2% of the marine component is protected but the nomination does not provide details of the natural values that occur there (56% of the size of HCS is marine).

The HCS boundaries are sufficient to include the values for which it is nominated except for the western upland boundary which omits a portion of the highest paleocoast. Past mining and quarrying are claimed not to have damaged geological features, but agricultural and forestry activities have led to some disturbance of superficial deposits. The impact of marine fisheries on sea bed habitats is not known but bottom fishing and mineral exploration would affect its geological values. Only 15km² of the 800km² marine component of the area is under protective status.

Management plans exist for all the nature reserves and the national park but these lands constitute only 9% of the total area. The two relevant municipalities do have development plans and the National Natural Resources Law recognises the HCS as an area of national interest. Although the largest proportion of the HCS is marine, there is no information on its management status except to note that 2% of it is protected.

It is also noted that a major highway runs through the area and a new bridge is being constructed. The field review expressed some concerns over a visual intrusion of a large television tower and proposed expansion of wind turbine generating stations. The nomination states that World Heritage status will assist in more protection of the geological features as well as encourage the continuation of small-scale farming. Management of such multiple use and privately owned areas, however, will be difficult to achieve as there is no single management agency responsible for the area.

In sum, IUCN believes that the legislation, if applied effectively, would be reasonably adequate to protect the land area of the HCS, even though 82% of it allows for some form of development. However, without a unified management framework and without sufficient attention given to the 56% of the area that is marine, assurances of long-term integrity as per Operational Guidelines 44 (v, vi) would be cause for concern.

5. ADDITIONAL COMMENTS

Since the field inspection of the HCS, UNESCO's World Heritage Centre has received a draft of a joint Finland/Sweden nomination for an adjacent area known as "The Quark". The document was submitted on 11 June, 1999 by the Kvarken Council who are the cross-border organisation between the two countries. This site is also proposed in the **Nordic World Heritage** report prepared by the Nordic Council of Ministers. A substantial part of the rationale for the proposed Quark nomination is based on similar isostatic phenomena as well as what appear to be other substantial biological and landscape values. The nomination has yet to be formally submitted by the two State Parties but it has been endorsed by a number of municipalities and country administrations. As there is such a close proximity of the Quark and the HCS, and as there is a large duplication of heritage values, the relation between the two sites needs clarification.

6. EVALUATION

As discussed above, there are a number of questions and uncertainties over various aspects of the nomination of the HCS, These include:

- ◆ The lack of an adequate comparative analysis in the nomination which does not allow a clear and convincing case to be made on the international significance of the isostatic rebound issue and related ecological processes;
- ◆ The lack of documentation in the nomination of the natural heritage values of the marine environment which comprises 56% of the total area; and
- ◆ The lack of an assessment of the potential overlap of HCS with the proposed transborder nomination of the Kvarken/Quark site;

In addition there are a number of concerns over management issues that would mean that the HCS would not fulfil the Conditions of Integrity as provided in the Operational Guidelines for the Convention.

Finally, both the **Nordic World Heritage** report and the report of the IUCN field inspection, recommend that the site may be considered as a potential cultural landscape nomination. Certainly with its strong historical traditions and attractive rural landscape features, the feasibility of this would seem worthy of investigation.

7. RECOMMENDATIONS

That the Bureau recommend to the Committee that the High Coast nomination be **deferred** to allow the Swedish authorities to (i) more fully document the values of the marine portion of the area; (ii) to provide a more complete comparative analysis including its relation to the proposed Quark World

Heritage nomination; and (iii) address the various issues relating to integrity. The Bureau may also wish to suggest that the State Party consider the prospect of nominating the site under cultural criteria.

**A.1. EXTENSION OF NATURAL PROPERTIES
INSCRIBED ON THE WORLD HERITAGE LIST**

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

BELOVEZHSKAYA PUSHCHA/BIALOWIEZA FOREST - EXTENSION (BELARUS / POLAND)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet**
- ii) **Additional Literature Consulted:** Breymeyer, A. (ed.) 1997. **Biosphere reserves in Poland.**- Warsaw, pp 71-96. Chebakova, I. V. 1997. **National parks of Russia.**- Moscow, BBC, 167 pp. Falinski, J. B. 1975. **Anthropogenic changes of the vegetation of Poland.**- Phytocoenosis 4.1, pp 97-116. Falinski, J.B. 1986. **Vegetation dynamics in temperate lowland primeval forests - Ecological studies in Bialowieza Forest.**- Geobotany 8, Dr W. Junk Publishers, Dordrecht/Boston/Lancaster, 537pp. Falinski, J. B., Kwiatkowski, W. 1994. **Concise geobotanical atlas of Bialowieza Forest.**- Warsaw/Bialowieza, **Phytocoenosis-Supplementum Cartographiae Geobotanicae** 6, 88pp. Luchkov, A., Tolkach, V., Berwick, S., Brylski, P. (ed.) 1997. **Belovezhskaya Pushcha - Forest Biodiversity Conservation.**- Minsk, 297pp. Ministry of Environmental Protection, Natural Resources, and Forestry 1998. **The contract for Bialowieza Forest.**- Warsaw, 16pp. The Board of Polish National Parks 1998. **National Parks in Poland.**- Warsaw/Bialowieza, 61pp.
- iii) **Consultations:**
- iv) **Field Visit:** April, 1999. Gerhard Heiss

2. SUMMARY OF NATURAL VALUES

This nomination is a proposal to extend the Belovezhskaya Pushcha/Bialowieza World Heritage Site, which is a transboundary World Heritage site between Belarus and Poland. The existing World Heritage area covers 87,607ha on the Belarus side and 5,316ha on the Poland side. This nomination of 5,186ha, is an extension to the existing World Heritage area on the Polish side. It has been nominated by Poland and is part of the Bialowieza National Park. This National Park was expanded in October 1996 when the Council of Ministers approved an extension of the area to make the whole site a National Park, which covers 10,502ha. It is situated in northeast-central Poland on the border with Belarus within Podlasie Promice, 62km southeast of Bialystok and 190km northeast of Warsaw (see Map 1).

The extension area is a part of the whole Belovezhskaya Pushcha/Bialowieza Puszcza unit. It is situated on the hydrological divide between the Baltic and Black Seas and lies in the drainage basin of the river Narewka, a tributary of Narew river. The area is covered by glacial formations of Central Poland with deposits composed of deep sands, sands overlaying clays, and clays and loams overlaying the Cretaceous bedrock. Other major deposits are organogenic formations of peat and marshy peat which occur in river valleys and local depressions which often contain raised mire systems.

Climate is of the cool continental type. Snow cover persists for three months a year on average. Mean annual precipitation is 640 mm and mean annual temperature is 6.8° C.

The Bialowieza National Park is situated in the centre of Belovezhskaya Pushcha/Bialowieza Puszcza, an extensive forest complex. Bialowieza Puszcza is considered one of the best investigated forest ecosystems in the world. Over a hundred years of scientific research has been conducted here. However, most of scientific research undertaken is limited to the strict nature reserve of Bialowieza National Park. 113 different plant associations have been noted within its Polish part. 20 forest associations, four communities of water plants, two shrub communities, and 13 communities of peat bogs and meadows occur within Bialowieza National Park. All major forest associations of this part of Europe occur. Dominant tree species are spruce, hornbeam, small-leaved lime, alder, oak, Norway maple, pine, ash, birch, and aspen. Beech, sycamore, large-leaved lime, larch, and yew are absent. 277 species of lichens, 200 species of mosses, 80 species of myxomycetes, and over 3,000 species of fungi have been identified within the national park.

The proposed extension area includes forest habitats of parabolic dunes and peatbogs with oligotrophic pine forests surrounded by hornbeam-oakwoods which are considered unique in northeast Poland. Besides here, they have survived only in marginal stream valleys of Bierbza and Narew rivers.

More than 10,000 species of fauna have been observed within the Bialowieza National Park, including 120 breeding birds and 56 species of mammals. Among mammals most noteworthy are European bison, wolf, lynx, otter, beaver, and moose. The Belovezhskaya Pushcha/Bialowieza Puszcza is most well known as the nucleus of the European bison. At present, nearly 300 bisons range freely on the Polish side and 240 on the Belorussian side. Most noteworthy birds are capercaillie, black stork, crane, eagle owl, pygmy owl, spotted eagle, booted eagle, three-toed woodpecker, and white-backed woodpecker.

3. COMPARISON WITH OTHER AREAS

The Belovezhskaya Pushcha/Bialowieza National Park - Extension Area (BPE) is located in the Middle European Forest Biogeographic Province and is part of the boreonemoral forest biome (transition zone of boreal coniferous and temperate deciduous broadleaf forests). The BPE is part of the Belovezhskaya Pushcha/Bialowieza Puszcza forest complex, the largest and best preserved lowland forest in Europe and is within the enlargement of Bialowieza National Park which occurred in 1996 (10,502ha). Within the palearctic realm six World Heritage sites with temperate forests exist - Pirin National Park/Bulgaria (40,060ha), Huanglong Scenic and Historic Interest Area/China (72,000ha), Huangshan/China (15,400ha), Taishan/China (25,000ha), Plitvice Lakes National Park/Croatia (19,200ha), and Durmitor National Park/Yugoslavia (32,000ha). The BNE shares no similarities with the sites listed above. Similarities may be better found in other reserves of Belarus and the Russian Federation like Berezinskiy Strict Nature Reserve/Belarus (76,201ha), Chavash Varmane National Park/Russian Federation (25,199ha), Khvalynsky National Park/Russian Federation (25,514ha), Marii Chodra National Park/Russian Federation (36,593ha), Nizhnyaya Kama National Park/Russian Federation (25,848ha), Samarskaya Luka National Park/Russian Federation (127,186ha), and Smolny National Park/Russian Federation (36,482ha). However, those areas are smaller in size and the state of preservation of old growth forests is lower than the Belovezhskaya Pushcha/Bialowieza Puszcza as a whole.

Belovezhskaya Pushcha/Bialowieza Puszcza forest complex is divided by state boundaries into a Belorussian part of about 90,000ha and a Polish part of about 60,000ha. While nearly the total Belorussian part (87,607ha) was nominated in 1992 for inclusion on the World Heritage list, the Polish part was limited to 5,316ha following the boundaries of the existing Bialowieza National Park boundaries at that time.. The extension area (5,186ha) increases the biodiversity in forest habitats of the Polish part by protecting oligotrophic pinewoods. However, those pinewoods are common on the Belorussian side of the existing World Heritage site (about one third of Belovezhskaya National Park). Native old-growth forest stands are rare and natural condition of forests in general is much lower on the extension area than in the existing World Heritage site on the Polish side.

4. INTEGRITY

All of the Belovezhskaya Pushcha/Bialowieza Puszcza forest complex is State-owned. The national park is managed by the Ministry of Environmental Protection, Natural Resources and Forestry. The extension area is legally protected under national park status since 1996 and no people live within the area. The extension area is surrounded by a buffer zone of 3,224ha in size.

In general, threats for the extension area are the same as for the national park and the Belovezhskaya Pushcha/Bialowieza Puszcza as a whole. Major threats are forest exploitation, agriculture, human impacts on the hydrological system, poisonous chemical transports, and air pollution. Within the existing World Heritage site on the Polish side 4,747ha are under strict protection without any human activities besides limited access of visitors. However, it is noted that forest management activities are not prohibited from any part of the extension area. These activities include removal of dead timber, thinning, and harvesting of seed trees. IUCN considers that forest exploitation represents a threat within the extension area itself and also in the surrounding zone. IUCN considers these activities are not compatible with potential World Heritage status.

In recognition of the unique value of the forest complex, the Ministry of Environmental Protection, Natural Resources, and Forestry has launched in 1998 'The Contract for Bialowieza Forest' with its major goal of enlarging national park boundaries to cover the whole complex in 2000. This would involve an additional extension of the National Park to cover a total area of between 58,000 and 59,000ha. However, a final decision has not been taken yet and discussions have reached a crucial point at present. It is noted that the additional extension may take a number of years as it involves sensitive issues with the local population. The implementation of this plan is anticipated to commence in July 2000.

Other threats include intensification of agriculture on the Belorussian side and activities associated with drainage. In the sixties, drainage of large areas in Belarus caused a significant decrease of groundwater level causing decline of some tree species. Recent plans for new drainage activities in Belarus could impair the sensitive forest ecosystem once more. The Siemianowka water reservoir on Narew river has also been noted as a potentially serious impact to the natural integrity of the hydrological system. However, investigations on impacts of this reservoir are just under way and it is not possible at this time to draw well-founded conclusions. Concerns also exist about poisonous chemical transport on a railway line crossing the forest complex for 9km on its northwestern end, 8km from the national park boundary.

The importance of managing the Belovezhskaya Pushcha/Bialowieza Puszcza forest complex as one integrated unit should be emphasised. The creation of this site as the first transboundary World Heritage site in 1992 was an important step to achieve this integrated management. However, expansion of the boundaries of Bialowieza National Park is considered necessary to ensure effective management of species and threats over the whole forest complex. The previously mentioned initiative by the Ministry of Environmental Protection, Natural Resources, and Forestry regarding "The Contract for Bialowieza Forest" is an important initiative which should be supported, particularly its major goal of inclusion of the whole forest complex under national park status. IUCN applauds the decision to allocate resources to realise this plan by the Ministry. Aside from scientific and ecological reasons, the enlargement provides the opportunity for all settlements in the surroundings of Bialowieza Puszcza to participate in touristic income sources which are limited now to the Bialowieza village only.

A management plan for the Bialowieza National Park is under preparation and will be ready in 2002. This applies to the whole area of the National Park, plus the planned additional extension. In terms of budget and equipment, the site appears to have adequate resources at present.

5. ADDITIONAL COMMENTS

5.1. Cultural Values

The IUCN review mission noted cultural features within the extension area, specifically the (48ha) Palace Park, a park designed in English style from the end of the 19th century with a set of buildings dating back to 1,845 and representing hunting architecture of the tsar period.

6. EVALUATION

Belovezhskaya Pushcha/Bialowieza Puszcza (150,000ha) has remained the largest and best preserved unit of mixed lowland forests in Europe divided by state boundary into a Belorussian (90,000ha) and a Polish part (60,000ha). While in Belarus nearly all forests of the complex have been designated as a national park (87,607ha) and became part of the first transboundary World Heritage site (92,923ha), a high level of protection by national park status in Poland has been limited to 5,316ha. In 1996 Bialowieza National Park has been extended to 10,502ha. The extension area (5,186ha) is nominated to become part of the World Heritage site.

Following field investigations, IUCN notes that the extension area provides an important contribution to biodiversity of the Polish part of existing World Heritage site, in particular by inclusion of oligotrophic pinewoods. However, oligotrophic pinewoods are quite common on the Belorussian part of the site (about 30% of forest cover) and therefore, this is not significant for the existing World Heritage site as a whole. Additionally, the natural condition of forests within the extension area is less than that within the existing World Heritage site on the Polish side. Within the extension area forest stands with high degree of human impacts are common and native old-growth stands are rare. No part of the enlargement is currently subject to strict prohibition of human activities by law. Thus, it is considered that the extension area is not significant enough by itself to warrant inclusion within the World Heritage site at this stage. Also, the conditions of integrity are not considered sufficient to warrant World Heritage status at this time.

Nevertheless, proposals by the Polish Government to expand the existing Bialowieza National Park are to be applauded, and to be encouraged at all levels.

7. RECOMMENDATIONS

The extension area not be included within the existing World Heritage site.

It is suggested that the Bureau outline its support for the Polish Government initiative for expansion of the existing Bialowieza National Park to give legal protection to the whole unit. IUCN notes that: (a) if this expansion occurs; and (b) if the standards of protection which apply within the existing World Heritage site apply to the expansion area, then it recommends that a new nomination proposal, enclosing the whole Polish part of the Belovezhskaya Puscha/Bialowieza Puszcza, should be nominated by the State Party.

**B. NOMINATIONS OF MIXED PROPERTIES TO THE
WORLD HERITAGE LIST**

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

MOUNT WUYI (CHINA)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet** (4 References).
- ii) **Additional Literature Consulted:** State Environmental Protection Administration. 1998. **China's Biodiversity: a country study**. Beijing; Hideo Tagawa and Mitsuru Hotta. ed. 1997. **Co-existence of the World Humid Evergreen Forest Ecosystems and People**. in *Tropics* 6(4); Chen Changdu. 1999. **On the position of Wuyishan Mountain in the biodiversity conservation of China**. Peking University, 3/1999.
- iii) **Consultations:** 4 external reviewers, Peking University, Beijing, local scientific and cultural experts of Fujian Province.
- iv) **Field visit:** March-April, 1999. Les F. Molloy.

2. SUMMARY OF NATURAL VALUES

Mount Wuyi lies along the north-western boundary of Fujian Province (with Jiangxi Province) in south-eastern China. They form the watershed between tributaries of the lower Yangtze Kiang to the north, and the Min River system of Fujian to the south. Mount Wuyi is heavily forested, with steep slopes and deep gorges. The range is the highest in south-east China and is sometimes referred to as "The Roof of Eastern China". The highest peak, Mt. Huanggang, is 2,158m and there are more than 110 other peaks higher than 1,000m.

Mount Wuyi lies along latitudes 27-28° N and, because they are only 250km from the East China Sea, they have a warm, wet and foggy climate subject to the monsoonal influence. The annual precipitation varies little throughout the site, ranging from 2,200mm in the SW to 3,200mm in the NE around Mt. Huanggang. Although Mount Wuyi lies within the subtropical climatic zone, snow can lie for up to one month in winter in the mountain meadowlands above 1,800m.

The site nominated covers an area of just under 100,000ha, consisting of four sectors (the first three being contiguous, see Map):

- ◆ A western Biodiversity Protection Area (63,575ha);
- ◆ A central Ecological Protection Area around the middle gorges of the Nine-Bend Stream;
- ◆ An eastern Scenic Protection Area (both natural and cultural) around the spectacular lower gorge of Nine-Bend Stream. (Zones 2 & 3 together total 36,400ha); and
- ◆ A separate area of 48ha, about 15km to the south-east, protecting the remains of the ancient city of the MinYue people who were assimilated into the Han empire.

In addition, there is a buffer zone of 27,888ha around the entire site.

The spectacular landforms in the eastern scenic area around the Nine-Bend stream gorge are isolated, sheer-sided monoliths of the local red sandstone. They dominate the skyline for a tortuous 10km section of the river (which has high water quality), standing 200-400m above the riverbed. The landscape has been formed by water cutting down through rectangular jointing in the sandstone, and periodic gravity collapse of huge blocks. It is a geomorphology which contains a lot of overhangs and caves, hence their use by the ancient Min and Yue people for burials in suspended 'boat coffins'.

The rocks of the western peaks are more volcanic or plutonic, with peaks above 1,500m consisting of hard tuffaceous lavas, rhyolite and granite. This area is bisected by a pronounced north-east/south-west fault, which is followed by the headwaters of Nine-Bend Stream. Access to this virtually uninhabited core biodiversity zone is difficult and is strictly controlled. A former military road gives four wheel drive access to Mt Huanggang and there are a small number of walking tracks. Otherwise the core area of nearly 60,000ha of the biodiversity protection zone is unmodified – probably the largest intact wilderness in southeast China.

Mount Wuyi has long been recognised as a centre of biodiversity in China. Since the famous English botanist R. Fortune visited Mount Wuyi to collect specimens in 1845, the mountains have attracted dozens of scientists from within China, Europe and the USA. Type specimens number close to 1,000 and most were collected from the Guadun and Dazhulan localities within the heart of the core area; most of these are now held in international museums, in London, Berlin, New York and Honolulu. The original Nature Reserve was designated in April 1979, then recognised as a key national Nature Reserve by the Chinese State Council in July 1979, and accepted as a MAB Biosphere Reserve by UNESCO in 1987. According to the recently-published, national strategic document, "*China's Biodiversity: a country study*", it is considered to be one of the 11 critical regions for biodiversity conservation in China – and the only one in south-eastern China. Its importance stems from its geographic location and climate, making it a mid-subtropical mixing zone between the temperate biotas to the north and the tropical to the south. Mount Wuyi is characterised by high species richness and many endemic species.

Within the western core lies the largest (30,000ha), intact mid-subtropical pristine forest in China. Five broad altitudinal vegetation belts are recognised, from evergreen broadleaf forest on red soils at 350m, to mountain meadow grassland (on mountain meadow soils) at 1,700-2,100m. However, these can be further broken down into 53 discrete plant associations. A total of 3,728 different plant species have been found, of which 2,888 are higher plants – including 282 fern species (85 genera), 25 gymnosperm species (18 genera) and 2,222 angiosperms (812 genera). The richest plant biodiversity is in the evergreen broadleaf forest type. The diversity of bamboo forest associations (14) and the number of orchids (78 species in 32 genera) are also noteworthy features. Within this flora there are 48 recognised plants endemic to Mount Wuyi, most of them ferns and bamboo.

Because of the wide variety of geological and geomorphological niches, microclimates, and the lack of any significant impact of the Pleistocene glaciations, Mount Wuyi has become a refuge for ancient and relic plants which are very rare elsewhere in China. The foremost is the endemic maidenhair tree, (the only member of its family), as well as many other rare gymnosperms and notable angiosperms. In addition, the importance of Mount Wuyi as a plant refuge is indicated by the large number of families present which contain only one (or very few) members, and the presence of a number of ancient families such as the Magnoliaceae, Illiciaceae, Lardizabalaceae, and Schisandraceae.

Mount Wuyi is even more famous for its fauna. To date 475 vertebrate animal species have been identified, including 71 mammals, 256 birds, 73 reptiles, 40 fishes, and 35 amphibians. Of these vertebrates, 49 are endemic to China, including the near-extinct Chinese tiger. Other rare animals are the clouded leopard, and three vertebrates endemic to Mount Wuyi – the 'horned toad' and another amphibian, and the bird David's Parrotbill. Mount Wuyi is also an important site for migratory birds and over 100 are protected under the Sino-Japanese and Sino-Australian agreements. A total of 143

species are under some form of State protection order (with 11 under 1st class protection) and 46 are listed under CITES.

The region is also renowned for its insect fauna, with 4,560 species identified to date. Estimates of the total number of insect species range from 10,000 to 20,000. In particular, Mount Wuyi is acknowledged as having an internationally outstanding amphibian, reptile and insect fauna.

3. COMPARISON WITH OTHER NATURAL AREAS

The nomination considers Mount Wuyi to be the best example of a tract of humid subtropical forest in China. Arguably, the most extensive remaining humid subtropical forests in the world are in southern China, between latitude 30° N and the Tropic of Cancer. Comparisons are difficult with other parts of the world because of climatic and floristic differences. At these latitudes (24-30° N) throughout most of the Northern Hemisphere, the prevailing biomes are deserts and high mountains. Comparable humid subtropical climatic environments (and the potential for subtropical evergreen broadleaf forests) can only be found in Florida, the foothills of the Himalaya and northern Myanmar, and the islands of Taiwan and southern Japan. Generally, these forests, on the mid-altitude slopes, are all dominated by trees from the Fagaceae, Lauraceae, Theaceae, Magnoliaceae, Elaeocarpaceae, and Hamamelidaceae, etc, while at higher altitudes this merges into a distinctive ‘cloud forest’ of Ericaceae and conifers of the Pinaceae, Taxodiaceae, Taxaceae and Cupressaceae families.

Within China, there are three other forested natural sites on the World Heritage list – Huangshan, Wulingyuan (now locally referred to as ‘Zhangjiajie’ after the name change of the locality) and Mt Emei – all lying within this broad subtropical climatic zone of the Palaearctic Realm. Wulingyuan site was only listed on scenic grounds but both Huangshan and Mt Emei qualified because of their biodiversity values [criterion (iv)]. Like Mount Wuyi, Huangshan and Mt Emei sites have a wide altitudinal range of vegetation; Huangshan is lower, while Mt Emei is nearly 1,000m higher than Mt Huanggang in Mount Wuyi. In terms of Udvardy Biogeographical Provinces, both Wulingyuan and Huangshan lie within the Oriental Deciduous Forest and Mt Emei spans both the Oriental Deciduous Forest and Chinese Subtropical Forest. Mount Wuyi, however, is on the border between both the Chinese Subtropical Forest and the South Chinese Rainforest. Mount Wuyi, therefore, has many of the biogeographic features of the Indomalayan Realm – it is warmer, wetter and has more tropical elements in its biota.

A comparison of the biodiversity of the three sites – Mount Wuyi, Huangshan and Mt Emei – indicates the pre-eminence of Mount Wuyi. Both Mount Wuyi and Mt Emei have an outstanding number of different plant species (3,600-3,700), each about 250% more than Huangshan. But it is in the number and variety of animals that Mount Wuyi stands out above the other two sites. The table in Figure 1 below shows that Mount Wuyi and Mt Emei have similar numbers of species of birds and amphibians, but Mount Wuyi has less fish, more mammals and more than twice the number of reptile species. The insect fauna of Mount Wuyi far surpasses that of Mt Emei in number (and variety) of species.

The WCMC protected area data base lists nearly 200 other protected areas within the South Chinese Rainforest and Chinese Subtropical Forest biogeographic provinces. Eight of them (in addition to Mount Wuyi) are larger than 55,000ha. but none of these are considered to have the biodiversity values of Mount Wuyi.

World Heritage (natural) site	Area (ha)	Total vertebrates	Mammals	Birds	Reptiles	Amphibians	Fish	Insects
Mount Wuyi	99,975	475	71	256	73	35	40	4,560
Mount Emei and Leshan	15,400	434	51	256	34	33	60	c.1,000
Mount Huangshan	15,400	300	48	170	38	20	24	n.r.
Yakushima (Japan)	10,747	n.r.	16	150	15	8	n.r.	1,900

n.r. = not reported

Figure 1. Numbers of animal species, comparing Mount Wuyi with other East Asian World Heritage sites

The only other comparable East Asian site on the World Heritage list is the island of Yakushima at 30° N in southern Japan, within the Japanese Evergreen Forest biogeographic province. Yakushima has just as wide an altitudinal range of forest (sea level to almost 2,000m) but the site is much smaller and does not have the robust shape of Mount Wuyi. However, Yakushima is a much wetter site (up to 10,000mm around the summits) and it has more of a warm temperate character (as opposed to subtropical). Yakushima is listed under criteria (ii) and (iii), but not criterion (iv); reference to Fig.1 illustrates that Yakushima has much lower total biodiversity (as befits a small island) although there are many other outstanding features to its flora.

4. INTEGRITY

One of the strengths of the nomination is its high level of ecological and landscape integrity (and on-going scientific research), and its long history of management as a protected area.

The positive integrity features are as follows:

- ◆ large size (c.100,000ha) with a diverse range of peak and valley landforms. [Fig. 1 shows the large size of Mount Wuyi relative to the limited size of the comparable existing World Heritage sites];
- ◆ the protected area lies within one provincial administration (Fujian);
- ◆ the site has an effective buffer zone;
- ◆ there are few inhabitants in the core zone (60,000ha); the 22,700 inhabitants in Mount Wuyi are scattered through 14 villages primarily in the ‘ecological protection’ and ‘scenic & cultural protection’ planning zones;
- ◆ the site has had a strict protective status since 1979, but prior to that provincial and central governments had issued protective edicts over the area for more than 1,000 years. The first edict banning forest-felling and fishing was made in the year 748 AD of the Tang Dynasty. In addition, 13 of the 450 historic rock inscriptions along the lower gorge of the Nine-Bend River exhort visitors and occupants to protect Nature; and

- ◆ a history of comprehensive management planning, beginning with the 1986 master plan for the scenic and historic areas, followed by the 1995 protection plan for the Chengcun Han Dynasty city, and in February 1998 the management plan for the nature reserve (biodiversity protection zone), produced with the support of the Global Environment Facility (GEF).

5. ADDITIONAL COMMENTS

5.1. Biosphere Reserve

The Biosphere Reserve status of the ‘biodiversity protection’ sector of the site for the past 12 years has meant that a great deal of scientific information has been able to be assembled for the nomination. On-going research is being assisted with finance from the GEF. There is a scientific museum at Sangang village in the heart of the protection zone, where the MAB research work is outlined and a comprehensive range of specimens are displayed to illustrate Mount Wuyi’s biodiversity.

5.2. Visitor issues

Mount Wuyi is very fortunate in that it does not yet (and may not) suffer the acute pressures of visitors now afflicting many natural sites in China, such as Taishan, Wulingyuan and Jiuzhaigou. Nevertheless, visitor numbers have increased to around 700,000 per annum. Of these, 300,000 annually raft down the Nine-Bend River gorge and another 120,000 visit the ‘Thread of Sky’ caves close by in the scenic zone. Visitor access to the biodiversity protection core (beyond Sangang village) is strictly controlled.

The rafting operation is very professionally controlled through a booking system and strict environmental codes. Up to 1,000 visitors daily are carried through the 10km stretch of the river, in raft relays, without congestion, noise, or water/air pollution.

There is no hotel accommodation within the site and it is the intention of site management to keep all such infrastructure in the ‘tourist service area’ outside.

5.3. Cultural landscape

IUCN’s comments on the site as a potential cultural landscape have been submitted to ICOMOS.

6. APPLICATION OF WORLD HERITAGE CRITERIA

Mount Wuyi site is nominated under criteria (ii), (iii) and (iv). Most of the documentation in the nomination document relates to the latter two criteria.

Criterion (ii): Ecological processes

There is evidence of species differentiation but, considering the fact that Mount Wuyi escaped the rejuvenating effects of the last glaciation, it is surprising that there is not more evidence presented of on-going biological evolution. IUCN considers that the site does not meet criterion (ii).

Criterion (iii): Superlative natural phenomena, scenic beauty

The case for criterion (iii) is also strong with respect to the features in the eastern scenic zone, especially the riverine landscape of Nine-Bend Stream (lower gorge). Rugged rock monoliths are a feature of other natural sites, such as Wulingyuan and Huangshan, but Mount Wuyi is exceptional in its juxtaposition of smooth rock cliffs with clear, deep water. The ancient cliff tracks are an important

dimension of the site, allowing the visitor to get a 'birds-eye-view' of the river that they are travelling down. IUCN considers that the site meets criterion (iii).

Criterion (iv): Biodiversity and threatened species

The biodiversity case made out for listing under criterion (iv) is the strongest. In essence (not withstanding Mt Emei), Mount Wuyi is the first natural Chinese site to be nominated on its biodiversity values, as much as its scenic values. The evidence points to Mount Wuyi being the outstanding biodiversity conservation site in south-east China and one of the outstanding subtropical forests in the world. Its floral importance is twofold:

- ◆ it is the largest, most representative example of a largely-intact forest encompassing the diversity of the Chinese Subtropical Forest and the South Chinese Rainforest; and
- ◆ it is a refuge for a large number of ancient, relict species, many of them endemic to China. Many of these plants are now very rare elsewhere in China.

Furthermore, in comparison with other Chinese (and East Asian) sites, its fauna show greater diversity in numbers of species and especially in the number and nature of its reptiles, amphibians and insects. IUCN considers that the site meets criterion (iv).

7. RECOMMENDATION

At its twenty-third ordinary session, the Bureau recommended that the World Heritage Committee **inscribe** Mount Wuyi under natural criteria (iii) and (iv).

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ISOLE EOLIE (AEOLIAN ISLANDS) (ITALY)

1. DOCUMENTATION

- i) **IUCN/WCMC Datasheets:** nil
- ii) **Additional Literature Consulted:** **Volcanoes of the World.** Smithsonian, Simkin T. et al., 1981. **Volcanoes: A Planetary Perspective.** OUP, Bullard F.M. 1973. **Guida Naturalistica alle Isole Eolie.** P. Lo Cassio ed. E. Navarra, L'Epos, Palermo, 1997. **Isole Eolie: Vulcanologia, Archeologia.** Milano, Oreste Rogusi, L. Brea e M. Cavalier. 1991. **Confirmed breeding of the storm petrel in the Aeolian Islands (Italy).** Naturalista Sicil., Anon. 1994. **Amphibians and reptiles of the circumsicilian islands: new data and some considerations.** Boll. Mus. Reg. Sci. Nat. Torino, C. Corti et al., 1997. **Guida Excursionistico Vulcanologica delle Isole Eolie.** Centro Studi e Ricerche de Storia e Problemi Eoliani, N. Calanchi et al., 1996. **Guida Alla Natura della Sicilia,** WWF, Milan, F. Pratesi e F. Tassi, 1974.
- iii) **Consultations:** 7 external reviewers. Officials of the Ministry of Cultural Property and Environment (Rome), Cultural Property and Environment (Province of Messina). Mayors of Lipari, Sindaco, Sant Marina di Silina, Sindaco, and Malfa. Provincial level management staff and field staff. Specialists in vulcanology and biology.
- iv) **Field Visit:** February-March 1999. Lawrence Hamilton, Ray Bondin (ICOMOS).

2. SUMMARY OF NATURAL VALUES

The Isole Eolie (Aeolian Islands) are located less than 40km off the northern coast of Sicily (see Map 1). The group consists of seven islands (Lipari, Vulcano, Salina, Stromboli, Filicudi, Alicudi and Panarea) and five small islets (Basiluzzo, Dattilo, Lisca Nera, Bottaro and Lisca Bianca) in the vicinity of Panarea. The total area of the Aeolian Islands is 1,216km². The islands range in size from Panarea which is 34km² to Lipari which is 376km².

The original nomination included the islands in their entirety, however, this has been changed following referral back to the State Party after the July 1999 Bureau meeting. The Bureau specifically requested the State Party to provide additional information and to address the exclusion of human use areas and to propose more sharply defined boundaries for the nature reserves and buffer zones. The revised nomination encompasses Zone A areas (nature reserves) being those areas of greatest scientific importance and Zone B areas being surrounding natural areas (see Map 2a-2c). Zone C areas are not included in the nomination, however, for the most part act as predominantly human modified landscape buffer zones to Zone A and B areas.

The islands' volcanic landforms represent classic features in the continuing study of vulcanology world-wide. With their scientific study from at least the 18th Century, the islands have provided two of the types of eruptions (Vulcanian and Strombolian) to vulcanology and geology textbooks and so have featured prominently in the education of all geoscientists for over 200 years. They continue to provide a rich field for vulcanological studies, as significant on-going geological processes in the development

of landforms. The nominated site provides an interrelated set of volcanic features and phenomena, as noted in Section 44 (b) (i) of the Operational Guidelines for the Implementation of the World Heritage Convention.

The revised nomination material provides additional information on the islands' biota. Information on the faunal characteristics of the archipelago has been made available with indications of levels of endemism. It was also noted on the evaluation mission that floral and faunal recovery seem to be occurring following past land-use, including terracing for wheat and olive cultivation. Some rare plants, lizards and insects are returning to the islands. Bird colonies are increasing also, now that hunting has been largely controlled. Additional information on flora has also been provided with species lists for each island and indications of levels of endemism and protection for threatened plants.

The cultural properties of the nomination, mainly buildings, have been evaluated separately by ICOMOS. The recommendation from ICOMOS was that the site did not meet cultural World Heritage criteria. However, in the proposed nature reserves there is considerable evidence of ancient land use, particularly stone-walled terraces, many of which were maintained until the depopulation of the islands during the late 19th and early 20th centuries.

3. COMPARISON WITH OTHER AREAS

By various counting methods there are at least 454 active volcanoes in the world (Bullard, 1973) or as many as 1343 (over the past 10,000 years) as tallied by the Smithsonian Institution (Simkin, 1981). The majority of the world's active volcanoes are found in the "Pacific Rim of Fire" that extends around the Pacific Ocean.

There are at least 22 island or portions of islands now inscribed on the World Heritage List. There are several active or dormant volcanoes located in World Heritage sites such as Sangay National Park, Virunga National Park, Kilimanjaro National Park, Tongariro National Park, Hawaii Volcanoes National Park, Galapagos Islands, Morne Trois Pitons National Park, Kamchatka Volcanoes, Mount Kenya National Park/Natural Forest, and Heard and McDonald Islands. Heard and McDonald are volcanic islands, as is Hawaii Volcanoes, and the Galapagos are a volcanic archipelago of islands very much like the Aeolian Islands. However, the Aeolian Islands gave their name to two recognised types of eruptions and are among the earliest ever studied and documented. Perhaps the principal distinguishing value of the Aeolians lies in the diversity of "textbook" volcanic features located within such a compact area and their history and on-going role as a field laboratory for the study of vulcanology. Comments from expert reviewers note the significance and importance of the nominated site for vulcanology. The twenty third (23rd) World Heritage Bureau meeting (July, 1999) noted that this site has the potential to meet World Heritage natural criterion (i).

There are other existing World Heritage sites in the Udvardy Mediterranean Sclerophyll Biogeographic Province: Mount Athos (Greece), Meteora (Greece), Ichkeul National Park (Tunisia), Doñana National Park (Spain), and Cape Girolata, Cape Porto, Scandola Nature Reserve and the Piana Calanches in Corsica (France). The maquis vegetation biome, within this biogeographic province, and associated fauna, are not well represented in the World Heritage List. On the Aeolian Islands the release of large areas from anthropogenic pressure (except low-level grazing) has permitted native vegetation and some native fauna to return, however, these elements do not provide a solid case to differentiate this site from other volcanic sites already on the World Heritage list.

4. INTEGRITY

The integrity of the proposed listing is strengthened by the revised boundaries and the exclusion of developed areas. The planned reserves are mainly the upper volcanic cones and the steep lands plunging to the sea. The field evaluation noted that almost all reserves (Zone A) were free from modern human structures and uses, except for grazing, and some park structures in the existing

Reserve of Mount Felci and Porri on Salina. In general, these areas are free from human disturbance due to either volcanic risk or very steep, rough slopes. Zone B areas show some development problems. For example, "modern" urban type housing already occurs within the areas proposed as B Zones.

While most of the delineated Zone A and B areas are only planned, Reserva Naturale "La Montagne delli Felci e dei Porri" on Salina is a statutory reserve, created by the Region of Palermo in 1984 and has a small protection staff. This reserve consists of the upper reaches of two volcanic hills covering roughly 278ha. Unfortunately Felci has been planted with alien tree species, such as pine and eucalyptus, seriously affecting the recovery of native species. The small islands of Alicudi (278ha.), Panarea (154ha.), Filicudi (562ha.) and Stromboli (718ha.), plus their islets, have been designated Nature Reserves under Regional law, however, there are no reserve staff on any of them and no administration on Alicudi or Filicudi. Vulcano and Lipari do not apparently have any legally defined reserves. On both, there is a substantial amount of urban and suburban development in the proposed Zone B, and some also in the proposed Zone A areas.

The Vulcanology Museum located in the Acropolis of Lipari, although still under development, provides an impressive educational and interpretive adjunct to the understanding of the volcanics of the islands. The maintenance and development of this facility would be essential and central to the value of any World Heritage listing.

No consolidated management plans exist for natural areas on the islands. However, there is a general regulatory plan for the four local communes (Lipari, Santa Marina Salina, Malfa and Leni) which aims to control further haphazard development. The additional information on biota also provides some indication of biodiversity values and threats. Issues of fragmentation, convoluted boundaries, and poor perimeter/area ratios can impact on natural values limiting the capacity for effective management. These issues stress the need for effective integrated management plans.

IUCN suggests there are a number of activities which could help develop the heritage significance of the area, including:

- ◆ development of museum facilities, including support of the current museum project. It is noted that, except for the excellent museum displays in the town of Lipari, there is currently limited interpretation on site or near site and it is recommended that more attention be given to this aspect;
- ◆ inclusion of professional geological input in published books and maps, and for the planning of tourist trips, and also for the education and training of tourist guides, and general publicity about the volcanic heritage of the Islands;
- ◆ development of a regular series of on-site conferences to build up information for the use of visitors to this area; and
- ◆ the development of a volcanic trail (a concept being used in the young volcanic area of western Victoria, Australia).

5. ADDITIONAL COMMENTS

Marine reserves and the presence of coral reefs are not mentioned in any of the documentation notwithstanding the islands being strongly oriented to coastal tourism.

At its Twenty-second ordinary session, the Bureau noted that the site has potential to meet natural criterion (i). The Bureau decided to refer the nomination back to allow the State Party to provide

additional information and to address the exclusion of human use areas to propose more sharply defined boundaries for the Nature Reserves and buffer zones.

The information requested was provided by the State party and reviewed by IUCN.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

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

The merit of the nomination rests upon the Aeolian Islands being an outstanding record of volcanic island building and destruction, the ongoing volcanic phenomenon, and the influence that vulcanism has had on the culture and peoples of these islands. Moreover, their activity and influence is in evidence today, with the active volcano of Stromboli and the continuing threat of Vulcan (and Vulcanello). The seven islands are in a volcanic arc or archipelago, much like the Hawaiian Islands. They offer in relatively small geographic space a model on a small scale of the story of volcanoes. They are well studied and monitored and have international significance in the study of vulcanology.

IUCN considers that the Aeolian Islands nomination possesses outstanding universal value within the meaning of criterion (i).

Criterion (ii): Ecological processes

The nomination does not directly address this criterion. It is noted that the Aeolian Islands have a long history of land use, and subsequent abandonment, which has led to an on-going processes of maquis recovery.

IUCN considers that the Aeolian Islands nomination does not meet this criterion.

Criterion (iii): Superlative natural phenomena, scenic beauty

The nomination does not directly address this criterion, though the still-active vulcanism, especially in Stromboli, is an interesting natural phenomenon. Though the juxtaposition of volcanic topography and seascape is very scenic, unsightly "modern" development, including visible solid waste dumps, mining activity, housing, small businesses, and infrastructure, impacts negatively on the setting of the volcanic and natural features.

IUCN considers that the Aeolian Islands nomination does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

Mediterranean climatic areas of the world are regionally important for their high plant diversity, high number of rare taxa, and high endemism. The Mediterranean basin suffers from prolonged human impact, and consequently many species of both flora and fauna are rare or threatened. The nomination provides evidence of the important contribution these islands make toward the conservation of biodiversity in the Mediterranean basin, however, this is considered a secondary value to the vulcanism.

IUCN considers that the Aeolian Islands nomination does not meet this criterion.

7. RECOMMENDATION

It is recommended that the Aeolian Islands, comprising zones A and B in the revised nomination from the State Party, be **inscribed** on the World Heritage List under criterion (i). The revised nomination

submitted by the State Party is more complete and presents a strong case for inscription based on volcanic values and also addresses issues relating to the boundary of the nomination.

However, IUCN notes some concerns in relation to the long term integrity of the site and recommends that the Committee urge the State Party to expedite formal legal protection for the nominated area and develop an integrated management plan for the area to ensure effective management of World Heritage values. The Committee may wish to request the State Party to report back in one year time in relation to progress with these issues.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

UVS NUUR BASIN (MONGOLIA / RUSSIAN FEDERATION)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:**
- ii) **Additional literature consulted:** Dompke, S. & Succow, M. 1998. **Cultural Landscapes and Nature Conservation in northern Eurasia**, NABU/AID Environment/Nature Conservation Bureau, Bonn. 330pp.; Henwood, W.D., 1998. An overview of Protected Areas in the Temperate Grassland Biome, **PARKS Vol. 8, No. 3**. 3-8; IUCN, 1994. **Protecting Nature: regional reviews of protected areas**, Ed. McNeely, J.A., Harrison, J., Dingwall, P., p.13; Ministry for Nature and the Environment of Mongolia, 1998; Biological Diversity in Mongolia. MNEM/UNDP/Regional Bureau for Asia & Pacific, Ulaanbaator. 106pp. Ministry for Nature and the Environment of Mongolia, 1996. **Mongolia's Wild Heritage**. MNEM/UNDP-GEF/WWF, Ulaanbaator, 42pp. UNESCO/Mongolian Ministry of Enlightenment, 1997. Mongolian Tentative List: Cultural & Natural Heritage. World Heritage Centre, 53pp. USSR Academy of Sciences, 1991. **Uvs Nuur Hollow: an unique test region for Biospherical Research**. Pushchino, 47pp. Russian Academy of Sciences (Siberian Division), 1993. Experiment Uvs Nuur. Pushchino, 432pp. Russian Academy of Sciences (Siberian Branch), 1994. **Uvs Nuur Hollow World**. 156pp.
- iii) **Consultations:** 2 external reviewers; relevant officials from government and non-government organisations in Mongolia and Republic of Tuva (Russian Federation).
- iv) **Field Visits:** J. Thorsell & Y. Badenkoy, June 1996 (Tuva section only); L.F. Molloy, August 1999 (Tuva and Mongolia).

2. SUMMARY OF NATURAL VALUES

The nominated site is the northern-most of the enclosed basins of Central Asia, lying between latitudes 49-51 degrees N and longitudes 91-99 E. The basin is enclosed on the north (Tuva) by the Tannu Ola Range and the Sangilen Mountains in the north-east (2,600-3,200m); the Tannu Ola Range marks the northern limits of Central Asia, for its northern slopes drain to one of the major rivers of Siberia, the Yenisey, which runs directly north for 3,000km from Tuva to empty into the Arctic Ocean. In the west, the basin is bounded by outliers from the Mongolian Altai – the glaciated Tsagan Shuvuut - Turgen Uul ranges, extending from Mongun Taiga (3,976m) in Tuva south to Turgen (3,955m) and Harkhiraa (4,057m) in western Mongolia. In the south, the Khan Khohiy Range (2,300-2,900m) extends along the full length of the main drainage system, the Tes-Khem River. Estimates of the size of the basin vary (because of the complex topography) but is considered to be in the range of 7.5 million hectares (5,400,000ha in Mongolia; 2,160,000ha in Tuva).

At the bottom of the basin lies Uvs Nuur (759m a.s.l), the large, roughly-circular lake (60-70km in diameter) from which the site takes its name. The main feeder to Uvs Nuur is the Tes-Khem River, which has its source in a fresh-water lake, Sangyn Dalai Nuur, in the alpine meadows and larch forests of the Sangilen uplands at the eastern extremity of the basin (in Mongolia). The Tes-Khem then flows 500km westwards, through steppe and desert, into southern Tuva, and then back into

Mongolia, before emptying into Uvs Nuur. For its last 100km, the river meanders through an extensive wetland complex, a green swathe in an otherwise semi-desert landscape; its delta is nearly 40km wide and is an important wildlife habitat. Uvs Nuur itself is by far the largest (335,000ha) of 7 lakes larger than 5,000ha within the basin. Uvs is relatively shallow (10-20m depth) and very saline (18g salts/l) and alkaline (pH 9.0). In all, the lakes display a range of hydrological character, water quality and biomass productivity; like Uvs Nuur, some of them have no surface outlet and those with the lowest level of dissolved minerals (such as Tere-Khol) are fed by springs from the surrounding dunelands. Uvs is the 'sea' of western Mongolia; it is so wide that the other side is often not visible, and it is frequented by a range of seabirds, even though the nearest ocean is 3,000km away.

The climate of the basin is sharply continental. The basin is in the rain-shadow of the Tannu Ola Range, which shelters it from the prevailing moisture-bearing north-westerly winds from Siberia. This is a significant bioclimatic transition, where the south Siberian taiga gives way to the deserts and steppes of Central Asia. The Uvs Nuur basin has an extraordinary temperature range; the lowest winter temperature in western Mongolia (-58° C) has been recorded here but summer temperatures can rise to 40° C. Because of the sharp topographic and climatic gradients, the basin contains representative samples of seven continental ecosystems.

Within the site there are 9 strictly protected areas (5 in Tuva; 4 in Mongolia) with a total area of 805,400ha, representing the main ecosystems. The 5 Tuvan 'cluster reserves' constitute the 'Uvs Nuur zapovednik'; four of them are grouped around the protected area administrative centre of Erzin and cover the taiga/steppe/desert (and 'desert lake') systems. The fifth Tuvan strictly protected area, Mongun Taiga (core 940ha, buffer 99,460ha), is in the extreme west and protects the Mongun Taiga massif, with its glaciers and tundra/alpine meadow landscapes.

Two of the Mongolian protected areas, Turgen Uul and Tsagaan Shuvuut, also lie in the western mountains. Together with Mongun Taiga, they effectively encircle the second-largest lake in the site, Ureg Nuur, which nestles in a mountain steppe basin at 1450m (and also has no surface outlet). Studies in the two Mongolian protected areas have shown the presence of 173 bird and 41 mammal species within their boundaries. Both are important habitats for the endangered Snow Leopard and there is active research into the conservation of this species. Other important mammals are large herbivores such as the Asiatic ibex, argali mountain sheep, wild boar, red deer and musk deer and the Mongolian and black-tailed gazelle; predators include: wolf, red fox, lynx, polecats and weasels, and many different kites, falcons, eagles and vultures. Monitoring of large mammals in the two protected areas indicated that Turgen Uul contains around 7,000 ibex and 200 argali, while Tsagaan Shuvuut probably holds 2,000 ibex and 800 argali.

Within the ecologically-diverse Uvs Nuur site, some 359 bird species have been recorded. Many of these are of international importance, including: Dalmatian pelican, red-crowned crane, Siberian crane, Houbara bustard, Asian dowitcher, relict gull, white-tailed sea eagle, and black griffon. Some of the migrating birds that use Uvs Nuur as a temporary habitat are rare: Bewick's swan, lesser white-fronted goose, red-breasted goose, and the Baikal teal. There are 81 resident rare and endangered bird species found within the wider Uvs Nuur basin, including the Eurasian spoonbill (more than 100 pairs breed around the lake), black stork, relict gull, Altai ular, swan goose, bar-headed goose, shelduck, osprey and white-tailed sea eagle. Many of these are entered in the Red Book(s) of Tuva and Mongolia. The vegetation also reflects the conjunction of the Siberian and Central Asian floras, with 19 species endemic to Tuva and Mongolia, 51 relict species and 94 plant species classified as rare.

3. COMPARISONS WITH OTHER AREAS

Biogeographically, Uvs Nuur is a very diverse site but one which has a high degree of ecological integrity because it all lies within one closed catchment. Consequently, it is not valid to compare individual ecosystem components of Uvs Nuur with other similar ecosystems; instead, the whole basin needs to be compared with other closed Central Asian lake systems.

The only other listed natural World Heritage site with some of Uvs Nuur's features is the Golden Mountains of Altai (GMA) lying 400km to the WNW in the Altai Republic of the Russian Federation. The western high mountain sector of Uvs Nuur is indeed an outlier of the Altai Mountains and shares with the GMA similar glacial landforms, tundra and boreal forest vegetation, and habitats for endangered large alpine mammals, especially the Snow Leopard. However, Uvs Nuur contains much more climatic and landscape diversity than GMA; it includes this Siberian mountain element (the Altai Highlands biogeographic province) but extends right into the Central Asian steppe and desert environment.

Most of the Uvs Nuur site lies within the Mongolia-Manchurian Steppe biogeographic province which currently has less than 1% of its large area (2.6 million sq km) in protected areas (McNeely et al, 1994) – and no World Heritage sites. The steppe grasslands are one of the major biomes of Eurasia, extending from Manchuria to Hungary, but they generally have a low level of protection – a conservation problem of world-wide concern. IUCN estimate that less than 1% of the world's natural grasslands are protected (IUCN, 1994; Henwood, 1998) and the Mongolian-Manchurian Steppe province is no exception.

The most famous of Central Asia's 'inland seas' is Lop Nur and the Tarim River system within the Taklamakan Desert basin of Xinjiang (Uygur Autonomous Region) in western China. The environment of this vast basin is severely modified through human use. There are other salt lake systems in western Mongolia (in both Uvs and Hovd aimags) but they do not have the diversity of the Uvs Nuur system. Within the Arjin Mountains Nature Reserve (nestled between the Altun Shan and Kun Lun Shan of southern Xinjiang) there are two salt lake systems – Ayakkum Hu and Aqqikkol Hu – but these are at a much higher altitude and have a very different alpine desert climate. There are a number of salt lakes (such as Ebinur Hu and Manas Hu) in the Dzungarian basin of northern Xinjiang (between the Tian Shan and Altai Mountains) but neither has protected area status. Further west, in Kyrgyzstan, Lake Issyk Kul is one of the largest (slightly saline) intermontane lakes in Central Asia but it is affected by urbanisation, industrialisation and intensive agriculture in its large catchment.

It is difficult to find data on the waterfowl populations of the other lakes of Central Asia for comparison purposes. The importance of Uvs Nuur for waterfowl migrating through Central Asia is well known.

Because of its high salinity, Uvs Nuur does not carry any fish which are edible for human populations, so it has never been subject to commercial exploitation. It does, however, contain two small fish which are endemic to the salt lakes of western Mongolia. Each is considered to be a relict species from the fish that populated the lakes of large extent in western Mongolia at the close of the last glaciation of the ice age.

It is difficult to assess whether Uvs Nuur contains the best of the world's steppe landscapes without a detailed knowledge of a biome that extends across 8,000km of Eurasia. However, virtually all the steppe landscapes of eastern Europe, the Ukraine, the central Russia uplands of the Don and Volga, Kazakstan, the western Siberian plain and Manchuria have been significantly modified – by arable agriculture and industrial development.

In conclusion, Uvs Nuur basin contains an outstanding diversity of ecosystems and spans one of the major geoclimatic boundaries of Asia, that between Central Asia and Siberia. No existing World

Heritage sites within this bio-geographic region contain this diversity. In addition, Uvs Nuur contains one of the best remaining natural steppe landscapes of Eurasia.

4. INTEGRITY

4.1. Legal Status and Scientific Research

The 5 Tuvan 'cluster areas' making up the Uvs Nuur zapovednik were given protected area status by both the governments of the Republic of Tuva and the Russian Federation in 1993. The 4 cluster areas in Mongolia were listed under the "Mongolian Law on Protected Areas" in 1994 and their buffer zones by law in 1997.

However, the 85% of Uvs Nuur basin that lies outside the 9 protected areas seems to have no specific protective legal status, other than the protection afforded to State-owned land. This issue is of concern (see 'Management' below) because of the threat of over-grazing, particularly in the desert steppe landscape around Uvs Nuur in the vicinity of the capital of Ulaangom.

The existing 9 strictly protected areas (SPAs) do not adequately cover the wide range of ecosystems within this large site. In particular, the wetlands in the lower 60km of the Tes-Khem need to be part of a protected area which can extend northwards across the border into Tuva, incorporating semi-desert, steppe, and the slopes of the Vostochnyi Tannu Ola range (mixed forest/steppe, taiga and tundra). This proposal was discussed with senior officials in Ulaan Baator who stated that it had merit and that both countries were on the point of signing a protocol to establish better trans-border conservation management. Also the nomination document admits that the additions of other SPAs are desirable.

4.2. Management

Management of the Tuvan Uvs Nuur zapovednik is vested in the State Committee for the Protection of the Environment, and exercised through the Tuvan Minister for the Environment and an administration centre in the village of Erzin at the junction of the Erzin and Tes-Khol rivers. The Mongolian Administration of the Uvs Nuur Basin Strictly Protected Area is based in Ulaangom.

However, the crucial integrity issue for the site is how the rest of the basin – nearly 7 million hectares – can be managed in a way which will sustain the natural values currently exhibited within the site. There is no comprehensive management plan for the basin, although this is stated to be "under preparation" by the Mongolian Ministry for Nature and the Environment in Ulaan Baator.

Although most Mongolian land is still the property of the State, Mongolia privatised grazing herds in 1992; since that date there has been a spectacular increase in the domesticated grazing animal population of Mongolia – from an estimated 20 million in 1992 to 30 million in 1999. Mongolia's most important sustainable natural resource is its fertile soils and grasslands, so the threat of continually increasing stock numbers leading to over-grazing (and rural conflicts over traditional family pasturage rights) is a very serious issue facing the country. It is certainly a key issue in maintaining the integrity of the natural and cultural values of the steppe and desert steppe ecosystems of Uvs Nuur.

4.3. Other Human Uses

There is a small open-cast coal mine near Ureg Nuur but at present it only has a very local impact. The lack of any controls over rural road development within the basin is another localised detrimental human impact that can probably only be improved through environmental education. The opportunities for large-scale tourism in the basin are very limited compared with more popular natural

attractions like Khovsgol National Park. Small-scale cultural/eco-tourism will develop naturally but any tourism strategy is a very low priority at this stage of Uvs Nuur's development.

4.4. Other Threats

Notwithstanding the above concern about the potential for over-grazing, there are currently few other serious threats to the natural environment of Uvs Nuur. The low level of urban population and complete lack of industry in both the Tuvan and Mongolian sectors affords protection; its geographic isolation, climatic extremes, and lack of surface water flow make it an unattractive locality for agricultural industries. There has been talk of pressures for mining within Tuva but the Tuvan government has blocked this industry initiative pending a decision on World Heritage. If rural populations continue to increase at their current rate, however, the impact of hunting and forest clearance could become a threat to the taiga and forest steppe ecosystems. Indeed, as per Operational Guidelines 44(vi), only the core zone would be appropriate for World Heritage nomination with the buffer and occupied zones excluded.

In conclusion, the Uvs Nuur basin has important integrity issues which need to be solved. The 1999 nomination differs significantly from the 1996 proposal, in that the original nomination of 12 'cluster reserves' (covering 838,000ha) has now been expanded to encompass the entire basin (of more than 7.5 million ha). Whilst the present nomination is much stronger because it is now a continuum of all the ecological diversity in the basin; on the other hand, it now includes all the villages, some agricultural areas, and vast areas of grazed mountain, steppe and desert lands, which are not subject to any form of explicit management controls over grazing levels, buildings, roading, discharges to waterways, etc. Economic and social/demographic pressures are steadily building on Mongolia's grazing lands and no assurances have been given by the State parties that this large site can be maintained in its current state through management planning and strict land-use regulations. Thus there are major questions of integrity relating to the nominated site.

5. CULTURAL LANDSCAPE VALUES

The Uvs Nuur basin has a rich historical and cultural heritage. The site has also been nominated for cultural heritage status, largely on the basis of 2900 sites containing burial mounds ('kurgans') and stone tablets ('steles'), many of late Palaeolithic age. These will be reported on separately by ICOMOS. However, IUCN would like to note the following:

- ◆ Historically, a large proportion of the Eurasian steppe would have undergone a vegetation succession to forest as the post-glacial climate became warmer – had wild herbivores and humans (as they domesticated wild grazing animals) not worked to maintain the grassland environment.
- ◆ There is a close relationship between the domesticated grazing animals (traditionally sheep, cattle, goats and horses) and the grassland plants of the steppes, a relationship which has moulded this landscape over thousands of years. To an extent the increasing domestication of livestock supplemented (and supplanted) the wild grazing animals of the steppe – such as Przewalski's horse, the Saiga Antelope and the wild Bactrian camel. Over the millennia, the nomadic seasonal herding patterns transferred plants and nutrients spatially within the steppe ecosystems. Some grasses and herbs will have been eliminated; others will have thrived. Soil organic matter (humus) gradually accumulated as plant leaf litter, dead roots and animal excreta were decomposed and their constituent nutrients recycled back into new plant growth. To a large extent, it can be argued that the great soils of the steppes – the chernozems and chestnut soils – are partly cultural by-products. They are indeed zonal soils but the domesticated herbivores (as well as wild ones) of the steppes have contributed to their development. In fact, some soil ecologists would argue that domesticated herbivores have been essential to the development of the steppe soil landscape.

- ◆ The nomadic herders of the steppes of Tuva and Mongolia have traditionally relied upon their grazing animals for most of their domestic needs. Animal protein and fat provides most of their diet; bone has a myriad uses as a raw material; felted wool is used to provide shelter (yurts/gers) and clothing. Sustainable hunting of marmots and other wild animals has traditionally supplemented food and skins from domesticated animals. The culture of the Tuvan and Mongolian herding society is inextricably linked to their land-use – nomadic pastoralism and a relationship to wild Nature. This is particularly reflected in their stories, songs, arts and crafts, and religious beliefs.

The only remaining question, then, is whether the Uvs Nuur basin is the best ‘universal’ example of a steppe cultural landscape. It could be that there are better steppe cultural landscapes in eastern Mongolia. Nevertheless, all the major varieties of steppe landscapes are well represented within the Uvs Nuur basin and the site would appear to have high value as a cultural landscape.

6. APPLICATION OF WORLD HERITAGE CRITERIA

The Uvs Nuur basin has been nominated under all four natural criteria, as well as criterion (v) for cultural properties:

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

The nomination document does not present any compelling evidence in support of this criterion. The western Mongolia mountains sector of the site contains a good range of glaciers and landforms of glacial origin but these are only of regional significance and probably better represented in the Golden Mountains of Altai site. IUCN consider that this site does not meet criterion (i).

Criterion (ii): Ecological processes

The closed salt lake system of Uvs Nuur is of international scientific importance because of its climatic and hydrological regimes. Because of the unchanging nature of the nomadic pastoral use of the grasslands within the basin over thousands of years, current research programmes should be able to unravel the rate at which Uvs Nuur (and other smaller lakes within the basin) have become saline (and eutrophic). These processes are on-going and because of its unique geophysical and biological characteristics, the basin has been chosen as an IGBP site for monitoring global warming. IUCN considers that this site has the potential to meet criterion (ii).

Criterion (iii): Superlative natural phenomena, scenic beauty

The diversity of landscapes within Uvs Nuur basin, and especially the uncluttered horizons of the steppes broken only by colourful ribs of weathered rocks (‘skerries’), have their own subtle aesthetic appeal. Overall, however, they are not superlative in character and the site is not considered to meet criterion (iii).

Criterion (iv): Biodiversity and threatened species

The Uvs Nuur site has a large range of ecosystems, representing the major biomes of eastern Eurasia, with a number of endemic plants. Although the basin is inhabited and has been used for nomadic pastoralism for thousands of years, the mountains, forests, steppes and deserts are extremely important habitats for a wide range of wild animals, many of them threatened or endangered. The steppe ecosystem supports a rich diversity of birds and the deserts a number of rare gerbil, jerboas and the marbled polecat. The mountains at the western end of the basin are important refuges for the globally threatened snow leopard, mountain sheep (argali) and the Asiatic ibex. Uvs Nuur itself is an important habitat for waterfowl as well as for birds migrating south from Siberia. IUCN considers that this site has the potential to meet criterion (iv).

7. RECOMMENDATIONS

That the Bureau recommend to the Committee that noting that Uvs Nuur Basin has the potential to meet natural criteria (ii) and (iv), **defer** the nomination back to the State Parties involved (Mongolia and the Russian Federation) until the management plan for the site is prepared, including the feasibility analysis of its implementation. Further, the authorities should be requested to revise the boundaries from the 7.5 million hectares to exclude the 90% of the basin which currently has no protective status.

The Bureau may wish to recommend to the two State Parties involved to continue their efforts to enhance transboundary cooperation to ensure the conservation of this site. The preparation and implementation of a joint management plan for this site might be a good framework for transboundary cooperation.

Noting the economic difficulties facing the State Parties involved, the Bureau may wish to encourage them to submit a request to the World Heritage Fund for technical assistance for the preparation and implementation of a management plan for the Uvs Nuur Basin.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

IBIZA, BIODIVERSITY AND CULTURE (SPAIN)

1. DOCUMENTATION

i) IUCN/WCMC Datasheets:

- i) **Additional Literature Consulted:** Heywood. 1994. **Centres of Plant Diversity.** WWF/IUCN, pp 50-51; Kelleher, Bleakley & Wells. 1995. **A Global Representative System of Marine Protected Areas.** Vol. 1. GBRMPA, WB and IUCN, pp 89-103; Aritio *et al.* 1993. **Parques Nacionales de España.** Incafo, pp 150-162; IUCN and RAC/SPA (UNEP). 1989. **Livre Rouge des Vegetaux, Peuplements, et Paysages Marins Menaces de Mediterranee.** Faculte des Sciences de Luminy. France, pp 83-107; Sherman, Alexander and Gold. 1993. **Large Marine Ecosystems.** AAAS, pp 137-146; Gomez-Campo. 1996. **Libro Rojo de Especies Vegetales Amenazadas de España e Islas Baleares.** ICONA, pp 647-667; Margalef. 1995. **Key Environments: Western Mediterranean.** Pergamon Press, pp 175-193; San Félix. 1997. **Guía Submarina de Ibiza y Formentera.** Ayuntamiento de Ibiza, 120 p; Ballesteros *et al.* 1987. **Invertebrados Alguícolas Marinos de las Islas Pitusas.** Consell Insular D' Eivissa I Formentera, 96 p.
- ii) **Consultations:** 2 external reviewers, officials of Ibiza and Formentera Municipal Government; ecologists, fishers, divers and nature reserve personnel.
- iii) **Field Visit:** February 1999, Pedro Rosabal.

2. SUMMARY OF NATURAL VALUES

The Ibiza site (nominated under both natural and cultural criteria) is located in the Balearic Islands, Western Mediterranean. The terrestrial component of the nomination includes the coastal lagoons and saltworks areas (Las Salinas) on the islands of Ibiza and Formentera as well as the small islands of Freus (Penjats, Espardell and Espalmador). The marine component includes the open sea between these islands up to limit of the isobar of 40m depth (see Map 2). This represents a total area of 11,231ha, including 2,667ha of land and 8,564ha of marine component.

The marine component is characterised by the presence of dense and very well preserved prairies of oceanic Posidonia (seagrass) and coral reefs. The other important ecosystems included are related to the saltworks areas (Las Salinas de Ibiza y Forementera) which were included in the List of Wetlands of International Importance (Ramsar Convention) in 1993 for their importance for migratory birds.

Oceanic Posidonia is an important endemic species only found in the Mediterranean basin. In its climax stage and under exceptional conditions of transparency and unpolluted waters, this species generates coastal reef that offers protection to coastal areas from storms. In this area, particularly around the Island of Formentera, the coastal reefs are four metres high, the highest reef reported world-wide of this origin (San Félix, 1998).

The prairies of Posidonia also have high importance as a hatchery for a variety of marine fish. This function is particularly important to the maintenance of fish stock thus being an essential element for sustainable fisheries. This ecosystem has a high biological productivity. One hectare of oceanic Posidonia produces 21 ton/year of biomass, similar to the productivity of a tropical forest (22 ton/year/ha).

This particular seagrass community is increasingly under threat across the Mediterranean Sea mainly due to increasing levels of pollution. Consequently, oceanic Posidonia communities are included as a priority ecosystem for protection under the Habitat 2000 Directive (92/43/ECC) and under Annex IV of the Berne Convention. According to UNEP this is a highly threatened ecosystem in the Mediterranean Basin (UNEP 1989).

Other important marine values present in the nominated site are:

- ◆ Presence of the most diverse community of *Cladocora caespitosa*, supporting 220 species, the highest record for a marine community in the Mediterranean basin;
- ◆ The area offers protection to three globally endangered species, including the Monk Seal and to 5 marine species considered by IUCN in a Vulnerable state of conservation (IUCN, 1996);
- ◆ An important community of *Ecteinascidia turbinata*, a marine species with recognised value to prevent and combat different types of cancer; and
- ◆ A number of underwater caves that offer important elements to assess the geological and geomorphological evolution of the islands.

In relation to the values existing in the terrestrial component of the nominated site it is important to note:

- ◆ There are 11 species of strictly endemic plants;
- ◆ There are 7 Rare species of plants and 8 considered in a Vulnerable state of conservation (IUCN, 1996);
- ◆ The area contains well-preserved examples of *Juniperus sp.* forest, which was the typical coastal forest of the Mediterranean region but now only remains in a few sites. In the Island of Espalmador there is probably one of the few relict samples for the entire Mediterranean;
- ◆ 205 different species of birds have been reported in this area, particularly in the coastal lagoons and saltworks (Las Salinas) of which 171 are migratory species; and
- ◆ There are 56 species of invertebrates, 11 species of terrestrial reptiles, and 5 species of mammals reported from this area, all of them endemic to Ibiza and Formentera.

3. COMPARISON WITH OTHER AREAS

There are currently 42 sites on the World Heritage list with major wetland values and 40 others that contain a coastal and marine component. They include 20 Island World Heritage sites. However, most of the sites have been inscribed for their exceptional and extensive coral reefs formations, such as the Great Barrier Reef (Australia) and the Belize Barrier Reef (Belize). Other World Heritage sites include other types of seagrass beds, but most of them formed by *Thalassia sp* or *Halimeda sp* communities, thus biologically these are not comparable to the Posidonia prairies.

The Mediterranean Sea is a unique Marine Biogeographic Region and within it the Western Mediterranean is a distinct Biogeographic Zone (IUCN, 1995). In the Mediterranean basin there is only one other site that could be compared to Ibiza -- Capes Girolata and Porto and Scandola Nature Reserve, France. However, this site was included in the World Heritage list mainly for its dramatic geological landforms. Its marine component includes prairies of *Posidonia* but the proposed site in Ibiza (8,564ha) is double the size of the area represented in the French site (4,950ha). In addition, the *Posidonia* prairies of Ibiza are considered as the best preserved in the Mediterranean basin. Moreover, both the marine and terrestrial diversity is greater in Ibiza.

The nominated site offers protection to the Monk seal. It could be used as a reference for comparison with the Banc d' Arguin National Park World Heritage site (Mauritania). However this site is representative of a different Marine Biogeographical Region (Western Africa). The marine component in Banc d' Arguin only includes shallow coastal waters little more than 5m, that include seagrass beds consisting of *Zostera sp.*, *Cymodocea sp.*, and *Halodule sp.*, which form a different ecosystem to that of *Posidonia sp.* In the nominated site the marine component extends to the isobar of 40m, providing a broader sample of marine life at different depths. It also has a more diverse geomorphology including a number of underwater caves.

4. INTEGRITY

National Law 26 of 1995, which established the Nature Reserve of Ibiza and Formentera, protects this site. The site has also received international recognition by the Ramsar Convention and by the Habitat 2000 Directive (92/43/EC). Following the process of devolving power and responsibilities to local authorities in Spain, the Council of the Balearic Islands is negotiating with the national government over the jurisdiction and control of this Nature Reserve, which is presently under the control of the National Ministry of the Environment. It is expected that the State Court will devolve this responsibility to the Council of the Balearic Islands, but this would not imply a diminution in its legal protected area status. The World Heritage Centre and IUCN have received additional information from the State Party showing a comprehensive legal framework by which the State Party ensures to maintain full protection of the area under autonomic law.

A management plan exists for the area and it is being implemented. There are two administrative centres for the protection and management of this reserve, one in the Island of Ibiza, that serves as the headquarters, and a second one on the island of Formentera. There are 10 permanent staff working in the area with 4 vehicles for terrestrial patrol and one boat for marine patrol. However control on the use of the reserve is also supported by the local police and the National Coast Guards, the latter playing a key role in the marine and coastal areas. Volunteers (mainly members of local ecological groups and students) assist in management, particularly in summer where extra support is needed to clean up beaches and coastal areas due to the high number of visitors.

Twelve projects are currently being implemented in the Reserve. They include the construction of a Visitor Centre in Ibiza and a project dedicated to coastal zone protection. The total annual budget for conservation and management is around 4 million USD, mostly from the National Ministry of the Environment. There are on-going agreements with the University of Valencia, the University of Madrid and with the Ecological Group of Balearic Islands (GOB) to continue monitoring and research activities in the reserve. Rangers and technical staff in the reserve receive systematic training in management practices and biological monitoring as part of these agreements. There is also a strong commitment to conservation among the local fishers, who recognise the importance of protecting this area to ensure the long-term sustainability of traditional fisheries. Commercial fisheries are not allowed in the reserve and Coast Guards have acted to prevent violation of this regulation.

During the field mission, it was reported that a new submarine pipeline to discharge waters from a treatment plant in the urban areas of Ibiza was under consideration. There have been several local objections to this plan. Additional information has been received by the World Heritage Centre and

IUCN noting that the Government of the Balearic Islands has not allowed the construction of the submarine pipeline within the boundaries of the proposed site. At the same time the government proposed to evaluate other alternatives to re-use treated water so as to avoid the need to construct this submarine pipeline in any other location.

However, after the last session of the World Heritage Bureau and Committee (July 1999), IUCN has received information related to the approval by the EC of a project to reform and expand the port of Ibiza. This project will be partially funded by EU Fund for Cohesion and implies the construction of a dike to regulate coastal dynamics, offering greater protection to port facilities and operations. IUCN considers that this project could potentially impact the natural values of the marine area.

Further clarification is required in relation to the impact of this project, specifically in relation to the extent this development project could effect the conditions of integrity of the nominated site

5. ADDITIONAL COMMENTS

As indicated, this site is part of a Mixed Natural and Cultural Site nomination, which includes the ancient town of Ibiza and its fortress system. There are close linkages between the cultural and natural environment evident in:

- ◆ Strong local culture and traditions relate to the sea, with the marine environment providing an indivisible part of the landscape;
- ◆ The presence of more than 10 underwater archaeological sites related to the Late Bronze Age that help to understand old trade and interactions in the Western Mediterranean (Sherrat 1993). Most of these archaeological sites are far from adequately researched;
- ◆ In the Island of Formentera the local population is still applying traditional land use patterns that have been in place for the last 300 years. This has created a living cultural landscape that takes visitors to the island back to the Middle Ages; and
- ◆ The quality of the salt produced in the saltworks of Ibiza and Formentera (Las Salinas) depends on the quality of the coastal waters which, in turn, depend to a great extent on the ecological functions of the Posidonia prairies. Local people fully understand this and it is the basis of their concern for the protection of the marine environment.

Also in the Balearic Islands is the Archipelago de Cabrera National Park, consisting of 9,715ha of terrestrial and marine areas. It has some limited seagrass prairies but has other coral features and fish species that complement and extend the marine values in the Ibiza nomination. The potential exists to consider an extended World Heritage site, encompassing the current nomination plus Cabrera in a site that would be more representative of the whole variety of marine ecosystems of the Western Mediterranean.

The Bureau noted at its twenty-third session (Paris, July '99) that the site has the potential to meet natural criteria (ii) and (iv). The Bureau decided to refer the nomination back to allow the State Party to provide clear evidence on the continuation of the Nature Reserve's legal status under autonomic law, as well as clarification of the pipeline plans and their impact on the site. This information was provided and is reported on in this evaluation report.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

It is not clear from the nomination dossier under which criteria this site has been nominated. IUCN suggests that the State Party consider the case for inscription on the following two criteria:

Criterion (ii): Ecological process

In the nominated site the direct influence of the *Posidonia* prairies in the dynamics and evolution of the coastal zone of the islands can be observed extremely well and it is thus an excellent example of the interaction between the marine and coastal ecosystems. Accumulation and decomposition of *Posidonia* have led to the development of all the sandy beaches existing in the site and this is an ongoing process essential for the replenishment and growth of the existing beaches. At the same time, the protective function of *Posidonia* coastal reefs against storms is remarkably evident in the islands included in the nominated site. The regulatory functions of *Posidonia* prairies, particularly in retaining sediments and oxygenating coastal waters, is recognised as a key factor to ensure the high quality of the salt produced in Ibiza and Formentera.

Criterion (iv): Biodiversity and threatened species

The well-preserved *Posidonia* prairies in this site contain and support a diversity of marine life. This ecosystem, and its related biodiversity, is highly threatened in most parts of the Mediterranean. One assessment indicates that this ecosystem will completely disappear from the coast of France by 2010. Thus, conservation of *Posidonia* prairies has been identified as a priority under the Habitats Directive of the European Union. The nominated site has been also identified as a priority area to achieve a Global Representative System of Marine Protected Areas. The site contains a diverse community of *Cladocora caespitosa*, supporting 220 species, the highest recorded for a marine community in the Mediterranean Biogeographic Region. It also contains an important community of genetic value (*Ecteinascidia turbinata*) for pharmaceutical purpose. In addition, the area is of importance for the conservation of the Monk Seal. The terrestrial component of the nominated site also supports a diversity of plant and animal species, most of them endemic to these islands.

7. RECOMMENDATION

That the Bureau notes that the State Party did not identify which natural criteria the site might qualify under but IUCN suggests that natural criteria (ii) and (iv) might be relevant. But to satisfy the conditions of integrity, the State Party should provide further clarification, based on the EIA study, on the potential impact that the project to expand the port of Ibiza can have on the integrity of the nominated site. The Bureau is recommended to **defer** this nomination until this clarification is received.

The Bureau may also wish to invite the State Party to consider the nomination of the Archipelago of Cabrera with the possibility of it forming, with the Ibiza site, a combined site representing almost the whole spectrum of marine ecosystems of the Western Mediterranean.

WORLD HERITAGE NOMINATION –IUCN TECHNICAL EVALUATION

THE PYRÉNÉES – MOUNT PERDU - EXTENSION (FRANCE/SPAIN)

1. INSCRIPTION OF THE ORIGINAL SITE

The Pyrénées – Mount Perdu (France/Spain) was inscribed on the World Heritage List as a mixed site by the Committee at its 21st session in Naples, Italy. The site (30,639ha) was inscribed under natural criteria (i) and (iii) and under cultural criteria (iii), (iv) and (v). In relation to the natural values of the site the Committee noted:

“The calcareous massif of the Mont Perdu displays classic geological land forms, including deep canyons and spectacular cirque walls. It is also an outstanding scenic landscape with meadows, lakes, caves, and forests on mountain slopes. In addition, the area is of high interest to science and conservation.”

In relation to the cultural values the Committee noted: “The Pyrénées – Mount Perdu area between France and Spain is an outstanding cultural landscape which combines scenic beauty with a socio-economic structure that has its roots in the past and illustrates a mountain way of life that has become rare in Europe.”

“The Committee furthermore encouraged France to consider including the village of Bestué and its environs, including its spectacular flights of terraced fields.”

2. SUMMARY OF NATURAL VALUES

The proposed extension is a relatively small area of 550ha (or 1.8% of the existing World Heritage area) located on the French side of the frontier. The area is bordered to the east and south by the existing WHS and contains the northern side of the upper valley of Héas – a glacial trough gouged by quaternary glaciers. The southern side of the valley of Héas is part of the current WHS.

The extension stretches from the existing WHS boundary on the lower slopes of the southern side of the valley of Héas (la Lèche) down to the valley floor and up northern side of the valley (Montagne de Camplong) to the Crête de Campbieil. Two peaks, the Pic de Pelay (2,401m) and the Pic de Hourquette (2,563m) along the Crête de Campbieil, are within the extension area. The extension also includes the plateaux of Camplong at approximately 2,000m.

The extension includes the Gave de Héas [*Gave*: fast flowing mountain stream] which flows from the Cirque de Troumouse within the World Heritage area and its tributary the Gave de l’Aguila which flows from the Montagne des Aiguillous also within the World Heritage area.

3. COMPARISON WITH OTHER AREAS

See 1997 IUCN Technical Evaluation.

4. INTEGRITY

The proposed extension area is owned by private individuals and the “commission syndicale do Barèges pour les pâturages.” The area receives 40,000 visitors a year who are attracted by the cirques of Troumouse (to the south east) and Estaubé (to the south) as well as the hamlet of Héas. The D 922 road runs along the floor of the valley de Héas.

The area is in the Site Classé de Gavarnie-Gèdre which is part of the “zone périphérique” of the Pyrénées National Park. The area is also part of the “zones naturelles d’interêt écologique, faunistique et floristique (ZNIEFF)” Type 1 & 2. The extension area will be part of the area covered by the management plan which is currently in preparation (for presentation to the Bureau/Committee in November/December, 1999) and will be completed in 2000.

The existing site is made up of two types of protected area on the French side and three types of protected area on the Spanish side (see Box 1). The 1997 IUCN evaluation noted that though the proposed boundary of the nominated site conformed closely to the scientific boundary (the landscape unit that has Mount Perdu as its centrepiece) it does not conform to current administrative boundaries (see Map 1). IUCN expressed its concerns that “this overlay of World Heritage Site boundary that is different from the existing protected area matrix may present some challenges in terms of management and presentation the site.”

Box 1. Administrative Units of Pyrénées - Mont Perdu

Spain:	Ordessa National Park	15,608ha
	Vignemale Wildlife Sanctuary	3,200ha
	Periphery Protection Area	1,326ha
	Total Spain	<u>20,134ha</u>
France:	Pyrénées National Park (part)	7,451ha
	Site Classé Gedre Gavarnie	3,054ha
	Total France	<u>10,505ha</u>
	Total	<u>30,639ha</u>

The original IUCN evaluation noted that “IUCN was also not fully convinced that the legal basis of a “Site Classé” (French designation) and a “Periphery Protection Area “ (Spanish designation) were sufficient for long-term protection.”

It is hoped that these management issues will be addressed in the management plan.

5. ADDITIONAL COMMENTS

The area is also nominated for its cultural landscape values as an example of traditional human occupation centred on the chapel of Héas. The plateaux of Camplong has been traditionally used for summer grazing, however, the area is not being grazed as extensively as it was in the past and is becoming naturally reforested. It is hoped that extending the World Heritage area will help re-establish traditional pastoralism on the Camplong plateaux.

The area nominated does not appear to correspond to the area the 1997 World Heritage Committee encouraged France to consider for inclusion following ICOMOS' recommendation.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The existing Pyrénées – Mount Perdu (France/Spain) World Heritage site was inscribed under criteria i and iii. The proposed extension would not meet any natural criteria on its own. However, the extension has comparable scenic and geomorphological values to the existing site. IUCN still retains its concerns as to whether the legal basis is sufficient for long term protection (as noted in the original IUCN evaluation). IUCN believes that the value of the area lies in its significance as a cultural landscape. The applicability of cultural criteria to the proposed extension will be reviewed separately by ICOMOS.

7. RECOMMENDATION

That the extension of the World Heritage area be recommended on the basis of cultural landscape values.

**C. NOMINATIONS OF CULTURAL PROPERTIES TO THE
WORLD HERITAGE LIST**

WORLD HERITAGE CULTURAL NOMINATION - IUCN COMMENTS

AREA ARQUEOLOGICA Y NATURAL ALTO RIO PINTURAS (ARGENTINA)

To Note: This site was included in the initial list prepared by the World Heritage Centre as a Mixed Property. The nomination received from the State Party placed attention on both the natural and cultural values of this site, reinforcing the arguments for a mixed site. Accordingly a joint mission by IUCN and ICOMOS experts was organised and implemented with support from the State Party. It was only after the mission that IUCN and ICOMOS received clarification from the Centre noting that this nomination should be considered only as a Cultural Site. However IUCN considered that comments on the natural values present in this area would help ICOMOS in preparing its report and recommendation on this nomination.

Field Mission:

January 1999. Pedro Rosabal (IUCN), Francisco Erize (Argentinean Administration of National Parks), and Roy Querejazu Lewis (ICOMOS).

Consultations:

In addition to the field mission during which national and provincial officials, landowners, and rangers working in the area were consulted, IUCN has also consulted with three reviewers.

IUCN assessment:

While the nomination does not properly address the natural values existing in the area IUCN considers that is important to note the following:

- ◆ The nominated site is representative of the Udvardy's Patagonian Desert Biogeographic Province, which is also considered by WWF as an area of outstanding biological diversity. There are two other protected areas within this biogeographic province (Talampaya National Park and Laguna de los Pozuelos). However more additional information is required to assess how the natural values present in the nominated site compares with these other protected areas;
- ◆ The nominated site offers protection to 103 species of flora representing 37 families. From the total number of species, 63% are endemic of Patagonia, 8% are strictly endemic of the Southern Patagonia and 5% are local endemic of Santa Cruz province. This is an important value considering that the nominated site is located within an important Global Centre of Plant Diversity (WWF & IUCN, 1997);
- ◆ An important element to consider is the strong relationship between the wildlife and the cultural values occurring in the nominated site. Almost all species represented in the paintings of Cueva de las Manos can be observed in the surrounding natural areas. Large herds of guanaco (*Lama guanicoe*), a prominent species reflected in the paintings, due to its important for the sustainable livelihood of the first hunter-gatherer groups who inhabited this area, can still be seen in the area. Also a good population of choiques (*Pterocnemia pennata*), another emblematic specie in the paintings, is also present in the area. This represents a strong on-going relation between culture and nature in this site;

- ◆ In addition to the above species, there has been reported 3 species of amphibians, 18 reptiles, 45 birds and 18 mammals, including species of high priority for conservation such as puma (*Felis concolor*), condor (*Vultur gryphus*) and chinchillón (*Lagidium sp*);
- ◆ The most relevant natural value of the nominated site is its scenery related to the Pinturas River canyon. While this canyon does not rank high in comparison with other natural sites included in the World Heritage List, it is certainly an unusual geomorphologic feature in the monotonous landscape that characterises Patagonia. The canyon, of about 200m depth, with its vertical walls offers remarkable scenery to visitors. The canyon, and its past role in the hunting strategies of the hunter-gatherer groups, has also been immortalised in the paintings of Cueva de las Manos. Thus the protection of this natural environment should be seen as an integral element of the protection and management of this nominated site.

Management issues:

IUCN would like to note that, while the existing legal and management framework seem to be sufficient for the protection of the nominated site, during the field mission it was noted that it was not adequate to effectively protect the natural environment and its associated values. The overall landscape and its associated flora and fauna should be considered as an integral element to understand the environmental context which supported an important population of hunter-gatherer groups that inhabited this area for thousand of years. During the field mission the desirability of expanding the boundaries of the nominated site was discussed so as to include its broader natural environment to offer additional protection to important species of flora and fauna, as well as to the Pinturas River Canyon. The need to prepare a comprehensive management plan was also discussed, not only to protect cultural values but the natural values as well. This is an important issue considering that there are only two other protected areas offering protection to the huge Biogeographic Region of Patagonia.

Recently IUCN has received information noting that the Provincial Government of Santa Cruz has reinforced the legal status of a broader area, by declaring it as a Provincial Priority Area of Cultural and **Natural** Heritage (emphasis added) in March 1999. This new declaration includes the nominated site (declared as a National Historic Monument in 1993) plus expands the boundaries to offer better protection to the surrounding landscape and its associated flora and fauna. The Provincial Government is in the process to declare this bigger area as a Provincial Reserve. This would allow the preparation of a comprehensive management plan that would aim to enhance the protection of the natural and cultural values existing in this area.

IUCN summary:

At present (April 19, 1999) IUCN does not know the ICOMOS recommendation in relation to this site. As indicated, this is an important site for its scenery and biodiversity values. IUCN consider that the natural values present in the nominated site should be seen as an integral element for the protection and understanding of the cultural values, for which the site has been nominated for inclusion in the World Heritage List. If the site is considered by ICOMOS to have the requisite qualities of a cultural site for inclusion in the World Heritage List, IUCN considers that there is a need to significantly strengthen management aspects to ensure the effective protection of the site. Future management should also encourage effective input from natural resource specialists to ensure that protection of values are maintained or enhanced. IUCN would also like to recognise the interest and commitment of the Provincial Government of Santa Cruz for its actions which oriented to enhance the protected status of this area by broadening its objectives and boundaries, to include the protection of the broader landscape and associated natural values.

Recommendation from the twenty-third ordinary session of the Bureau: July, 1999.

The Bureau recommended that the Committee inscribe this site on the World Heritage List on the basis of cultural *criterion (iii)*.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

VIÑALES VALLEY (CUBA)

Field Mission:

While the IUCN and ICOMOS experts were in Cuba over the same period, because of other commitments it was not possible to undertake a joint inspection. While they had some discussions in Havana, IUCN is not currently aware of the position ICOMOS is taking on this nomination.

IUCN role:

Essentially this is to contribute to ICOMOS comments on aspects of para. 38 of the Operational Guidelines particularly relating to the extent to which *"the existence of traditional forms of land-use supports biological diversity..."* and responding to the statement in the Operational Guidelines that *"The protection of traditional cultural landscapes is therefore helpful in maintaining biological diversity."*

Consultations: In addition to a field mission by Jim Barborak in 1999 during which national and local officials were consulted, IUCN has also consulted with six reviewers.

IUCN assessment:

IUCN considers that the area does not possess any significant biological diversity values in terms of Para. 38. The area has for centuries been a centre of tobacco production with techniques ranging from traditional cropping mechanisms to modern high-tech tobacco growing. In the course of this long history of cultivation, there have been no significant side benefits for biodiversity conservation.

As an IUCN commentator reported "At Vinales, it is the combination of valley agriculture with the stunning backdrop of the vertically sided karst hills that is memorable" rather than biodiversity values. Nevertheless, the valley's forests do support 17 endemic species and this does add a valuable biodiversity component to the site.

Commenting on the area's tower karst landscape, an IUCN reviewer pointed out that there are many locations in the world with similar karst landforms such as Ha Long Bay WH site (Vietnam) and that on these grounds the site would not measure up as an example of a karst landscape of world significance.

The 1996 IUCN Technical Evaluation tabled when the World Heritage Bureau decided in 1997 that the Vinales Valley did not meet the criteria for a natural site summarised a range of natural values including flora typical of western Cuba and wildlife and birds and an extensive cave system as well as some ammonite fossils. As indicated, the Bureau did not consider these values merited inscription of the site for its natural values.

Management issues:

In addition, IUCN notes the absence of a strong, unified, institutional framework for managing visual aspects and land use in the valley. For example, while a national park has been proposed for the valley, it had not been gazetted at the time of the field mission and, in any case, its proposed

boundaries differ for the boundaries of the site as nominated. By comparison, the area of Old Havana has a very effective zoning and building supervision agency with taxing powers which has provided both the teeth and the funds needed to tackle the restoration of the outstanding cultural values in that World Heritage site.

IUCN Summary:

As indicated, this is a visually exciting place and, should ICOMOS decide to recommend inscription under Cultural criteria, then there are some natural values which would be complementary to the cultural values of the site such as the tower karst and cave system as well as the valley's forest ecosystem with a high level of endemism. However, as has already been determined by the WH Bureau in 1987, the valley is not considered to meet the Natural criteria for a WH inscription. However, if the site is considered by ICOMOS to have the requisite qualities of a cultural landscape, IUCN considers that there is a need to significantly strengthen management aspects to ensure that those qualities are maintained and negative aspects are remedied under both an appropriate legal status and an effective management regime. Future management should also encourage effective input from natural resource specialists to ensure the valley's natural values are maintained or enhanced.

Recommendation from the twenty-third ordinary session of the Bureau: July, 1999.

At its twenty-third ordinary session the Bureau recommended that the nomination be *referred back* to the State Party to enable it to provide additional information for review by ICOMOS. If this information would be provided before 1 October 1999, a revised evaluation and recommendation could be presented by ICOMOS to the twenty-third extraordinary session of the Bureau.

**ANNEX 1 - PROPERTIES WHICH WERE DEFERRED BY
THE 23RD ORDINARY SESSION OF THE BUREAU OF THE
WORLD HERITAGE COMMITTEE**

NATURAL PROPERTIES DEFERRED BY THE BUREAU

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ALEJANDRO DE HUMBOLDT NATIONAL PARK (CUBA)

1. DOCUMENTATION

- i) **IUCN/WCMC Datasheet:** (6 references).
- ii) **Additional Literature Consulted:** Centro Nacional de Areas Protegidas/Agencia de Medio Ambiente, Ministerio de Ciencia, Tecnologia y Medio Ambiente. 1999. **Plan de manejo—Parque Nacional Alejandro de Humboldt, Cuba;** Thorsell, J. & T. Sigaty. 1997. **A global overview of forest protected areas on the World Heritage List.** IUCN; World Conservation Monitoring Centre. 1998. **Operational Guidelines for the Implementation of the World Heritage Convention.** Unesco. Paris; Gaceta Oficial de la Republica de Cuba. 1997. Ley No. 81 del Medio Ambiente. July 11, 1997; Anon. n.d. **Parque Nacional Alejandro de Humboldt;** Anon. 1998. **Proyecto Decreto Ley de Areas Protegidas (Cuba);** Borhidi. 1985. **The phytogeographic characteristics and evolution of the flora of Cuba.** Academy of Science of Hungary.
- iii) **Consultations:** 7 external reviewers; senior officials of the National Council for Cultural Patrimony and the National Protected Area Center, Ministry of Science, Technology, and Environment (SITMA), provincial level authorities and field staff.
- iv) **Field Visit:** February 1999. James R. Barborak.

2. SUMMARY OF NATURAL VALUES

Alejandro de Humboldt National Park (AHNP) has been recently established and is located in the north-eastern part of Cuba, covering most of the central part of the Saqua-Baracpa Mountain Range. It comprises 66,700ha of land and 2,641ha of marine area. It contains unique ecosystems which contain high levels of endemism and total numbers of endemic species. Specific features include:

- ◆ AHNP constitutes the most important strictly protected area in Cuba (a combination of IUCN Category Ia within a Category II area);
- ◆ Basic and ultra-basic igneous rocks from the Cretaceous period are predominant, with an important manifestation of pseudo-karst. This area includes the oldest evolutionary massifs in the Caribbean;
- ◆ AHNP has 905 endemic flora species, almost 30% of all endemics reported for Cuba. Of this total figure, 343 species live exclusively in this area;
- ◆ Faunal values are high. Forests in AHNP are important refuges for many endemic, resident and migratory bird species, including five species considered as Threatened. In the marine component of the Park, there is a significant colony of Caribbean manatees, considered vulnerable to extinction in the wider Caribbean. There are also 45 species of reptiles, two endemic molluscs and nine freshwater shrimp species, all of them endemic of Cuba; and

- ◆ AHNP is one of the most remote and unexplored areas in the Caribbean region. Biodiversity inventories recently carried out in the Park reported three new species of reptiles, two new species of amphibians, 17 new species of arachnids and three new species of crustaceans.

3. COMPARISON WITH OTHER AREAS

The Cuban Archipelago represents a biogeographical province of its own, not yet represented in the World Heritage List. At present there is only one natural heritage property from the insular Caribbean listed on the World Heritage List: the Morne Trois Pitons National Park in Dominica. That site (6,857ha), while possessing important volcanic features not shared by AHNP, is much smaller, with much lower total species diversity, and fewer endemic species. While both sites have peak heights of about 1,200 meters, the altitudinal diversity of AHNP, which stretches from coastal waters and reefs to peaks of 1,175 meters, is greater than that of Morne Trois Pitons (500-1,220).

Morne Trois Pitons is extremely wet (rainfall over 7,000 mm per year), but lacks the climatic variation found in AHNP, and also lacks the serpentine formations which have given rise to the exceptionally high levels of endemism found at the Cuban site. For these reasons, AHNP can be said to compare very favourably on biological terms with Morne Trois Pitons, and with other potential World Heritage Sites that might be nominated for their terrestrial biodiversity from anywhere in the insular Caribbean.

AHNP also compares favourably with Cocos Island National Park (Costa Rica), and with the Galapagos Islands, which although located in the Pacific Ocean, are the only other comparable insular World Heritage Sites in tropical America. Both Cocos and Galapagos have outstanding marine resources and evolutionary, ecological and geologic features that make them unique and globally significant; however, neither has the levels of endemism found in AHNP.

On a global level, AHNP and the surrounding Biosphere Reserve have more floral diversity than all but two large tropical islands—Hispaniola and New Caledonia. Nearby Hispaniola has no protected ecosystems that can rival the altitudinal and ecological diversity, total size, or integrity of AHNP, and New Caledonia lacks AHNP's faunal diversity. The park has more floral diversity than many of the world's largest and most floristically diverse islands, such as Jamaica, Hawaii and Fiji. It surpasses many continental endemism hotspots around the world, such as those in Tanzania and the Ivory Coast, in terms of the number of endemic plant species.

Reptilian endemism levels are also comparable to, or exceed, those in such noted centres as south-western Australia, the eastern Himalayas, the Malaysian peninsula, and the California floristic province. In addition, the site's integrity is better than many tropical islands since introduced species have difficulty colonising its azonal plant formations on serpentine and peridotite rocks than is the case in many tropical island ecosystems.

In relation to geological-geomorphological features, it is important to note that pseudokarst in serpentines or related ultrabasic rocks is an unusual phenomenon. However, it is incorrect to state, as the nomination does, that this occurrence in Cuba can be considered representative of pseudokarst - the term encompasses an immense variety of land forms in a wide range of lithologies. Those in quartzite and sandstone, for example, in Venezuela and Zimbabwe, are considered more extensive and much more spectacular, and the latter pseudokarst is already inscribed on the World Heritage List as part of Mosi-oa-Tunya / Victoria Falls WHS (Zambia / Zimbabwe).

4. INTEGRITY

4.1. Boundaries

The AHNP has been established by linking two existing Nature Reserves and one Wildlife Refuge. The AHNP was then transferred as an administrative unit to the Ministry of Science, Technology and Environment. However, the forest between these core areas and from there to the sea still belongs to the Ministry of Agriculture, and even under a protective category of forests, does not meet the objectives of an IUCN Protected Area Category II (National Park). Boundaries are currently under revision as the basis to transfer the whole area to the Ministry of Science, Technology and Environment.

Once pending changes in the park boundary are approved, AHNP will contain most key and interrelated natural elements present in the region. At that time it will have sufficient size, altitudinal and climatic diversity and ecological elements necessary for the long-term conservation of the park's ecosystems and their biological diversity, including endemic and migratory species. When expanded, it will contain ecosystems ranging from below sea level to some of the highest peaks in eastern Cuba.

4.2. Management plan

The site has a draft management plan that provides, in general, an acceptable level of detail. However, it requires strengthening in the area of internal zoning, financial strategies, and tourism planning, in the face of probable increases future tourism pressures.

4.3. Staffing and Budget

AHNP has a large, well-trained and motivated staff, but it has an inadequate operational budget. However, the location of AHNP near major existing and planned tourism development sites increases its potential for at least modest levels of self-financing through visitor fees.

While the economic crisis in Cuba has seriously affected the protected area agency's capabilities, at AHNP the number of field staff (60), their level of training and their esprit de corps are truly exceptional. Working with extremely limited financial resources, using local materials and appropriate technology, they have made important strides towards consolidating park management in a brief period of time.

4.4. Legislation

The current legislative framework for the park is inadequate. The declaration of Cudullas del Toa Mountain Range as a Biosphere Reserve by UNESCO in 1987 is not a legally binding declaration and has not been supported by National Law. Moreover, AHNP has been declared by the authorities of Guantanamo Province but has not been endorsed or ratified by National legislation. The declaration of this National Park by the National authorities is essential to link the existing care areas and to increase the size and altitude diversity of the park. It is also essential for the transfer of management responsibilities to the Ministry of Science, Technology and Environment.

4.5. Mining

There are important threats to the integrity of the AHNP. To the north of the park is one of the most important comprehensive open-cast mining regions in Cuba. Although the area allocated for future mining is primarily forested at present, economic necessity, and particularly the boom that might eventually take place if the investment climate changes, might pose important threats to the park. A small deep mine that was "grandfathered" in when the park was created, and the nearby town of Melba, form an important pincer deep inside the park periphery and require special controls. The two

main core zones of the park are still separated, although the area between them is intact, government owned, and part of the larger surrounding Biosphere Reserve.

4.6. Agriculture

Until pending legislation is passed, the park limit does not yet reach the coast at Taco Bay. Even when it does, a sizeable area paralleling the main coastal road through the coastal extremity of the park is subjected to agricultural land uses, cutting through the coast-to-mountain corridor and affecting the views from the more accessible coastal edge of the park.

Agroforestry systems (shade coffee and cacao) found in the buffer zone are among the most environmentally benign land uses in the tropics. The fact that the park forms part of a much larger biosphere reserve and special watershed management region ensures landscape level planning and management and protection for core biodiversity values.

4.7. Alien species

Exotic species, while less of a problem than in other smaller islands, are nevertheless present and new introductions could have unknown consequences for native flora and fauna.

4.8. Local Population

Rural population density is low and growth rates are minimal. Ongoing environmental education and outreach programs appear thus to be succeeding. There seems to be little pressure from private landowners or cooperatives ringing the park to encroach on forested areas.

4.9. Visitation

Tourism, while currently extremely limited, should increase at Taco Bay as thousands of new hotel rooms at nearby beaches and towns are built, posing special challenges to the park staff, who up to now have not had to deal with visitor management issues.

4.10. Other Issues

The severe economic crisis in Cuba could bring other threats and challenges to park management, including staff reductions, greater levels of poaching and encroachment by neighbouring communities, pressure to expand mining and timber cutting in the park, etc.

Hurricanes are a naturally occurring threat to the park, but it has survived millions of years of their cumulative impacts and many species are adapted to hurricane impacts. At this time, little can be said about threats posed by climate change, but the altitudinal, climatic, and ecological variability within the park should enhance its ability to withstand such impacts better than many other protected areas that lack its size or internal variability.

5. ADDITIONAL COMMENTS

None.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

AHNP has been nominated under all four World Heritage natural criteria. IUCN recommends that its case for inscription strongly rests on the following two:

Criterion (ii): Ecological processes

The size, altitudinal diversity, complex lithologies, and landform diversity of AHNP have resulted in a range of ecosystems and species unmatched in the Insular Caribbean. It was a Miocene-Pleistocene refuge site, particularly in the glacial eras, for the Caribbean biota. The fresh water rivers that flow off the peaks of the park are some of the largest in the insular Caribbean and because of this have high freshwater biological diversity. Because of the serpentine, peridotite, karst and pseudokarst geology of the region, AHNP is an excellent example of ongoing processes in the evolution of species and communities on underlying rocks that pose special challenges to plant survival. IUCN considers that AHNP meets criterion (ii).

Criterion (iv): Biodiversity and threatened species

AHNP contains the most important and significant natural habitats for in-situ conservation of terrestrial biological diversity in the entire insular Caribbean. It contains 16 of 28 plant formations defined for Cuba, the largest island in the Caribbean, which is a unique biogeographic province. It is one of the most important sites for conservation of endemic flora in the entire Western Hemisphere – nearly 70% of the 1,302 spermatophytes already described, of an estimated total of 1,800-2,000, are endemic to the park. AHNP is one of the most biologically diverse terrestrial tropical ecosystems in an island setting anywhere on earth. Endemism rates for vertebrates and invertebrates found in the park are also very high. Many of these are threatened because of their small range. Because of their uniqueness and the fact that they represent unique evolutionary processes, they are of outstanding universal value from the point of view of science and conservation. IUCN considers that AHNP meets criterion (iv).

7. RECOMMENDATION FROM THE TWENTY-THIRD ORDINARY SESSION OF THE BUREAU: JULY, 1999

At its twenty-third ordinary session, the Bureau noted that Alejandro de Humboldt National Park is considered to meet natural criteria (ii) and (iv) but decided to **defer** the nomination to allow approval of the law expanding the park and approval of an expanded boundary which links the currently isolated core zones. Until this law and this boundary are in place, the integrity of the site cannot be guaranteed.

The Bureau also commended the State Party for its efforts for the protection of this site.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

PARCO NAZIONALE DEL GRAN PARADISO (ITALY)

1. DOCUMENTATION

- i) **WCMC Data Sheet:** (4 references).
- ii) **Additional Literature Consulted:** Index Seminum, 1998-1999. Description of Alpine Botanical Garden "Paradisina". Grand Paradiso National Park, Plant list for garden; **The Birds of Gran Paradiso** – F. Framarin, Gran Paradiso National Park 1996; Proceedings, 2nd World Conference on Mountain Ungulates. ed. V. Peracino, several articles on ibex, Grand Paradiso National Park, 1998; Project Otter, Grand Paradiso. V. Peracino, Gran Paradiso National Park, Ibex **Jour. Mountain Ecology**, 1996; **ibex**; Special Issue of *Jour. Mountain Ecology on Ibex*, 1993; Delle parte della Lince, ed. V. Peracino, Grand Paradiso National Park, 1995; *Il Parco Nazionale del Gran Paradiso! 1992: 70 Anni di Storia, di Cultura e di Ricerca Scientifica* ed. B. Bassano et al. Grand Paradiso National Park, 1992; **Le Parc National du Grand Paradis**. R. Gambino et P. Saccod. *Revue de Géographie Alpine*, LXXIII, 1985; *I. Parchi del Piemonte*, T. Bognati et al. Edizioni L'Arciere, Cuneo, 1998; Spatial interactions between wild ruminants (Alpine Ibex and Chamois) and cattle on high altitude grassland. B. Bassano et al. *Atti: International Conference on the Sustainable Uses of Biological Resources*, Budapest, pp 26-29, 1996; **Gran Paradiso**. B. Bassano, et al, Editori Il Risveglio, Torino, 1992; Checklist de la Faune, Grand Paradiso National Park, unpublished; Large predators in the Alps: The fall and rise of man's competitors, - U. Breitenmoser, **Biological Conservation** 83 (3): 279-287, 1998.
- iii) **Consultations:** 2 external reviewers, Ministry for Cultural Property and Environment, Rome; University of Turin; Director of Regional Nature Parks in Piedmonte; local officials from Autonomous Region Vallée d'Aoste, park staff.
- iv) **Field Visit:** March 1999. Lawrence Hamilton.

2. SUMMARY OF NATURAL VALUES

Parco Nazionale Del Gran Paradiso (PNGP) (70,318ha) was established in 1922, building on a nucleus of a Royal Hunting Preserve set up in 1856. This mountain park contains Gran Paradiso peak, at 4,061m, the highest mountain in Italy. There are several glaciers, glacial cirques and the evidence of past glacial history. Slopes are very steep and the penetrating valleys are narrow, thus allowing only limited alpine grassland and forest. Larch, spruce and fir forest covers about 20% of the nominated area. The vegetation contains some Mediterranean elements, and several rare and threatened species occur.

The build-up of wild ungulate populations and the return of species which were extirpated, particularly predators, is possibly the greatest natural value of the PNGP. Ibex were eliminated from the Alps, except for a small population in PNGP. This population has now increased and fluctuates between 4,000 and 5,000 individuals. Through cooperation across the French border with Vanoise National Park, seasonal migration of ibex has been assured. The Chamois now number over 8,000 and red and roe deer occur at lower elevations. It is now recognised that there is a need for greater

predation in PNGP than can be provided by its resident golden eagles, owls, fox, martens and weasels, and so the park management has been considering the reintroduction of bearded vulture, lynx and wolf. In the past few years the “re-wilding” of the area has permitted the natural recolonisation by bearded vulture and lynx, and it is suspected that the wolf has also found its way back to this area as it has elsewhere in the Apennines and the Alps.

3. COMPARISON WITH OTHER AREAS

The nominated area is located within the Udvardy Central European Highlands Biogeographical Province. Though no World Heritage sites exist in this Province two nominations are currently in preparation for the Mont Blanc area and the Aletsch Glacier region.

The Alps with a length of about 1,100km in west-east direction and an average breadth of about 200km, represent one of the most extensive mountain ranges in Europe. The range can be roughly sub-divided into the Western Alps, the Eastern Alps and the Southern Alps. The nominated PNGP is located within the High Alps, or the inner zone of the range, which stretch from the Western Alps to the Eastern Alps and are dominated by crystalline rocks and schist.

At present, 13 national parks are found within the Alps. In the Western Alps there are four national parks, three of which (Les Ecrins, Vanoise and PNGP) cover the crystalline zone of the High Alps and one (Mercantour) covers part of the crystalline zone as well as the calcareous and schist zones. In the Eastern Alps there are five national parks three of which (Swiss, Stelvio, Hohe Tauern) are part of the inner zone of metamorphic rocks while two (Berchtesgaden and Kalkalpen) are part of the outer zone of calcareous rocks. In the Southern Alps there are three national parks one of which (Val Grande) is dominated by metamorphic rocks (schist) while two (Dolomiti Bellunesi and Triglav) are dominated by calcareous rocks.

From the aesthetic and geological point of view, the most impressive parks of the western High Alps part are Dauphiné (in Les Ecrins National Park), Mont Blanc and Berner Hochalpen. Floral diversity and endemism are highest in the calcareous massifs of the Western and Southern Alps. Five biodiversity "hot spots" have been identified: the Maritime and Ligurian Alps (Mercantour, Argentera Nature Park), the Bergamo and Trentino Alps (Adamello-Brenta Nature Park) and the Julian Alps (Triglav).

From a faunistical point of view, the PNGP is well known for saving ibex from extinction within the Alps. However, ibex is no longer considered a threatened species but has become widespread throughout the Alps. Ibex can be found within and outside many reserves (for example, Swiss National Park, Stelvio National Park, Berchtesgaden National Park, Hohe Tauern National Park, Allgäuer Alpen, Oberbayerische Alpen). In general, the species list of PNGP includes some rare animals, such as the pygmy owl, capercaillie and golden eagle, but these species occur over the whole mountain range. Important populations, for example, the last autochthonous brown bear population within the Alps, occur in other reserves. In conclusion, PNGP is representative of the Alps but has no particularly unique features. It is secondary in importance to other areas of the Alps in terms of scenery, glaciation and biological values.

4. INTEGRITY

4.1. Legislation

The legislative underpinning for PNGP is adequate and is covered by various pieces of legislation and decrees. These are augmented by the 1991 national law on protected areas in Italy. This law provides criteria for protected areas activities relating to conservation, management, restoration, educational and scientific research. It provides for state intervention in national parks, and allows park zoning. PNGP is using this law to control agriculture, and restore buildings and infrastructure.

4.2. Management Plan

At present, a 1983 park zoning plan is being followed; this constitutes a *de facto* Management Plan, however, it has not been officially adopted and approved by the two Provinces and the park communes. More detailed planning is currently underway which should result in a formal PNGP Management Plan. There are urban council plans and a territorial landscape plan for the Valdotaine portion of the area. Subsidies are provided to maintain the traditional architectural character of houses within the park, such as the stone slates for roofs.

4.3. Transfrontier Cooperation

A cooperative agreement and twinning with the Vanoise National Park (France), which abuts PNGP to the south-east, provides greater integrity, and supports joint programmes on ibex. These two national parks, plus the adjacent Nature Reserve of Val d'Isère, form one of the largest contiguous blocks of protected area in Western Europe.

4.4. Land Ownership

Land ownership is a potential threat to the integrity of the Park, with only five percent of the park area actually under PNGP ownership (the original hunting reserve). There has, however, been a significant change in public thinking and increasing value placed upon PNGP, including awareness of the need to comply with regulations and guidelines. The 1991 national law on protected areas provides a strong tool which should help ensure PNGP's integrity despite a complex pattern of land ownership.

4.5. Staffing

The staff of 56 rangers are well-trained. They are mainly involved in management and monitoring of fauna; including the control of poaching and loose dogs.

4.6. Visitation

There are roughly 300 park guides and they receive some training. All solid waste is removed from the park, and litter is well controlled. Water quality is periodically monitored in the streams. Six impressive interpretation centres (with a seventh planned) are strategically placed and help to project to the public the park's mission to conserve nature.

4.7. Human Use

Some forestry takes place under the direction of the Forestry Department on communal and private lands, but it is limited, partly due to the steep slopes and the need for avalanche protection. About 20% of the park is covered in forest or shrubland, with much of it too steep for forest harvesting. Only 0.8% of the land is in urban or cultivated zones. Some 8,000 persons live in the various villages in the periphery of the park; 300 more live in the protected zone. Upper alpine pastures which are small in extent (about 20% of PNGP) are lightly grazed in summer. The park is essentially an IUCN Protected Area Category V with an interior, high elevation Category II zone.

5. ADDITIONAL COMMENTS

Problems were experienced with the completeness of the nomination document and the authorities sent a revised nomination document to IUCN which was received on 9 April, 1999. IUCN reviewed this revised nomination and reported on the nomination to the twenty-third session of the Bureau.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The nomination only briefly deals with geophysical criteria, biological value and cultural heritage.

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

The geophysical case and field inspection for criterion (i) is not compelling.

Criterion (iii): Superlative natural phenomena, scenic beauty

The case for criterion (iii) is not adequately made. Though PNGP is an area of great natural beauty and aesthetic importance, it cannot be considered outstanding even on the level of the European Alps.

Criterion (iv): Biodiversity and threatened species

While some justification for inscription is made on the grounds of three rare plant species, a rich mammal complement (36 species) and more than 100 bird species, the biodiversity is not of outstanding universal value as documented, thus not meeting criterion (iv).

Criterion (ii): Ecological processes

The most compelling reason for inscription is for criterion (ii), but this has not been properly addressed in the nomination.

7. RECOMMENDATION FROM THE TWENTY-THIRD ORDINARY SESSION OF THE BUREAU: JULY, 1999

At its twenty-third session, the Bureau noted that Parco Nazionale Del Gran Paradiso alone **does not meet** World Heritage natural criteria and that the site should be considered as one element of a broader World Heritage Alps nomination.

The Bureau noted that World Heritage nominations are currently in preparation for the Mont Blanc area and the Aletsch Glacier. The Bureau also noted that an initiative led by the World Heritage Centre is under way to convene a regional workshop to consider the potential of the Alps region in relation to the World Heritage Convention.

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

PHONG NHA CAVE (VIETNAM)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet** (13 references).
- ii) **Additional Literature Consulted:** Deharveng, L. 1999. **Phong Nha Cave Biodiversity**. Unpublished Report. 3p; Government of the Socialist Republic of Vietnam and Global Environment Facility. 1994. **Biodiversity Action Plan for Vietnam**. Hanoi; Dillon, T.C. & Wikramanayake, E.D. 1997. **A Forum for Trans-boundary Conservation in Cambodia, Laos and Vietnam**. WWF, Hanoi and Washington. Project VIE/91/G31-1994; Limbert, H. 1992. The caves of Phong Nha and Hang Toi, Quang Binh Province, Vietnam. **The International Cave**. Vol. 2. pp 4-9; Limbert, H. 1992. Vietnam 1992, Return to the river caves of Quang Binh. **The International Caver**. Vol. 5. pp 19-25; Limbert, H. 1994. **Vietnam 1994**. The 1994 British/Vietnamese Speleological Expedition Report. Privately published; Limbert, H. 1994. Vietnam: A Caver's Paradise. **The International Caver**. Vol. 12. pp 3-9; Limbert, H. 1997. Vietnam '97. **The International Caver**. Vol. 20. pp 11-18; WWF, *LINC*. 1998. **Linking Hin Namno and Phong Nha through Parallel Conservation**. WWF Indochina Programme. Hanoi; Nguyen Quang My & Vu Van Phai. n.d. **Cavern Tourism in Vietnam**; Pham Khang. 1985. The development of karst landscapes in Vietnam. **Acta Geologica Polonica**. 35 (3-4). pp 305-319; Nguyen Van Thang. ed. 1997. **Danh gia hien trang moi truong khu bao ton thien Phong Nha nam 1996-1997**; Multiple Authors. 1997. **Report of Field surveys on biodiversity in Phong Nha - Ke Bang Forest**. Mimeo Report. Hanoi. 84 p; Quang Binh Peoples Committee. 1998. **Investment Project: Establishment National Park Phong Nha-Ke Bang, Quang Binh**. Mimeo report; Timmins, R.J., Do Tuoc & Trinh Viet Cuong. in prep. **A preliminary assessment of the conservation importance and conservation priorities of the Phing Nha - Ke Bang proposed national park, Quang Binh Province, Vietnam**. Draft Report only, to be published by Flora and Fauna International. Hanoi; Vermeulen, J. & T. Whitten. eds. in prep. **Impacts of industrial use of limestone resources on biodiversity and cultural heritage (in East Asia)**. Draft Report only of the joint World Bank-IUCN project, together with various background papers; Watson, J. *et al.* 1997. **Guidelines for Cave and Karst Protection**. IUCN.
- iii) **Consultations:** 5 external reviewers. Staff of: CNRS, France; Gunung Mulu Caves, Malaysia; WWF Vietnam; University of Sydney; Nottingham Technological University; and the Geological Society of Australia. Individual speleologists and historians. Senior officials of the Department of Conservation and Museology (DOCAM), Vietnam. Park staff and senior officials form: Quang Binh Provincial People's Committee; Department of Science, Technology and Environment; Phong Nha / Ke Bang Program; Phong Nha Forest Protection Division; Relics and Landscape Management Board within Department of Culture and Information; Provincial International Relations Department; and the Department of Science, Technology and Environment.
- iv) **Field Visit:** January-February 1999. Elery Hamilton-Smith, and Hans Friederich.

2. SUMMARY OF NATURAL VALUES

The Phong Nha Nature Reserve (PNNR) is situated on the edge of the Phong Nha/Ke Bang Karst plateau in Central Vietnam. It is only part of the total plateau, which extends to and adjoins the Hin Namno karst of Laos. Phong Nha contains many caves, 17 of which have been explored and mapped by members of the British Cave Research Association, in conjunction with the University of Hanoi. Many caves are large and spectacular, and together they total (to date) some 65km. in length. However, investigation has so far been limited to mapping the extent of the caves, which in itself is a major undertaking.

The karst landscape of (PNNR) is an extremely complex and ancient one, with high geodiversity and some geomorphic features of considerable significance.

The reserve is largely covered by tropical forest, and although this was severely damaged by fire during the war, it is recovering rapidly and is now in a healthy state. It has a high level of biodiversity and endemic species. Data also indicates a high level of faunal diversity. The nomination documentation reports that:

- ◆ there are currently 735 vascular plants recorded in 413 genera and 140 families;
- ◆ preliminary faunal surveys have identified 461 vertebrate species, comprising 65 species of mammals, 260 bird species, 53 reptile species, 22 amphibians and 61 freshwater fish.

In summary, it must be emphasised that knowledge of the Phong Nha area is remarkably limited, and this has constrained both the preparation of the nomination document and the IUCN evaluation.

3. COMPARISON WITH OTHER AREAS

3.1. Karst Areas and Geodiversity

Attention to date on karst features has concentrated upon the caves, but the surface features, and in particular a large polje (a flat floored area surrounded on all sides by steep limestone hills), are considered to be of greater importance.

Most existing World Heritage sites containing karst are in temperate regions and include Skocjan Caves (Slovenia); Caves of the Aggtelek Karst/Slovak Karst (Hungary/Slovakia); Plitvice Lakes National Park (Croatia); Canadian Rocky Mountain Parks and Nahanni National Park (Canada); Mammoth Cave National Park and Grand Canyon National Park (USA); Te Wahipounamu (New Zealand); East Rennell (Solomon Islands); Huanglong and Jiuzhaigou Valley (China); Tasmanian Wilderness and Fossil Mammal Sites (Australia).

None of these can be justly compared with Phong Nha as they have vastly dissimilar geologic, geomorphic, climatic and biotic conditions. It is interesting that the surface topography of Phong Nha is not unlike that of Skocjanske (source of the term karst, and generally seen as the classical karst site) but the geologic structure and processes are vastly different. Ha Long Bay in Vietnam is an outstanding example of partly submerged towerkarst, and is totally different from Phong Nha. These are other karst areas under consideration by IUCN in 1999. These include the Alejandro de Humbolt National Park and the System of Marine Terraces of Cabo Cruz and Maisi, both in Cuba. Neither are directly comparable with Phong Nha. These two occur within an island ecosystem and do not have the complexity and diversity of karst geomorphology.

Turning to the karsts of the wet tropics in the South-east Asian region, one can much more justly make comparisons. Many of these areas, like Phong Nha, are located within large and spectacular limestone plateaux, and the caves have often only been recognised and explored in recent years.

However, many have been the subject of considerable scientific research, and have been proven to be significant on a wide range of criteria. Three areas are currently in the process of consideration for World Heritage status:

- ◆ In East Malaysia, the Gunung Mulu Caves have National Park Status, have river systems which dwarf those of Phong Nha, and have the world's largest cave chambers and passages;
- ◆ St. Paul Subterranean Park on Palawan in the Philippines; and
- ◆ The Massive Baliem River karst of the Lorentz National Park of West Irian.

Other Asian karst areas of note include:

- ◆ Many regions of China, particularly in the South, and including the remarkable tower karst of Guangxi, have immense and complex karst systems;
- ◆ Niah Caves of East Malaysia with their great biodiversity and palaeontological/ archaeological significance;
- ◆ Gomantong, also in East Malaysia, with its truly significant geomorphic character, including cave passages of over 200m. in height and a remarkable biodiversity;
- ◆ Many karst areas of Indonesia, including the famous Gunung Sewu of Java – one of the archetypal tropical karst landforms;
- ◆ Neighbouring Papua New Guinea, which is at a very early stage of environmental management, has extensive cave systems and underground rivers such as those of Atea Kanada, Mamo Kanada, Selminum Tem and the Nakanai mountains of New Britain;
- ◆ Finally, many of Thailand's National Parks contain cave systems. There are some thousands of identified and documented caves, many of which are immense in size, very often richly and beautifully decorated, and many with well-researched biodiversity and important archaeological sites; and
- ◆ Major areas of largely unexplored karst in Laos.

However, all of these are less complex, and many of them probably younger, karst systems than those of Phong Nha. In brief, although the nomination document emphasises the extent to which the caves of Phong Nha are large and striking, they are in themselves no more and sometimes much less so than many other sites throughout SE Asia. On broader criteria which take into account the totality of the karst system, Phong Nha must be seen as possibly one of the most significant karst sites in south-east Asia. As in virtually all aspects of the site, there is a great lack of knowledge or previous research, so the significance of the site can only be fully identified and supported when the Nature Reserve is researched as thoroughly as many others have been.

3.2. Forest Biodiversity

There are two other forest protected areas in South-east Asia which have World Heritage Status: the Thungyai-Huai Kha Kheng Wildlife Sanctuaries in Thailand (Tropical Dry Forest) and the Ujung Kulon National Park in Indonesia (Tropical Moist Forest). The 3.5 million ha. Lorentz National Park has been nominated as World Heritage this year. This is the largest protected area in South-east Asia and includes one of the largest expanses of tropical forest in South-east Asia. The forest biodiversity values of Phong Nha, on its own, does not compare favourably with these existing and proposed sites. However, if the nominated area were linked with the Hin Namno karst ecosystem of Lao PDR, then

this would constitute an area of high significance for forest biodiversity conservation. Adjoining forests in Lao PDR have been identified as priority areas for conservation and protect forest ecosystems, which exhibit high levels of species endemism. Such a trans-boundary protected area system would constitute the largest surviving area of karst forest in South-east Asia. It is thus recommended that such an expansion should be considered by the State Party in conjunction with the government of the Lao PDR.

4. INTEGRITY

PNNR was established in 1986. By 1991, the reserve area had been expanded to the current total of 41,132ha, and a management plan has been approved for the reserve. The research summary of the plan, although adequate, highlights the lack of information on natural values within the nomination site.

The management board of the Reserve, responsible for protection of forest resources and biodiversity was set up in 1994. Cave conservation and the provision of a tourism service are the responsibility of the Phong Nha Historical Relic and Landscape Board. A total of 26 staff are engaged in management and protection of the reserve. The 1999 IUCN review mission noted a high standard of cave management and a dedicated and committed staff working in the reserve.

However, there are some major problems in relation to site integrity:

- ◆ Although considerable progress has been made in protection of the surface environment, the rugged nature of the country, difficulty of control, low income of many local families and relative shortage of resources for control purposes mean that wildlife poaching and illegal timber gathering will be extremely difficult to eliminate. Staff are making great efforts to progressively make the protection as strict as possible but this remains a challenging issue;
- ◆ IUCN is particularly concerned that road #20 traverses the site and provides ready access to core areas. It is also used for the movement of cattle and other domesticated animals, and so, in various ways, it seriously threatens the integrity of the site. Further, there is a proposal to upgrade this road and IUCN strongly suggests that an alternative route be found which by-passes the nature reserve; and
- ◆ The watershed is not included in the nomination, and as the integrity of any karst area is dependent upon quality and quantity of the water input, this is a matter of concern. More widely, the current boundary appears to be an arbitrary one, and needs to be reviewed, to ensure it can more effectively protect natural values.

5. ADDITIONAL COMMENTS

The nomination names the site as *Phong Nha Caves*. However, the nomination document deals with the Phong Nha Nature Reserve as a whole, and it is clear that this is the intended site, It also gives special attention to biodiversity of the surface environment, which may well prove to be far more significant than the caves. Accordingly, we recommend that the nomenclature of the site be amended at an early stage to ensure consistency.

The IUCN mission noted the lack of research and knowledge of the PNNR. Topographic mapping was inadequate and significant errors were noted in the available maps. All published information on the area and the nomination itself described a relatively young karst system, with a single-generation cave development and a corresponding simple overall geology and biology. However, the IUCN mission discovered that the area contains a very complex and ancient karst system. In addition, there are large outcrops of sandstone, laterite and shale, which have a significant impact on both the landscapes and the flora and fauna of the area. Detailed geological maps were not available.

One indication of the problem is that the work in progress by Timmins *et al.* is the first to survey the important bat populations. Further species were still being located on a virtually daily basis right up to the end of the field work phase, suggesting that many species remain to be found. More importantly, many of the species which have been identified are considered to be extremely rare and little known.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

Each of the four criteria are dealt with in turn below:

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

The nomination lists this as one of the criteria for inscription, but no real evidence was presented to support this. On inspection, it is now clear that the simple description of the area provided in the nomination document is an over-simplification; the evolution of the landscape and caves has been both discontinuous and complex. Unlike other karst areas in Vietnam, which generally consist of tower karst, Phong Nha is probably best described as part of a larger dissected plateau, which also encompasses the Ke Bang and Hin Namno karsts. Most importantly, the limestone is not itself continuous, but demonstrates complex interbedding with shales and sandstones. This, together with the capping of schists and apparent granites which has probably been thrust over the limestones and is now eroded to a remnant outcrop, has led to a particularly distinctive topography.

The caves alone demonstrate discrete episodic sequences of events, leaving behind various levels of fossil passages, some of them very high, and one of these in fact being near the summit of the plateau; formerly buried and now uncovered palaeokarst (karst from previous, perhaps very ancient, periods of solution); evidence of major changes in the routes of underground rivers; changes in the solutional regime; deposition and later re-solution of giant speleothems and unusual features such as sub-aerial stromatolites (speleothems which are shaped by interaction between blue-green algae and the deposition of calcite). In particular, the location and form of the caves suggests that they might owe much of their size and morphology to some as yet undetermined implications of the schists and granites which overlay the limestone and if so, this is an unusual feature in itself. There are also both re-sorted and layered schist-derived sands and granitic gravels in the caves.

On the surface, there is a striking series of landscapes, ranging from deeply dissected ranges and plateaux to an immense polje (a flat-floored and enclosed valley) This may be either a solutional or tectonic landform, but in the context of what is known about the geological history of the region, this suggests the karst system is an old and relatively mature one. There is evidence of at least one period of hydrothermal activity in the evolution of the karst. The plateau is probably one of the finest and most distinctive examples of a complex karst landform in SE Asia and, as already noted, has more in common with the Skocjan karst of Slovenia than with most other Asian karst landscapes.

Thus, there is, in brief, a large and unexpected amount of evidence of earth's history. Without further research, the significance of the site to science cannot be properly assessed. However, it is potentially a site of very great importance for increasing our understanding of the geologic, geomorphic and geochronological history of the region. This is the highest priority for further research. IUCN considers this site has potential to meet criterion (i), however the potential value for World Heritage would be greater under criterion (i) if the nominated area was linked with the Hin Namno karst reserve in Lao PDR.

Criterion (ii): Ecological processes

The nomination document does not justify inscription under this criterion but given that the area is not well researched it is not possible to argue for inscription under this criterion at present.

Criterion (iii): Superlative natural phenomena, scenic beauty

Phong Nha is certainly a very large and spectacular cave system and is clearly of great significance at the national level. However, some of the claims made about size in the nomination are not accurate, and even if they were, size alone would not merit inscription. As noted above, even at the regional level, and given present knowledge, Phong Nha does not rival other caves in the region in terms of size or other significant characteristics.

But on turning to the site as a whole, the Nature Reserve is a superlative and distinctive example of mature karst. IUCN cannot identify other precisely comparable sites in the South-east Asian region. Taking the striking surface topography of the dissected plateau, the springs and rivers, the steadily developing quality of the forest and the striking beauty of the caves, all of which is based in the geomorphic and geological complexity of the site, it is a site of regional significance. IUCN considers that the nominated area does not have the necessary superlative features to warrant inscription under criterion (iii).

Criterion (iv): Biodiversity and threatened species

The nomination includes examples of the now rare tall lowland forest, which has almost disappeared from other countries in the region.

Although knowledge of the area is still limited, the number of identified species, in itself, is comparable with other South-east Asian rain forest, and in fact, better researched areas show even much greater diversity. However, more recent data made available (Timmins *et al*, in prep.) deals much more fully with the fauna and its status, particularly in relation to mammals and birds. It vividly demonstrates the impact of continuing and more intensive research. One problem is that this report included the Ke Bang area, and there are some difficulties in comparability - but bats and many of the larger mammals do not respect human boundary lines, and so many of the reported species probably do occur in Phong Nha. The currently known extent of endangered, or threatened species is detailed in the Table below.

	Listed in nomination document	Further species listed by Timmins <i>et al</i>	Total species
Mammals (excl. bats)	26	4	30
Bats	-	11	11
Birds	12	10	22
Reptiles and Amphibians	11	-	11

Table 1 - Species listed in the Red Books as vulnerable, rare, threatened or endangered, or otherwise very rare (hence recognised as data deficient)

Thus, the nominated area (and neighbouring lands) continue to support at least 73 important species, several of which are endemic to the limestone massif of which Phong Nha is part. In particular, it includes the total world population of François' Langur. However, the Nature Reserve is too small to provide adequately for protection of biodiversity, particularly of larger species such as the tiger, and so the moves to establish the larger Phong Nha/Ke Bang National Park must be seen as an urgent requirement. Similarly, the proposed trans-boundary integration with Hin Namno karst reserve of Laos, which will cover the whole of the Limestone plateau, is vital and urgent.

IUCN considers that the nominated area does not by itself meet World Heritage criterion (iv). However, if the area were to include the larger Phong Nha/Ke Bang National Park then this revised area would have strong potential for World Heritage under criterion (iv). The further addition of the

Hin Namno Karst reserve, and other significant areas, in Lao PDR would also considerably enhance the status of this area as World Heritage.

7. RECOMMENDATION FROM THE TWENTY-THIRD ORDINARY SESSION OF THE BUREAU: JULY, 1999

At its twenty-third ordinary session, the Bureau noted that the nominated area has potential value as a World Heritage site under criteria (i) and (iv) on the condition that it was expanded to include the larger Phong Nha/Ke Bang National Park with an associated fully integrated management structure. The Bureau decided to **defer** a decision on the site, pending review of the possibility of expanding the boundaries of the site as proposed. It is also strongly recommended that there be discussions with the Lao PDR State Party with a view to further expanding the boundaries of the site, at a later stage, to include the Hin Namno Karst reserve of Lao PDR and any other relevant areas.

On 4 September, the Vietnam National Commission for UNESCO notified the World Heritage Centre of the State Party's intention to expand the nominated area to include the larger Phong Nha-Ke Bang National Park and establish a fully integrated management structure for the site.

MIXED PROPERTIES DEFFERRED BY THE BUREAU

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE GREATER BLUE MOUNTAINS AREA (AUSTRALIA)

1. DOCUMENTATION

- i) **IUCN/WCMC Datasheets:** (7 references)
- ii) **Additional Literature Consulted:** Williams J.E. and J. Woinarski. 1997. **Eucalypt Ecology**. C.U.P.; Keith, D.A. *et al.* 1999. Vascular Flora of Wetlands – East Forest Region, NSW. In press; MacKey. B.G. *et al.* 1997. The Role of Wilderness in Nature Conservation. ANU Report to Environment Australia. 87p.; DEST. 1994. Australia's Biodiversity. Biodiversity Unit Paper No.2. 87p.; Davis, S.D. *et al.* 1995. **Centres of Plant Diversity**. Vol.2. IUCN/WWF; Woinarski, J. and R. Braithwaite. 1990. Conservation Foci for Australian Birds and Mammals. **Search** 21(2); Braithwaite, R. 1990. Australia's Unique Biota. **J. Biogeog.** 17; Westoby, M. 1988. Comparing Australian Ecosystems to Those Elsewhere. **Bioscience** 38 (8); Kirkpatrick, J.B. 1994. The International Significance of the Natural Values of the Australian Alps. Report to AALC. 86p.; Good, R. 1989. **The Scientific Significance of the Australian Alps**. Fenner Conference Proceedings; City of Blue Mountains. 1997. Submission to Minister of Transport and Regional Development on Second Major Airport, Sydney; Total Environment Centre and Colong Foundation. 1998. Submission to Environment Australia on Proposed Badgerys Creek Airport; P.P.K. Consultants. 1997. Second Sydney Airport Proposal. Draft Environmental Impact Statement. Department of Transport; Thorsell, J. and T. Sigaty. 1997. A Global Overview of Forest Protected Areas on the World Heritage List. IUCN; Commonwealth of Australia. 1998. Record of the World Heritage Expert Panel. Regional Forest Agreement Process. 101p.
- iii) **Consultations:** State and Commonwealth Agency representatives, City of Blue Mountains staff, local NGO's.
- iv) **Field Visit:** February 1999. Jim Thorsell, Les Clark and Kevin Jones (ICOMOS).

2. SUMMARY OF NATURAL VALUES

The Greater Blue Mountains Area (GBM) nomination consists of 1.03 million hectares of mostly forested landscape on a sandstone plateau 60-180km inland from central Sydney, New South Wales. The nomination is submitted on both natural and cultural criteria. It comprises 8 protected areas in two blocks separated by a transportation and urban development corridor. The GBM are not "mountains" in the conventional sense but are a deeply incised sandstone plateau rising from less than 100m to 1,300m elevation with basaltic outcrops on the higher ridges. Despite the small size of the rivers in the GBM, deep gorges have been formed where underlying shales have been eroded faster than the sandstones. 300m high cliffs, slot canyons and waterfalls are notable physical features. There is also a limestone belt that contains various karst features including a cave system. The climate is warm temperate with rainfall of up to 1,400mm with occasional snowfall. The GBM are thought to have acted as a refugia through climatic oscillations during recent geological history enabling the survival of a broad spectrum of biota.

A diverse range of 70 plant communities occur depending on the variety of substrates, altitudinal

gradients and slope. The GBM contains a wide and balanced representation of eucalypt habitats from wet and dry sclerophyll, mallee heathlands, as well as localised swamps, wetlands, and grassland. 90 eucalypt taxa (13% of the global total) occur in the GBM, 12 of which are considered endemic to the Sydney sandstone region. Representation of all 4 groups of eucalypts occur. Some rainforest occurs on high basalt outcrops and as admixtures in fertile valleys and gullies. Principal components of rainforest include families with warm temperate affinities and many species reach their southernmost limit in the GBM. There is also a high level of endemism with 114 endemic taxa found in the area as well as 120 nationally rare and threatened plant taxa. GBM hosts several evolutionary relic species (*Wollemia*, *Microstrobos*, *Acrophyllum*) which have persisted in highly restricted microsites. At least 7 plant species are considered extinct.

The GBM hosts a representative spectrum of Australian fauna made up of 52 native and 13 exotic species. The former include grey kangaroo, red-necked wallaby, wallaro, wombat and koala. The avifauna is varied with 265 native species and 10 exotics with a particularly high diversity of honeyeaters (25 species). In addition, there are 60 species of reptiles, 30 species of frog and a diverse but poorly known invertebrate fauna.

3. COMPARISON WITH OTHER AREAS

As is often noted, Australia is a continent on its own with many unique ecosystem processes and unique flora and fauna. The infertility of the soil and the climatic variability in Australia are the most extreme of all the continents and, after a long period of relative isolation, have resulted in a highly characteristic biota. Intra-continental comparisons are thus difficult and the discussions below are primarily made with other sites within Australia.

There are currently 65 sites on the World Heritage List with universally significant forest values. Five of these are found in Australia including 3 in the same Biogeographical Province (Eastern Sclerophyll Open Forest) as the GBM. These are the Wet Tropics of Queensland (partly) (894,420ha), Central Eastern Rainforest Reserves (366,455ha) and Fraser Island (166,283ha). (The forest values of the latter were considered secondary to the geophysical features but its forests were also considered as part of its basis for meeting criterion (iii)). All the above three existing sites as well as Kakadu and Southwest Tasmania contain extensive sclerophyll communities although not with the variety found in the GBM. (It would be useful to have a dendrogram to show the overlap and relationships among the floral groups but this is not available.)

From the northern part of the GBM it is possible to see in the distance the southernmost unit in the existing Central Eastern Rainforest Reserves (CERRA) World Heritage site. This site, though much smaller in size, contains 70+ species of eucalypts, which, on a unit area basis is 300% higher than the GBM (90 species). Species diversity, however, is not the only measure of what constitutes representation of the eucalypt ecosystem. CERRA, for instance, (as well as the Wet Tropics) displays a far greater diversity of interaction between rainforest and eucalypt communities which is a process of considerable ecological interest. Likewise, the GBM has a more diverse representation of plant life-history responses to fire. Thus, despite their proximity, there are many distinctions between the rainforest-dominated CERRA site which follows the Great Dividing Range and the eucalypt-dominated GBM area found in the Sydney Sandstone region (the Hunter Valley being the biogeographical break).

There are broader similarities with the Alps area to the south of the GBM which have also been suggested for World Heritage nomination (see Kirkpatrick, 1994 and Good, 1989). The GBM nomination does not discuss comparisons in any length with the Alps protected area complex but each area has its particular merits and there would be a substantial overlap in the rationale for nomination. (The Australian Vice-Chair of IUCN's World Commission on Protected Areas has, in fact, suggested that the two areas be linked and considered as a cluster nomination. Another reviewer, however, has

noted that the Alps has integrity problems which could preclude its inscription.) Other reviewers also referred to the importance of eucalypt forests in south-west Australia.

The GBM nomination makes several references to the Commonwealth of Australia's Report of a World Heritage Expert Panel (1998) which undertook a comparative assessment of forests in three States as part of the Regional Forest Agreement Process. This report adopted a thematic context (7 overall themes and 15 sub-themes) in identifying forest areas in the three States that "warrant further investigation as possible best global expressions of each sub-theme". IUCN considers such a reductionist approach useful at a State and National level but its findings on such a detailed list of sub-themes may not necessarily apply at the global level.

The findings of the Panel's report vis-à-vis the relevant natural sub-themes for the GBM nomination were as follows:

- ◆ Sub-theme: Passive continental margins: The GBM "are not amongst the best global expressions of the sub-theme" (p.14).
- ◆ Sub-theme: Refugia, Relicts: no sites in NSW, including the GBM (apart from examples already included in the CERRA site) warrant further investigation as a best global example.
- ◆ Sub-theme: Rainforest: "the Panel concluded that the Blue Mountains are not of major significance in representing the sub-theme of rainforest. The rainforest patch containing the Wollemi Pine was noted, but the Panel considered that it does not warrant further investigation in its own right..." (p.33-34).
- ◆ Sub-theme: Scleromorphy: "While recognising the importance of the expression of scleromorphy in the area, the Panel concluded that the Blue Mountains does not warrant further investigation as a globally-significant representation of the sub-theme." (p.38).
- ◆ Sub-theme: Eucalyptus-dominated vegetation: the Panel noted that 3 existing World Heritage sites all have eucalypt values and suggested possible additions to each of them to provide better coverage. It also noted that 2 major peaks of eucalypt species richness – one centred on the Blue Mountains area and a second in the Coff's Harbour to Border Ranges area (geographic areas of the CERRA site). It also identified 3 other areas (including the "sea to the Alps" transect) that warrant further investigation. It also concluded that "... a best global representation of Eucalypt-dominated vegetation in Australia ... would necessarily be based on a series of areas" (p.40). The GBM is thus one of 8 forests in 3 States that warrant further investigation under this sub-theme (Table 8).

Finally, the Panel noted that, although the natural values of the Blue Mountains did not warrant further investigation as globally-significant for 4 out of the above 5 sub-themes, the GBM have many important associative values that could contribute to the nomination if it was shown to be the best global expression of another theme.

The statement in the nomination that the GBM "constitutes one of the world's most important significant habitats for the *in situ* conservation of threatened plant species" was challenged by several reviewers, especially in the absence of comparative data. It is known that the adjacent and much smaller CERRA site has 170+ rare and threatened plant species compared with 120+ for the GBM and the Wet Tropics would have even more. Another question raised was the claim in the GBM nomination that it was "the centre of diversity of eucalypts..." (p.22) and that more comparative data on levels of endemism was needed. It is noted, for instance, in Williams and Woinarski (1997 p. 105), that the Darling Botanical District in south-western Australia has more eucalypt taxa (101) than the central-eastern region (of which GBM is a part) (84), and has many more endemics (31) than GBM (13).

The nomination document and the report of the expert Panel do not provide a comparative analysis of the values of the GBM under natural criterion (iii) – natural beauty. Certainly the GBM landscape is outstanding at the national level. Most reviewers felt, however, that there are many other areas in Australia that contain more striking sandstone landforms (e.g. Kimberly, Bungle-Bungles, Carnarvon Gorge) and others that have a greater aesthetic impact (e.g. Uluru, Kakadu, Southwest Tasmania). It is recalled that the CERRA World Heritage site also has equally high scenic values but these were considered secondary to its biological values and it was not inscribed on the basis of criterion (iii). The nomination also makes a claim to the aesthetic importance of the GBM being so close to a large city but this city/park proximity phenomenon is found in many other places (e.g. Capetown, Nairobi, Vancouver, Miami).

In summary, there are a number of claims in the nomination that may have been overstated when additional comparative data are considered and these need to be refined and clarified before the case for inscription can be answered. It is also clear that the GBM is not the only area that has important eucalypt forest values and that 5 existing World Heritage properties as well as 2 other sites also have their own (and in some cases more convincing) distinctive qualities. The major distinction of the GBM is that it contains the highest number of eucalypt taxa (13% of global total) and that it has the widest and most balanced representation. It is also acknowledged as a Gondwana refugia and contains one of the largest tracts of old growth eucalypt forest. These forests display a particularly diverse fire history. The remaining natural values are considered secondary to other sites but supportive of the area in an additive fashion.

4. INTEGRITY

There are three aspects relating to integrity that relate to the GBM nomination. These are the effects of previous land uses; boundary issues; and threats.

4.1. Previous Land Uses

The statement in the nomination (p. 180) that “The GBM area is close to pristine” and that most of it is “unmodified by European settlement” needs to be qualified. A number of uses have had substantial cumulative impact on the nominated area in the past (though most have now been phased out) These are:

- ◆ **Water storage dam.** The Warragamba dam, which created lake Burragorang, supplies 70% of Sydney’s water requirements. A substantial area of the GBM valley bottom forest was lost when the dam was constructed. Although the reservoir itself has been excluded from the nominated area, part of its catchment area extends into the Nattai, Blue Mountains and Kanangra Boyd areas of the GBM.
- ◆ **Cattle grazing,** particularly in Kanangra and Nattai National Parks and to a lesser extent in Wollemi and Yengo. Now mostly removed but grazing by feral cattle and horses still occurs.
- ◆ **Logging,** has occurred in a few localities in the nominated area, especially in key mountain habitats in Kanangra Boyd National Park.
- ◆ **Coal mining,** formerly occurred in parts of Blue Mountains National Park (several major features are the result of cliff collapses). One of the popular visitor attractions is a relic of coal mining – the Scenic Railway at Katoomba. Much of this mining was long ago (late 19th and early 20th century) and is now regarded as a part of the cultural heritage of the area. Nevertheless, the coal mining did impact on the catchments of both the Nepean and Grose catchments of the nominated area.

- ◆ **Military activities.** Much of Wollemi National Park was a military exercise area prior to its reservation. Whilst much of the military exercises were low key and confined to the more accessible areas, there remains evidence of impacts including tracks, an airstrip, many unfilled trenches and old campsites with rubbish.
- ◆ **Oil shale mining.** Although the past oil shale mining in the Wolgan and Newnes valleys are noted in the context of the cultural heritage, no mention is made of the massive impacts of these operations on the natural environment. Some of the areas now presented as pristine forest were completely stripped of forest for pit props and fuel, all of which has been photographically recorded.
- ◆ **Clearing.** Many valley sites and some plateau sites have been subjected to clearing and roading since the commencement of colonisation. Some have completely regrown and others remain evident. Extensive areas in the Nattai were cleared before farmers were moved out to protect the water catchment. Even in some of the more remote parts of the Wollemi, small clearings remain, often associated with small patches of volcanic soils.
- ◆ **Fire Policy.** A major change in the fire regime in the GBM has occurred since European settlement. Although the fire history is not well understood, there have been a number of species shifts that have altered the natural functioning of the GBM ecosystem.

On the positive side, all of the above impacts are being reduced by active management and the landscape is recovering. In presenting the case for the GBM, however, these previous uses were not clearly identified.

4.2. Boundary Issues

Although the nominated area is of sufficient size to protect the biota and ecosystem processes, it does have several boundary anomalies that reduce the effectiveness of its 1 mil ha. size. First, the map of the area reveals an extraordinarily convoluted boundary, particularly in the north and east. This is explained by historical patterns of clearing and private land ownership that preceded establishment of the parks. Aside from the complexity in managing an area with such a high boundary/area ratio, these private lands represent relatively little threat (e.g. source of runoff, introduced species and wildfires) to the GBM. The New South Wales Government also has guidelines for controlling developments in adjoining lands which address this issue.

Of greater concern is the central corridor occupied by the City of the Blue Mountains and a national transport artery that splits the nominated area in two (the GBM not a “contiguous” unit as stated in the nomination {p. 121}). All of this corridor is upslope from the nominated area and poses a number of threats to the site as will be discussed below.

A second issue with boundaries is the existence in the GBM of 155 inholdings totalling 75,000ha. In light of potential concerns over the existence of enclaves, IUCN requested supplementary information on the specific location, uses and threats in these private inholdings. This additional information noted that the landuse on half of the inholdings is cattle grazing on native vegetation. Other uses made of the inholdings are for rural residences and selective logging. Although there is one mining lease within one inholding and coal does exist in others, mining is not economic and is not permitted within the external boundaries of the GBM. It is also the policy of the NPWS to acquire inholdings that have conservation significance as funds are available. Sydney Water has also acquired 13 enclaves for catchment protection. Nevertheless, inholdings within the site are substantial in number and size and, although, not presenting any great current threat, have the potential of becoming problems in the future.

4.3. Threats

As for any protected area, the GBM have an array of management issues to face. The nomination document (section 5) provides a good overview of all but one of these (see below) and how they are being met. During the field mission IUCN was impressed with the overall standard of management, commitment and cooperation with the City of Blue Mountains. As the City is a critically important interface between the GBM and major urban development, such cooperation is essential. Particularly commendable initiatives were the Bioindicators Survey, Bush Care Programme, the trail system, the Introduced Species Management Plan and the State Government's sewerage transfer scheme which has diverted discharge into the nominated area from the City. Control of stormwater runoff, however, has just begun with only about 10% of the \$150 mil required now allocated. With a major city running along a rocky ridge above the nominated area runoff into the Grose and Nepean rivers will always be a problem and will always detract from the integrity of the site.

One threat not mentioned in the nomination is the proposal for a new international airport at Badgerys Creek 10km from the eastern boundary of the GBM. IUCN has reviewed relevant portions of the draft Environmental Impact Statement as well as copies of submissions against the proposal by conservation and community groups. The proposed airport would maximise use of airspace over the Blue Mountains area resulting in aircraft noise levels of 70 to 80 decibels. Such flights would also be visually intrusive and adversely affect the natural quiet and ambience of this part of the GBM. The airport would also increase air pollution through vehicle traffic to the site and airborne fuel emissions and fuel dumping. As noted in the submission by the City of Blue Mountains, the World Heritage nomination of the GBM "... would be unacceptably compromised by the adverse impact... caused by aircraft flights over the Blue Mountains". Other local governments and the State Government also oppose the project. A decision by the Commonwealth Government on construction of the new airport is expected to be announced in mid-1999.

5. ADDITIONAL COMMENTS

IUCN conducted the field inspection of the GBM jointly with ICOMOS. Strong linkages between the cultural and natural values of the area clearly do exist. On the question of the conservation history of the area, IUCN concurs with the report of the ICOMOS representative that this is of national rather than international value.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The GBM was nominated as a mixed site including natural criteria (ii), (iii) and (iv). The nomination notes that "...the crux of the case for its World Heritage listing could be said to lie in the outstanding universal significance of eucalypt-dominated vegetation, of which it represents the best single example...". The first question that arises then is – is there some way in which eucalypt –dominated vegetation is universally important in the sense that this judgement could be applied to other taxa, for example the *acacias*, *grevilleas*, *banksias*, *quercus*?

Certainly the eucalypts are a remarkable group of plants with many distinctive ecological traits. They have evolved in isolation on a fragment of Gondwana and represent a major component of global biodiversity. Eucalypts illustrate the importance of edaphic factors in community evolution and the unique structure of their canopies creates an environment without parallel in other taxa. Eucalypts are considered typically "Australian" but they also occur naturally in Indonesia, Papua New Guinea and the Philippines.

Several reviewers felt that to base a nomination, however, on the universal significance of one taxa of plants is a somewhat narrow focus and could lead to a precedent for many others. Also the question was raised of whether the GBM, with only 90 or 13% of 700 known eucalypt taxa, was sufficient on

its own to demonstrate the traits of the genus. IUCN suggests that it may be more realistic to view the GBM nomination as an ecosystem that is dominated by eucalypt taxa (though it also has a substantial *acacia* element) but that has a mix of other natural and cultural values that combine to make the GBM the special landscape that it is.

Apart from this general question, of focus on one taxa, IUCN came to the conclusion that the case for World Heritage inscription of the GBM under natural criteria has not been demonstrated. This conclusion is partly based on (1) several claims in the nomination that require qualification; (2) the discussion in section 3 above on the comparison of the GBM with other sites; and (3) the findings of the World Heritage Expert Panel which did not suggest a clear basis for the GBM as being sufficient on its own. In more detail:

- ◆ There were shown to be 5 existing World Heritage sites in Australia that all had significant eucalypt and sclerophyll features along with various other outstanding natural values. Although the GBM is one of 2 peaks of eucalypt diversity, there is considerable overlap with existing sites and the nomination did not demonstrate that, on its own, this focus was sufficient to meet the test of outstanding universal value.
- ◆ The World Heritage Expert Panel recognised 4 other areas in 3 states that had globally important eucalypt values. Two of these – the Australian Alps and the GBM – were presented as equivalent to two other existing World Heritage sites (Kakadu and Southwest Tasmania) in terms of their importance in representing the sub-theme of eucalyptus-dominated vegetation. The Panel then went on to suggest that a series of areas would be required to constitute a globally-significant expression of the eucalypt vegetation sub-theme. Based on the recommendations of the World Heritage Expert Panel Report, it is concluded that the GBM on its own is not sufficient to meet World Heritage criteria (ii) and (iv) and that a serial nomination might be worth considering.
- ◆ Although the Panel noted the importance of the GBM for 4 other sub-themes (for example the significance of the Wollemi pine as a relict species), it did not rate the area as warranting further investigation on the global significance for any of these. IUCN would concur with this and also adds caution on taking such an additive approach where a collection of secondary values is combined to build a case for inscription.

In conclusion, IUCN has found this a difficult nomination to assess. The GBM have many important heritage features, and the protected areas within them are well managed. The arguments, moreover, are finely balanced, but IUCN's judgement is that the nomination in its present form does not meet the criteria for World Heritage status. The GBM are clearly significant at the national level but a clear and convincing case for their importance at the global level has not been made. Whether a serial nomination consisting of the GBM and one or more other areas, as suggested by the Panel and a number of reviewers could be made is a question worthy of further study by the Australian authorities. Part of the revised nomination would also need to take into account issues dealing with the Conditions of Integrity including the 156 inholdings in the site and the threats from the proposed new airport.

Finally, IUCN supports the conclusions of the State/Commonwealth Expert Panel that there is potential in a serial nomination to cover eucalypt systems in Australia, in which the GBM area could be a key component, along perhaps with parts of the Australian Alps and the south-western corner of Western Australia. Indeed IUCN notes that there is a useful precedent in the Australian Fossil Mammal site in which distantly separate sites form part of one nomination.

7. RECOMMENDATION FROM THE TWENTY-THIRD ORDINARY SESSION OF THE BUREAU: JULY, 1999

At its twenty-third ordinary session, the Bureau decided to **defer** the present nomination under natural criteria and to invite the Australian authorities to consider the possibility of a serial nomination to

cover the full range of values of eucalyptus ecosystems. The Bureau also noted a number of impacts, including 155 inholdings and the potential for an airport at Badgerys Creek, which might compromise the integrity of the area.

The State Party has advised that they will be submitting information to address the concerns of the Bureau.

CC54/rnh/1999 Evaluations/c) Tech Eval Reports (Eng)/1 Committee Rep October 99

