Convention Concerning the Protection of the World Cultural and Natural Heritage

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

Report to the Bureau of the World Heritage Committee

Twenty-fourth session

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Prepared by IUCN – The World Conservation Union

5 May 2000

Cover photograph: The Drakensberg Park / Alternatively known as oKhahlamba Park (South Africa)

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5 May 2000

1. INTRODUCTION

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

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

(i) the need to ensure the highest standards of quality control and institutional memory in relation to technical evaluation, monitoring and other associated activities;

(ii) the need to increase the use of specialist networks of IUCN, especially WCPA, but also other relevant IUCN Commissions and specialist networks;

(iii) the need to work in support of the UNESCO World Heritage Centre and States Parties to examine how IUCN can creatively and effectively support the World Heritage Convention and individual sites as "flagships" for biodiversity conservation; and

(iv) the need to increase the level of effective partnership between IUCN and the World Heritage Centre, ICOMOS and ICCROM.

Members of the expert network of WCPA carry out the majority of technical evaluation missions. This has allows for the involvement of regional natural heritage experts and broadens the capacity of IUCN with regard to its work under the World Heritage Convention. Reports from field missions are comprehensively reviewed by a working session of the IUCN World Heritage Operational Panel at IUCN Headquarters held from 3-7 April, 2000. PPA then prepared the final technical evaluation reports 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.

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 evaluations. 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 partner institutions.

2. FORMAT

Each technical evaluation report presents a concise summary of the nomination, a comparison with other similar sites, a review of management and integrity issues and concludes with the assessment of the applicability of the criteria, and a clear recommendation to the World Heritage Bureau. Standardised data sheets, prepared for each nomination by the World Conservation Monitoring Centre (WCMC), are available in a separate document.

3. SITES REVIEWED

At the time of writing, sixteen evaluation reports have been prepared by IUCN in 2000. These comprised:

- Thirteen (13) natural sites nominations (including one renomination and two extensions to existing World Heritage sites);
- Three (3) mixed sites (including one deferred site for which additional information has been received); and

IUCN will provide a supplementary report to the June 2000 Bureau which will include the technical evaluation of one natural site, one mixed property and comments on one cultural landscape nomination. The field inspection of these sites took place in April and May, after the printing of this report.

It has not been possible to review two (2) 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 two (2) sites will be included in the full evaluation report to the 2000 November Bureau meeting

The specific files reviewed by IUCN are as follows:

A. Nominations of natural properties to the World Heritage List

A.1 New nominations

966	Ischigualasto Provincial Park/Talampaya National Park	Argentina
967	Noel Kempff Mercado National Park	Bolivia
998	Jaú National Park	Brazil
999	Pantanal Conservation Complex	Brazil
1000	Fernando de Noronha Marine National Park	Brazil
964	Kopacki rit	Croatia
991	National Park of Abruzzo	Italy
1012	Kinabalu Park	Malaysia
1013	Gunung Mulu National Park	Malaysia
953	Lena River Delta	Russian Federation
1007	The Cape Floristic Region – Phase 1: Cape Peninsula Protected Natural Environment	South Africa
1017	Central Suriname Nature Reserve	Suriname

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

898	The High Coast	Sweden

A.3	**Extension of properties inscribed on the World Heritage List**	
98 Bis	Plitvice Lakes National Park	Croatia
725-858 Bis	Caves of the Aggtelek Karst and Slovak Karst (Extension to include the Dobšinská Ice Cave (Slovakia))	Hungary / Slovakia
A.4	**Renomination of properties inscribed on the World Heritage List to include additional criteria**	
672 Bis	Ha Long Bay	Vietnam
B	**Nomination of mixed properties to the World Heritage List**	
B.1	**New nominations**	
1001	Mt. Qincheng and Dujiangyan Irrigation System	China
994	Curonian Spit	Lithuania/Russian Federation
992	Shey-Phoksudo National Park	Nepal
985	Drakensberg Park alternatively known as oKhahlamba Park	South Africa
B.2	**Deferred nominations for which additional information has been received**	
917	Greater Blue Mountains Area	Australia
C	**Nominations of cultural properties to the World Heritage List**	
C.1	**New nominations**	
968	Södra Ölands Odlingslandskap (The Agricultural Landscape of Southern Öland)	Sweden

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 2000);

3. **Field Inspection**. Missions are sent to evaluate the site on the ground and to discuss the nomination with relevant authorities;

4. **IUCN World Heritage Operational Panel Review**. The IUCN World Heritage Operational Panel intensively reviews all field inspection reports and associated background material and agrees 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 will be incorporated into the final IUCN evaluation report which is sent to the World Heritage Centre eight weeks prior to the 2000 November Bureau and Committee meeting.

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

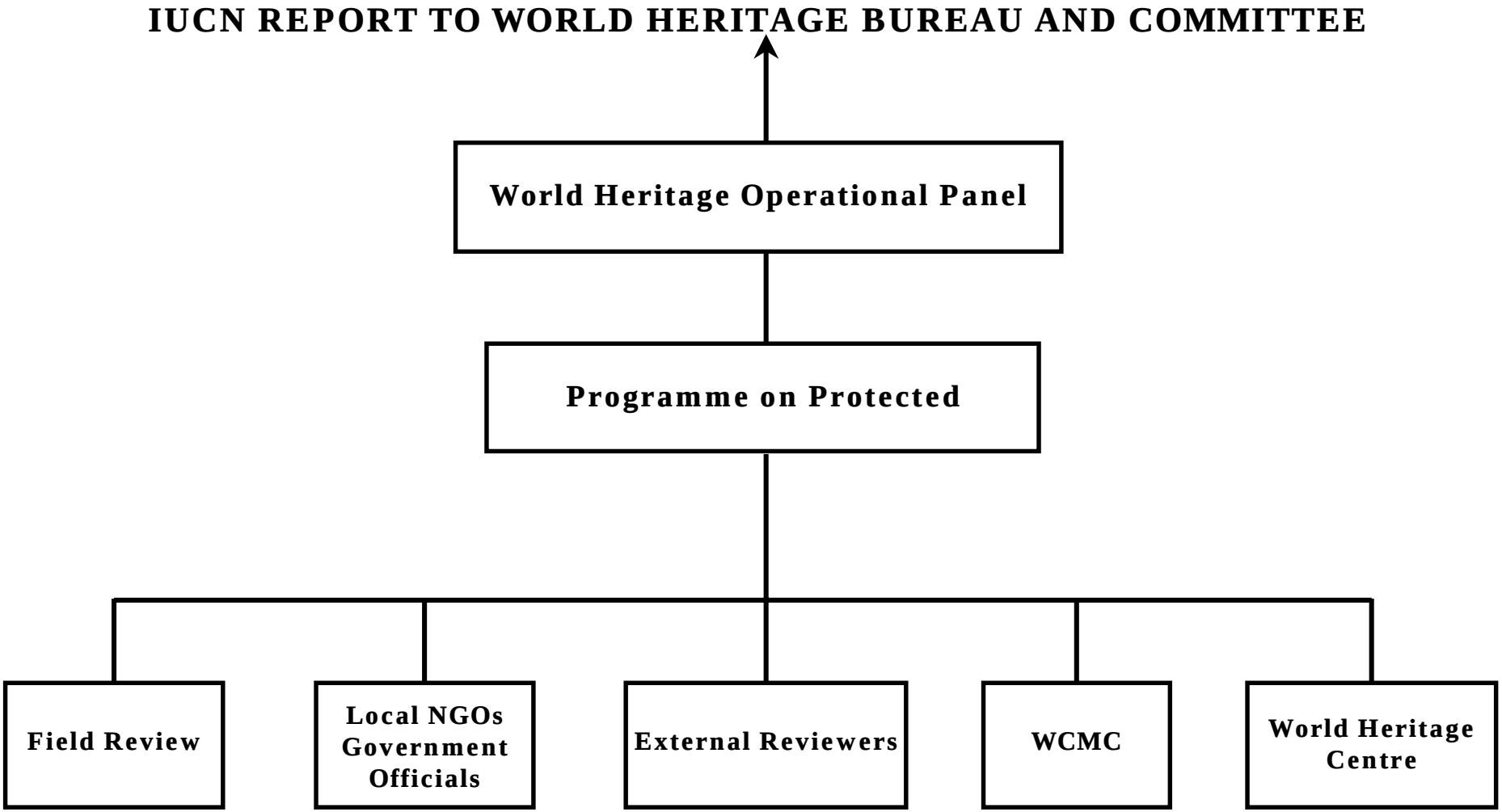
It is stressed that the Biogeographical Province concept is used as a basis for comparison only and does not imply that World Heritage sites are to be selected solely on this criteria. The guiding principle is that World Heritage sites are only those areas of outstanding universal value.

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

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

This report presents the official position of IUCN.

Figure 1


IUCN REPORT TO WORLD HERITAGE BUREAU AND COMMITTEE
World Heritage Operational Panel
Programme on Protected
Field Review
Local NGOs Government Officials
External Reviewers
WCMC
World Heritage Centre

TECHNICAL EVALUATION REPORTS

A. Nominations of natural properties to the World Heritage List

A.1. New nominations

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ISCHIGUALASTO PROVINCIAL PARK-TALAMPAYA NATIONAL PARK (ARGENTINA)

1. DOCUMENTATION

i) **WCMC Data Sheet**: (9 references)

ii) **Additional literature consulted**: 1998. **Monograph on Ecosystems and Palaeontology of Ischigualasto Natural Park**. Argentina; 2000. **Criteria and Actions for Co-operative Management of the Ischigualasto-Talampaya Parks**; Sill, W. 2000. **Comparison of the world's Triassic vertebrate localities - a synopsis**. Unpublished Ms., 2pp; Olsen, P. 2000. **The Triassic World**. Columbia University; Wells, R. T. 1996. Earth's Geological History – a contextual framework for assessment of World Heritage fossil site nominations in **Global Theme Study of World Heritage Natural Sites**, IUCN, Switzerland, 43pp.

iii) **Consultations**: Specialists from the National Secretariat of Tourism, University of San Juan, Museum of Natural Sciences, staff of Ischigualasto Provincial Park, Argentine National Parks Administration, University of La Rioja, local government and authorities.

iv) **Field visit**: Paul Dingwall. March, 2000.

2. SUMMARY OF NATURAL VALUES

The nominated site comprises two contiguous parks: Ischigualasto Provincial Park (Category II, IUCN) created in 1971, and Talampaya National Park (Category II, IUCN), originally established as a provincial park in 1975 but reclassified as a national park in 1997. Located respectively in the provinces of San Juan and La Rioja, in the desert region on the western border of the Sierras Pampeanas of central Argentina, the parks encompass a single geographical unit of 275,369ha (see maps 1 and 2). The parks were established to protect geological formations of the Triassic Period, and associated landscapes, scenery and biota.

The site constitutes almost the entire sedimentary Ischigualasto-Villa Union Triassic Basin, consisting of continental sediments deposited during the entire Triassic Period of geological time, from approximately 245 to 208 million years ago. There are six geological formations, the earliest of which are the red sandstones of the Talampaya and Tarjados Formations, exposed as 200m-high cliffs in Talampaya NP. The Ischichuca-Chenares Formation is composed of lake beds and beach deposits, the latter containing fossils of an ancestral group of mammals, termed Therapsida, including animals ranging in size from a bear to a small elephant. Also present are fossils of a group termed Archosauria - animals that are ancestors of the dinosaurs (and by extension birds), crocodiles and lizards. The Los Rastros Formation, cyclic sediments deposited in rift valleys during the earliest breakup of the Gondwana supercontinent, has a wealth of fossil plants, especially ferns such as *Cladophlebis*. The Ischigualasto Formation, composed of strikingly white floodplain sediments, is immensely rich in fossil specimens of reptiles, amphibians, therapsids and plants. The vertebrate specimens contain the earliest primitive dinosaurs, *Eoraptor*, and its more advanced contemporary *Herrerasaurus*. Finally, the Los Colorados Formation comprises classic red sandstones with an abundance of dinosaur fossils, almost entirely archosaurs and including large herbivorous and carnivorous dinosaurs, primitive true crocodiles, and primitive true mammals.

Ischigualasto-Talampaya is of outstanding scientific importance as the only known area in the world that contains a complete sequence of continental sediments with abundant fossil fauna and flora for the Triassic Period of geological history. This period is very significant for understanding the evolution of life on earth, as it represents the origin of both mammals and dinosaurs. Further, it offers the prospect of resolving one of the greatest enigmas of palaeontology - the rise to dominance of the dinosaurs and suppression of mammalian evolution over a period of 150 million years. The rich diversity of fossils includes some 56 known genera of vertebrates (species numbers yet to be determined), and at least 100 species of plants. Together with the geological strata, the fossils provide a unique window for viewing Triassic palaeoenvironments.

Additional to the scientific importance of the site are its scenic landscapes and features of great aesthetic and cultural value, including 1500 year-old petroglyphs. Outstanding among these are the 200m-high red sandstone cliffs of the Talampaya Fm. in Talampaya NP. In Ischigualasto Provincial Park, the white and multicoloured sediments of the Ischigualasto Fm. create a stark, lunar-like landscape entitled “El Valle de la Luna - the Valley of the Moon”.

The site has typical El Monte (desert) vegetation, which is sparse and characterised by xeric shrubs and cactus, with mesquite and quebracho trees. Among the 172 species of higher plants recorded are six considered in need of special protection because they are endemic and/or rare. Among the vertebrates, those considered endangered or vulnerable include five species of mammals, three species of birds and three species of reptiles.

3. COMPARISON WITH OTHER GEOLOGICAL SITES

The Triassic Period opens the Mesozoic Era of geological time, known as the “Age of Dinosaurs”. Comprising three major stages, it was a critical period in the evolution of life on earth because all of the groups of tetrapods (4-legged animals) evolved by its end (Olsen, 2000). Continental Triassic sediments like those in Ischigualasto-Talampaya are found at several world localities, but they are generally limited in extent and not rich in fossils (Sill, 2000). Germany, Switzerland, Italy and the U.K. have Early and Late Triassic exposures. Russia’s Ural Mountains have an important Early Triassic site, and there are others in China and India, the latter having the continent’s only well known Late Triassic fossils. The Karoo of southern Africa is a major reference for the Early Triassic, while Algeria, Libya and Morocco have some Late Triassic sites. In North America, Early Triassic vertebrates are found only in scattered localities in the southwest, and there are extensive Late Triassic sediments in eastern USA extending into Canada, and in the red beds of the southwest, notably in the Chinle Fm. of Arizona. In Antarctica Early and Late Triassic sites are known, principally bearing fossil plants with some vertebrates.

Unlike any other place in the world, the Argentine Ischigualasto-Talampaya site has seven sequential Triassic formations representing the entire Triassic Period. The Middle Triassic here is undoubtedly the best representative of that age currently known anywhere.

Few Triassic sites are protected. Only two in the United States are protected as national parks or monuments: the Petrified Forest NP in Arizona, which has several plant and animal groups represented, but is limited to the Late Triassic; and Dinosaur NM in Utah, with its outstanding dinosaur assemblage of great scientific importance, which is mostly Late Jurassic in age. Among existing World Heritage sites, the one most noted for its fossil dinosaurs is Canada’s Dinosaur Provincial Park but it is much younger that Ischigualasto-Talampaya, dating from the Late Cretaceous only 75 million years ago. Of the other important palaeontological sites on the World Heritage List - Australian Fossil Sites, Messel and Miguasha - none is Triassic in age. Wells (1996), in providing an indicative representative list of the world’s fossil sites with potential for World Heritage status, selects Ischigualasto for its exceptional Mid-Late Triassic record of early dinosaurs.

Attached is an Annex which documents the qualities of the nominated site against the IUCN criteria for establishing the universal value of fossil sites (Wells, 1996). The results provide a good demonstration of the World Heritage significance of the site.

4. INTEGRITY

4.1 Boundaries

The boundaries of the nominated site encompass the surface expression of the entire Triassic age Ischigualasto-Villa Union sedimentary basin, thus including all key fossiliferous strata within the protected area. It is a holistic geological site containing an entire geosystem with all interrelated components - continuous sequences of rock outcrops, erosional forms, outwash areas and depositional features. Although most of the boundaries follow straight lines rather than topographic contours, this is not a problem given the poor definition of catchments in the desert landscape.

4.2 Management

The nominated site is public land with strong legal protection. Although about 20% of the area is managed under Provincial law, this provides statutory protection equivalent to the national park. There is no formally approved management plan for the site, but the plan for Talampaya NP is in the final stages of public consultation, and for Ischigualasto there is a comprehensive resource management document providing the basis for a future plan. The national and provincial authorities are establishing a single cooperative management regime for the site. Already, there is a documented agreement specifying common management objectives, planning processes and zoning procedures, and integrated action in respect of staff training, tourism management, control measures, research, institutional supervision and support, among others. Oversight of joint management will be provided by a standing Coordinating Committee, assisted by a single Technical Advisory Group representative of key local scientific institutions, provincial agencies and non-governmental conservation organisations. This should ensure the application of uniform management policies, programmes and standards across the entire site.

Management resources are limited and park infrastructure is only rudimentary at present. However, the need for improvement is well recognised by the administering agencies, and appropriate provisions are included in the draft management plan. There is a commitment to implement the management plan by the key authorities at all levels - park, municipal, provincial and national. Among the priority management requirements are:

- increased staffing levels above the existing complement at Ischigualasto of one ranger and eight certified guides, and at Talampaya of two rangers and 17 unofficial guides;
- more vehicles for park maintenance and visitor guiding purposes;
- improved administration and visitor facilities, such as interpretation centres, rangers' accommodation, toilets, stores, restaurants, camping facilities and walking trails; and
- increased funding.

The parks are zoned appropriately for protection and use, and currently there are no significant threats to the values protected in the nominated site. Impacts from tourist use, unauthorised grazing and exotic pests are minimal and are within acceptable levels that can be sustained without serious loss of park values. Research and collection of specimens are strictly controlled, and there are heavy penalties for illegal collecting and poaching, which appear to be minimal. The parks are very well served by scientific and technical advice for underpinning their research, education, training and interpretive programmes. A feature at the site is the strong interaction between the parks and the surrounding communities.

Overall, the nominated site adequately satisfies all key conditions of integrity.

5. ADDITIONAL COMMENTS

No additional comments.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

Ischigualasto-Talampaya is nominated in accordance with World Heritage natural criteria (i), (iii) and
(iv).

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

Unlike any other place on earth, Ischigualasto-Talampaya is made up of a complete sequence of fossiliferous continental sediments representing the entire Triassic Period of geological history. As such, it is one of the most important palaeontological sites in the world, and of great scientific and conservation value. This is the fundamental basis of its claim to outstanding universal value in representing a major stage of earth's geological evolution.

In the sediments of Ischigualasto-Talampaya are found fossil-bearing strata that document the transition from Early Triassic mammalian ancestors to the age of dinosaur dominance in the Late Triassic. No other place in the world has fossils that can compare to those preserved in the Chanares, Los Rastros and Ischigualasto Formations in these parks for revealing the evolution of vertebrate life and the nature of palaeoenvironments in the Triassic Period, which ushered in the Age of Dinosaurs over the next 150 million years. Although there are Triassic sites on other continents, they are generally small and scattered with limited fossil abundance, and they represent only a restricted period of the 45 million years of Triassic time. IUCN considers that the nominated site meets this criterion.

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

Ischigualasto-Talampaya contains some spectacular scenery. The many canyons in Talampaya NP are bounded by towering 200m high bright red-coloured walls, some eroded into cathedral-like spires, while in Ischigualasto PP stratified rock formations are carved by rain and wind into erosional shapes, protruding conspicuously above a stark, ash-coloured landscape colloquially referred to as "El Valle de la Luna- the Valley of the Moon". Also the rock formations and landscapes of the parks have become visual icons for the region and the country, ranged alongside the images of Argentina's other World Heritage sites - the peaks and glaciers of Los Glaciares and the cataracts of Iguazu Falls. However, when compared to other World Heritage sites inscribed under this criterion, the nominated site does not rank high. IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

The biodiversity values of the site are not well documented in the nomination, and the claim made against this criterion is, therefore, not established. The plants and wildlife of the parks are still not completely known. The vegetation has been broadly mapped throughout, and an inventory of the plants in Ischigualasto Provincial Park only recently conducted. On the positive side, the natural habitats of the site are important because they are largely in an unmodified state. The site is large (about three quarters of a million hectares) and protects a very substantial representative piece of El Monte(desert) ecosystems - certainly more than any of the several other protected areas in the desert region. On the negative side, the biota and habitats here are typical of the region rather than outstanding and, apart from three plants being reported as endemics, they lack special features. Nor is the vegetation here of a type that is unique in the world - being

essentially replicated in the great Sonoran Desert of southwestern USA. IUCN does not consider that the nominated site meets this criterion.

7. RECOMMENDATION

That the Bureau recommends to the Committee to **inscribe** Ischigualasto Provincial Park and Talampaya National Park on the World Heritage List under natural criterion (i).

The Bureau may also wish to recommend to the Committee that the State Party, along with the relevant Provincial authorities, proceeds as soon as possible with the establishment of a single cooperative management regime, including completion of an integrated management plan and provision of adequate human and financial resources to implement effective management.

ANNEX I: EVALUATION CHECKLIST FOR FOSSIL SITES

Coverage of an extended geological time period

Ischigualasto-Talampaya has fossils covering virtually all of the Triassic Period, i.e. approximately 45 million years from 245 to 208 million years B.P. It is the only known area containing a complete sequence of fossiliferous continental sediments for the Triassic, so is of immense scientific importance.

Rich species diversity

The site provides a wide variety of both plant and vertebrate fossils. At least 56 genera of vertebrates are known, including fish, amphibians and a great variety of reptiles and direct mammalian ancestors. Some 100 species of fossil plants have been identified. Palynological (pollen) studies are incomplete but will increase the known diversity of the ancient flora. Three species of fossil freshwater invertebrates have been identified.

Uniquely representative of a geological time period

The nominated site is unique in presenting a complete sequence of continental fossil bearing strata from the Triassic. Other sites, especially in South Africa, Russia and the USA, have representative Triassic faunas of the Early and/or Late Triassic, but none of them has extensive Middle Triassic specimens. Moreover, none of them can document the transition from Therapsida (ancestral mammals) in the Early Triassic to the dominant dinosaur fauna of the Late Triassic.

Contribution to understanding life on earth

The nominated site is one of the principal locations for studies on the origins of dinosaurs, and on the early faunal transition that was eventually to lead to dominance of dinosaurs in all the earth's ecological niches on land, sea and in the air, a most significant faunal transition in the history of life on earth. The abundance of fossil biota enables comprehensive interpretation of palaeoenvironments and landforming processes that existed more than 200 million years ago.

Prospects for ongoing discoveries

Literally thousands of specimens have been recovered from the sediments of the parks, and many fossils are added to the collections annually. There are excellent prospects for further significant discoveries of fossil flora and fauna at the site. Due to the very rugged terrain, more than half of the site has not yet been thoroughly explored.

International level of interest

The fossil plants and vertebrates of Ischigualasto-Talampaya are of great significance to the sciences of palaeontology and evolutionary biology. The site is of international renown in scientific circles as a principal location for in-situ study of the world's earliest dinosaurs. Palaeontological research has been conducted here for 70 years, and most of the 627 scientific papers related to the area are published in international journals. Specimens from the site are of high quality and are in great demand for research and display, such as for the special exhibit on the world's oldest dinosaurs held at the Texas Memorial Museum in 1997.

Associated features of natural value

Among the other notable natural features are spectacularly scenic rock formations and landscapes, protected wildlife and endemic plants characteristic of "El Monte" (desert) vegetation.

State of preservation of specimens

The site is remarkable for the recovery of whole skeletons of vertebrate animals, enabling detailed study of the physiology and behaviour of the earliest dinosaurs and proto-mammals. Studies of jaw structures, for example, have revealed feeding mechanisms, skull shapes record the evolution of forward-looking eyes, and limb anatomy displays the early development of bipedalism and upright stance among the dinosaurs.

Curation, study and display of site and fossils

Specimens from the site, both palaeontological and biological, are fully catalogued and curated by the Museum of Natural Sciences at the University of San Juan, which is the principal research centre for the parks. The senior researcher has worked in the parks for more than 30 years, is an expert on the geology of the Triassic and one of the world's leading vertebrate palaeontologists. Researchers from the University of La Rioja are also very active at the site. While specimens are freely available for study, strict laws control all collecting of specimens, and all research is supervised by the University of San Juan. There are displays of the specimens at the museum, where a major new display of fossils and Triassic palaeoenvironments is planned. Exhibits at the park visitor interpretive centres are rudimentary but will be improved as resources allow. There are some in-situ displays of fossils in the parks. Rangers or guides accompany all visitors to the parks.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

NOEL KEMPFF MERCADO NATIONAL PARK (BOLIVIA)

The field inspection of the site took place in April 2000 and unfortunately the Technical Evaluation Report was not completed at the time of printing of this report. The evaluation report will be included in a supplementary report to the June 2000 Bureau Meeting.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

JAÚ NATIONAL PARK (BRAZIL)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (8 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; Davis, S. D. *et. al.* **Centres of Plant Diversity.** Vol. 3. IUCN; Thorsell, J. and T. Sigaty, 1997. **A global overview of forest protected areas on the World Heritage List (Draft).** IUCN; Gillet, H. *et. al.*, 1998. **A global overview of protected areas on the World Heritage List of particular importance for biodiversity.** UNESCO/WCMC/IUCN; Rylands, A. B., 1991. **The status of conservation areas in the Brazilian Amazon.** WWF, Washington DC; Rojas, M. and C. Castaño, 1990. **Areas protegidas de la cuenca del Amazonas.** Bogotá, Colombia; Castaño. C., 1993. **Situación general de la conservación de la biodiversidad en la región Amazónica: Evaluación de las áreas protegidas propuestas y estrategias.** FAO/CEE/IUCN, Ecuador; Henrique Borges. S and Carvalhes, A., 2000. Bird species of black water inundation forest in the Jaú National Park: their contribution to regional species richness. **In Biodiversity and Conservation,** Vol. 9, No. 2, pp 201-214.

iii) **Consultations:** 5 external reviewers, local park staff; staff of Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA) - Brazilia and IBAMA-Manaus; Vitória Amazônica Foundation; Municipal Secretary for Environment and Development/ Manaus; National Foundation of Indigenous Communities; National Institute for Environmental Research for Amazonia; University of the Amazon. Representatives of local communities.

iv) **Field visit:** Pedro Rosabal. February, 2000.

2. SUMMARY OF NATURAL VALUES

The Jaú National Park (JNP), with an area of 2,272,000ha, is the largest National Park in the Amazon Basin. It is located approximately 200km north-west of the city of Manaus, within the municipalities of Barcelos and Novo Airao in Amazonas State (see Map 1). Amazonia is known as one of the most biodiversity rich regions on the planet. It is the largest drainage basin of the world, measuring 6,300,000km^2, and home to the largest tropical forest, extending some 5,000,000 km^2.

The Amazon River can be divided, from the limnological point of view, into three types of systems characterised by water colour. One of them is the blackwater system, the headwaters of which are located primarily in the crystalline soils of the Guyana Shield. Its dark colour results from organic acids liberated into the water through the decomposition of organic matter and the lack of terrestrial sediments. JNP includes a significant proportion of the blackwater drainage system and associated flora and fauna. The rivers of JNP provide a landscape of white-sand beaches during the dry season and flooded forest during the wet season, as well as secondary stream beds of different sizes, channels, lakes, *paranás* (a branch of the river separated from the main channel by a strip of non-inundated land) and an important fluvial phenomenon - the *ria lake*, which is typical of all large rivers in the Amazon region. Of important aesthetic value during the dry

seasons is the nine-tier waterfall of the Carabinani River where the river drops gradually along an 800m trajectory.

The forest cover of JNP is linked to the extensive and continuous tropical rainforests of the Amazon Central Plain. It includes three vegetation types (RadamBrasil, 1978): (a) dense tropical forest, located primarily on *terra firme*, thereby free from inundation in the flooding season. This forest is generally very stratified, including a stratum of large emergent species than can reach more than 30m, and presents an average of 180 plant species per hectare (Ferreira *et. al*., 1996); (b) open tropical forest, characterised by an arboreal stratum with individuals of low height and thin trunks, with many epiphytes of the families Bromeliaceae and Orquidiaceae, and containing an average of 108 plant species per hectare (Ferreira *et. al*., 1996). Where these forests grow on inundated soils they are known as *Igapó* forests; and (c) Campinarana, a vegetation mosaic restricted to the Negro River watershed, occupying primarily upland regions and drained by tabular watercourses.

JNP protects an impressive range of fauna, with many species associated with blackwater river systems. There is a high diversity of vertebrates with 120 species of mammals, 441 birds, 15 reptiles and 320 fishes. The number of birds reported for JNP is likely to increase with research as the avifauna of this area is poorly known. It has been indicated as a priority area for ornithological studies (Oren and Albuquerque, 1991). Numerous species of global conservation concern live within JNP, including jaguar, giant otter, Amazonian Manatee, South American River Turtle and black caiman. The importance of JNP for the Amazonian fauna is reflected by the fact that it contains approximately 60% of the species of fishes reported to exist in the Negro River watershed, and also 60% of the birds recorded from the Central Amazon (Borges *et al*., 1996). JNP is also a key reference area for the study of the Amazonian Manatee.

3. COMPARISON WITH OTHER AREAS

The nominated site is located within Udvardy's Amazonian Biogeographic Province. There are other World Heritage areas which contain parts of the Amazonian Province (namely Sangay National Park in Ecuador and Manú National Park in Peru); however, JNP is the only one that contains this Province exclusively.

The Manú National Park (Peru) is mainly located in the Yungas Biogeographical Province. It encompasses altitudes ranging from 240 to 4,000 m, with a mosaic of tropical forests, mountainous landscapes and high plains. However, Manú conserves only part of the broad diversity of Amazonian landscapes. The Jaú National Park offers the possibility of preserving a large area of tropical forest on the Central Amazonian Plain. The Park is also unique in protecting extensive Amazonian forests within a blackwater ecosystem, a system that is still poorly known from the scientific point of view.

JNP is also important from the hydrological point of view as it covers the entire basin of Jaú River, considered as the best example of a blackwater river ecosystem (Pinheiro, 1999). The site includes the unique flora associated with blackwater flooded forests. The dry-land habitats of JNP contain large areas of high forests and an open vegetation called campinas and campinaranas on white-sand soils.

The Central Suriname Nature Reserve, that has been also nominated for World Heritage listing in 2000, is located in a very different area of the Amazon region (on the Pre-Cambrian Guyana Shield). In these areas clear water rivers predominate. Despite the fact that aerial photographs suggest that JNP and the Suriname reserve are similar, the floristic composition is very different.

There are a number of protected areas covering blackwater ecosystems in the Brazilian Amazon - the Pico da Neblina Transfrontier National Park (2,200,000 ha); Jaú National Park (2,272,000), the Anavuhanas Ecological Station (350,018 ha), the Uatumã Biological Reserve (560,000 ha), Serra do Aracá State Park (1,818,700 ha), and Rio Negro State Park (436,042 ha). The most significant of these, however, is Jaú in terms of its size, the large extension of blackwater flooded

forest, and its location spanning two important Biogeographical Provinces: the central lowlands of Amazonia and the Guyana Shield. The Serra do Aracá and Pico da Neblina are mountain protected areas, mainly associated with the Guyana Shield.

As mentioned, the only other World Heritage Site which includes at least part of the Amazon lowland ecosystems is Manú National Park in Peru, but it is only representative of whitewater river ecosystems of the upper Madre de Dios basin. Otherwise there are no such sites in the Amazon lowlands and certainly none which include the blackwater ecosystems, which are highly distinct in terms of their fauna, flora, limnology, and geology.

4. INTEGRITY

4.1 Boundaries

JNP's initial point is the confluence of the Jaú and Negro rivers and, from this point onward, it extends along the right margin of the Jaú River until the mouth of the Carabinani River. It encompasses the hydrographic basin of the Jaú River. According to the Brazilian Law for Protected Areas it has been established with a 10km buffer zone all around the National Park. The boundaries are adequate including a large area that is sufficient to maintain ecological processes occurring in the Jaú River watershed.

Park boundaries and geography favour protection of natural resources, such that only two monitoring posts are necessary to administer and control the entire area of the Park. IBAMA is the Federal Agency responsible for the management of the site. JNP has a permanent post at the mouth of the Jaú River, where it is possible to control all boats entering the Jaú and Carabinani Rivers. Although the monitoring routine has already been put into effect, equipment and training of Park employees are still insufficient for meeting identified needs. The second post, planned for the mouth of the Unini River, will be the most difficult to implement since part of the river lies outside official park boundaries, and the river is mostly used by commercial fishermen. The installation of this post is planned for this year, according to the Management Plan (see below).

4.2 Management

JNP is one of the few conservation units in the Brazilian Amazon with a management plan that is both complete and in the implementation phase. The management plan was completed in 1997 by the Vitória Amazônica Foundation after extensive consultation between IBAMA, the State government, research institutions and individuals from the extractive and tourism industries. Park planning benefited from the contribution of nearly 60 researchers of distinct areas of expertise, representing 13 different institutions.

The management plan for JNP is a comprehensive document that includes detailed information on the natural and social- cultural values of the Park, thematic maps, and the zoning of the Park. A management regime is proposed for each zone. Nine management programmes are proposed for the Park including operations and control, public use, research, environmental management and restoration, alternative economic options, and environmental education. A detailed workplan for implementation and budget is also included.

One of the objectives of the management plan is to integrate local people with conservation activities. Local communities (175 families) live along the main channel of the Unini River (112 families), with a small population on the Jaú River (56 families) and only 7 families on the Carabinani River (FVA, 1998). No indigenous residents live within the Park boundaries. Local people carry out traditional ways of life, making a living from the exploitation of traditional products such as bitter manioc cultivation, and from hunting and fishing (fishes and turtles). There are no major impacts associated with the activities of local people, which are very localised and based on sustainable practices. It is important to note that local people are now tending to leave the park looking for better schooling and medical facilities that have been developed outside the Park.

Management activities planned to integrate local residents with conservation initiatives within JNP include periodic meetings with Park residents to disseminate planning actions, training for professionals working on environmental education and research on economic valuation of natural resources. This programme includes the area of influence of JNP in Novo Airao. During the field mission it was possible to verify the high level of commitment from local people toward conservation of the site.

JNP has a personnel consisting of 27 people, four of them working for IBAMA (the head of the conservation unit and three rangers) and 23 working for Vitória Amazônica Foundation (including five researchers, two educators; and two technical staff responsible for the analysis and implementation of alternative economic activities). In addition there are 26 volunteer environmental protection agents from local communities. They use small radio stations to inform the authorities of IBAMA and Park staff of any intruders or problems detected, thus providing an active support to patrol activities. The management plan considers the need to increase the number of staff working in the Park although the number of staff today has proven to be sufficient to enforce conservation and control activities.

Between 1993 and 1998, IBAMA invested around R$1,400 million (approximately US$780,000) in JNP, of which R$378,000 (US$211,000) were spent on the elaboration of the management plan for the Park. It has been estimated that from 1992 to 1997, FVA channelled around R$1,600 million (US$894,000) into the preparation of the plan. Not included in this figure are salaries of researchers and expenses incurred by collaborating organisations. The primary sources of funding were: IBAMA through its National Programme for the Environment (PNMA-IBAMA), World Wildlife Fund (WWF), the European Union (EU), the W. Alton Jones Foundation and the Government of Austria. Available funding for the PP-G7 amounts close to US$47 million, with just a portion of this total (close to US$3.8 million) allocated to the Phase 1 for implementing the management plan.

4.3 Threats

In the region surrounding JNP, there are no development projects in effect or foreseen in the future, such as the construction of hydroelectric dams, gas transport lines, power lines or highways.

In the JNP, three natural processes that cause alterations to the environment occur: blow downs, changes in river flood dynamics and natural burns in areas of open vegetation. However, all of these events are part of the natural dynamic of Amazonian ecosystems and particularly hold important implications for the successional dynamics of the forest.

Activities conflicting with conservation of the area are primarily the commercial and ornamental fishing activities, and the hunting of chelonians. These activities occur primarily in the rivers surrounding the Park, such as the Unini and no impact to the populations of these species within the JNP has been reported. The Park Management Plan outlines extension activities which seek to conserve natural resources and educate the population living within the park and in adjacent areas in order to reduce the pressure over the Park's resources. The primary steps described to ameliorate these conflicting activities have already been carried out. These include the routine monitoring of the mouth of the Jaú and other areas, the training of 26 volunteer environmental agents to assist in these activities, and environmental campaigns over the radio to disseminate the limits and objectives of the JNP.

Ecotourism in the JNP is still limited; only in the last year, with the completion of the Management Plan was the Park opened for tourists. In 1998, 850 individuals visited the Park, the majority of these foreigners. These visits seek primarily the waterfalls of the Carabinani and the extensive beaches of the Negro River. This activity does not impact on the Park's natural values.

5. ADDITIONAL COMMENTS

The Ministry of the Environment of Brazil (MMA) has been working on an innovative new project called "Ecological Corridors", the purpose of which is to support conservation projects and help regulate the use of natural resources. This project is part of the Pilot Programme for the Protection of Brazilian Tropical Forests (PP-G7), in which various public organisations, such as the Ministry for the Environment, IBAMA, the National Indian Foundation (FUNAI) and state environmental institutions, are participating.

As mentioned before, the government of Brazil, through the Ministry of the Environment and IBAMA, is working on the development of a large biological corridor in Central Amazon which includes JNP and other 6 protected areas. Three reviewers suggested the desirability of including in a World Heritage site two of these areas, Mamirauá and Amanã, both of them designated as State Sustainable Development Reserves (close to Category VI, IUCN 1994). This issue was discussed during the evaluation mission in a meeting organised in the Institute for Environmental Protection for the Amazon Basin, Manaus. All participants agreed that it would be desirable to have a World Heritage site covering Jaú, Mamirauá and Amanã. However, they were also concerned at the implications of World Heritage status for areas like Mamirauá and Amanã where there is much higher human occupation including indigenous peoples groups. It was stressed that there would need to be a process of consultation with these local communities and indigenous peoples before a nomination for World Heritage listing was prepared. It was recommended that the best option would be to proceed only with the nomination of Jaú National Park and, if inscribed on the World Heritage list, this may provide a framework for future consultation for a subsequent nomination including Mamirauá and Amanã State Sustainable Development Reserves.

JNP also contains important cultural values that are relics of past human occupation of the Amazon region. A recent survey identified 17 archaeological sites at the mouth of the Negro River, with collected material as yet undated, suggesting that the area may have been a passageway between the Solimoes and Negro watersheds by ethnic groups present in these two regions. Numerous stone carvings are found on the river's edge, reinforcing the potential for archaeological research. Detailed studies of these sites could help to explain the history of human occupation of the lower Negro River region (FVA, 1997). The city of Airao, founded near the end of the XVII Century, is located in the buffer zone of JNP and represents the first Portuguese settlement of the Negro River watershed. Nowadays, the Instituto do Patrimonio Histórico Brasileiro (IPHAN) is in process of confirming the merit of the Airao ruins (abandoned in the 1950's) for official preservation activities (FVA, 1997).

6. APPLICATION OF WORLD HERITAGE CRITERIA

JNP has been identified as a significant site in a number of regional and global assessments. It is considered as a hot spot for biodiversity conservation in the Amazon basin (CI, 1991), as well as a site of high biodiversity value for conserving tropical forest biodiversity (CIFOR/UNESCO, 1998). IUCN also identified JNP as a forest protected area that merited World Heritage nomination (Thorsell, J. & Sigaty, T., 1997). This site has been nominated for inscription on the World Heritage List on the basis of all four natural criteria:

Criterion (i): Outstanding Example of Major Stages of Earth's Geological Evolution

JNP occupies an intermediate geographical position between the oldest and the most recent sedimentary formations of the Amazon Basin. Nearly 65% of the site forms part of the Solimoes Formation, an extensive sedimentary deposit, from the Palaeocene and Pleistocene. A unique geological formation of the Amazon basin is found here: the Prosperança formation, composed of uplands in a tabular terrain, which represents a barrier against the drainage of pluvial waters, is found here. Prosperança and Trombetas formations are much older landforms, dating from the Palaeocene Era. However JNP does not rank highly compared with other existing World Heritage sites that show examples of longer periods of Earth's evolution. IUCN does not consider that the nominated site meets this criterion.

Criterion (ii): Contains Outstanding Examples Representing Significant On-going Ecological and Biological Processes

From the limnological point of view the complex drainage system of the Amazon basin can be subdivided into three types of systems, one of them being the blackwater river system. Its dark colour results from organic acids released into the water through the decomposition of organic matter and the lack of terrestrial sediments. JNP not only protects the entire hydrological basin of the Negro River but a large portion (60%) of the biodiversity associated with the blackriver system. JNP also has a sufficient size to allow the maintenance of significant on-going ecological and biological processes, such as blow downs, changes in the river flood dynamics and natural burns, thus providing unique opportunities to study their effect on biodiversity in natural ecosystems. IUCN considers that the nominated site meets this criterion.

Criterion (iii): Site Containing Superlative Natural Phenomena or Exceptional Natural Beauty

The rivers of JNP provide a landscape of white-sand beaches during the dry season and flooded forest during the wet season, as well as secondary streambeds of distinct sizes, channels, and lakes. All these natural features are of aesthetic value but they are also found in other large rivers in the Amazon region. JNP contains the nine-tier waterfall of the Carabinani River, where the river drops gradually along an 800m trajectory. However, it can only be seen during the dry season and cannot be compared with other spectacular natural phenomena presented in a number of World Heritage natural sites. IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Contains Important Habitats for Biological Diversity and Threatened Species

JNP protects a large and representative sample of the Amazon Central Plain forest, presenting an average of 180 plant species per hectare. JNP also protects an impressive sample of fauna, with many species associated with blackwater river systems. There is a high diversity of vertebrates with 120 species of mammals, 411 birds, 15 reptiles and 320 fishes. Numerous species of conservation concern live within the Park, including jaguar, giant river, Amazonian Manatee, South American River Turtle and black caiman. The importance of JNP for other Amazonian fauna is reflected in the fact that it contains approximately 60% of the species of fishes reported to exist in the Negro River watershed, and 60% of the birds recorded from the Central Amazon. JNP also cover one Endemic Birds Area of the World (BirdLife International, 1998), a Centre of Plant Diversity (WWF/IUCN, 1994) and one of the Global 200 Ecoregions (WWF, 1998). IUCN considers that the nominated site meets this criterion.

The nominated site meets all the conditions of integrity as provided in the Operational Guidelines paragraph 44b.

7. RECOMMENDATIONS

That the Bureau recommend to the Committee that Jaú National Park be **inscribed** on the World Heritage List under natural criteria (ii) and (iv). The Bureau may also wish to encourage the State Party:

- to support implementation of the project to develop a biological corridor including JNP and Mamirauá and Amanã State Sustainable Development Reserves;
- to acknowledge the efforts of Vitória Amazônica Foundation for the protection and management of this site; and
- to provide additional technical, human and financial resources to consolidate the management of JNP.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE PANTANAL CONSERVATION COMPLEX (BRAZIL)

1. DOCUMENTATION

i) **IUCN/WCMC Data sheets** (8 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; Dinerstein, E. *et. al.*, 1995. **A conservation assessment of the terrestrial ecoregions of Latin America and the Caribbean.** Washington, DC; Davis, S.D. *et. al.*, **Centres of Plant Diversity.** Vol. 3. IUCN; Thorsell, J., Fersters, R. and T. Sigaty, 1997. **A global overview of wetland and marine protected areas on the World Heritage List (Draft).** IUCN; Gillet, H. *et. al.*, 1998. **A global overview of protected areas on the World Heritage List of particular importance for biodiversity.** UNESCO/WCMC/IUCN; Swarts, H., 2000. **The Pantanal of Brazil, Bolivia and Paraguay: Proceedings of the World Conference on Preservation and Sustainable Development in the Pantanal.** Canada; Frazier, S. **Directory of Wetlands of International Importance: An Update.** Cambridge, UK; Ponce, V. M., 1995. **Hydrologic and Environmental Impact of the Paraná-Paraguay Waterway on the Pantanal of Matto Grosso, Brazil: A Reference Study.** San Diego State University, California, USA; MMA/Funatura/CI, 1999. **Priority areas for the Conservation of Biodiversity of Pantanal and Cerrado regions.** Brasilia.

iii) **Consultations:** 4 external reviewers, local park staff; staff of IBAMA-Brasilia and IBAMA-Cuiabá, EcoTrópica Foundation, Municipal Secretary for Environment and Development/ Cuiabá, Municipal Secretary for Environment and Development/Mato Grosso do Sul, University of Cuiabá, Wildlife Conservation Society.

iv) **Field visit:** Pedro Rosabal. February, 2000.

2. SUMMARY OF NATURAL VALUES

The Pantanal Conservation Complex (PCC) consists of a cluster of four (4) protected areas: Pantanal Matogrossense National Park (Category II, IUCN), Dorochê Private Reserve(Category Ia, IUCN), Acurizal Private Reserve (Category Ia, IUCN), and Penha Private Reserve (Category Ia, IUCN), for a total area of 187,818ha (see Map 1). This complex of protected areas is located in western central Brazil, at the south-western portion of Matto Grosso State, at the international border with Bolivia and Paraguay. It represents 1.3% of Brazil's Pantanal, which is the principal part of one of the world's largest freshwater wetland ecosystems (Eberhard, 1999). Despite its relatively small size the nominated site presents a unique combination of natural ecosystems (wetlands and mountains) that make it unique within Pantanal's region.

The main source of water for the Pantanal is the Cuiabá River, which is the principal tributary of the Paraguay River; these two rivers are functionally among the most important waterways in the Pantanal. The nominated site is located in the headwater basins of these two rivers, thus being critically important from the hydrological point of view, as well as for the role it plays in disseminating nutrients to the whole Pantanal region. The nominated site includes typical

ecosystems and natural features of the Pantanal such as river corridors, gallery forests, perennial wetlands and lakes, seasonally inundated grasslands and terrestrial forests. Acurizal and Penha Private Reserves, contains most of the Amolar Mountain range with a maximum altitude of 900m. This creates an abrupt transition between seasonally flooded environments and the mountains, representing a unique ecological gradient for the entire Pantanal region (Eberhard, 1999).

Due to the combination of wetlands and the Amolar Mountains, the vegetation of the site is one of the most diverse compared to other areas of the Pantanal. It contains the vegetation of the dry-savannah (Cerrado) and the semi-deciduous forest of the south and south-east Brazil (Paiva Scardua, 1997). There is an area of semi-deciduous alluvial forest with small trees (10-15m in height) and bushes. In permanent bays, floating island masses of riverine vegetation are found. For the whole Pantanal region 250 species of aquatic plants have been reported, from which 100 of them (40%) are found in the nominated site. Typical of swamps, near the rivers and on waterlogged patches of earth, are clumps of acurí palm trees, forming the palm-tree groves and palm woodlands for which the region is famous. The slopes of the Amolar Mountains are covered by several vegetation types, including savannahs and the endangered Bolivian lowland dry forests (Eberhard, 1999). Also associated with the Amolar Mountains is the only semi-decidiuos forest area that can be found in the whole Pantanal region (The Nature Conservancy, 1999), which still remains in pristine state.

The abundance and diversity of wildlife is the most spectacular feature of the site. During the field mission to the nominated site it was possible to see large groups of animals every 8-10 seconds, a remarkable example of wildlife diversity. The fauna of the Pantanal region is extremely diverse and includes 80 species of mammals, 650 birds and 50 reptiles and over 300 species of fish. The nominated site preserves 65 mammals (81% of the total for Pantanal), 212 birds (33%), and 22 reptiles (44%). These numbers reflect the present level of knowledge and will most likely increase following a systematic research programme in the nominated site, which is just beginning using.. This is particularly important for the biodiversity of the Amolar Mountains, where most forests have been insufficiently studied.

Populations of species of conservation concern such as jaguar, marsh deer, giant anteater and giant otter live in the nominated site. The population of jaguar associated with the Acurizal Private Reserve is probably the largest of the whole Pantanal region (The Nature Conservancy, 1999). It is worth noting that this was the site where George B. Schaller, a scientist of the New York Zoological Society, once conducted his influential research on large mammals and their habitats.

The site is one of the most important breeding grounds for typical wetland birds such as Jabiru stork, as well as several other species of herons, ibis and ducks. Parrots are also very diverse, with 26 species recorded in the area including hyacinth macaw, the world's largest parrot. A large proportion of the remnant wild population of this species inhabits the nominated site. This was a key value that justified the inscription of Pantanal Matogrossense National Park as a Ramsar site.

3. COMPARISON WITH OTHER AREAS

There are no other World Heritage sites in the Biogeographical Province of Campos Cerrados (Udvardy, 1975). There are 44 sites on the World Heritage List with major wetlands values and 23 of them contain major freshwater ecosystems. However, they are in different biogeographic regions and represent different ecological characteristics. The nomination document refers to the World Heritage site of the Everglades National Park (USA). There are major differences between these two sites: the Everglades, with an average altitude of 1m lacks the altitudinal and ecological gradient of the nominated site that reaches 900m in the Amolar Mountains. While mangroves are the predominant type of vegetation in the Everglades, the vegetation is more diverse in the nominated site. The number of reported birds in the nominated site (212) is lower than that of the Everglades (400) but it is likely that this number will increase with further research. The number of mammals in the nominated site (65) is more than double that for the Everglades (25). However, Everglades is much larger and comprises all of the wetland area.

The key question, raised by reviewers, is how representative the nominated site is with respect to the whole Pantanal region. In fact, as pointed out in the nomination document, and recognised by all reviewers, there are a number of "Pantanals" within the vast Pantanal region. According to the degree and duration of flooding it can be divided into three sub-regions (Henebry and Kux, 1999); with regard to phytosociology, water level permanence and biological pathways it can be divided into 10 sub-regions (EMBRAPA, 1995); and according to the distribution and number of species (flora and fauna), degree of endemism, threatened species, and level of environmental pressures, it can be divided into 19 sub-regions (MMA, Funatura, CI, 1999). The obvious conclusion is that it is impossible to define a single area that is representative of the whole Pantanal.

Therefore, it is essential to define how important the nominated site is in relation to the whole Pantanal. As proposed in the nomination document, and acknowledged by one reviewer, the argument that the nominated site is a "summary of the Pantanal at small scale" is valid. This is due to the combination of the Amolar Mountain range with the main draining system of the Paraguay and Cuiabá rivers, offering a synthesis of the biological and physical processes of the entire Pantanal region. In addition, the site is representative of 4 sub-regions (Eberhard, 1999) with regard to the 10 sub-regions defined by phytosociology, water level permanence and biological pathways (EMBRAPA, 1995). Most importantly, there are other particular features that makes the nominated site outstanding:

- due to its geographical location and hydrographic regime it is the only area that remains partially inundated during the dry season so wildlife, and particularly mammals, migrate to this area searching for water and other resources;

- in the rainy season it is one of the first areas to be flooded and from it the water flows to the rest of Pantanal, thus its contribution in dispersing nutrients and larvae is particularly high;

- in the beginning of the rainy season, where anaerobic conditions prevail in most channels and streams, there occurs a phenomena of upstream migration of a number of fishes to the small rivers and streams flowing from the Amolar mountains that have a greater concentration of oxygen. This is a rare natural phenomena for the entire Pantanal that can be easily seen in the nominated site;

- because the area is strictly protected it plays a significant role in maintaining fisheries stock as it functions as a no-take reserve (Ferraz de Lima, J.A., 1999). This is particularly important as over-fishing is a critical problem for the entire Pantanal, and;

- the nominated site, which is contiguous to another protected area on the Bolivian border, can play a catalytic role for promoting transboundary cooperation between Brazil, Bolivia and Paraguay on Pantanal's protection and management.

4. INTEGRITY

4.1 Boundaries

The boundaries of the Pantanal Matogrossense National Park are clearly demarcated by a system of buoys in the aquatic areas, and posters and other signals in the terrestrial areas, as part of the implementation of the management plan of this area. The boundaries of the 3 Private Reserves are in the process of being demarcated in the field. However, they are easy to identify because they relate to more clearly defined geographic features, such as rivers and borders of the mountain range.

It is important to note that around the nominated site there are two abandoned private properties that provide additional protection to the nominated site. At present IBAMA is evaluating the possibility to legally obtain control over these areas so as to expand the National Park. On the other hand, the Ecotrópica Foundation is working with a family that owns another property to the North of the nominated site in order to establish another private reserve. It seems likely that the

establishment of this new private reserve might occur shortly. If all these efforts are successful an extension close to half a million hectares may be possible to the nominated site.

4.2 Management

The Pantanal Mattogrossense National Park (PMNP) was designated as such by Federal Decree No. 86,392 of 24 September 1981; the three Private Reserves were designated by Federal Decree No. 1,922 of 6 June 1996. PMNP was declared as a Wetland of International Importance (Ramsar Site) in 1993. It is important to note that a Federal Decree allowing the establishment of privately-owned reserves recognises that they be managed for conservation purposes in perpetuity.

PMNP has an Emergency Management Plan (Campello, 1994) that it is in the process of implementation. All the other three Private Reserves have a management plan that is under implementation since 1998 by the Ecotrópica Foundation. IBAMA dedicates, from the Federal Budget, a total of USD$80,000 for managing PMNP. In addition, close to USD$45,000 is assigned to the National Park from the State budget. The Ecotrópica Foundation has a budget of USD$120,000 for managing the Private Reserves. Under the IDB's Pantanal Programme, which will invest USD$400 million for the whole Pantanal region, probably around USD$1 million will be injected into the National Park to facilitate public use.

PMNP has good, newly built facilities for visitors and researchers. The headquarters had major improvements and renovations during 1995 and 1996, with resources from the National Environment Programme (PNA). A Park Visitor Centre will shortly be operational as part of the new facilities, which can also accommodate groups of up to 15 people, with meeting rooms, bedrooms and a laboratory. Research plans for PMNP are being discussed with a variety of stakeholders. The Ecotrópica Foundation headquarters, located in Acurizal Private Reserve, also has excellent facilities for visitors and researchers.

PMNP has a staff of eight, including a general director, one permanent ranger and six temporary rangers that live in Cuiabá. Two small boats and one speedboat are used for patrolling. The Ecotrópica Foundation has one person in Cuiabá who is responsible for the three Private Reserves and three field-workers permanently based in the reserves. Two speedboats are used for patrolling the private reserves. Staff of PMNP and the Private Reserves co-ordinate their patrolling activities and they are in permanent communication by radio. Control of the site is relatively easy as the only access is by boat, necessitating passing through the existing facilities and control post in PMNP. The other way to get into the nominated area is by air, hiring small private planes in Cuiabá. This is also easily controlled, however, as the only landing strip within the nominated site is located in Acurizal Private Reserve, where The Ecotrópica Foundation has its headquarters.

To enhance the management of the nominated site an Integrated Management Plan for the National Park and the 3 Private Reserves is in the process of preparation. IBAMA and The Ecotrópica Foundation are coordinating this activity, which will also involve participation by the Ministry of the Environment, TNC, the University of Mato Grosso, the University of Mato Grosso do Sul, and experts from Everglades National Park (which has a sister park scheme with PMNP). The participation of experts from the Ministry of the Environment of Bolivia and Paraguay is also envisaged. The Ministry of the Environment of Brazil, through the GEF funded project "Watershed management of Alto Paraguay", has allocated close to USD$140,000 for the preparation and first phase of implementation of this integrated management plan. The Ecotrópica Foundation is also raising funds through TNC and a number of US Foundations to support preparation and implementation of this plan, with a first draft expected to be ready by December 2000.

4.3 Threats

The nominated site is not facing immediate threats to its integrity and there are no local people living within the site. However, the long-term integrity of this site depends on the maintenance of Pantanal's complex hydrologic regime. In this regard a major threat is posed by the proposed Hidrovia project, a massive navigational waterway project currently being considered in the region.

This project intends to build an inland waterway more than 3,400km long in the Paraguay and Paraná rivers, linking Cáceres in the State of Mato Grosso and Nueva Palmira, in Uruguay. The idea is to straighten and dredge the rivers in order to facilitate large ship navigation and, consequently, the transportation of Brazilian soybean harvests overseas. The works will affect the natural dynamic of water flow patterns in the basin principally the Pantanal's massive absorption of flood water followed by slow release (Gottgens *et al.*, 1998; Silveira, 1997).

Mineral extraction is also a cause for concern in the region. Principally, the use of mercury to extract gold from the soils is posing a major threat to the health of the whole Pantanal ecosystem. This removal process releases large amounts of this highly toxic substance into the soils and rivers, which eventually flow into the waters of the Pantanal. The nominated site, due to its location upstream of the Pantanal basin, is in a relatively better position in relation to this threat and there are no reports of pollution-related impacts on the site (The Nature Conservancy, 1999).

Illegal wildlife poaching and the live animal trade have been controlled within the boundaries of the nominated site. In fact there is a clear recovery in the population of a number of species, particularly caimans, jaguars and parrots, within the nominated site (Eberhard, 1999). However, this continues to be a major problem for the Pantanal region.

Programmes that attract tourists to the Pantanal have been developed without proper planning. The programmes, which are growing rapidly in the northern Pantanal region, have caused an increase in illegal sport fishing, creating disturbances in bird nesting areas, and a demand for pollution-causing luxury items (The Nature Conservancy & Ecotrópica Foundation, 1999).

To support the Brazilian government in addressing Pantanal's environmental problems, huge investments will be provided for its preservation. The International Development Bank (IDB) will invest USD$400 million designated to: (a) watershed management and erosion control; (b) control of urban, agriculture and mining pollution; (c) development of environmentally sustainable economic activities; (d) better management of fisheries and wildlife, and; (e) development of a larger and better managed system of protected areas. It is likely there will be other investments targeting Pantanal's conservation from GEF, WWF, CI TNC and GEF-France.

5. ADDITIONAL COMMENTS

There are a high number of archaeological sites and ancient stone inscriptions within the nominated site that have not been properly documented nor studied. The preservation of the site will ensure the maintenance of these cultural values.

The nominated site has great potential to catalyse transboundary co-operation between Brazil, Paraguay and Bolivia. There is a protected area on the Bolivian side – the San Matías Sustainable Development Area – which is contiguous to the nominated site, which shares common ecosystems and species. There have been informal communications between The Ecotrópica Foundation and the Bolivian Protected Areas Agency to explore options for cooperation. In addition, as mentioned, the preparation of the Integrated Management Plan for the nominated site is expected to include the participation of experts from Bolivia and Paraguay to discuss transboundary cooperation. If the World Heritage Committee decides to support inscription of the nominated site, efforts on transboundary cooperation could be enhanced using the Convention as an international framework for this.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The nominated site has been proposed for inscription under all four natural criteria:

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

While the nominated site is a good example of recent Quaternary processes that led to the formation of the Pantanal basin, it does not rank high in relation to other World Heritage sites

that show a much longer and complex sequence of Earth's geological evolution. IUCN does not consider that the nominated site meets this criterion.

Criterion (ii): Ecological processes

The nominated site is, in reduced scale, a model of on-going ecological and biological processes that occur in Pantanal. The association of the Amolar Mountains with the dominant freshwater wetland ecosystems confers to the site a uniquely important ecological gradient in the whole Pantanal region that contributes to important biological processes. The nominated site also plays a key role in the dispersion of nutrients to the entire basin. IUCN considers that the nominated site meets this criterion.

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

The nominated site with its combination of wetland areas bordered by the Amolar Mountains, which have a number of very steep cliffs, produces a dramatic landscape that has been frequently described in a number of international television programmes and magazines as "magical". This landscape is exceptional in Pantanal's region. It is extraordinary to see in one place a big group of Amazon Victoria Regia, an impressive aquatic plant, and not far away an immense cactus from semi-arid regions. This spectacular landscape is enriched by the diversity and abundance of wildlife and by the sound of thousands of birds. IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

IUCN in its global overview of wetland and marine protected areas on the World Heritage List considers Pantanal as a significant region that should be represented in the World Heritage List. A number of assessments conducted on priorities for conservation in the Pantanal region recognise the particular importance of the nominated site for biodiversity conservation (MMA/Funatura/CI, 1999). The area preserves important habitats representative of Pantanal that contain a number of globally threatened species such as the jaguar, the marsh deer, giant anteater and the hyacinth macaw. Moreover, the nominated site is the most important reserve for maintaining fisheries stock in the Pantanal region. IUCN considers that the nominated site meets this criterion.

The nominated site meets all the conditions of integrity as provided in the Operational Guidelines paragraph 44b.

7. RECOMMENDATION

That the Bureau recommend to the Committee the Pantanal Conservation Complex be **inscribed** on the World Heritage List under natural criteria (ii), (iii) and (iv). The Bureau may also wish to:

- acknowledge the support from by IDB and The Ecotrópica Foundation for the conservation of the Pantanal Conservation Complex;

- encourage the State Party to provide technical and financial support to finalise and implement the integrated management plan and enhance the management capacity of this area;

- encourage the State Party to investigate the World Heritage potential of other protected areas in this diverse and extensive region;

- encourage the State Parties of Brazil, Bolivia and Paraguay to explore ways and means to enhance transboundary cooperation on conservation and sustainable use of Pantanal's region,

giving attention to the possibility of establishing a Transboundary World Heritage site associated with the Pantanal Conservation Complex; and

- encourage the State Parties of Brazil, Bolivia and Paraguay to carefully consider the environmental impact that the Hidrovia Project may have on the biodiversity in the Pantanal region.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

FERNANDO DE NORONHA NATIONAL MARINE PARK (BRAZIL)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet** (10 references)

ii) **Additional Literature Consulted:** Bibby et al, 1992. **Putting Biodiversity on the Map. Priority Areas for Global Conservation.** Cambridge, UK; Stattersfield *et. al.*, 1998. **Endemic Birds Areas of the World: Priorities for Biodiversity 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; IUCN Tropic Forest Program/ Conservation Monitoring Centre, 1998. **Brazil, Atlantic Coastal Forests: Conservation of Biological Diversity and Forest Ecosystems**; Davis, S.D. *et. al.* **Centres of Plant Diversity.** Vol. 3. IUCN; Prance, 1987. **Biogeography of neotropical plants.** In Biogeography and Quaternary History in Tropical America. Whitmore and Prance, eds. pp 46-65. Oxford: Clarendon Press; UNEP/IUCN, 1998. **Coral Reefs of the World.** Vol. 1: Atlantic and Eastern Pacific. IUCN Gland, Switzerland and Cambridge, UK; GBRMPA/WB/ IUCN, 1995. **A Global Representative System of Marine Protected Areas.** Vol. 2: Wider Caribbean, West Africa and South Atlantic. Washington DC, USA; Elder, D. E. and Pernetta, J. eds., 1991. **Oceans.** London, UK; Sanches, T. M. and Bellini, C. Juvenile *Eretmochelys imbricata* and *Chelonia mydas* in the Archipelago of Fernando de Noronha, Brazil. **In Chelonian Conservation and Biology**, Vol.3, No.2. pp 308-311, Washington DC, USA.

iii) **Consultations:** 3 external reviewers, Fernando de Noronha National Marine Park, IBAMA, Secretary for the Environment of Pernambuco State, TAMAR Regional Project, Local Community Council, Local Association of Fishermen, Local Association of Tourism Operators, Aguas Claras Dive Centre, Golfinhos Rotadores Project.

iv) **Field Visit:**. Pedro Rosabal, February, 2000.

2. SUMMARY OF NATURAL VALUES

Fernando de Norohna National Marine Park (FNNMP) is located in the Archipelago of Fernando de Norohna in the State of Pernambuco in Brazil (see Map 1). The nominated area includes another 21 smaller offshore islands and islets. FNNMP covers some 11,270ha, of which 85% is marine. The terrestrial area incorporates some 70% of the main island of Fernando de Norohna, excluding the central section of the north coast where the urban nucleus of the island is located. In addition, there is a buffer zone which encircles the entire site and encompasses all remaining terrestrial areas of the main island (see Map 1).

The Archipelago represents the peaks of a large submarine mountain system of volcanic origin that rise up some 4,000 metres from the ocean floor to an altitude of 323m ASL. The geology is characterised by a number of volcanic rocks, including pyroclastic deposits of tufa and breccia, lavas and formations such as volcanic plugs, dykes and domes. Over this basic structure harder intrusions have remained and now form distinctive peaks such as Morro do Pico. The coastline is complex, with high cliffs alternating with sandy beaches. The northwest-facing shores are relatively sheltered and calm, while the rocky south-east shores face the predominant currents and winds.

FNNMP displays vegetation classified as Insular Atlantic Forest. This is a sub-type of the Atlantic Rainforest, which is considered the world's most threatened tropical forest. Up to now, over 400 species of vascular plants have been found in FNNMP, 3 of them being endemic. The only occurrence of oceanic mangrove in the South Atlantic region is found in the National Park.

The islands serve as a nesting area for marine birds and are considered to accommodate the largest concentration of tropical seabirds, in terms of diversity and numbers of individuals, in the Western Atlantic Ocean. Fourteen species of migratory birds breed in the Park, and records show the occurrence of 55 species of migratory birds in the archipelago. Among the terrestrial bird species there are six native species, 3 of them being locally endemic; including the Noronho vireo or "sebito". The islands are considered a Global Centre Of Bird Endemism (BirdLife International, 1998). The islands also have two endemic species of terrestrial reptile, as well as a rare species of terrestrial crab found only in FNNMP.

FNNMP displays an abundance of marine fauna with a wide variety of species. Two species of marine turtles are also present: the hawksbill turtle, the planet's second most threatened species, that uses the area for feeding and growing; and the green turtle that breeds and feeds in the park. Fifteen species of coral have been reported and six of them are endemic to Brazil. Ninety-five species of fish have been reported in Fernando de Noronha (Moorish, 1995); two are endemic to the Archipelago.

The Spinner Dolphin is also present at the site. They occur in tropical oceans and are included in the category" insufficiently well-known but dependent on Conservation" in the IUCN Red List. Over 90% of the days of the year, groups from 1000 to 1200 Spinner Dolphins, come to the waters of the Golfinhos Bay to rest, breed and raise their offspring. This high concentration of Spinner Dolphins in a relatively small area is an interesting natural phenomenon that attracts the attention of scientists and divers worldwide. There have been reports of sightings of other cetaceans in the region of the Archipelago: Coloured dolphins, Regular dolphins, Flippers, Melon-head dolphins, Pilot whales, Mink whales and Humpback whales.

3. COMPARISON WITH OTHER AREAS

Fernando de Noronha Archipelago is a Biogeographic Province on its own within the Neo-Tropical Realm. It represents an example of a large submarine mountain system of volcanic origin. In this respect, it may be compared to other Atlantic volcanic islands, including those of Atoll das Rocas and the rocks of São Pedro and São Paulo, Ascension Island, Santa Helena Island, and the Island of Trinidad. However, the nominated site differs greatly from those islands for having higher biodiversity values, including the presence of Insular Atlantic Rainforest.

There are a number of Island natural World Heritage sites of volcanic origin, such as Galapagos National Park (Ecuador), Cocos Island National Park (Costa Rica) and Hawaii Volcanoes National Park (USA). However, all of them are in the Pacific Ocean with clear differences in relation to oceanography and marine biodiversity (Elder, D.E. and Pernetta, J, 1991). Leaving aside this major difference, FNNMP has a higher number of species of flora (400) than Cocos Islands (235). In addition the nominated site is the only known mangrove on an oceanic island in the Southern Atlantic.

The number of seabirds reported for FNNMP (55) is higher than for Gough Island (22) but it is lower in comparison to Cocos Islands, Galapagos and the New Zealand Sub-Antarctic Islands. Scenically, Fernando de Noronha is not as impressive as Cocos Islands with its forest-covered precipitous slopes and waterfalls, or when compared with Hawaii, Galapagos or Gough Island.

The number of species of fish is lower (95) compared to Cocos Islands (300), however, there are two species endemic to Fernando de Noronha Archipelago. The nominated site also contains 6 endemic species of coral. While Cocos Island is well known for the particular abundance of hammerhead sharks and white-tip sharks, Fernando de Noronha presents abundant populations of other shark species, particularly the lemon shark.

A distinct feature of Fernando de Noronha is the resident population of 1000-1200 spinner dolphins that occurs in Baía dos Golfinhos (Dolphin Bay). The only other known resident population occurs in Kealake'akua Bay, in Hawaii. The population in the nominated site exhibits a well-defined pattern of activity, including nightly feeding in deep ocean waters followed by a return to Baía dos Golfinhos to rest. The dolphins arrive at the Bay with a remarkable punctuality, between 07:00-07:30H each morning and their arrival is spectacular due to the high number of individuals. This is one of the main attractions for visitors who can watch this phenomenon from the high cliffs surrounding the bay. According to the well-known underwater photographer and explorer Tim Burton "there is no other place in the world where you can see such a high concentration of dolphins in such a small area" (Burton, T. 1998).

In sum, Fernando de Noronha Archipelago has a few unique features in comparison to other Island World Heritage sites. Being a Biogeographic Province on its own, as well as a Global Centre of Bird Endemism, makes this site distinctive.

4. INTEGRITY

The terrestrial and marine components of the nominated site are well conserved. The boundaries of the site are considered adequate (extending to 50m isobar) for conserving marine biodiversity. On the mainland all terrestrial habitats are included to ensure the maintenance of biodiversity and endemism.

The integrity of the site is preserved through a number of Federal and State laws and regulations. IBAMA is the Federal Agency responsible for the management and conservation of this site. Financial resources for conservation and management come from the Federal Government, which provides a budget of US$80,000 per year.

A management plan for the National Marine Park was prepared by IBAMA in 1990 and is being implemented. This management plan responds to the management objectives for IUCN Category II (IUCN, 1994). There is a management unit on the main island, comprising the Director of the Park, five administrative employees, and eleven rangers. There are four 4WD vehicles for terrestrial patrolling and monitoring and one fast-speed boat for marine patrol.

Management activities are enhanced through the active participation of staff from the TAMAR Project. This project has 3 vehicles for monitoring and permanent staff located at observation points to control marine waters around the main island. In addition, local people play an active role in monitoring and patrolling through the local Diver's Association, the Association of Traditional Fishermen and the Association of Tour Operators. Participation of local people in conservation activities is coordinated by the Marine Park Authority and the District Council for the Environment, both reporting to the Council of the Archipelago.

There are strict environmental regulations and controls established for the Archipelago, particularly in relation to tourism development and visitation. These regulations include restricting the number of visitors to 420 per day, prohibiting the entrance of disposable material and non-recycled bottles to the Archipelago, and migratory controls to maintain the existing population of 2,500 people.

5. ADDITIONAL COMMENTS

The nominated site has an interesting history of occupation that has left a rich cultural heritage. There are a number of cultural sites found within the park and the buffer zone that carry an important record of the history of the island. The Nossa Senhora dos Remédios Church was completely restored in 1988. Fort Ruins also remain at Capela da Quixaba, a former prison. The strategic position of the archipelago made it of high military importance to control access to Brazil, thus a system of 10 fortresses were constructed along the coast of the main island. Considering the limited size of the main island – 17 square kilometres – this is probably the highest density of

military construction worldwide (Borges Lins, M. J., 1999), therefore giving this site an important value for cultural heritage. Nine of these fortresses can be found on the main island in different states of conservation. Also of cultural value is São Miguel Palace, formerly the administration centre of the penitentiary, but now housing the administrative headquarters of the State District of Fernando de Noronha.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

Fernando de Noronhna National Marine Park has been nominated for inscription on the World Heritage List on the basis of all four natural criteria. The information that is provided in the nomination document is not sufficient to justify inscription.

7. RECOMMENDATION

That the Bureau recommends to the Committee to **defer** the nomination to enable the State Party, if it wishes, to provide additional information to support the case for inscription.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

KOPACKI RIT (CROATIA)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet**: (8 references).

ii) **Additional literature consulted**: Andrija Bognar. 1990. **Geomorfologija Baranje**, ("Geomorphology of Baranja"), Zagreb. Euronatur: **Proposal for a transfrontier Biosphere Reserve**, pamphlet. Anon. 1999. **Reconstruction Project for Eastern Slavonia, Baranja and Western Srijem (Loan IBRD 4351 – HR) and Grant for Kopacki rit wetlands management project (GEF-MSP Grant No. TF 022644)**, project document Part D, Nature Protection, GEF. Bilje. Melita Mihaljevic (ed): 1999. **Kopacki rit Research Survey and Bibliography**, Croatian Academy of Sciences and Arts. Zagreb & Osijek. J C Refsgaard *et al*: 1998 An Integrated Model for the Danubian Lowland – Methodology and Applications, **Water Resources Management** 12: 433-465. M Schneider-Jacoby: 1994. **Sava and Drava – Ecological Value and Future of the Two Major Rivers in Croatia** Periodicum Biologorum Vol. 96 No 4 348-356, 1994. Marlise Simons: 1999. Where War Roiled Danube, Nature Is Peacemaker, **New York Times** 15 December 1999. Stephan Srsan: 1998. **Kopacki rit on old maps and plans**, illustrated pamphlet prepared for the 19th Conference of the Danubian countries, Osijek. Anon. 1999. **Evaluation of wetlands and floodplains in the Danube River basin**, Summary, UNDP/GEF Assistance. WWF: 1998. **A European Lifeline - Green Danube**, WWF Journal No. 3 June. D Varga: 1998. **Sustainable development of Bilje Municipality**, illustrated pamphlet. D Varga: 1999. **Development bases of Sustainable Rural Tourism of Municipality Bilje**.

iii) **Consultations**: 3 external reviewers; Ministry of Environmental Protection and Physical Planning, Zagreb and Osijek; Kopacki rit Nature Park, Osijek; Municipality of Bilje.

iv) **Field Visit**:, M. Smart, March 2000.

2. SUMMARY OF NATURAL VALUES

The nominated site coincides with the Kopacki rit Nature Reserve, covering 17,700ha, with a buffer zone of about 30,000ha. Since 1993, it has been listed as a Wetland of International Importance (i.e. as a Ramsar site). It has also been identified as an Important Bird Area by BirdLife International.

Kopacki rit is an inner delta wetland, rather than a coastal one, with distinct morphological and sedimentary characteristics. It is situated in the central section of the Danube floodplain, at the confluence of the Danube and one of its five major tributaries, the Drava. The Drava rises in the Austrian Alps and flows through Slovenia, Croatia and Hungary in a fairly short, straight course; at the time of snow melt, its flood waters reach the Danube before the Danube itself floods. The Drava waters act as a block when the Danube in turn floods (normally in March), with the result that the Danube overflows its banks to the north and west of the confluence, creating for about a month a completely flooded area -- Kopacki rit. When the water recedes, this area becomes a mosaic of lakes, reed beds and riverine forest.

This interaction of water and land generates high biological productivity and diversity. The triangle of land between the Danube and Drava (known in Croatia as Baranja and in Hungary as Baranya), has always attracted human and wildlife exploiters of the rich resources of forest, fish, game and agricultural land.

All aspects of Kopacki rit's natural flora and fauna have been extensively researched over many years with records going back to the seventeenth century. The vegetation of the open permanent waters is dominated by the water lilies. Reeds and cattail are the first to colonise the open water, followed by White Willow and Black and White Poplar. In some areas, stands of exotic American poplars have been planted for forestry exploitation, but it is planned to remove most of these. Since the area is naturally so wet, climax forest of oak occurs only on higher ground at the edge of the area.

Kopacki rit is the largest and most significant spawning ground in the central and upper Danube for all fish species of the area (44 species of fish recorded). The natural area is traditionally a centre of fisheries and, in addition, a series of fishponds have been constructed in the partly reclaimed area. Among mammals, 54 species have been recorded: Red Deer and Wild Boar are exploited in parts of the area by hunters, while European Otter and Pine Marten are common.

Bird populations are the most spectacular feature of the site. 285 species have been recorded, among them a healthy breeding population of Ferruginous Duck (classified by IUCN as vulnerable to extinction in the IUCN Red Data Book); 20 pairs of White-tailed Eagle breed in and near Kopacki rit; this species was until recently considered as endangered and is still classified by IUCN as "Near-Threatened". However, the global population of this bird is estimated at 7,000, and even along the Drava there are about 100 pairs. Its survival as a breeding species, and indeed its recent expansion in central Europe, is due to the existence of two inaccessible Croatian sites, Lonjsko Polje and Kopacki rit. The White-tailed Eagle in Kopacki rit competes for nest sites with the Saker Falcon of which about five pairs nest. The Saker Falcon concentration is numerous but is a fraction of the global population. The presence in such numbers of these two bird predators from the top of the food chain is an illustration of the biological health and wealth of the site.

Kopacki rit has acted as a refuge for many species of breeding birds, particularly fish eaters, in periods when there was less concern than at present for their conservation along the Danube. Today, the thousand or so Grey Herons, several hundred pairs of tran-Saharan herons, the whole range of European woodpeckers and many other breeding birds form the nucleus for other more vulnerable colonies elsewhere. The site is therefore a "gene pool" for many healthy species as well as a refuge for endangered ones.

Kopacki rit is also a major stopover for many migratory birds in the autumn, notably European Spoonbill (about 1,000 birds, or 10% of the Central and East European population). Finally, it holds internationally important populations of wintering birds – such as 14,000 ducks and 12,000 geese.

3. COMPARISON WITH OTHER AREAS

Within the Danube Basin as a whole, the most notable wetland is the Danube Delta (a World Heritage site of 679,222ha.). There are also a number of other important wetlands in the central Danube floodplain, as follows:

- Srebana, Bulgaria (also a World Heritage site of some 600ha.);
- The Hainburg area of Austria;
- The Morava-Dyje wetlands between Austria, the Czech Republic and Slovakia;
- The Hungarian/Slovakian wetlands near Cabcikovo; and
- Kopacki rit.

The protected area of Kopacki rit currently covers 17,700ha. and plans are in hand to extend this. It is of course much smaller than the Danube Delta, but extensive international work undertaken on the conservation of the Danube catchment since the political changes of the 1990s has identified the Danube-Drave triangle as the largest surviving floodplain of the Danube River Basin, with great potential for ecological restoration. UNDP/GEF/WWF consider that Kopacki rit and the Danube Delta are the two most important sites in the Danube River.

Further afield, there are no comparable floodplains to the west in Europe. To the east, there is the Biebrza-Narew complex in eastern Poland and the river Oka floodplains. There are other extensive wetlands in parts of Poland, Belarus and Ukraine – but none exhibits the unusual feature of an inland delta.

Some comparative figures on species numbers in some other protected areas and World Heritage sites which have wetland values are given in table 1 below (arranged alphabetically by country).

Table 1 Comparison of Kopacki rit with other protected areas and World Heritage sites which have wetland values:

Protected Area	Country	Size [ha]	Total Plant sp.	Mammals	Bird sp. (# specimens)	Reptiles	Amphibians	Fish
Kakadu NP	Australia	1,980,400	>1,600	64	>294	128	na	na
Srébarna NP	Bulgaria	600	67	na	180	na	na	na
Kopacki rit	Croatia	17,770 (+30,000 Buffer)	>400	55	285	10	11	44
Río Platano Biosphere Reserve	Honduras	500,000	na	>39	377	126		na
Sian Ka'an	Mexico	408,000 terrestrial	1,054	103	339	42		>52
Manu NP	Peru	1,532,806	>1,200	200	>800	12	77	na
Danube Delta	Romania	547,000	na	na	>300	na	na	45
Volga Delta	Russian Federation	650,000	na	na	>300	na	na	na
Doñana NP	Spain	50,720		30	365	19	10	8
Ichkeul NP	Tunisia	12,600	na	na	185	na	na	na
Everglades NP	USA	592,920	>950	- 25 native - 800 vertebrates	>400	>60		>275

This table clearly indicates the importance of Kopacki rit at the European, rather than the international scale.

Inner deltas, such as Kopacki rit, are quite different in morphological terms from those deltas where a river meets the sea, so comparisons with the Danube or Volga Deltas, for example, have to be qualified. Several large inner deltas also exist in tropical areas (e.g. that of the Inner Niger in Mali, or the Okavango in Botswana) and in some boreal areas (e.g. the Peace-Athabasca Delta in Canada).

Like the Danube, other rivers in temperate latitudes, such as the Mississippi or Yang-tse, have undergone intensive alteration at human hands for navigation, agriculture, or flood control. Lake Poyang on a tributary of the Yang-tse in China offers a comparable case to Kopacki rit, but

on a larger scale.

In sum, Kopacki rit is distinctive at a European scale for the following reasons:

- it is an intact, functioning inland delta of a major river; rare in temperate climes;

- it is the best preserved example of an alluvial floodplain along the Danube, which is: a) the habitat of a number of threatened species; and b) a gene pool of biological diversity for tropical European species, notably fish and birds.

4. INTEGRITY

The nominated site is conserved in the Kopacki rit Nature Park, currently 17,000ha. This is subdivided into a Special Zoological Reserve of 6,234ha, (an area of high protection corresponding to IUCN Category I) and a wider, managed area of about 11,000ha (IUCN Category V). Plans are in hand to increase the area and effectiveness of protection, by establishing a larger National Park or by extending the Special Protected Zone. The present Nature Park is bisected north-south by an embankment built for flood control; the area east of this embankment, covering perhaps half of the total area and including the Special Zoological Reserve, is entirely natural and subject to flooding by the river; in the area west of the embankment there is some agriculture and forestry, with fish production in fish ponds.

The situation has changed considerably since the recent war between 1991 and 1997, when the front line passed through the centre of the Nature Park, and many local inhabitants fled the area. The park suffered surprisingly little damage; parts were mined but the mines are now being removed. Many of the former economic activities have ceased. The park authorities thus have a unique opportunity to start again from scratch and to have a greater influence on the management of the area. To this end, a management plan is being prepared by park staff with considerable financial support from GEF.

The most significant natural areas of alluvial floodplain are already included in the park. Future plans envisage extension of the protected area in three directions to include an additional 40,000ha. of remaining natural areas: west of the current protected area, on the north bank of the Drava, in the direction of Osijek; south, along the south bank of the Drava; and north along the Danube to the Hungarian border. These plans in fact follow the legal boundary between Croatia and Serbia, which follows the former meanders of the Danube, the de facto boundary is the main course of the Danube, and part of the area proposed for future protection is thus on the Serbian side of the Danube.

The area of the park to the west of the north-south embankment, which suffered some modification in ecological character by being cut off from natural flooding will, under future management plans, be more sympathetically managed for conservation purposes. These plans envisage better integration of economic activities (notably forestry, hunting and water supply) in this area, and development of the whole area in a sustainable manner, highlighting local produce and services. The nomination document also identifies a number of positive actions proposed to divert effluent from the Wetland and process it through a treatment plant.

The natural qualities of Kopacki rit have suffered in the past, but they are now being restored. The area cannot be said to enjoy complete conditions of integrity, but the trend is in the right direction.

5. ADDITIONAL COMMENTS

Despite recent conflict in the Balkans region, the prospects for conservation of Danube wetlands are far better now than previously. There is much more co-operation among the countries and far higher awareness of conservation needs. The Danube Pollution Reduction Programme has already identified a number of major sites for conservation, including Kopacki rit. GEF funds

have been mobilised for some of this work. Plans are also afoot to develop an international biosphere reserve, or a network of co-operating biosphere reserves, covering the major riverine habitats of a number of Danube countries.

More specifically, recent political developments in Croatia are increasingly favourable to conservation. Also a number of countries in Eastern and Central Europe are being encouraged to meet the nature conservation requirements of the European Union (notably the Habitats and Birds Directives), which will secure improved protection for wetland sites.

The conservation work undertaken in recent years at Kopacki rit by the authorities in Croatia, and their plans for the future management and extension of the site, deserve the highest praise and encouragement. The development of a biosphere reserve site, or network, for the Danube riverine environment is an obvious way of giving international recognition to what has been achieved. It would also help to encourage greater international co-operation for the protection of Kopacki rit and other Danube wetland sites. IUCN would strongly support such an initiative.

IUCN would also encourage and support moves to develop closer co-operation between Kopacki rit and other immediately nearby protected areas, notably with the Duna-Drava National Park, including the Danube floodplain and oxbows just to the north in Hungary. As soon as practical, co-operation should also be established with the Gornje-Podunavlje Regional Park on the left bank of the Danube in the Serbian Republic (FR Yugoslavia).

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

Although Kopacki rit has already been successfully nominated as a Ramsar site, the question is whether Kopacki rit also meets the more rigorous and demanding criteria of World Heritage

The nomination is confusing in that it sets out six criteria under which it is claimed that the site merits World Heritage status. None of these exactly coincides with those in the Operational Guidelines. Bearing in mind the qualities of the site, it is considered appropriate to assess Kopacki rit against criteria (ii) and (iv).

Criterion (ii): Ecological processes

Kopacki rit is a most unusual feature as an inland delta. However, it is questionable whether it can be recognised as having outstanding universal values in this respect. It is remarkable in the European context, and of key importance in the Danube River Basin, but World Heritage status would require that it be truly outstanding on a worldwide scale. It cannot compare to a number of other, far larger inland deltas, such as that of Okavango and the inner Niger. IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

Kopacki rit is among the more important wetland bird area in Europe as table 1 shows. It is significant regionally for a number of threatened species (notably White-tailed Eagle and Ferruginous Duck). It holds important numbers of breeding birds and is a key site for a number of autumnal migrants, as well as wintering waterfowl. However, the numbers of these species are not globally exceptional: for example, there are far less than 1% of the global populations of the White-tailed Eagle and Ferruginous Duck breeding at the site. IUCN does not consider that the nominated site meets this criterion.

7. RECOMMENDATION

IUCN recognises that Kopacki rit is an important site at the European scale and very significant within the Danube Basin as a whole. Nonetheless it does not meet the criteria set by the World Heritage Convention. Moreover, there remain a number of important integrity questions unresolved. Therefore IUCN does not recommend that it be inscribed as a World Heritage site.

The Bureau may wish to commend the State Party for conservation work undertaken in recent years at Kopacki rit and encourage the development of a biosphere reserve site.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

NATIONAL PARK OF ABRUZZO (ITALY)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (8 references)

ii) **Additional Literature Consulted:** Duffey, E. 1982. **National Parks and Reserves of Western Europe**. Harrow House Editions Ltd., London; Embleton, C. (ed.) 1984. **Geomorphology of Europe**. MacMillan Publishers, London; Ente Autonomo Parco Nazionale d'Abruzzo. 1999. **LA Pianificazione del Parco Nazionale d'Abruzzo**. Roma; Heiss, G. 1989. **Inventur Europäischer Natur - und Nationalparke**. Föderation der Natur - und Nationalparke Europas (FNNPE), Grafenau; Parco nazionale d'Abruzzo. 1999. **Le Parc National des Abruzzes**. Rome; Plavsic-Gojkovic, N. *et. al.* 1970. **Ein Beitrag Zur Kenntnis der Pflanzensoziologischen Zusammensetzung und Aufbauelemente des Urwaldreservates "Corkova Uvala" (Plitwitzer Seen Nationalpark)**. Acad. Sarajevo 15; Tassi,. F. 1983. **The Abruzzo Brown Bea**r. Panda, World Wildlife Fund, Rome; van den Brink, F. 1968. Zoogdierenqids. Amsterdam and Brussels.

iii) **Consultations:** 3 external reviewers. National Park administration and local officials.

iv) **Field visit:** Gerhard Heiss, March, 2000

2. SUMMARY OF NATURAL VALUES

The National Park of Abruzzo (NPA) is located on the central Appenine range, 150km south-east of Rome in Central Italy. The Park has an area of 44,000ha that includes part of three Provinces (Aquila, Frosinone and Isernia), and twenty-two communes, and includes five distinct geographical areas: Alto Sangro, Marsica Fucenese and the Peligna valley in Abruzzo; the Comino valley in Lazio; the Mainarde in Molise (see Maps 1 and 2).

NPA is characterised by a landscape of gently sloping limestone and dolomite hills, originating 30-170 million years ago, and rises to the barren and scree sloped peaks of Mounts Petrosa (2,249m), Marsicano (2,245m) and Greco (2,285m), which overlook the Sangro river valley. Other rivers within the park include the Canneto river in the south, Melfa, Giovenco and Volturno. Evidence of a glacial past includes mountain cirques and morraines, and glacial lakes such as Vivo, Montagna Spaccata and Pantaniello. There are also aspects of karst scenery, including pot-holes and caves. Lake Barrea is a dammed reservoir.

The flora is rich and varied with more than 1,200 recognised species, mixed forest and pasture habitats, alpine meadows and rocky environments (Tassi, in press). The majority of the forests are beech or mixed beech habitats but many species of mixed oak wood occur at lower altitudes, all with a significant herbaceous and shrub understorey. There are important glacial relicts such as Austrian pine, Swiss mountain pine and birch. Other trees include two species of maple including *Acer opalus*, flowering ash *Fraxinus ornus*, a local race of *Pinus nigra* and, at higher altitudes, dwarf mountain pine and junipers.

There are 60 species of mammals including brown bear, wolf, Abruzzo chamois, wild cat, otter, stone marten, marten, badger, hare and polecat. Lynx was last documented prior to 1926 and red deer

and roe deer became locally extinct in the last century. The latter two species are currently being reintroduced (Tassi, 1984).

There are an estimated 300 species of bird species, including nesting golden eagle and many palaeo-montane species such as alpine chough, wallcreeper, alpine acceptor and the rare white-backed woodpecker. Up to 30 species of reptiles have been recorded. There are also four endemic amphibians (Anon, 1988).

3. COMPARISON WITH OTHER AREAS

National Park of Abruzzo (NPA) is part of the Central European Highlands Biogeographical Province, which already contains two natural World Heritage sites (Plitvice Lakes National Park and Durmitor National Park) and one mixed natural/cultural site (Ohrid Lake Nature Reserve). Plitvice Lakes and Durmitor are similar to NPA in some respects but habitat diversity in those two sites is higher than in the NPA. Both these existing World Heritage sites contain fir spruce forests as well as beech-forest ecosystems. Additionally, NPA does not have outstanding landscape features like the travertine lakes and waterfalls of Plitvice Lakes and the 40km-long Tara gorge of Durmitor. All three sites are affected by settlements, roads, and tourist facilities but the degree of naturalness is higher in the two existing World Heritage sites. In Plitvice Lakes a small primeval forest - Corkova Uvala - has survived; in Durmitor, forests on the steep and inaccessible slopes of the Tara gorge have been only slightly affected by human exploitation. However, all forest ecosystems of NPA have been affected by human activity, reputedly for at least 4000 years with a period of intense exploitation after the Second World War. As a result, the NPA forest is mostly young (between 40 till 80 years) with very rare old growth stands and some ancient trees which have survived in coppice with standard systems or in grazed areas.

Although Plitvice Lakes, Durmitor, and NPA belong to the same biogeographical province, there are different biotic and abiotic considerations on both sides of the Adriatic Sea.

The Appennine chain forms the mountain backbone of the Italian peninsula, from the Maritime Alps in the north to the Straits of Messina in the south: it is roughly subdivided into the Northern, Central and Southern Appennines. The highest elevations are reached in the Central Appennines in the Gran Sasso (Corno Grande 2,912m) and Maiella (Monte Amaro 2,795m) massifs. The NPA is part of the Central Appennines, and representative of it, with its typical limestone geology and mostly roundshaped mountain forms.

In the Abruzzo region itself, the Gran Sasso e Monti della Laga National Park and Maiella National Park were established in 1995. Monti Sibillini National Park, a little to the north in Umbria (established 1993) is also considered part of the Central Appennines. Gran Sasso e Monti della Laga NP is the largest (148,945ha), most diverse reserve of the parks and has the highest peak in the chain of mountains. Its more rugged peaks resemble those of the Alpine Dolomites and contain the only glacier (Ghiacciaio del Calderone) in the entire Appennines. However, human influence is still high (settlements, roads, storage lakes, ski lifts) with serious impacts on natural values. For example, the tunnel of Rome-Ancona, running through the main crest of Gran Sasso, is responsible for a drop in ground water levels of 700 metres.

Management activities for conservation in these newly-established parks are not yet as well established as those in NPA. Additionally, there are two other national parks of the Northern Appennines which show similarities with NPA: Appennino Toscoemiliano National Park and Foreste Casentinesi National Park. However, the state of naturalness of these is even lower than the other sites described.

In conclusion, NPA is typical of the Appennine range. While it is certainly an attractive area, and some of its natural qualities are in the process of restoration, it cannot be said to contain outstanding universal values. It is, however, significant at the European scale and of great importance within Italy.

4. INTEGRITY

4.1. Boundaries

Protection of the NPA dates back to 1921 when, on a private initiative, the first Italian nature reserve was established in Camosciara. A year later the National Park of Abruzzo was inaugurated and its protection by law secured in 1923 in the National Park Act. The initial 18,000ha protected was increased over time to its present size of 50,288ha.

There is some confusion over the precise area nominated. The nomination refers to 44,000ha but the NPA was recently enlarged to 50,288ha. During the field visit, it was suggested that the pre-park (buffer zone with 76,029ha) should also become part of the World Heritage proposal. Two parts of the pre-park (La Montagnola and Torrente Lacerno) are already planned to become part of the NPA while other parts are appropriate to complete the ecosystem (e.g.- Monte Greco, Gole del Sagittario). However, some other parts are fairly heavily settled (e.g. Valle Volturno) and would not be appropriate as part of an IUCN Category II National Park.

The NPA protects a section of the river Sangro from its source to 25km downstream. The boundaries follow the crests of the river valley and are geographically appropriate. However, the key species of NPA, the Marsican brown bear, requires a minimum of 100,000 – 120,000ha to support a viable population of 100 individuals. This accounts for a proposal to include the pre-park within the nominated site. It appears too that other key species of NPA (lynx, wolf) cannot be protected within the park's current size alone.

4.2. Ownership Situation

The IUCN field mission to NPA was informed that 95% of the park's territory is in the hands of the communities and private individuals. At present, all communities, except one, are persuaded of the benefits of adhering to the park's nature conservation policy. The unfavourable ownership situation has been solved by the park administration leasing the exploitation rights of forests and pasture lands from the communities so that the communities receive income without losing their forests. At present 20,000ha of forests and pasturelands are leased by the park and, for the present, the system works well. However, the situation may change and longer term contracts are required to ensure the long-term integrity of the site.

4.3. Resident Human Population

Some 5,000 people live within the boundaries of the NPA. There are eight villages located in the main valley of river Sangro and the Val Giovenco. The predominant local economy has now changed from agriculture to tourism. The original large herds of sheep have disappeared, although the evidence of grazing is still apparent. Remaining domestic stock have retreated from the slopes to the valley bottoms, which were formerly used for cultivation. Former industrial exploitation of forests has been limited to personal use as firewood. Only the community of Pescasseroli continues to exploit forests in the park for industrial purposes (15,000 – 20,000 stems per year).

4.4. Development pressures

It is apparent that the NPA does not represent a natural part of the Appennine chain, but an area which was historically exploited fairly intensively. However, the condition of NPA is now considered very favourable for restoring natural qualities, though this policy of restoration has been seriously compromised by the construction of the storage lake of Lago di Barrea and tourist activity at Pescasseroli.

Although located near the edge of the park, the storage lake seriously affects the water ecosystem of the proposed strict nature reserve of Foce di Barrea situated downstream. This needs the permanent flow of the river Sangro but park authorities have no influence on the upstream

management of the water regime, a situation not acceptable for an area which deserves to receive the highest protection status in the park.

However, the most serious threats come from tourist activities of Pescasseroli. The 4,000-inhabitant community in the centre of NPA has been developed as a tourist resort in the style of the 1970s, with large blocks of flats in exposed places, three ski lifts and other facilities. At peak periods, tourism numbers greatly exceed the local population and even the capacity of the tourist facilities (6,000 at most). On the positive side, illegal building, which was a great problem in the past, now seems to be under control with the removal of some unauthorised minor buildings.

4.5. Management

Great progress has been made in strengthening park management in the last decade. However, management objectives which are actively implemented in the field are more appropriate to a habitat/species management area (Category IV) or a protected landscape (Category V) than to a Category II national park.

The park territory is divided into four management zones: Zone A (strict nature reserve), Zone B (general nature reserve), Zone C (protection zone), and Zone D (development zone). Only within Zone A (about 4,000ha) is all kind of human exploitation prohibited, although it does not appear to be wholly effective. Another 5,000ha will be added to Zone A in the future. Zone B, with about 40,000ha, allows traditional uses of natural resources. Zone C, with about 6,000ha, is managed as agricultural land. Zone D are settlements covering a small area.

The most dominant ecosystem of NPA is beech forests, which cover 75% of the territory, 40% of which (15.000ha) are no longer exploited. The management aim is to protect large mammals, such as bear, wolf and lynx. Dead wood, the most evident and characteristic criteria for natural forests, is very rarely found in the NPA forests due to collection for firewood. Natural disturbances, such as fire, are suppressed if possible. Management of forests in NPA has been under the control of the forest administration, but a recent legislation change will bring it under the control of the park in due course.

5. ADDITIONAL COMMENTS

The IUCN field mission met only with the park administration and local officials. It become clear during the mission that they were not fully conversant with the requirements of World Heritage status. As a result, much attention during the review was focused on management issues rather than the inherent natural qualities of the site.

It is noted that the park administration has carried out a very impressive programme of work over a number of years to reintroduce natural qualities to the site – for example to help build up populations of large mammals and to restore damaged ecosystems. It has also been very successful in developing the support of local people for conservation, so much so that they have supported proposals to enlarge the park. The NPA also provided an example of how the tourist appeal of a national park can provide the “engine” for regional economic growth in an otherwise depressed rural area.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

On the basis of the field mission and the unanimous view of independent reviewers, NPA is not considered of "outstanding universal value". Nevertheless, its importance in a European context, and the excellent work being carried out by the park administration has been recognised by the award of the European Diploma of the European Union.

Comments under each of the criteria follow:

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

The geology and geomorphology of NPA is representative of the Central Appennines, but outstanding features of national value are better displayed in the nearby national parks of Gran Sasso e Monti della Laga and Maiella. Diversity and evolution of geological and geomorphological features are also better represented in Monti Sibillini, Gran Sasso e Monti della Laga, and Maiella. IUCN does not consider that the nominated site meets this criterion.

Criterion (ii): Ecological processes

Many ecological processes in NPA are still more or less subject to human influences: for example, forest ecosystems are still under low but important exploitation pressure (e.g. removal of dead wood). The main river system has been seriously devalued by the construction of a storage lake. Grazing in the past has impacted the natural tree line and restoration of forest ecosystems from earlier severe exploitation is still ongoing. The valley bottoms, most important for ecological exchange in natural environments, are occupied for human use. Only rocky environments on the highest mountaintops are reserved exclusively for natural ecological processes. IUCN does not consider that the nominated site meets this criterion.

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

Natural phenomena or areas of natural beauty and aesthetic importance certainly exist in NPA but there area of national level significance and not global. IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

The NPA is home to 62 species of mammals, 230 species of birds, 44 species of reptiles, amphibians and fishes, and 1,950 species of vascular plants. The nomination identifies the most important species as the Abruzzo chamois and the Marsican brown bear. The Abruzzo chamois is claimed in the nomination paper to be a distinct species but specialised literature questions this. In any case, small populations of Abruzzo chamois are now found as well in the nearby national parks of Maiella and Gran Sasso e Monti della Laga. The Marsican brown bear is considered as a subspecies both from the nomination paper and specialised literature. Small autochthonous populations have survived in Gran Sasso e Monti della Laga National Park and Maiella National Park as well. To protect 100 individuals, it is estimated almost double the size of the nomination site is required. The protection of the brown bear is an important task for nature conservation efforts on the European scale, but more significant brown bear habitat exists in Slovenia/Croatia and in Bulgaria. Recent material published estimates the total number of species existing within NPA at about 6,000 species which compares unfavourably with, for example, Bialowieza World Heritage site with about 10,000 species. IUCN does not consider that the nominated site meets this criterion.

Conditions of integrity

In considering the conditions of integrity for natural World Heritage sites, as required under the Operational Guidelines paragraph 44(b), NPA does not have sufficient size to protect most key species (brown bear, lynx, wolf) in viable population numbers, although the inclusion of the buffer zone would improve this position significantly. The site has a management plan showing that about half of NPA is under direct management of the park authorities, while the other half is still open for exploitation purposes and park authorities are dependant on the cooperation of the landowners. Additionally, it is difficult to understand why ski lifts in the surroundings of Pescasseroli are classified as traditional uses (Zone B).

7. RECOMMENDATION

The NPA is not recommended for inscription on the World Heritage list.

The Bureau may wish to commend the authorities for the steps they have already taken to strengthen the protection of the area and to restore its natural qualities. It may also be appropriate to consider whether this park, along with others, could form the core of an international biosphere reserve in the region, illustrating different stages of human influence on the natural environment, the scope for ecological restoration, the links between protected areas and the local economy, and mechanisms for co-operation with local communities and private landowners.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

KINABALU PARK (SABAH, MALAYSIA)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (16 references)

ii) **Additional Literature Consulted:** IUCN-SSC. 1998. Global Action Plan for Microchiroptean Bats. Final Draft; Braatz, S. 1992. Conserving Biological Diversity: A Strategy for Protected Areas in Asia – Pacific Region. World Bank Technical Paper 193; Collins, M. *et al* eds. 1991. **The Conservation Atlas of Tropical Forests** – Asia and Pacific; IUCN McNeely, J. 1999. **Mobilising Broader Support for Asia's Biodiversity**. ABD; MacKinnon, J. ed. 1997. **Protected Area Systems Review of the Indomalayan Realm**. ABC/WCMC; Hitchcock, P. 1998. Post World Heritage Seminar Report on Mission to Malaysia; CIFOR/UNESCO 1999. **World Heritage Forests** – The World Heritage Convention as a Mechanism for Conserving Tropical Forest Biodiversity; Cubitt, G. 1996. **Wild Malaysia**. New Holland; Meng, W. K. 1991. The State of Nature Conservation in Malaysia. Proceedings; Kitayama, K. 1993. Human Impacts and Implications for Management in Mount Kinabalu. **in** Hamilton, L. *et al* eds. 1993. **Peaks, Parks and People**. East-West Centre; IUCN/WWF. 1995. **Centres of Plant Diversity**. Vol. 2. Asia; MacKinnon, K. *et al* 1996. **The Ecology of Kalimantan.** Periplus; Khoom, Wong. 1998. Kinabalu: Sabah's Tropical Paradise. **Plant Talk** (15); Cleary M and P. Eaton. 1992. **Borneo – Change and Development**. OUP; MacKinnon, J. 1975. **Borneo**. Time-Life Books; Brooks, R. R. 1987. **Serpentine and its Vegetation**. Croom Helm; Roberts, J. L. 1989. **Geological Structures**. Macmillan Field Guide.

iii) **Consultations:** 13 external reviewers, officials from Sabah Forest Department,

iv) **Field Visit:** J. Thorsell, January, 2000

2. SUMMARY OF NATURAL VALUES

As the highest mountain between the Himalayas and New Guinea, Mount Kinabalu (4,095m) holds a distinctive position for the biota of Southeast Asia. Kinabalu is a granite intrusion formed 15 million years ago by the hardening of a mass of molten rock that rose beneath the sedimentary rocks of Borneo's Crocker Range. One million years ago this pluton was thrust upward by tectonic movements which continues to this day. The sandstone and shale that once covered the granite have been eroded to reveal the underlying rock. During the Pleistocene, glaciers covered Kinabalu's summit, scouring the granite plateau and sharpening the jagged peaks above the ice. The ice sheet disappeared 10,000 years ago. Since then, wind and water have sculpted the summit peaks further to create pinnacles and deep valleys.

Kinabalu Park presents a wide range of habitats within its altitudinal range of 152m – 4,095m and size of 75,370ha. Natural vegetation covers 93% of the park with rich tropical lowland and hill rainforest (dominated by diptocarps) amounting to 35%. Tropical montane forest covers another 37% of the park with sub-alpine forest and evergreen scrub found at the higher elevations. Of particular conservation significance are vegetation types developed on ultramafic (serpentine) rocks. Ultramafic vegetation covers about 16% of the park and contains many species restricted to this substrate.

Kinabalu has been identified by IUCN/WWF as a Centre of Plant Diversity. Despite its geological youth, it is exceptionally rich in species with elements from the Himalayas, China, Australia, Malesia and Pantropical floras. The park has between 5,000-6,000 vascular plant species, 1,000 of which are orchids. It is particularly rich in *Ficus* (78 taxa), ferns (610sp) and *Nepenthes* (9 species of pitcher plants). *Rafflesia*, a rare parasitic plant is also found. The mountain flora has diverse "living fossils" such as the celery pine and the trig-oak, the evolutionary link between oaks and beeches.

Wildlife is also diverse with 90 species of lowland mammals and 22 others found in the montane zone. Four species of primates occur and 326 bird species have been recorded. Mount Kinabalu is thus both species-rich and an important centre for endemism. Half of all Borneo's birds, mammals and amphibian species including many rare and endangered species occur in the park. Two-thirds of all Bornean reptiles and at least half of its plant species are represented in the park.

3. COMPARISONS WITH OTHER AREAS

The island of Borneo is a Biogeographic Province on its own which includes five other IUCN category II national parks larger than the nominated site. None has the altitudinal gradient (almost 4,000m) and the variety of life zones of Kinabalu. Unfortunately, the protected areas on the Indonesian portion of the island have been seriously degraded and Kinabalu is considered as being one of only two sites on the island (along with Gunung Mulu) with potential as a natural World Heritage site. Even though there are 28 centres of plant diversity and endemism on Borneo, "by far the most important site in Borneo is Mount Kinabalu" (Davis, 1995. p. 258). Moreover, "Mount Kinabalu is, for its area, undoubtedly the richest locality in species in Asia west of New Guinea, and one of the few mountains in the Old World to compare in species diversity with the Andes of Colombia and Ecuador" (Davis, ibid, p. 250).

Although there are several other mountains in the region (Crocker Range, Bukit Raya), none has an alpine zone or the variety of species or dramatic scenery found in Kinabalu. The notable exception is the Lorentz World Heritage site on Irian Jaya (inscribed 1999) which is higher (4,884m), 30 times as large, extends out to sea and contains extant glaciers. Indeed, the plant communities of the summit zone on Mount Kinabalu have close affinities with alpine vegetation on New Guinea's higher and more extensive mountains. The geology of the two sites is very distinct, however, because Lorentz has been uplifted at the edge of two colliding continental plates. The biota also varies between the two sites as Lorentz is in a different Biogeographic Realm (Oceania) and falls to the east of the biologically-dividing "Wallace Line". Lorentz is also inhabited by 6,300 indigenous people while Kinabalu has only a few families living in one small enclave in the park.

Granitic dome structures occur elsewhere in the world including the Huangshan and Yakushima World Heritage sites and in the Central Suriname Nature Reserve (nominated in 1999). Kinabalu is the highest of these but its formations are less dramatic than those at Huangshan. Ultramafic substrates (i.e. rocks containing high concentrations of magnesium and iron) occupy less that 1% of the surface of the earth but their unusual and highly-specialised floras have attracted great scientific interest. Other World Heritage sites with ultramafic floras occur in Southwest New Zealand and Puerto Princessa in Palawan as well as other localities (upper Tiber in Italy, northern Honshu in Japan and on Skye in Scotland).

In conclusion, Mount Kinabalu is one of the most outstanding centres of plant diversity in the Indomalayan Biogeographic Realm and indeed, the world. The Kinabalu massif has a remarkably rich flora with elements from the Himalayas, China, Australia and Malesia. Its geology and scenery are supportive natural features that combine to make Kinabalu a park with high scientific and conservation value.

4. INTEGRITY

4.1. Boundaries

The boundaries of Kinabalu Park encompass the main bulk of the mountain including the remaining naturally forested slopes. The site thus incorporates the natural diversity and habitats that constitute Kinabalu's key natural heritage values. Settlement and logging occurs right up to the boundary in many places but the park's limits are clearly marked and regularly patrolled. There is no provision for buffer zones and it would be beneficial for the Sabah State Government to carefully regulate development in key strategic locations outside the park where it still has control.

Two modifications to boundaries have resulted in losses to integrity of Kinabalu Park. In 1970, 2,555ha were excised to allow a copper deposit to be mined. This mine is now worked out but evidence remains. In 1984 a large area of forest was excised to build a golf course, housing development and dairy farm in the Pinosuk area. Several important plant localities were destroyed and much forest was lost. Although compensation for this loss of parkland was made, the losses at Pinosuk were significant. While these past reductions in size were unfortunate, the majority of the key natural values remain.

4.2 Legislation

In terms of legislation and institutional structures, national parks are defined as a concurrent function under the Malaysian constitution. Both state and federal levels of government have powers to pass legislation provided there is consultation. In Sabah, national parks including Kinabalu are established and managed at the State level under the State of Sabah Parks Enactment of 1984 and Amendment of 1996. Malaysia's national park act does not apply to Sabah (or Sarawak) and it is thus the state level of government that will carry the prime responsibility for the implementing the Convention in Malaysia (as is the case in other federal systems).

4.3 Management

A management plan was prepared in 1993 and will soon need updating. The plan is backed by adequate legislation and a state policy document. Kinabalu has been the most productive site in Borneo for scientific research and has an excellent collection of specimens and a laboratory facility. Staffing levels and budget are adequate. Tourism pressures are high but impacts are reasonably controlled. Intensive visitor facility development is kept to the margins of the park. Kinabalu's scenic values are partially marred by the construction of several transmission towers built in the high ridges but these were built before the park was established and it is unlikely that they could be removed.

4.4 Threats

Some encroachment in the form of illegal agriculture and logging has occurred in the past but, with boundaries now marked and patrolled, this threat is minimal. There has been some overcollecting and poaching of orchids and pitcher plants. Park authorities have sought cooperation of local villagers to report on thefts of rare plants and to involve them in an ethnobotany project. There are 12 people practising subsistence agriculture in one 40ha section of the park but they have been there historically and are considering voluntarily re-locating outside the park. Near the mountain huts there is a problem with several invasive plants and attention is needed to ensure that this is kept under control.

In sum, Kinabalu Park sets a high standard for protected area management in south-east Asia. Although much of the lowland forest of the region has been transformed to other uses and the park is becoming an island in a sea of agriculture and forestry development, it is still in a good state of conservation. The only potential threats relate to adjacent land tenure and continued agricultural pressures around the boundary of the park.

5. ADDITIONAL COMMENTS

Prior to the mid-20th Century, Mount Kinabalu was regarded as a sacred mountain by the Dusan people of the surrounding foothills. The mythology associated with the mountain in former times is one reason the upland region was left intact.

6. APPLICATION OF WORLD HERITAGE CRITERIA

Kinabalu Park was nominated under all four natural criteria. All assessments conducted on biological priorities in south-east Asia by FAO, UNEP, ADB, IUCN, WWF and Conservation International rank Mount Kinabalu as one of the top priorities in the Indomalayan region. Kinabalu Park is a clear candidate for inscription on the World Heritage list on the basis of the following two natural criteria:

Criterion (ii): Ecological processes

The high species diversity of Kinabalu results from a number of factors:

- the great altitudinal and climatic gradient from tropical forest to alpine conditions;
- precipitous topography causing effective geographical isolation over short distances;
- the diverse geology with many localised edaphic conditions, particularly the ultramafic substrates;
- the frequent climate oscillations influenced by El Niño events; and
- geological history of the Malay archipelago and proximity to the much older Crocker Range.

The above processes provide ideal conditions for a diverse biota, high endemism and rapid evolutionary rates. IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

Research on the biota of Mount Kinabalu has been extensive and has established that the park is floristically species-rich and a globally important Centre of Plant Endemism. The Park contains an estimated 5,000-6,000 vascular plant species including representatives from more than half the families of all flowering plants. The presence of 1,000 orchid species, 78 species of *Ficus*, and 60 species of ferns are indicative of the botanical richness of the park. The variety of Kinabalu's habitats includes 6 vegetation zones from lowland rainforest through to alpine scrub at 4,095m. Faunal diversity is also high with the majority of Borneo's mammals, birds, amphibians and invertebrates (many threatened and vulnerable) known to occur in the park. It is clear that Kinabalu Park contains "the most important and significant habitats for *in-situ* conservation of biological diversity". IUCN considers that the nominated site meets this criterion.

The case for natural criteria (i) and (iii) was not convincingly made in the nomination document. Although there are high geological values and the park is the dominant landscape feature on the island, these are considered secondary to Kinabalu's primary natural values under criteria ii and iv.

The site meets all related "conditions of integrity" described in Operational Guidelines paragraph 44 (b) but attention needs to be given to minimising external impacts.

7. RECOMMENDATIONS

That the Bureau recommend to the Committee that Kinabalu Park be **inscribed** on the World Heritage list under natural criteria ii and iv. The Bureau may wish to encourage the State Party

to minimise impacts on the park, as discussed above in section 4, by carefully regulating activities in proximity to its borders.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

GUNUNG MULU NATIONAL PARK (SARAWAK, MALAYSIA)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (18 references)

ii) **Additional Literature Consulted:** Meridith M. and J. Wooldridge. 1992. **Giant Caves of Borneo**. Tropical Press. Kuala Lumpur; IUCN-SSC 1998 Global Action Plan for Microchiroptean Bats. Final Draft; Vermeulen J. and T. Whitten. 1999. **Biodiversity and Cultural Property in the Management of Limestone Resources**. Lessons from East Asia. World Bank/IUCN; Braatz. S 1992. Conserving Biological Diversity: A Strategy for Protected Areas in Asia – Pacific Region. World Bank Technical Paper 193; Collins M. *et al* eds. **The Conservation Atlas of Tropical Forests** – Asia and Pacific; IUCN McNeely J. 1999. **Mobilising Broader Support for Asia's Biodiversity**. ADB; MacKinnon J. ed. 1997 **Protected Area Systems Review of the Indomalayan Realm**. ABC/WCMC; Hitchcock P. 1998. Post World Heritage Seminar Report on Mission to Malaysia; CIFOR/UNESCO 1999. **World Heritage Forests** – The World Heritage Convention as a Mechanism for Conserving Tropical Forest Biodiversity; Cubitt G. 1996. **Wild Malaysia**. New Holland; MacKinnon, K. *et. al*. 1996. **The Ecology of Kalimantan** Periplus; Mandis Roberts Consultants. 2000. Integrated Development and Management Plan. Inception Report; Waltham, T. 1997. Mulu. The Ultimate in Cavernous Karst. **Geology Today**. Nov/Dec; Waltham, T. 1995. The Pinnacle Karst of Gunung Api, Mulu, Sarawak. **Cave and Karst Science** 22(3); Brookfield, H. *et. al.* 1996. **In Place of the Forest: Environmental and Socio-Economic Transformation in Borneo**. UNU Press; MacKinnon, J. 1975. **Borneo**. Time-Life Books; Cleary M. and P. Eaton. 1992. **Borneo – Change and Development**, OUP; Hanbury-Tenison, R. 1982. **Mulu - The Rainforest**. Weidenfeld and Nicholson.

iii) **Consultations:** 17 external reviewers, officials from Sarawak Forest Department, Mandis Roberts Planning Consultants.

iv) **Field Visit:** J. Thorsell, January 2000

2. SUMMARY OF NATURAL VALUES

Gunung Mulu National Park (GMNP) on the island of Borneo protects a wide range of natural values within its 52,864 hectares (see Map 1). With an altitudinal range from 28m to the 2377m summit of Gunung Mulu, the park has 17 vegetation zones, primarily lowland rainforest (40% of the area) and montane rainforest (20% of the area). Some 3,500 species of vascular plants have been recorded including a high number of endemics found on limestone substrates. GMNP is considered to be one of the richest sites in the world for palms with 109 species of 20 genera identified. Eighty species of mammals and 270 species of birds (including 24 Borneon endemics) have been recorded. The cave fauna, including many trogloditic species, number over 200. The area also has many species of reptiles (55), amphibians (76), fish (48) and invertebrates (20,000+). The park also supports huge bat colonies (3 million wrinkled-lipped freetail bats inhabit Deer Cave alone) and cave swiflets (several million in one cave).

GMNP is not only important for this high biodiversity but also for its karst features. There are at least 295km of explored caves including some of the largest in the world. A range of cave types at different levels exist due to uplift during the late Pliocene to Pleistocene. The caves, which are

concentrated in the Melinau limestone formation and on Gunung Api and are estimated to be at least 2-3 million years old. Sarawak Chamber, which is 600m x 415m and 80m high, is the largest known cave chamber in the world. There are some exceptional decorated speleothems with spectacular examples of argonite and calcite needles. Another outstanding karst feature in GMNP are the "pinnacles", 50m high sharp blades of rock that project through the rainforest canopy.

In sum, GMNP protects a substantial area of Borneo's primary tropical forest containing a high diversity of biota including many Borneon endemics and threatened species. The park also has a high concentration of large cave passages and chambers which in turn provide a major wildlife spectacle in terms of millions of cave swiftlets and bats. The area is roadless and has no permanent residents. Local Penans retain traditional hunting rights within the park.

3. COMPARISONS WITH OTHER AREAS

There are no natural World Heritage sites in the Borneo Biogeographic Province although Kinabalu in the neighbouring state of Sabah has also been nominated for review in 2000. There is some overlap in species between Kinabalu and GMNP, with the former being about 20% more species-rich in both flora and fauna. Kinabalu is very different geologically (i.e. a granite dome) and is much higher in elevation (4100m). Kinabalu does not have the extensive karst landscape of GMNP, however, nor any of the associated values that are found with karst. Both sites are very distinctive in their own right and are judged by most reviewers as the two most important conservation areas on the island of Borneo.

GMNP's karst features have been the focus of much research (notably through the Royal Geographical Society) and are generally accepted to be among the most spectacular in the world. Most other World Heritage karst and cave sites are in the temperate zone (e.g. Carlsbad, Mammoth, Castleguard (Canadian Rockies), Wulingyuan, Agglelek, Plitvice, Skokjan, Nahanni) and are very different from GMNP's rainforest karst setting. A relevant comparison is the Lorentz World Heritage site in Irian Jaya, inscribed in 1999, which includes major high altitude karst with what may be the largest underground river in the world. In terms of scale of its karst features, Lorentz is thus comparable to Mulu but differs in almost all other respects. There are also tropical karst features at Thung Yai Hua Kha Khaeng in Thailand and in the Puerto Princessa World Heritage Site in the Philippines, but these are on a much smaller scale with much less variety than found in GMNP. The Phong Nha/Hin Namno karst in Vietnam/Laos is another significant area but of lesser global significance than Mulu. There are many karst features in China as well but these are not tropical karst.

Perhaps the most similar karst area is to be found in several remote areas of Papua New Guinea's mountains. These areas are little known (Hindenburg Wall, Kanada, and Nakanai mountains) and none have any protective status. The pinnacle karst of Mulu is distinctive as well as being in both a more natural condition and a larger scale than the "Stone Forest" in Lunan, China. It is also different from the pinnacles found in Madagascar's Tsingy de Bemaraha World Heritage site in that Mulu is located on a steep mountain side and is not in the form of dissected plateaus created beneath major controlling bedding planes. Finally, there are clear contrasts between Mulu's caves that evolved on such a gigantic scale by a process of dissolution and those of Mammoth (USA) with its longer networks of smaller passages and Carlsbad (USA) which has evolved largely by hydrothermal processes.

In conclusion, the caves of Mulu are so long, large and complex, that Gunung Api can claim to be the most cavernous mountain in the world. It is also the most studied tropical karst area in the world and is without rival in terms of karst scenery and its setting in a mountainous rainforest.

Finally, the nomination notes the importance of the area for microchiropteran bats. This is certainly the case for the freetailed bat which number 3 million in Deer Cave alone. This is still much smaller than some *Tadaridu brasiliensis* colonies in South America, many of which number between 10 and 20 million. Likewise, there are other caves and parks with more bat species (e.g.

Phong Nha). Comparative data for cave swiflets is not available but the numbers using Mulu are impressive. In sum, GMNP is indeed a significant habitat for bats and swiflets and is among the world's most important sites for protection of these species.

4. INTEGRITY

4.1 Boundaries

GMNP's limits are not ideal as full catchment protection is lacking (very important for some of the caves) and the very important caves in the adjacent Gunung Buda area are not included in the site. Fortunately, the State Government of Sarawak has recognised these deficiencies and the nomination document provides a map (see Map 2) indicating several extensions awaiting Ministerial approval. An additional 25,000ha. will eventually be added. Certainly the Gunung Buda area has substantial values and should be eventually incorporated into the site (particularly as it is currently being overharvested by swiflet nest collectors). These extensions will greatly contribute to the integrity of the Park.

GMNP also adjoins the Labi Forest Reserve in Brunei. This reserve contains extensive undisturbed lowland forest and effectively complements GMNP by adding to its integrity and habitat connectivity. IUCN suggests high-level discussions between the Governments of Sarawak and Brunei on the future co-operative protection of the two adjoining sites.

4.2 Management

GMNP has had two management plans prepared and a third is now in process (due September, 2000). Implementation has been effective with a park headquarters, field stations and a good system of trails and access to four "show caves". One constraint is adequate staffing. Currently there is only an acting park director and the level of staffing (47 people) and range of expertise compares unfavourably with Kinabalu in Sabah. Related to this constraint is the proposal to contract the management of the park out to a private body. Provision for concession management is made in Sarawak's 1998 Parks Act and, if structured properly, could result in a more effective management regime. The new management plan will contain details of the new arrangements.

In terms of legislation and institutional structures, national parks are defined as a concurrent function under the Malaysian constitution. Both state and federal levels of government have powers to pass legislation provided there is consultation. In Sarawak, national parks including Gunung Mulu are established and managed at the State level under a new Ordinance passed in 1998. Malaysia's national park act does not apply to Sarawak (or Sabah) and it is thus the individual states that will carry the prime responsibility for the implementing the Convention in Malaysia (as is the case in other federal systems).

4.3 Threats

Local Penan and Berawan peoples were given privileges to hunt pig and deer in the park when it was gazetted. As much of the traditional nomadic hunting area outside the park has been affected by logging, hunting pressure on the park has intensified especially on larger animals such as pigs, primates and hornbills. GMNP has been intensively hunted over the past decade and a wildlife census is needed to determine sustainability levels.

A second serious threat comes from logging which is occurring around the park. Most of the forests have been cut up to the boundary rivers. Growing erosion has increased the silt-load of these rivers significantly altering the aquatic ecology. Further away from the park, the conversion of natural forests to oil palm plantations is inevitably leading to habitat loss for cave swiftlets and bats. These species are known to forage for insects beyond a 25km radius from their nesting sites. IUCN suggests that clear felling to create oil palm estates not be permitted within this distance from the GMNP boundary.

5. ADDITIONAL COMMENTS

With some 300 nomadic Penans using the GMNP for hunting and gathering and with two Penan settlements on the boundary of the park, various social issues need attention. These will be addressed in the management plan now being prepared.

6. APPLICATION OF WORLD HERITAGE CRITERIA

GMNP was nominated under all four natural criteria. In all assessments conducted by IUCN, WWF and other conservation organisations on the biological values of protected areas in Asia/Pacific, GMNP is ranked as one of the top priorities. Other reviews of karst features also mention Mulu as one of the most outstanding in the world. With its combination of many natural values, GMNP is a clear candidate for inscription on the World Heritage List on the basis of all four natural criteria:

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

The concentration of caves in Mulu's Melinau Formation with its geomorphic and structural characteristics are an outstanding resource which allows a greater understanding of earth's history. The caves of Mulu are important for their classic features of underground geomorphology, notably the sediment sequence and the layered sequences of wall notches that demonstrate an evolutionary history of more than 1.5 million years. This exceptionally long period makes the caves a valuable data source on geo-climatic fluctuations during the Pleistocene. The giant doline of the "Garden of Eden" is a massive expression of karstic collapse whose proximity to the nearby Sarawak Chamber (the world's largest) offers one of the world's finest examples of the collapse process in Karstic terrain. Also of significance are the foot caves found around the base of the limestone mountains which demonstrate the processes of lateral planation in a karst environment. IUCN considers that the nominated site meets this criterion.

Criterion (ii): Ecological Processes

GMNP provides outstanding scientific opportunities to study theories on the origins of cave faunas. The food webs of Mulu's caves and the large-scale transfer of food energy from forest to caves by bats and swiftlets is an exceptionally well-studied process here. Many of Mulu's troglodytes belong to very ancient groups which have largely disappeared from the modern land surface and are now represented by a few widely scattered species. These evolutionary processes in response to tectonic change are on-going. IUCN considers that the nominated site meets this criterion.

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

With its deeply-incised canyons, wild rivers, rainforest-covered mountains, spectacular limestone pinnacles, cave passages and decorations, Mulu has outstanding scenic values. The natural phenomenon of millions of bats and swiflets leaving and entering the caves is a superlative wildlife spectacle as is the less-easily appreciated life of the invertebrate world in the caves. IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

GMNP also provides significant natural habitat for a wide range of plant and animal diversity both above and below ground. Its lowland and montane forests are botanically-rich in species and high in endemism. Mulu is one of the richest sites in the world for palm species and assumes greater importance in perspective of the transformation of much of Borneo's forests. The park also hosts one of the highest number of bat species (28) and populations in the region as well as a exceptionally diverse range of troglobitic species. IUCN considers that the nominated site meets this criterion.

If clarifications can be obtained on the 4 issues outlined in section 7, IUCN would consider that the nominated site meets the conditions of integrity as provided in the Operational Guidelines paragraph 44b.

7. RECOMMENDATION

That the Bureau note that Gunung Mulu National Park is considered by IUCN to meet natural criteria i, ii, iii and iv. However, IUCN recommends that the nomination be **referred** back to the State Party for clarification of the following:

- progress with the gazettement process to incorporate the three extensions as indicated on Figure 3 of the nomination;
- action to strengthen management capacity in the park;
- recognition of the need to minimise impacts of logging activities around the park and the effect of clear-felling on cave swiftlet and bat populations; and
- assurance that the new management plan addresses issues relating to local peoples' use of and benefits from the park as well as the new contractual arrangements for management of the park.

The Bureau may also wish bring to the attention of the State Party the important buffer and corridor function of the adjacent protected forests in the Labi Hills in Brunei.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

LENA RIVER DELTA (RUSSIAN FEDERATION)

Regrettably, an IUCN Technical Evaluation Report of this nomination is not available for the July Bureau meeting. The State Party requested that a field mission be delayed for climatic reasons. The IUCN evaluation mission will take place in August 2000 and a report will be prepared for the November meeting of the Bureau.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE CAPE FLORISTIC REGION: PHASE 1 (SOUTH AFRICA)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (14 references)

ii) **Additional Literature Consulted:** Cowling, R. M. 1990. Diversity components in a species-rich area of the Cape Floristic Region. **Journal of Vegetation Science** No. 83. pp 699-710; Cowling, R. M. and Holmes, P. M. 1992. Flora and Vegetation in **Ecology of Fynbos**. Cowling, R. M. (ed.); Cowling, R. M. & Hilton-Taylor, C. 1994. Patterns of plant diversity and endemism in southern Africa: An overview in **Strelitzia** No. 1. pp 31-52; Cowling, R. M. & P. M Holmes. 1992. Endemism and speciation in a lowland flora from the Cape Floristic Region in **Botanical Journal of the Linnean Society** No. 47. pp 367-383; Cowling, *et al.* 1996. The Cape Peninsula South Africa: phyisiographical, biological and historical background to an extraordinary hotspot of biodiversity in **Biodiversity and Conservation** No. 5. pp 527-550; Davis, S. D. and Heywood, V. H. 1994. **Centres of Plant Diversity: A guide and strategy for their conservation**. Oxford University Press; Department of Environmental Affairs and Tourism. Republic of South Africa: **Nomination Proposal for the Cape Floristic Region. Phase 1: Peninsula Protected Natural Environment**. June 1999; Goldblatt, P. and Manning, J. C. 1999. **Cape flora – A conspectus of the Cape flora of South Africa**; Groombridge,B. 1992**. Global Biodiversity – Status of the Earth's Living Resources**. Chapman and Hall; Myers, N. 1990. The Biodiversity Challenge: Expanded hot-spot analysis. **The Environmentalist**. No. 10. pp 243-255. Richardson, *et. al.* 1996. Current and future threats to plant diversity on the Cape peninsula, South Africa in: **Biodiversity and Conservation**. No. 5. pp 607-648..

iii) **Consultations:** 5 external reviewers. Relevant officials from federal and provincial park agencies. Local communities and relevant interest groups.

iv) **Field Visit:** David Sheppard, February, 2000.

2. SUMMARY OF NATURAL VALUES

The Cape Floristic Region (CFR) is located within the Cape Province in south west of South Africa. The nomination will be presented in two phases, with Phase 1 covering the core area of the Cape Peninsula Protected Natural Environment (CPPNE) (see Maps 1 and 2). The core area of CPPNE covers 21,837ha and includes the Cape Peninsula National Park and the remaining public lands within the CPPNE. Phase 2 comprises six additional natural properties covering an additional 533,271ha.

This evaluation covers Phase 1, which is located on the Cape Peninsula. Its biological characteristics are typical of the south-western portion of the CFR. The CPPNE has a richness of habitats and plants. The Cape Floristic Region is often referred to as the "Fynbos biome", since Fynbos is the dominant vegetation and contributes most of the species to the flora of this region. On most biological assessments, this region is noted as one of the world's biodiversity "hot spots". Scenically, the area is dominated by the Table Mountain and by the rugged Cape Point.

The climate of the CFR is predominantly Mediterranean. Three climatic gradients are common: north-south along the west coast, west-east along the south coast and from the coast to the

interior. The mean annual temperature range on the coast is less than 8°C but exceeds 12°C further inland. Strong winds are a common feature along the Cape coast which has significance in relation to the management of fire. The Cape mountains are largely composed of hard quartzitic rocks of the Table Mountain and Witteberg series. The sharp floristic differences between lowland and montane environments can partly be explained by the presence of distinct soils in these areas.

The core area of the CPPNE is dominated by the Fynbos Biome which comprises two types of vegetation, Cape Fynbos shrubland and Renosterveld shrubland. The Fynbos biome is the more diverse. The Cape Peninsula is one of the six centres of endemism within the CFR. The maximum species concentration is in the south west Cape mountains, from where the floristic richness decreases in a northerly and easterly direction. The Cape Peninsula has been noted as "The Jewel in the Cape Floristic Region's Crown" due to its floristic diversity and endemism. The Cape Peninsula flora is one of the richest for any similar sized area, both in the Cape Floral Kingdom and elsewhere in the world. With 4,651 plant species and a level of species endemism of 31.9%, this area is outstanding on floristic grounds. Plant species richness is unparalleled in other temperate plant biodiversity hotspots around the world.

3. COMPARISONS WITH OTHER AREAS

The CFR is unique on floristic grounds. It is located within the Cape Schlerophyll biogeographical province (Udvardy, 1975); there are no World Heritage sites within this province. In view of its unique floristic values it is also recognised as a floral kingdom of its own - The Cape Floristic Kingdom (Good, 1974; Takhtajan, 1986) – there are no other World Heritage sites within the Cape Floristic Kingdom. The CFR is among the highest biodiversity “hot spots” in the world, based on plant diversity and endemism. Table 1 shows the numbers of endemic species presented in 18 “Hot Spots” (Groombridge, 1992) and this clearly indicates the pre-eminent position of the Cape Region. Sites within three other biodiversity “hot spots”, as shown in Table 1, have been nominated as World Heritage sites in 2000: Upland Western Amazonia; Atlantic Coastal Brazil; and Borneo (north). Two sites within the Brazil Atlantic Forests were inscribed on the World Heritage list in 1999. The only area known to have similar characteristics is south western Australia, where there is not an existing or proposed World Heritage site. There are no comparable areas in the other Mediterranean-climate areas in the world (in Chile, California or around the Mediterranean Sea).

Table 1: Numbers of endemic species present in 18 “Hot Spots”

REGION	HIGHER PLANTS	MAMMALS	REPTILES	AMPHIBIANS	SWALLOWTAIL BUTTERFLIES
Cape Region (South Africa)	6,000	15	43	23	0
Upland western Amazonia	5,000	-	-	c. 70	-
Atlantic coastal Brazil	5,000	40	92	168	7
Madagascar	4,900	86	234	142	11
Philippines	3,700	98	120	41	23
Borneo (north)	3,500	42	69	47	4
Eastern Himalaya	3,500	-	20	25	-
SW Australia	2,830	10	25	22	0
Western Ecuador	2,500	9	-	-	2
Colombian Chocó	2,500	8	137	111	0
Peninsular Malaysia	2,400	4	25	7	0
Californian floristic province	2,140	15	15	16	0
Western Ghats (India)	1,600	7	91	84	5
Central Chile	1,450	-	-	-	-
New Caledonia	1,400	2	21	0	2
Eastern Arc Mts (Tanzania)	535	20	-	49	3
SW Sri Lanka	500	4	-	-	2

SW Cote d'lvoire	200	3	-	2	0
TOTAL	**49,955**	**375**	**892**	**737**	**59**

The CFR has one fifth of all the plant species of Africa, despite occupying less that 0.5% of the continent's area (Goldblatt and Manning, 1999). The CFR has globally significant endemism levels and includes five endemic families; by comparison the whole of southern Africa has only 12 endemic families (Goldblatt, 1978). It has a high level of dependency, with almost 6,000 of the 8,500 plant species being endemic to the region. The core area of CPPNE Phase 1 is one of the six centres of endemism within the CFR. This centre has the greatest diversity and highest level of endemism within the CFR. The Cape Peninsula, with 4,651 plant species and a level of endemism of 31.9%, has plant biodiversity unparalleled in other temperate biodiversity "hotspots" and compares favourably with other sites either on or proposed for the World Heritage List for their botanical values. These include Shirakami (Japan), Garajonay (Spain) and Kinabalu (Malaysia). With the exception of Kinabalu, the core area of the CPPNE has greater levels of plant biodiversity and endemism. In recognition of these levels of biodiversity and endemism, the CFR has been identified as a Global Centre Of Plant Diversity (Davis and Heywood, 1994.

The CFR has areas of high natural beauty and aesthetic importance, including Table Mountain and Cape Point. However, there are existing mountain World Heritage sites, such as Mt. Kilimanjaro (Kenya) and Golden Mountains of the Altai (GMA) (Russian Federation) which have arguably higher value for natural beauty and aesthetic importance. It is also noted that the GMA is not inscribed for scenic values.

4. INTEGRITY

Human activities have had a significant impact on the biodiversity of the Cape Peninsula, since first European settlement in 1652. Urbanisation and agriculture have transformed 37% of the original area of natural vegetation. Lowland vegetation has been most affected although almost half of the transformation has occurred in only one of the 15 recognised vegetation types. However, other vegetation types have also been affected and, specifically, vegetation at higher altitudes has been impacted by alien species. Human population pressures on biodiversity are expected to grow. The current population within the Cape Peninsula region of 3.5 million is projected to grow to 6.2 million by 2020. This growth poses the most significant challenge to the long-term integrity of the area, particularly through increasing pressures for access and urban development, and an increasing incidence of human induced fire.

The following issues relating to the long-term integrity of the core area of the CPPNE are highlighted.

4.1. Management and Planning Framework

(i) Management Framework

The first phase of the nomination is for the natural site comprising the core area of the CPPNE. The core area covers the Cape Peninsula National Park (CPNP) and remaining public land within the CPPNE. Management arrangements are complex. A number of management agencies are involved including South Africa National Parks (SANP), South African National Defence Force, The National Botanic Institute (Kirstenbosch Botanical Garden) and Provincial authorities. The range of management authorities poses significant challenges, particularly in the management of fire and alien vegetation. There is currently a process of consolidating public land ownership and management within the core area of the CPPNE as a first priority. As a secondary priority, there is a focus on including important areas of public or private land outside of the core area of the CPPNE within the Cape Peninsula National Park.

The establishment of the Cape Peninsula National Park in 1998 has itself provided a major stimulus towards this and it is noted that all Provincial lands within the CPPNE have been recently (March, 2000) transferred to SANP. IUCN welcomes this consolidation under SANP and

notes that the majority of the significant areas within the core areas of CPPNE have been secured. IUCN considers that the management and control of the core area should be placed under one effective and consolidated management authority before the area could be considered for inscription as World Heritage site. The objective should be to ensure that areas of highest biodiversity potential should be afforded the highest level of protection, under one consolidated management agency. It is noted that this is the objective of the State Party as outlined in the nomination document. IUCN recommends that the State Party expedite existing efforts towards this objective.

(ii) Kirstenbosch Botanical Garden

It is noted that the Kirstenbosch Botanical Garden is currently included in the nomination. It covers approximately 200ha (out of a total core area of 21,837ha) and is focused on research and public education relating to Fynbos vegetation. It includes significant infrastructure (restaurant, car parks, visitor centres, etc). There is no other Botanic Gardens in the world which is included within a natural World Heritage site, although some are included under cultural criteria. IUCN considers the Kirstenbosch is an exceptional case and that it should be included within the World Heritage site, for the following reasons: (a) it is managed in an integrated way with the surrounding core area of the CPPNE; (b) its research programmes relate to and support the objectives of the nominated site; and (c) important biodiversity is included within its boundaries.

(ii) Management Plan

There is no single management plan for CPPNE at present. However, a plan is under preparation, as at February, 2000, and a draft Management Policy Outline has been prepared. This policy outline provides an excellent framework for the management of the core area of CPPNE. However, it still requires more work to finalise as an adequate management plan for the CPPNE. It is also noted that there are a large number of plans, adopted by local, provincial and national agencies which influence the way CPPNE is managed. These plans promote conservation objectives but they should ideally be subsumed under the overall management plan for the CPPNE, once it is prepared

4.2. Boundary Issues

(i) CPPNE

The boundary is shown in Map 2. The following points are relevant: (a) there is a considerable urban interface and this poses significant challenges for conservation management, particularly in relation to control of access and fire. The urban edge needs to be clearly defined and legislation enforced. SANP is making positive steps towards this; (b) there is no formal link between the northern and southern zones of the park. To address this there are currently proposals to develop a natural corridor via the Noordhoek Flats. This needs to be further developed; (c) there are few connections within the CPPNE between the high altitude zones and the coast. This is necessary to protect the full range of habitats and ecotones. There are opportunities to provide such protection, particularly those relating to the current process of land consolidation, and these should be explored; and (d) the CPPNE includes a buffer area to the core zone. Activities in the buffer zone must be managed to minimise impact to the core zone.

It is noted that these boundary issues are currently being addressed by SANP, however, more work is still required, particularly in relation to the above points, before the site could be considered to meet the Conditions of Integrity as required under Operational Guidelines, paragraph 44b.

(ii) Cape Floristic Region

The six additional sites in the CFR emerged from a comprehensive ecological survey exercise to identify a minimum set of complementary natural properties. This aimed to ensure that areas to

be nominated in Phase 2 are those **most** representative of the fynbos biome within the CFR. The exact boundaries and numbers of these areas is currently under review, by the State Party, using "state of the art" assessment procedures. This work should be encouraged and the final reserve boundaries included in the Phase 2 of the CFR nomination.

4.3. Management Issues

(i) Fire

The management of fire is a major issue within the CPPNE and the CFR. This issue was given particular prominence with a major fire which burnt approximately 40% of the core area of the CPPNE during the week prior to the evaluation mission. Fire is a natural component of the Fynbos biome but the fire incidence is greatly increased within the CPPNE, due in large part to the proximity to the larger urban centre of Cape Town. Increasing fire incidence is also related to the presence of alien invasive species. The SANP has initiated a controlled burning programme for the CPPNE which includes: fire regimes which maintain biological diversity; maintenance of fire breaks along the urban edge; and development of fire education programmes. It is important that fire management strategies be continually refined and that they specifically address key constraints, including: removal of invasive species; coordination between different agencies; and adequacy of resources.

It is noted that, since the recent (January, 2000) fire there has been substantial commitment from local business to support fire prevention services.

(ii) Invasive Species

Alien plants pose the most severe threat for the continued existence of Fynbos ecosystems. Invasive species have invaded large areas of CPPNE. SANP, and other agencies, are investing considerable efforts into the management of invasive species and significant external resources have been mobilised. This work should be accelerated, and particular attention given to: long term follow up; eradication on higher, more inaccessible areas; and control of invasives on public and private land adjoining the core area of the CPPNE.

(iii) Staff and Budget

The resources available for conservation management of CPPNE are adequate. Resources available from SANP are increasingly complemented from other sources, including from the Global Environment Facility and the private sector. While welcome, it is important that increasing pressures for financial viability, which are often associated with pressure for commercial development, do not compromise core biodiversity values within the CPPNE.

(iv) Tourism and Infrastructure Development

There is significant development around and within the CPPNE reflecting its location adjacent to the city of Cape Town. Pressures for additional development are significant. It is important that developments within the CPPNE should be kept to a minimum, consistent with the need to protect biodiversity values and to enhance visitor appreciation of natural values. The existing emphasis on community extension or “social ecology” within the Cape Peninsula is important to increase community awareness and support for the CPPNE.

5. ADDITIONAL COMMENTS

As noted, this nomination is presented in two phases and this evaluation covers Phase 1, which is located on the Cape Peninsula. The rationale for the phased nomination was that the State Party considered Phase 1 could potentially meet the conditions for inscription on the World Heritage List now, whilst the remaining areas in phase 2 could be nominated later particularly when exact boundaries had been identified.

6. APPLICATION OF WORLD HERITAGE CRITERIA

CFR has been nominated under three World Heritage natural criteria (ii), (iii) and (iv). The nomination will be presented in two phases, with the first covering the core area of CPPNE and the second covering six additional natural areas. This section refers to the application of the natural world heritage criteria solely to Phase 1 – the core area of CPPNE. IUCN recommends that the case for inscription rests on the following criteria:

Criterion (ii) Ecological processes

The Cape Floristic Region is considered of outstanding universal value for representing ongoing ecological and biological processes associated with the evolution of the unique Fynbos biome. These processes are represented generally within CFR and also very significantly demonstrated within the Phase 1 of the nomination. Particularly relevant are the patterns of diversity and endemism and the biogeographical affinities of CFR. IUCN considers that the nominated site meets this criterion.

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

The nomination makes a case for inscription under criterion (iii). The case for outstanding beauty rests largely on the scenic values of Table Mountain and, to a lesser degree, of Cape Point. IUCN recognises these areas as having important scenic value and, in the case of Table Mountain, an iconic status. The case for criterion (iii) is strong but IUCN considers the scenic values are secondary to the very strong rationale for justification under the two primary natural criteria (ii) and (iv). IUCN does not consider that the nominated site meets this criterion.

Criterion (iv) Biodiversity and Threatened Species

The Cape Peninsula flora is one of the richest for any similar sized area in the world. The number of species per genus within CFR (9:1) and per family (52) are among the highest given for various species-rich regions in the world. The species density in CFR is amongst the highest in the world. Phase 1 of the nomination, with 4,651 plant species, encompasses the greatest diversity within the Cape Floristic Region. It also displays the highest levels of endemism at 31.9 % - this makes it the key centre of plant endemism in the Cape Floristic Region. It represents one of the world's most important biodiversity hot spots. IUCN considers that the nominated site meets this criterion.

IUCN also notes the significant progress towards effective management of Phase 1. Good progress is also being made towards bringing the area under one consolidated management regime, but more work is required before Phase 1 could be accepted for World Heritage listing, particularly in relation to ensuring the core area of CPPNE is under one consolidated management agency. The intention to ensure all public land in the core area of CPPNE is under the control of SANP is noted and it is recommended that this occur before the site is inscribed as world heritage.

IUCN notes that the State Party will submit further documentation for a Phase 2, covering the additional six natural areas within CFR. IUCN recommends that work continue on finalising the boundaries for the additional six natural areas including within the CFR, with a particular focus on ensuring the most important areas for biodiversity are nominated.

7. RECOMMENDATION

That the Bureau note that Phase 1 of the Cape Floristic Region is considered by IUCN to meet natural criteria (ii) and (iv). However, IUCN recommends that the nomination be **referred** back to the State Party with the request that they expedite the work to ensure that the core area of the CPPNE is under one effective and consolidated management regime.

The Bureau may also wish to encourage the State Party to complete the preparatory work associated with Phase 2 of CFR nomination and to submit this when the boundaries of the complementary areas within CFR are finalised.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

CENTRAL SURINAME NATURE RESERVE (SURINAME)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (15 references)

ii) **Additional Literature Consulted:** BOS Foundation. 1996. The Guyana Shield – Recent Developments and Alternatives for Sustainable Development. **Newsletter** 15(2). September; UNDP. 2000. Conservation of Globally Significant Forest Ecosystems in Suriname's Guyana Shield. Programme Document; Sitzer, N. and R. Rice. 1995. Backs to the Wall in Suriname: Forest Policy in a Country in Crisis. WRI; Peres, C. and J. Terbourgh. 1995. Amazonian Nature Reserves: An Analysis of the Defensibility Status of Existing Conservation Units and Design Criteria for the Future. **Conservation Biology.** 9(1) February; FAO/UNEP. 1995. Protected Area Systems in the Amazon. (English translation of report); Davis, S. D. *et. al.* 1997. **Centres of Plant Diversity**. Vol. 3. WWF/IUCN; Bean-Douezy, J. P. *et al*. 1999. **Neblina** ed. De la Maritime; Harcourt, C. S. and J. Sayer. 1996. **Conservation Atlas of Tropical Forests – The Americas**. Simon and Schuster; Dinerstein, E. *et al*. 1995. **A Conservation Assessment of the Terrestrial Ecoregions of Latin America**. WWF/World Bank; CIFOR/UNESCO. 1999. **World Heritage Forests**. The World Heritage Convention as a Mechanism for Conserving Tropical Forest Biodiversity. Workshop Proceedings; Prance, G. and T. Lovejoy 1985. **Amazonia**. Pergamon; Colchester, M. 1995. Forest Politics in Suriname. International Books; Eden, M. J. 1992. **Ecology and Land Management in Amazonia**. Belhaven Press.

iii) **Consultations:** 9 external reviewers, officials from Suriname Ministry of Natural Reserves, STINASU, Conservation International and WWF-Suriname

iv) **Field Visit:** J. Thorsell, February, 2000

2. SUMMARY OF NATURAL VALUES

The Central Suriname Nature Reserve (CSNR) comprises 1.6 mil. ha. of primary tropical forest of west-central Suriname, within the phylogeographic limits of Amazonia. The Reserve protects the upper watershed of the Coppename River and covers a range of topography and ecosystems. The nominated site is one of the two largest reserves in the Guyana Shield highlands (the other being the 3 mil. ha Canaima World Heritage site in Venezuela). The CSNR is of notable conservation value due to its pristine state as an uninhabited and unhunted region. Its montane and lowland forests contain a high diversity of plant life with almost 6,000 vascular plant species collected to date. There are also other areas of swamp forest, savannah and xerophytic vegetation on the granite outcrops. The Reserve's avifauna numbers 400 species and there are viable populations of animals typical of the region including jaguar, giant armadillo, giant river otter, tapir, sloths and eight species of primates. Much of the CSNR has yet to be inventoried and the true extent of the area's diversity is not fully known.

Several distinctive geological and physical formations occur in the site including several granite inselbergs that rise up to 360m above the surrounding tropical forest. The eastern-most tepui of the Guyana Shield occurs in the Reserve and there is a range of hills in the south that reach 1,230m. The CSNR was established in 1998 to link up three pre-existing reserves that are now incorporated in the larger site.

3. COMPARISONS WITH OTHER AREAS

Comprising 1.6 mil. ha., the CSNR covers 11% of the land surface of Suriname and is by far the largest and most important protected area in the country. Compared to its neighbours, Guyana and French Guyana, the CSNR is much larger and more pristine than the protected areas in those countries. Within the Guyana Biogeographical Province it is smaller than the existing Canaima World Heritage site (3 mil. ha.) although, only 2 mil. ha. of Canaima is forested and tepui-dominated. Canaima has much more varied scenery and topography that the CSNR and displays more dramatically the natural features of the Guyana Shield and "pantepui system". The CSNR is also much smaller than the 3.5 mil. ha. transfrontier Neblina National Park(s) between Brazil and Venezuela. Much of this site, however, has been adversely affected by illegal gold mining and human settlement.

Although the area of the CSNR is not within the Amazonian watershed, it is mostly covered with Amazon basin vegetation(e.g. *Hylea amazonica*) and is within the phytogeographic limits of Amazonia. Within this region, where the planet's most extensive and diverse tropical forests remain, three natural World Heritage sites have been inscribed: Sangay (Ecuador), Rio Abiseo (Peru), and Manu (Peru). Two others have been nominated for evaluation in 2000: Jaú (Brazil) and Noel Kempff (Bolivia). In 1996 there were 60 protected areas (IUCN Category I and II) in the Amazon basin, most of which are globally significant (see Map 1) but there is no easy formula for identifying the sites which would be the "most outstanding". Various attempts to assign priorities among these have been made (e.g. Dinerstein *et. al.* 1995). In this study, the Amazon was divided into 34 ecoregions, each having distinctive feature but specific reserves were not given ratings.

Granitic dome structures are found in several other World Heritage sites including Huangshan (China), Yakushima (Japan) and in the newly nominated Kinabalu Park (Malaysia). Although all of these are higher and more numerous than the domes found in CSNR, the geological origins are distinct.

To conclude, the CSNR has a number of attributes that distinguish it from other reserves in the region: (1) its size makes it one of the 10 largest tropical forest reserves in the Amazon/Guyana Shield region; (2) its floristic composition, due to its location on the eastern edge of the precambrian Guyana Shield, contains an assemblage of species with substantial differences with the rest of the region; (3) it is of particular importance for several rare faunal species such as Cock-of-the Rock and Giant Otter; (4) it contains the distinctive geological feature of granite domes and additional relief provided by a tepui and the Wilhelmina mountain range; and (5) it is one of the very few undisturbed forest areas in the Amazonian region with no inhabitants and no human use.

4. INTEGRITY

Although large parts of the Guyana Shield and Amazon regions are being rapidly transformed by logging, hunting, mining and settlement, the CSNR remains inaccessible, largely unaffected and unthreatened by human activity. However, as development pressures build around the reserve it is likely that, in future, threats may arise. For example, 60-100km to the north and west of the CSNR mining and logging concessions are being given mainly to multi-national companies. There is currently some small-scale mining in reserves to the east of the reserve and a major bauxite deposit is known to exist to the west in the Bakhuis hills.

While the aforementioned concessions lie outside of the CSNR's watershed, vigilance is needed to ensure that future development activity is not expanded into areas critical to maintaining ecological functions within it. This is necessary to foreclose the risk mercury contamination within the Reserve or alteration of vital hydrological functions through water abstraction and sedimentation. Increased human activity and traffic that will come with the development of concessions could also pose a threat. A buffer zone would help ensure that any development is strictly controlled. Satellite image monitoring will be used to identify any changes in regional forest cover.

As is the case with all of Suriname's protected areas system the CSNR suffers from a general lack of resources and capacity within government agencies to enforce its protected area status or provide the necessary park management infrastructure. The remoteness of the CSNR has thus far protected it, but this same factor has also slowed the government's conservation activities there. Of the three existing protected areas that were linked to form the CSNR, only the Raleighvallen Natural Reserve has infrastructure for park management and a management plan. Preparation of a plan for the whole reserve has commenced. This process will take some time as consultations with the local communities (residing 60-100km outside the CSNR) are being undertaken .

To ensure the necessary capacity and long-term financing to manage the CSNR (and Suriname's other protected areas), the Government of Suriname, Conservation International and UNDP/GEF have commenced a 6 year project. The project focuses on capacity building and provision of facilities on site. Over US$1 mil. has been invested to date with a total of US$18 mil. being provided in a trust fund which will be managed by the newly-formed Suriname Conservation Foundation.

5. ADDITIONAL COMMENTS

The creation of the CSNR has encouraged the French government's plans to create the Parc du Guyane in the southern section of French Guyana. The Government of Guyana has also recently expanded the extent of the Kaieteur National Park. There may be considerable opportunities for regional cooperation between the three countries in terms of a conservation corridor through the region (although all 3 of these sites are not contiguous).

6. APPLICATION OF WORLD HERITAGE CRITERIA

CSNR was nominated under all four natural criteria. CSNR is complementary to an existing World Heritage site in the same Biogeographical Province (Canaima). It is a strong candidate for inscription under natural criteria (ii) and (iv):

Criterion (ii): Ecological processes

The CSNR conserves a large portion of the easternmost portion of the Guyana Shield, an ancient, mineral-dense layer of the earth's crust, formerly connected to the continent of Africa. As a geologically stable speciation centre, this region has produced a well-defined assemblage of biota including many endemics. The area of the reserve falls within one of 26 Amazonia refugia as defined in Prance and Lovejoy (1985). The CSNR encompasses significant vertical relief, topography and soil conditions which have resulted in a variety of ecosystems. Such ecosystem variation across environmental gradients is necessary to allow organisms within these ecosystems to move in response to disturbance, adapt to change, and maintain gene flow between populations. The CSNR's size, undisturbed state (a rare condition in Amazonian forest parks) and protection of the entire Coppename watershed will allow long-term functioning of the ecosystem. IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

Although much basic inventory work remains to be done in the unexplored portions of the CSNR, it is clear that the Reserve is a major reservoir for biota of the region. The CSNR is globally significant for its high diversity of plant life (6,000 vascular plant species, 8 primate species), a number of which are endemic to the Guyana Shield and are threatened. IUCN considers that the nominated site meets this criterion.

The case for natural criteria (i) and (iii) was not convincingly made in the nomination document and both these criteria are better demonstrated in the Canaima World Heritage site. Although

there are high geological values and scenic values in the CSNR, there are considered secondary to its primary natural values under (ii) and (iv).

The site meets all related "conditions of integrity" as described in Operational Guidelines paragraph 44(vi) but early completion and implementation of the management plan should be encouraged.

7. RECOMMENDATIONS

That the Bureau recommend to the Committee that the Central Suriname Nature Reserve be **inscribed** on the World Heritage list under natural criteria (ii) and (iv). The Bureau may also wish to encourage completion of the management plan for the Reserve and commend the State Party and its partners for establishing the trust fund to support protection of the site.

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

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE HIGH COAST (SWEDEN)

BACKGROUND

1. The 1999 World Heritage Committee Meeting (Marrakech, Morocco) agreed to defer the nomination of The High Coast (Sweden), to allow the Swedish authorities to: a) more fully document the natural values of the marine portion of the area; b) provide a more complete comparative analysis including its relation to the proposed Quark World Heritage nomination between Sweden and Finland; and c) address the various issues relating to integrity. It was also recommended that the State Party consider the prospect of nominating the site under cultural criteria.

2. The State Party provided (by letter to the World Heritage Centre of 11 April, 2000), considerable background information in response to the recommendation of the 1999 World Heritage Committee. In summary, this covered the following aspects:

   - Glacio-Isostatic Uplift, A Global View;
   - The High Coast, rising from the sea for 10,000 years;
   - Life in the Sea;
   - Cultural Landscape and History;
   - The High Coast, 5,000 years of human history;
   - Pictures of the High Coast;
   - Vegetation and Land Uplift in The High Coast;
   - Ecolabelling of The High Coast; and
   - Description of The High Coast Landscape;

3. IUCN has briefly reviewed the material and considers that:

   The State Party is to be commended on the material provided. However, IUCN considers this site should be reviewed as a new nomination for 2001, for the following reasons:

   - There is substantial new material incorporated in the nomination which will necessitate considerable review in addition to that carried out for the original nomination; and
   - IUCN is currently committed to dealing with a considerable number of new nominations in 2000, as well as other World Heritage responsibilities in relation to State of Conservation reporting monitoring missions and training activities.

4. It is noted that the recent Expert Meeting on the Operational Guidelines (Canterbury, 11 to 14 April, 2000) considered the issue of deferred sites and recommended that they be considered in the same way as for new nominations. That is, they would be considered in

the year following the receipt of information by the World Heritage Centre. IUCN feels this is a logical recommendation on the process for dealing with deferred sites.

5. The original IUCN evaluation report suggested that there be further clarification of the relationship between The High Coast and the adjacent area in Finland known as "The Quark". The IUCN report noted that a draft of a joint Finland/Sweden nomination had been received by UNESCO's World Heritage Centre from the Kvarken Council, who are the cross border organisation between the two countries. Most of the rationale for the proposed Quark nomination is the similarity to the isostatic phenomena demonstrated in the Swedish High Coast. The two areas also share similar biological and landscape values. Due to the proximity of the Quark and The High Coast nomination, coupled with the apparent duplication of heritage values, IUCN suggested there should be a comparative analysis between The High Coast and the proposed Quark World Heritage nomination. The material submitted by the State Party in April, 2000 provided information on The High Coast in relation to the Quark area. However, IUCN feels that more information could be provided in relation to the potential for a transboundary nomination between Sweden and Finland in this area.

RECOMMENDATION

That the Swedish High Coast be considered in 2001 and that further information be provided in relation to the potential for a transboundary nomination between Sweden and Finland.

A.3. Extension of properties inscribed on the World Heritage List

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

PLITVICE LAKES EXTENSION (CROATIA)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:**

ii) **Literature consulted**: S. Bozicevic. (undated) **The Plitvice Lakes**, Plitvice Lakes National Park, 96 pp; I. Pevalak. 1968. **The biodynamics of the Lakes of Plitvice and their protection**; S. Bozicevic (ed). 1998. **The Plitvice Lakes National Park – Natural History, Guide, Photomonography** 96pp, Plitvice Lakes National Park; M. Schneider-Jacoby. 1996. A view from abroad: Nature Preservation in Croatia – An investment in the future of the country, **Turizam** Vol 44, No 11/12; B. Stilinovic and S. Bozicevic. 1988. The Plitvice Lakes – A natural phenomenon in the middle of the Dinaric Karst in Croatia, **European Water Management**, Vol 1, No 1.

iii) **Consultations**: three external reviewers; Ministry of Environmental Protection and Physical Planning, Zagreb; Plitvice Lakes National Park, Plitvicka Jezero.

iv) **Field Visit**: Michael Smart, March, 2000.

2. SUMMARY OF NATURAL VALUES

The area inscribed on the World Heritage List in 1979 as Plitvice Lakes National Park (PLNP) covered 19,462ha. In 1997, the area of the National Park was extended by the Croatian Parliament to 29,482ha. The Croatian authorities have now proposed that the World Heritage site be extended to include this enlargement of the park by 10,020ha.

PLNP is situated in the karst area of Croatia. It consists of a series of lakes in the valley of the Bijela rijeka (White River) and Crna rijeka (Black River), which join to become the Korana River, which flows into the River Kupa and eventually into the River Sava. The lakes are formed by barriers of travertine (or tufa) across the valley which create deep highly oligotrophic lakes. The travertine barriers are not static and are constantly being both dissolved and eroded away and regenerated by new growth and deposition. A series of spectacular waterfalls cascade down the sides of the valley, these and the lakes depend on high water quality. Maintenance of water quality is aided by the fact that the surrounding catchment is forested. The forests are mostly secondary, having been felled for timber in the past, but regeneration is natural and there is now no timber production.

The proposed extension almost encircles the existing World Heritage site and its key value is that it extends the boundaries to include most of the karstic basin. The new boundaries generally follow natural boundaries rather than, as before in some areas, roads running through the valley floors.

The main importance of the extension is that it is designed to give much greater protection to the catchment of the lakes. This is of vital importance, because any pollution or impurity in the water entering the system disrupts the delicate process of travertine formation in this karstic system.

The extension also includes an 84 hectare area of forest which has never been cut (the only one in the park), with spruce and beech trees estimated to be 400 and 700 years old respectively. This is in a prime area for the large mammals of the site, including European brown bear, wolf and European lynx.

3. COMPARISON WITH OTHER AREAS

Plitvice Lakes National Park has already been accepted as being of "outstanding universal value" by its inscription on the World Heritage list. The proposed extension, while not itself containing features of such value, is of significant importance to the existing site since it forms part of the catchment and thus helps guarantee that the on-going process of travertine formation may continue by minimising pollution or enrichment.

4. INTEGRITY

The proposed extension adds significantly to the integrity of the site, by giving greater security to the water supply and quality to the lakes, and by extending the area of protected forest. Croatian law does not permit exploitation of the forests in the national park while regulations provide that tourist facilities, which might have impaired water quality, cannot be constructed in the immediate catchment area.

The proposed extension to the World Heritage site does include part of the Borje-Vrhovine national highway but the IUCN mission reports that a new regulation prohibits heavy traffic use of the section of road passing through the park. Instead, heavy traffic must use an alternative route, thus reducing disturbance and pollution threats from this source.

The current "management plan" for the existing site dates from 1986 and obviously does not take into account either the impact of war on the site, subsequent restoration work or the extension to the National Park. It is important that a new management plan be prepared to take account of the changes. The plan should include provisions for the monitoring of water quality as well as covering action to enhance it.

5. ADDITIONAL COMMENTS

The nomination document (and IUCN reviewers) expresses concern about deteriorating water quality in the lakes. The nomination states that "the biggest problem is in the existing effluent disposal system, which is far from satisfactory. Preparations for the construction of a new system are under way and, in the meantime, there is ongoing monitoring". This is, of course, a problem within the existing site and not in the proposed extension.

Water quality and other aspects affecting the existing site are addressed separately in the State of Conservation section of the agenda for the Bureau.

It is also noted that PLNP is not on the List of Wetlands of International Importance and the Croatian authorities may wish to propose the site under the Ramsar Convention.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

Plitvice Lakes National Park was inscribed on the World Heritage List in 1979, under natural criteria (ii) and (iii). Criterion (ii) then identified outstanding examples of on-going ecological, biological and geological processes; and the continuing formation of travertine, which creates the barriers and thus forms the lakes at Plitvice were cited as outstanding examples of such processes. Criterion (iii) speaks of superlative natural phenomena or areas of exceptional natural beauty and the Plitvice Lakes was also seen as meeting this criterion.

The proposed extension strengthens the existing site by preventing deleterious developments in the surrounding catchment area. The proposed extension would not meet any natural criteria on its own but it would enhance the integrity of the site by extending catchment protection crucial to water quality and brings in forested areas including unlogged forest.

Note: This case raises the implications of the 1992 change in natural criteria when criterion (ii) which previously covered ongoing ecological, biological and geological processes was amended and

"on-going geological processes" were transferred to the revised criterion (i).

7. RECOMMENDATION

That the Bureau recommend the Committee approve the extension of Plitvice Lakes National Park by the nominated 10,020ha.

The Bureau may also wish to recommend that the State Party prepare a new management plan for the enlarged site.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

CAVES OF THE AGGTELEK KARST AND SLOVAK KARST (HUNGARY / SLOVAKIA)

EXTENSION TO INCLUDE DOBŠINSKÁ ICE CAVE (SLOVAKIA)

Background note: The Dobšinská Ice Cave was part of the larger nomination from Slovakia considered by the 22nd session of the Bureau and Committee in 1998. The Committee report "recalled that the Bureau . . . decided to **refer** the nomination back to the State Party asking the Slovak authorities to consider incorporating the Dobšinská Ice Cave portion into the nearby World Heritage site of the Caves of The Aggtelek Karst and Slovak Karst. The report of the Committee session in 1998 shows that "the Committee did not inscribe the site on the World Heritage list" but that the State Party, the Centre and IUCN were encouraged by the Chairperson "to cooperate in the preparation of a revised nomination . . .". This nomination of the Dobšinská Ice Cave in Slovakia as an addition to the existing cave site in Hungary is the result of that cooperation.

1 DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (7 references)

ii) **Additional Literature Consulted:** Lalkovic, M. 1995. On the Problems of the Ice Filling in the Dobšinská Ice Cave. **Acta Carsologica**. Krasoslovni Zbornik XXIV; Courbon, P. *et. al.* 1989. **Atlas of the Great Caves of the World**; Waltham, T. 1974. **Caves**. Macmillan; Juberthie, C. 1995. **Underground Habitats and their Protection**. Nature and Environment No. 72. Council of Europe Press; Middleton, J. & T. Walthan. 1986. **The Underground Atlas: A Gazetteer of The World's Cave Regions**. St Mattin's Press; Watson, J. *et al*. 1997. **Guidelines for Cave and Karst Protection**. IUCN World Commission on Protected Areas' Working Group on Cave and Karst Protection. IUCN; Stanners, D. & Bourdeau, P. eds. 1995. **Europe's Environment The Dobris Assessment** European Environment Agency; Esping, L. 1998. **Potential Natural World Heritage Sites in Europe**. Report on Parks for Life: Action for Protected Areas in Europe Priority Project 14a. IUCN-WCPA Europe/FNNPE-Europarc Federation.

iii) **Consultations:** 22 external reviewers, Slovensky raj National Park staff and Slovak Government Officials.

iv) **Field Visit:** J. Marsh and R. Hogan, May 1998.

2. SUMMARY OF NATURAL VALUES

The Dobšinská Ice Cave (DIC) is located in the western Carpathian Mountains and is a distinct feature within the Slovensky raj National Park. The DIC is located 21km north of the existing transfrontier Caves of the Aggtelek Karst and Slovak Karst site inscribed in 1995. It is one component of the Stratenská Cave network, all of which is part of the nominated site. DIC is isolated from the larger Stratenská cave by a fallen block of limestone, which traps cold air and permits the accumulation of ice. Cold air flows into the cave in winter and remains during the summer. The natural opening of the ice cave is north facing and shaded by forest so the cave is protected from warming. An ice mass with a maximum depth of 26.5m and a volume of approximately 110,000m^3 fills a considerable part of the cave. The upper surface of this

underground glacier, or glacière, is decorated with ice stalagmites from the freezing of local drip waters. The ice mass is stable in that the rate of ice accumulation in winter is in equilibrium with the rate of basal melt and lateral sublimation. Dobšinská Ice Cave contains one of the largest glacières known at a very low altitude (969m). Many reviewers consider the DIC to be a "textbook example" of an ice cave.

3. COMPARISONS WITH OTHER AREAS

Stratenská (of which DIC is a part) is one of the longest caves (23km) entirely on Slovak territory and contains the largest underground chamber (79,017m^3) in the country. However, the 25km Baradla-Domica Cave System (part of the Caves of the Aggtelek and Slovak Karst World Heritage site), which straddles the Slovak-Hungarian border, is longer than Stratenská. On a global scale there are many cave spaces around the world which are measured in millions rather than thousands of metres cubed, e.g. Luse in Papua New Guinea (50Mm^3).

Ice caves are relatively common at high altitudes. Small glacières are found in caves in the Canadian Rocky Mountains and Nahanni World Heritage sites and other karst areas of the Mackenzie Mountains in the Canadian Northwest Territories. Indeed, the Grotte Valerie in Nahanni is recognised as the best example in the world of an ice cave. There are also ice caves in limestone areas of Europe such as Eisreisenwelt, Dachstein, Reisenhohle and Schellenburger Hohle in the Alps, Scarisoara glacière in Romania, and Kungur Ice Cave in the Urals. There are many other ice-clogged shafts and chambers known in limestone caves in Russia, the Alps and Pyrénées.

A distinct feature of Dobšinská is its topo-climatic setting. At 970m above sea level, it is lower than other tourist ice caves. The mean annual external air temperature is +6^{o}C but the cave is able to conserve a -5 to -6^{o}C temperature. In contrast, the glacières in South Nahanni National Park are supported by mean annual external temperatures of -6^{o}C to -8^{o}C.

In terms of elevation, Dobšinská is by no means the lowest ice cave in the region. The mouth of the Silica Ice Cave in Hungary (part of the Caves of the Aggtelek and Slovak Karst World Heritage site) is at 503m and it is considered to be the lowest ice cave in the temperate zone. In Slovakia the opening to the Demänovská Ice Cave, in the Low Tatras is at 840m, again lower than the DIC. Up to the latitude of 50^o, all other known ice caves are situated at higher altitudes: the Alps (940m); Bulgaria (830m); Croatia (600m); Georgia (above 1,000m); Poland (between 1010 and 1850m); Romania (840m); Slovenia (758-1090m).

However, the DIC is one of the largest glacières in one of the warmest glacière sites that is known. It is considered by some to be a text-book example of an ice cave. There is also a long history of paleoclimatic research in Dobšinská Ice Cave and the site is important for research on climate change. (For further information on natural values and comparison with other areas see the 1998 IUCN Technical Evaluation of the Ravines of the Slovak Paradis and Dobšinská Ice Cave.)

4. INTEGRITY

The DIC was damaged to some extent during the first fifty years after its discovery, but current management now maintains the cave to a high standard. The area does not have any heavy industry in the immediate vicinity so damage from acid rain does not present a threat.

Protection of the area is complex. All land in the Slovak Republic is classified under one of five 'degrees of conservation' with the 'fifth degree of conservation' affording the highest level of protection. The nominated area is situated on the territory of the Slovensky raj National Park (IUCN category II protected area) with all the nominated area within zones of the fifth degree of conservation.

Only the caves themselves have been included in the nomination and not their protection zones above ground. However, a 6.6km2 protection zone covers the karst plateau area immediately above the caves. The strict control of activities in this area is considered crucial to the protection of the caves. The Ice Cave is only open to the public for four summer months and is visited by about 90,000 tourists each year. The trail from the road up to the cave has been upgraded, and interpretive signs are being erected. All the boardwalks in the cave are new, and well-designed. At one point the route goes through a short tunnel cut many years ago in the ice, and elsewhere along a ledge cut into the ice, however, public access to the ice is generally prevented. Electric lighting has been installed, but is generally unobtrusive and designed to prevent excessive heating of the cave and algal growth. In several places instruments have been installed to monitor conditions in the cave, including the temperature of the air and the bedrock. Numerous survey points have been established to enable detailed mapping of the cave and ice, and to monitor changes in the volume and movement of the ice. A management plan covering the period 1996-2006 is available and is considered to be adequate for the management of the site.

The glacière is maintained by the plug or roof-fall, which prevents cool air escaping from the cave in summer. Should this plug become damaged dense cool air would quickly flow out of the ice cave causing the glacière to melt. Partly to avoid damage to this plug the Stratenská Cave remains closed to the public.

While IUCN finds the management of the DIC satisfactory it would like to remind the Bureau of concerns over threats to the transfrontier Caves of the Aggtelek Karst and Slovak Karst. The existing World Heritage site consists of underground caves and has no surface component. Though the surface area that protects the caves (60,000ha) has IUCN Category V protection, concerns have been raised about agricultural activities in this area effecting the caves. The 19th session of the Committee "requested the Centre to write to the national authorities to recommend that control is needed over surface activities such as agricultural pollution, deforestation and soil erosion" that could affect the caves.

5. ADDITIONAL COMMENTS

The authorities in Hungary have agreed (letter of 9 October, 1999) to the inclusion of DIC within the transfrontier Caves of the Aggtelek Karst and Slovak Karst.

The nomination document does not explain the functional linkages between the Stratenská caves and the existing World Heritage site 21km to the south. However, as the DIC is in close proximity and because the 722 caves of Aggtelek and Slovak Karst are not themselves a contiguous unit, the addition of DIC is a reasonable proposal.

6. APPLICATION OF WORLD HERITAGE CRITERIA

As with the inscription of the Caves of the Aggtelek Karst and Slovak Karst in 1995, the DIC would qualify for incorporation within this site under natural criterion (i). Although the DIC is a relatively small (6km^2) and specialised feature, it does add variety to the existing site. It would not merit inscription on its own but its features relate to and complement the Caves of Aggtelek Karst and Slovak Karst. Additionally, the proposal is in terms of the advice given to the Slovak authorities arising out of the Bureau and Committee sessions in 1998 as outlined in the Background Note.

7. RECOMMENDATION

That the Bureau recommend to the Committee that Dobšinská Ice Cave be **incorporated** as part of the Caves of the Aggtelek Karst and Slovak Karst World Heritage site.

The Bureau may wish to recommend that both State Parties regulate activities in the adjacent watershed which may affect the integrity of the Caves of the Aggtelek Karst and Slovak Karst World Heritage site in terms of the concern expressed by the Committee at its 19th session.

A.4. Renomination of properties on the Heritage List to include additional criteria

WORLD HERITAGE RENOMINATION – IUCN TECHNICAL EVALUATION

HA LONG BAY (VIETNAM)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (2 references).

ii) **Additional Literature Consulted:** Nguyen Thi Son. 1997. **How can Tourism and National Parks Exist Symbiotically? Cat Ba Island, Vietnam**; Tran Duc Thanh. 1998. **Geological History of Ha Long Bay**; Vermeulen, J. and T. Whitten. 1998. **Land and Freshwater Molluscs of the karst regions ENE of Haiphong and the Cuc Phong National Park, northern Vietnam**. unpublished report; Vermeulen, J. and T. Whitten. 1999. **Biodiversity and Cultural Property in the Management of Limestone Resources**; Vietnam National Commission for UNESCO. 2000. **Draft feasibility report for a project to develop Ha Long Bay as an ecomuseum**; Waltham, T. 1998. **Limestone Karst of Ha Long Bay, Vietnam, Engineering Geology Report**; Watson, J. *et. al.* 1997. **Guidelines for Cave and Karst Protection**, IUCN.

iii) **Consultations:** 3 external reviewers, Senior officers of UNESCO (Vietnam), Vietnam National Committee for UNESCO, Department of Conservation and Museology, Fauna and Flora International, World Bank, and Quang Ninh Provincial People's Committee. Park staff and Senior Officials from the Management Department of Ha Long Bay.

iv) **Field Visit:** Elery Hamilton-Smith, March, 2000. Field visits prior to initial listing in 1994: Jim Thorsell, March/April 1993, and Jacques Lecoup, November, 1994.

2. SUMMARY OF NATURAL VALUES

Ha Long Bay is located within the Quang Ninh Province of Vietnam. Situated in the Gulf of Tonkin the site includes some 1600 islands and islets forming a spectacular seascape of limestone pillars. Because of their precipitous nature, most of the islands are uninhabited and relatively unaffected by human influence.

In recognition of its remarkable scenic quality, Ha Long Bay was inscribed as a natural World Heritage site in 1994 under criterion (iii). The inscribed site covers an area of 434sq. kms and this renomination seeks to have the current World Heritage site inscribed under criterion (i) in addition to the existing listing under criterion (iii).

The values of Ha Long Bay, which resulted in its 1994 inscription under criterion (iii), are well documented and will not be elaborated here.

The geomorphology of Ha Long Bay is known as a drowned karst landscape due to the exceptional combination of its limestone karst features which have been subject to repeated regression and transgression of the sea over geological time. The limestones of Ha Long Bay have been eroded into a mature landscape of fengcong (clusters of conical peaks) and fenglin (isolated tower features) karst features, modified by sea invasion at a later stage.

The smaller islands are fenglin towers of 50m to 100m high with height to width ratios up to about 6. Many have vertical walls on all or most sides and these continue to evolve by rock falls and large slab failures. The larger islands contain the conical hills of fengcong karst, the summits of which average 100m above sea level with some exceeding 200m.

Marine invasion of Ha Long Bay has added an extra element to the normal process of lateral undercutting of the limestone towers and islands. The most conspicuous feature being the main notch cut into the entire rocky coastline. Notches are a feature of limestone cliffs worldwide, but those of Ha Long Bay are exceptionally well developed and, at many sites, extend into arches and caves. This process of undercutting and subsequent erosion maintain the steep faces of the fenglin karst towers and thereby perpetuates the spectacular nature of the landscape.

A distinctive feature of Ha Long Bay is the abundance of lakes within the larger limestone islands: Dau Be Island, for example, has six enclosed lakes.

Extensive limestone caves represent another important feature of Ha Long Bay, with three main types able to be identified: old phreatic caves formed below the water table of the time; old karstic foot caves formed by lateral undercutting of cliffs at base level; and marine notch caves formed at sea level where rock structures are powerfully eroded and eventually reduced to a wave cut platform.

In summary, Ha Long Bay possesses a tremendous diversity of caves and other landforms which derive from the unusual geomorphological process of marine invaded tower karst. These areas provide a unique and extensive reservoir of data for the future understanding of geoclimatic history and the nature of karst processes in a complex environment.

3. COMPARISON WITH OTHER AREAS

The geomorphological values of Ha Long Bay are the key values to be compared with other sites in assessing the merits of this renomination under criterion (i).

The eastern Adriatic, Greek and Aegean coasts of Turkey provide other outstanding examples of tower karst although not of drowned tower karst, which is a style of karst landscape found mainly in the tropics and subtropics.

Ha Long Bay in not unique in SE Asia for being a drowned tower karst – other sites where such a phenomenon occurs include the Mergui archipelago off the Andaman coast of Burma; in northern Malaysia (notably Langkawi); in Thailand at Koh Maeku in Ang Thong National Park, and Changwat Surat Thani and, most impressively, in the area of Phangnga and Ao Luk on the Andaman coast of peninsular Thailand. Other karst areas include Ninh Binh in Vietnam, Yangshou and Wulingyuan in China, however, the great extent of the Ha Long Bay tower karst and the richness of its forms (both current and 'fossil' forms) set it apart from all comparable areas of drowned tower karst in SE Asia.

Apart from Ha Long Bay there are no equivalent sites on the World Heritage List, either in terms of steep tower karst in general or drowned tower karst in particular.

In summary Ha Long Bay is considered one of the most extensive and best-developed areas of tower karst in the world. What distinguishes this site from others is the process of marine invasion and, whilst the phenomenon of drowned tropical tower karst is known elsewhere in the world, Ha Long Bay provides by far the best example in the world.

4. INTEGRITY

The Bureau's attention is drawn to the State of Conservation (SOC) Report submitted by IUCN to the World Heritage Centre which reports on a range of integrity issues for the Ha Long Bay World Heritage site.

Systematic management of the area has been instituted only since inscription as a World Heritage site and, while progress has been made, there is a continuing task to improve the integrity and quality of the environment. While the marine environment faces continuing challenges addressed in the SOC Report, the site's scenic features, geomorphology and cultural heritage are all relatively intact. Although some minor threats to the quality of the area exist at present, including problems of littering, these do not prejudice the inscription of the site on the basis of its geological values.

Protective legislation at both national and provincial levels is adequate and will be further strengthened by the new national legislation for protection of natural and cultural heritage which is currently being prepared. However, legislation relating to development projects is not so clear and a number of proposed new developments could jeopardise long-term integrity of the site.

In addition, there are significant problems occurring below sea level. These have damaging geomorphic impacts, including the deposition of silt and other solid waste, pollution of the water and the introduction of invasive species.

Cat Ba Island and the islands of Bai Tu Long Bay provide extensive opportunities for the progressive expansion of the tourism industry and the necessary development of the aquaculture industry. Thus, with the current boundaries, these areas not only provide a buffer zone for the World Heritage area, but serve valuable complementary functions in their own right. There has been considerable research, policy development and action aimed at developing an appropriate balance between conservation and development throughout the region as a whole. Accordingly, the relevant government authorities may care to investigate and consider the potential value of seeking biosphere reserve status for the whole of the defined National Protection Area.

The renomination site meets all related "conditions of integrity" as described in the Operational Guidelines paragraph 44(b).

5. OTHER COMMENTS

The quality of tourism management is steadily improving. In particular, the sensitivity, aesthetic quality and attention to public safety of infrastructure such as pathways, steps and board walks is of a high standard. Every effort is being made to ensure that tourism is in keeping with the primary mandate for conservation.

The proposed recognition of the geomorphic values at World Heritage level should imply the highest standard of management and presentation of the site to visitors. Consistent with this a programme of measures to increase the understanding and appreciation of geomorphological processes and the management requirements for karst landforms should be put in place. There is also a clear need to build the capacity of staff in relation to cave and karst interpretation.

6. APPLICATION OF WORLD HERITAGE CRITERIA

This site was renominated under criterion (i). It has already been inscribed on the World Heritage List under criterion (iii).

The comparative assessment shows that Ha Long Bay is the most extensive and best example of marine invaded tower karst known and one of the most important areas of fengcong and fenglin karst in the world.

Although the site contains geomorphological features duplicated elsewhere, it demonstrates these better than any other area in the world. Furthermore, its size and area provide sufficient integrity for these large scale geomorphic processes to operate unhindered. Although the site has a long history of human use, it is not seriously degraded and retains a high level of naturalness. Finally, the site exhibits a wide range of diversity of natural features.

Ha Long Bay is considered to possess outstanding universal value as the most complete and extensive example of its type in the world.

7. RECOMMENDATION

That the Bureau recommend to the Committee that Ha Long Bay be **inscribed** on the World Heritage List under natural criterion (i) in addition to the site's existing 1994 listing under criterion (iii).

The Bureau may wish to commend the Ha Long Bay Management Department on the improvement in management of the renominated area since their appointment and encourage the continuing efforts for further improvement.

The Bureau may further wish to encourage the State Party to expedite a programme to increase visitor understanding of cave and karst geomorphological processes and to improve staff capacity in these areas.

B. Nominations of mixed properties to the World Heritage List

B.1. New nominations

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

MT. QINGCHENG AND DUJIANGYAN IRRIGATION SYSTEM (CHINA)

1. DOCUMENTATION

i) **IUCN/WCMC Data sheet**:

ii) **Additional literature consulted**: Chen Changdu, 1999. Ed.-in-chief, **Biodiversity Research and Conservation in Dujiangyan**, Sichuan Publishing House of Science and Technology, 114pp.; Chen Changdu, 1999. **The Dujiangyan Area – Pivot sector of Assemblage, Differentiation, and Maintenance of Biodiversity in northern part of Hengduan Mountains.;** MacKinnon, J.; Sha, M.; Cheung, C.; Carey, G.; Xiang, Z.; Melville, D., 1996. **A Biodiversity Review of China**, Ed. Carey, G. WWF International, Hong Kong. 529pp.; Myers, N., Mittermeier, R.A., Mittermeier, C.G., Gustavo, A.B., Kent, J., 2000. Biodiversity hotspots for conservation priorities**. Nature**, 403, 853-8.; State Environment Protection Agency, 1998. **China's Biodiversity: a Country Study**,. Zhang Weiping (Ed). China Environment Science Press, Beijing. 476pp.

iii) **Consultations**: 2 external reviewers; relevant officials from China's central government, Sichuan Province and Dujiangyan County; scientific experts from Chinese Academy of Sciences.

iv) **Field visit**: L. F. Molloy, February/March, 2000.

2. SUMMARY OF NATURAL VALUES

The nominated site is in south-western China, within Dujiangyan County at the western margin of the Chengdu Plain in Sichuan province (see Maps 1 and 2). A major tributary of the Yangxi Jiang, the Min Jiang River, bisects the site just upstream from the city of Dujiangyan, the location of the historic Dujiangyan Irrigation System. The site has three core sectors:

- **Mt Qingcheng** (1261m) within a 1522ha 'Natural and Cultural Scenic Protection Area'.
- the core of **Longxi-Hongkou** Nature Reserve, an uninhabited mountainous area of 16,138ha.
- the **Dujiangyan Irrigation System** structures, an area of 231.5ha within Dujiangyan City.

Mt Qingcheng and Longxi-Hongkou NR are linked by a forested, mountainous buffer zone of 36,858ha, so most of the site (54,518ha, excluding the irrigation structures) is natural in character. The highest point is Mt Guangguang (4583m), almost 4000m above the Chengdu Plain.

The Longxi-Hongkou Nature Reserve and the Mt Qingcheng forests are a complex ecotone**,** a transitional zone of climates, flora and fauna. Dujiangyan marks the transition from the subtropical to the warm temperate latitudes, as well as the topographic transition from the humid climate of the Chengdu Basin to the high-cold Qingzang Plateau. Floristically, the site marks the transition from Himalayan to Sino-Japanese flora; in terms of fauna, the site is a transition zone between Palaearctic and Oriental fauna. The environmental conditions and plant diversity of the ecotone have been recognised by many famous botanical collectors, and by Academia Sinica which

established the West China Subalpine Botanic Garden (a globally-important genetic bank for Rhododendrons) within Longxi-Hongkou Nature Reserve in 1986.

The nominated site lies within the "*Rainy Screen Belt of West China*" where warm Southeast Monsoon winds from the Pacific Ocean meet colder air draining from the Qingzang Plateau to the north and west. The climate within the belt along this frontal mountain band is humid and very misty – annual rainfall is relatively high (1300 - 2000 mm), humidity very high (>80%), annual sunshine hours very low (800-1000 hrs) and winters 2-4 degrees C warmer than other areas at the same latitude and elevation in China. These factors account for the seven distinct zones of natural vegetation on Mt Qingcheng and in Longxi-Hongkou NR, from sub-tropical evergreen broadleaved forest dominated by members of the Lauraceae at the lowest altitudes (700-1500m), through montane mixed coniferous and broadleaved forests (2000-3400m), to alpine shrubland and meadows (3000-4000m). In contrast to the evergreen broad-leaved forests of East and South China, the subtropical forests of Dujiangyan are dominated by members of the Laurel plant family.

The physical factors which give rise to the ecotone, are reflected in the high flora and fauna diversity within the site. 3012 species of higher plants have so far been collected: bryophytes, 397 (67 families; 182 genera); pteridophytes (ferns and fern allies), 203 (38 families; 73 genera); gymnosperms, 87 (10 families; 31 genera) ; and angiosperms, 2325 (163 families; 1079 genera). There are 585 species of vertebrate animals: 99 mammals, 367 birds, 22 reptiles, 23 amphibians and 75 fishes. Insects number more than 10,000 species. In addition, the Mt Qingcheng/Longxi forests (and, indeed, the entire Hengduan Mountain region of SW Sichuan/NW Yunnan) were a 'subtropical refuge' during the ice ages.

The dense bamboo understory found at 2800 - 3100m alt. is the habitat and food source for the Giant Panda. Longxi-Hongkou NR is believed to support a population of about 50-70 animals. It occupies a key natural corridor between the giant panda's mountainous habitats to the north (Min Shan) and south-west (Qionglai Shan, including Wuolong NR). Inbreeding within isolated panda populations is becoming a significant barrier to their reproduction and survival in the wild. Protection of the 'Dujiangyan corridor' is proposed as a crucial conservation measure, allowing the migration of young pandas (some raised in captivity at Wuolong Panda Centre) into unoccupied mountain territories in west-central Sichuan.

3. COMPARISON WITH OTHER AREAS

The nomination site lies near latitude 31°N. Compared to other significant mountains along the same latitude, Mt. Qingcheng/Longxi is of greater interest in that it displays a greater latitudinal range of vegetation zones - see table 1 below.

Table 1: Mt. Qingcheng/Longxi compared to other mountains at along 30°N

Other mountains and country	Vegetation zones compared to nominated site
Longs, Elbert and Blanca (USA)	Lacks sub-tropical vegetation zone
Esenada, Penyanevada (Mexico)	Lacks sub-alpine and alpine zones
Toubkal (Morocco)	Less vertical zonation
Mt. Blanc (Italy, France)	Lacks sub-tropical vegetation zone

Within China, the Mt Qingcheng/Longxi forests lie within one of eleven 'critical regions for biodiversity conservation' (see "China's Biodiversity: a Country Study", SEPA, 1998) – the Min Shan and northern Hengduan Shan of western Sichuan. Dujiangyan lies in the transitional belt between these two major mountainous districts. This part of south-central China is also considered by many scientists as one of the world's 25 'hotspots' for biodiversity conservation (Myers et al, 2000). Its unique position as a 'mixing zone' is also reflected in the fact that it has

characteristics of two biogeographical provinces (Udvardy, 1975) – the Sichuan Highlands and the Chinese Subtropical Forest provinces.

Several existing World Heritage sites in the region lie along the same latitude as the nominated site: Emeishan, Wulingyuan (or 'Zhangjiajie'), Huangshan, Wuyi Shan and the island of Yakushima in southern Japan. Wulingyuan contains a number of primitive plant species but has none of the plant biodiversity of the Mt Qingcheng/Longxi forests. Yakushima, which lies in the Japanese Evergreen Forest province, has a wide altitudinal range of forest (from sea level to 2000m) but a typically-restricted island flora.

The three other Chinese World Heritage 'subtropical forest' sites – Emeishan, Huangshan and Wuyishan – have been inscribed under criterion (iv). Comparative biodiversity data are summarised in Table 2 below. Mt Qingcheng/Longxi and Wuyishan are both much larger sites than Emeishan and Huangshan, which is reflected in the higher number of species of vertebrate animals in Mt Qingcheng /Longxi and Wuyishan Mt Qingcheng/Longxi is especially rich in mammals, birds, fish and insects, whereas the other three sites have more reptiles and amphibians.

Table .2 Comparison of Biodiversity of Mt. Qingcheng with other Chinese natural World Heritage Sites

World Heritage Site (Natural)	Area (ha)	Altitude range (m)	Total Plant Species	Primitive Plant Taxa	Mammals	Birds	Reptiles	Amphibians	Fish	Insects
Mt Qingcheng /Longxi	54,000	4,000	3,012	Rich	99	367	22	23	75	c. 10,000
Emeishan	15,400	2,500	3,200	Moderate	51	256	34	33	60	c.1,000
Huangshan	15,400	1,300	c.800	low-moderate	48	170	38	20	24	n.r.
Wuyishan	99,975	1,800	2,888	Moderate	71	256	73	35	40	4,560

n.r. = not recorded

The total number of plant species in the forests of Mt Qingcheng/Longxi is similar to that of Emeishan and Wuyishan but are different in character: the flora of Wuyishan has many tropical elements and is not representative of continental Central China.

Two other listed natural sites in Sichuan: Jiuzhaigou and Huanglong, differ from the Mt Qingcheng/Longxi forests in vegetation character. Both of them are high altitude sites in the Min Shan, with only some 1000 plant species, very few of which are endemic at the genera level.

Both are also considered Giant Panda habitats, although there is no up-to-date information on populations, nor reports of recent sightings. While Emeishan is not panda habitat; Mt Qingcheng/Longxi is important for that purpose and a key protected area since it provides a corridor for the movement of these endangered animals between the Qionglai Shan (including Wolong NR) and Min Shan habitats and their panda populations.

Essentially, Mt Qingcheng/Longxi is closest in character to Emeishan. The two sites lie only 150km apart. Consequently, they require close comparison to establish if their differences are sufficiently distinct for Mt Qingcheng/Longxi also to be considered of outstanding universal value. This is especially necessary as the 1996 nomination document for Emeishan made similar general claims then those made for Mt Qingcheng/Longxi.

The 'Rainy Screen Belt of West China' is not so well expressed at Emeishan – a more isolated mountain outliner – as at Mt Qingcheng/Longxi. Emeishan summit is also 1500m lower than Mt Guangguang. Botanical experts claim that the floristic features of Emeishan are all contained within Mt Qingcheng/Longxi; certainly the latter has a much wider range of ecological niches and

is altogether a better example of the ecotone between the different biomes of China – east and west, north and south. Mt Qingcheng/Longxi's bryophyte flora (especially the diversity of mosses) is outstanding and among the richest in the world. The complexity of the site's flora attracts much research interest and accounts for the establishment of internationally-recognised botanical gardens for the conservation of this genetic material, especially that of the rare plants of the Hengduan Shan.

The number of subalpine and alpine flowering ornamental plants in Mt Qingcheng/Longxi is outstanding, notably from the *Rhododendron* genus (including azaleas). Of the 850 known rhododendron species, China has 470; 400 occur in the Hengduan Shan humid mountainous belt of South-west China. Over 250 of these have been collected, studied and propagated within the West China Subalpine Botanic Garden.

If Mt Qingcheng/Longxi is more topographically-variable and biologically-diverse than Emeishan, it still remains a question as to whether it is the best biodiversity site in south-west China. Both sites lie at the eastern margin of the mountains which link to the great Hengduan Shan, the mountain range that extends east and south-east from the Himalayas, marking the parallel folds of the Eurasian Plate as it 'flows' around the Indian Plate. The Hengduan Shan includes the south-eastern corner of Tibet, northern Myanmar and the mountains of Yunnan and Sichuan. It is a striking landscape of deep, parallel mountain valleys with altitudinal differences of up to 4000m. These mountains are probably the most important centre of plant biodiversity in China. The flora contains 116 genera endemic to China – 48% of China's total endemic genera (Ying Junsheng, 1994). It is likely that there are protected areas within the Hengduan Shan where biodiversity exceeds that of the nominated site.

It is concluded that the biodiversity value of Mt Qingcheng is significantly higher than that of Emeishan but China should be encouraged to clarify whether this site is really the **best** site to recognise the biodiversity of outstanding universal value in South-west China – or whether further work needs to be done to identify better sites in the Hengduan Shan.

4. INTEGRITY

One of the strengths of the nomination is its high degree of ecological and landscape integrity. The following are positive features: it is relatively large; the two natural core areas are well-buffered; the site lies within one county administration (Dujiangyan) and logging has recently been banned in the catchment of the Min Jiang River.

The 36,858ha buffer zone forms an 'envelope' around the 17,660ha of the areas and has been included as part of the nomination. Although it has roads and people living in it, the buffer zone is relatively natural in character and contains important habitat for Giant Panda and other species. Without the buffer zone the natural component of the nominated area would be made up of two small core areas of 1522ha and 16,138ha. The natural values would appear to be enhanced if the combined area of core and buffer (54,518ha) are included in the nomination. However, further study is needed to verify if the natural integrity and management of the buffer zone would meet the conditions of integrity.

Although Longxi-Hongkou was designated as a National Nature Reserve only in 1997, an impressive programme of management has already been undertaken. For example: delineation of core area and other management zones; establishment of four conservation monitoring stations; establishment of regular patrols for plant and animal protection; and building a Museum of Nature Preservation, with displays.

Nevertheless, a number of problems remain to be addressed:

- Completion of the "Overall Management Plan" for the nature reserve. There appear to be no regulations to guide management of the four zones in the reserve, and no plans for

rehabilitating the forests on the margins of the Min Jiang River, needed to create viable 'forest corridor' for Giant Panda migration.

- Insecure funding base: costs to date appear to have been met from the Dujiangyan municipal budget but in the longer term it is intended that they be supported from timber sales from Dujiangyan's state plantations.

- Lack of ecologically-trained scientists and technicians to advise on conservation management.

- Failure to control damaging tourist development: as in many Chinese "scenic spots", Longxi-Hongkou NR is vulnerable to inappropriate tourist development.

- No comprehensive programmes for scientific monitoring, education or public awareness.

Many of these deficiencies are explained by the newness of the Longxi-Hongkou Nature Reserve, even though there appear to be long-established plans and regulations for the historic/cultural features of the site (Dujiangyan Irrigation System and the temples on Mt Qingcheng). Furthermore, the management problems facing Longxi-Hongkou Nature Reserve are poorly addressed in the nomination document.

5. ADDITIONAL COMMENTS

No additional comments.

6. APPLICATION OF WORLD HERITAGE CRITERIA

The site has been nominated under both natural and cultural criteria. While IUCN recognises that there are Taoist cultural values associated with several of the mountains, the functional linkage between the natural part of the nominated site and the Dujiangyan irrigation system is very limited. This historic feature can therefore be assessed quite independently from the question of the site's natural values.

The natural part of the site has been nominated under natural criteria (ii), (iii) and (iv).

Criterion (ii): Ecological processes

The outstanding value of the site as a composite ecotone is accepted. Many elements of the flora, especially the bryophytes, pteridophytes (ferns and fern allies) and seed plants are abundant, diversified and complicated in their origins – as is to be expected in a mixing zone between the subtropical flora of East Asia and the temperate flora of the Himalaya/Qingzang Plateau. There are many ancient and primitive plant species, and many endemic genera (often containing one, or very few, species) of high scientific value. Along with Mount Emei, the site has a key role in understanding the evolution of the flora of Central and South-west China IUCN considers that the nominated site meets this criterion.

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

There is nothing exceptional about the scenery and landscape of the site. Its cloudy and wet climatic character, while conducive to richness in biodiversity, means that any aesthetic values of the mountainous landscapes are difficult to see IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

The site has an outstanding range of plant biodiversity and diversity of mammals, birds and freshwater fish. There is high endemism in both flora (especially at the genera level) and fauna (especially mammals and fish). Five of the notable mammals in the site are rare and endangered – the Giant Panda, Golden Monkey, Takin, Leopard and Clouded leopard -- and have been placed under Class I national protection. The Giant Panda is a global "icon species" for conservation and the efforts of Chinese and other experts to conserve it are well known. In many ways, this site nomination has grown out of China's earlier nomination of Wolong Nature Reserve as a Giant Panda site (a nomination which was deferred by the Committee). Although the site is not viable as a panda reserve on its own, it contains prime habitat for the species and is a key corridor for pandas ranging throughout their remaining habitats in the mountains to the north and south. In this connection, it would be worth considering whether the nominated site should be extended to include the nearby Wolong Nature Reserve. Subject to a satisfactory resolution of integrity issues, IUCN considers that the nominated site meets this criterion.

7. RECOMMENDATION

That the Bureau note that Mt Qingcheng is considered by IUCN to meet natural criteria (ii) and (iv). However, IUCN recommends that the nomination be **deferred** back to the State Party for clarification of the following matters relating to the integrity of the site:

- the natural integrity and management regime in the buffer zone;
- the completion of the Overall Plan for the management of Longxi-Hongkou Nature Reserve, and a commitment made to its early implementation;
- the inclusion within the plan of arrangements to deal with long term funding, the development of adequate trained staff, satisfactory controls over tourism development and activities, and programmes for monitoring, research, education and public awareness.

The Bureau may also wish to recommend that the State Party consider: (a) the merits of enlarging the site to include other Giant Panda areas, such as Wolong Nature Reserve physically linked to the site, if appropriate; and (b) initiating a wider review of the potential which exists in China for other natural World Heritage sites. In order to undertake such a task, the State Party may wish to co-operate with the World Heritage Centre and IUCN in organising an in-country workshop with the aim of a systematic identification of sites of high biodiversity which may be potential candidates for World Heritage nomination.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

CURONIAN SPIT (LITHUANIA / RUSSIAN FEDERATION)

The field inspection of the site is scheduled for May 2000.

The evaluation report will be included in a supplementary report to the June 2000 Bureau meeting.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

SHEY-PHOKSUDO NATIONAL PARK (NEPAL)

An IUCN Technical Evaluation Report of this nomination is not available for the June 2000 Bureau meeting. The State Party requested that a field mission be delayed for climatic reasons. The IUCN evaluation mission will take place in October 2000 and a report will be prepared for the November meeting of the Bureau.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE DRAKENSBERG PARK / ALTERNATIVELY KNOWN AS OKHAHLAMBA PARK (SOUTH AFRICA)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (13 references).

ii) **Additional Literature Consulted:** Armstrong, A. J. 200. Faunal Diversity and Importance. Highlights. Internal Report. KwaZulu Nature Conservation Service; Botha, G. 2000. **Geology and Geomorphlogy of the oKhahlamba Drakensberg Park**. Council for Geoscience Report. 2000-0009; Cowling, N. J. and Hilton-Taylor, C. 1994. Patterns of plant diversity and endemism in southern Africa: an overview. In Huntley, B. 1994. **Botanical Diversity in Southern Africa**, National Botanical Institute, Pretoria. Strelitzia 1 31-52; Davis, S. D. and Heywood, V. H. 1994. **Centre of Plant Diversity: A Guide and Strategy for their Conservation**. WWF/IUCN 1994; Henwood, W. D. 1988. An overview of protected areas in the temperate grasslands biome. **PARKS**. 1998. Vol. 8. No. 3; Killick; D. J. B. 1994. Drakensberg alpine region. In Davies, S. D. and Heywood, V. H. 1994. Oxford University Press, Oxford; Killick; D. J. B. 1997. Alpine tundra of southern Africa. In Wielgolaski, F. E. (ed.). **Ecosystems of the World 3: Polar and alpine tundra**. Elsevier, Amsterdam pp. 199-209; MacRae, C. 1999. **Life etched in stone**. Geological Society of South Africa; Statlersfield, A. J., *et. al.* 1998 **Endemic Bird Areas of the World. Priorities for Biodiversity Conservation**. BirdLife International, Cambridge.

iii) **Consultations:** 7 external reviewers. Relevant officials from federal and provincial park agencies. Local communities and interested groups.

iv) **Field Visit:** David Sheppard, February, 2000.

2. SUMMARY OF NATURAL VALUES

The Drakensberg Park (DP), alternatively known as oKhahlamba Park, is the largest protected area established on The Great Escarpment of the southern African subcontinent. It is located in an inland mountain range in KwaZulu-Natal province in South Africa, along the eastern border of Lesotho (see Map 1). DP covers an area of 242,813ha and comprises a northern and a significantly larger southern section (see Map 2). The mountainous area between these two sections, known as the Mnweni area, is tribal land. DP can be divided into two distinct physiographic regions. The foothills, of "Little Berg" are steep sided spurs, escarpments and valleys which occur below 2,000m elevation, while the high main escarpment rises to more that 3,400m. There is considerable variation in topography, including vast basalt and sandstone cliffs, deep valleys, intervening spurs and extensive plateau areas. This topographical variation contributes to the outstanding scenic value of DP. The climate of the Drakensberg region is dominated by the influence of subtropical anticyclones. In winter, the subsistence of air causes atmospheric stability and thus a distinct dry season. In summer, (November to March), the subsidence inversion may rise above the escarpment resulting in an influx of humid air from the Indian Ocean by south-easterly winds. Precipitation in the summer months accounts for 70% of the annual total rainfall. The Drakensberg is one of the best watered, least drought prone areas of southern Africa. DP has particular significance for catchment protection and the provision of high quality water supplies for surrounding communities; a number of rivers in the region originate from DP.

The geology of the Drakensberg is characterised by a thick sedimentary succession, capped by an accumulation of basalt, comprising the upper part of the Karoo Supergroup succession which has a composite thickness of up to 7,000m in this area. The most distinctive physiographic feature of the Drakensberg foothills is the high cliffs formed of fine grained sandstone comprising the Clarens Formation. The Molteno-Elliot-Clarens transition illustrates a palaeoclimatic transformation during the latter part of a ~250 million year latitudinal drift of Gondwana from a subpolar position towards the current subtropical location of this part of Africa. This succession also preserves an almost complete fossilised record of 80 million years of reptile evolution.

The vegetation in DP is influenced by topography and the effects of climate, soil, geology, slope, drainage and fire. The vegetation is attitudinally zoned, forming three belts coinciding with the main topographical features, namely the river valley system, the spurs and the summit plateau. These are the low altitude belt (1,280-1,830m) with Podocarp forest, the mid altitude belt (1,830-2,865m) with Fynbos vegetation and the high altitude belt (2,865-3,500m) with alpine tundra and heath. A total of 2,153 species of plants been described in DP, including a large number of internationally and nationally threatened species. A significant feature is the high level of plant species endemism. The Park also includes significant grassland communities.

The fauna of DP includes a total of 48 mammal species, 296 bird species, 48 reptiles, 26 amphibians and 8 fish species. The invertebrate fauna is poorly known but includes many species endemic to the region. A number of globally threatened faunal species occur in DP, including the Long-Toed Tree Frog, the Yellow-Breasted Pipit and the Natal Midlands Dwarf Chameleon.

DP is an area of exceptional natural beauty and aesthetic importance, with the key scenic feature being its spectacular mountain range with its high escarpment walls of dark basalt, ridges and intervening spurs.

3. COMPARISONS WITH OTHER AREAS

DP has been nominated under all four natural criteria and three cultural criteria. There are a number of other mountain protected areas within The Afromontane biogeographical province, as well as a number of World Heritage sites, including Mt. Kilimanjaro; Rwenzori; and Mont Nimba. The DP is distinctive on floristic grounds. Floristically, The Park occurs within a unique floristic region, the Drakensberg Alpine Region of Southern Africa (Davis and Haywood, 1994). This floristic region covers the park and a large percentage of the land area of Lesotho. The Drakensberg Alpine Region in South Africa and Lesotho has been identified in a global review of Centres of Biodiversity (WWF/IUCN) as one of global importance. Additionally, WWF's Global 200 Ecosystems, identifying biologically outstanding regions most representative of the world's biodiversity, includes South African Montane/Grassland, of which Drakensberg is a part. Particularly significant within DP is the high level of floristic endemism and the unique high altitude montane grassland and alpine tundra vegetation with its associated endemic palaeo – invertebrate fauna. DP has outstanding species richness with 2,153 plant species within the park, including 109 which are globally threatened. There is no other World Heritage site within this floristic region. There are other World Heritage sites which protect grassland communities, such as the Manas and Kaziranga World Heritage sites in India which protect unique tall grassland communities. However, the grassland communities within DP, reflecting sharp altitudinal and topographic gradients, are not replicated within other World Heritage sites. This is important in the context of the low level of grassland protection globally, less that 1%, and also specifically within World Heritage sites.

The conservation status within the Drakensberg Alpine Region would also be enhanced through the proposed transboundary expansion of DP, to include adjoining areas in Lesotho (refer Section 4.2). This would significantly increase the overall conservation status within the Drakensberg Alpine Region. DP is also identified as occurring within one of the globally important endemic bird areas of the world: the Lesotho Highlands. DP is noted as having significance for the occurrence of the Yellow-Breasted Pipit, the Drakensberg Siskin and the Orange-breasted

Rockjumper. (Stattersfield *et. al*., 1998). Overall, the DP includes 119 bird species which are globally threatened.

Geologically, DP differs from other mountain ranges, such as the Andes, Rockies and the Himalayas, particularly in terms of the composition of geological sequences and processes of formation. There are similarities with the Simen World Heritage site in Ethiopia, which is part of the Simen Massif, and includes the highest peak in Ethiopia, Ras Dashan Terara (4,620m). This massif was formed some 25 million years ago and, as with the Drakensberg, comprises igneous basalts which have been eroded to form precipitous cliffs and deep gorges. However, there are differences between these two sites in terms of geomorphology, biodiversity and size. There are a number of World Heritage sites inscribed for their superlative natural phenomena of natural beauty. These include sites such as The Wet Tropics of Queensland (Australia), Belize Barrier Reef Reserve System (Belize) and Los Glaciares (Argentina). DP, with its spectacular escarpment walls of dark basalt lying above the light coloured clarens sandstone, compares favourably with these sites.

In summary, DP is distinctive for its floristic diversity and endemism, its montane grassland and alpine tundra communities, and for its features of outstanding aesthetic value.

4. INTEGRITY

The area has a long history of effective conservation management, dating back to 1927 when the first component area of DP (Cathedral Peak State Forest) was proclaimed. The Park is largely unaffected by human development activities. The area is large enough to survive as a natural area and to maintain natural values, even though there are outside influences. The following issues relating to the long term integrity of DP are highlighted.

4.1 Boundary Issues

The DP currently comprises a northern section and a much larger southern one (see Map 2). The intervening area along the escarpment is part of the Mnweni Community Land. The nomination document stressed that "the need to establish a conservation area in the Mnweni region that would join the two sections of the DP has long been recognised". Planning mechanisms currently restrict development above the 1,650m contour to maintain ecological integrity. As a further step to conserve the area a cooperative agreement between the Mnweni Community Trust and KwaZulu-Natal Nature Conservation Service is envisaged. Planning programmes have also identified privately-owned land along the escarpment to the south of the site which could also become a future conservation area to further extend DP.

There is also an important transboundary proposal involving DP and the adjoining area in Lesotho (the Sehlabethebe National Park). The Drakensberg – Maloti Transfrontier Conservation and Development Programme is being developed jointly by the National Environment Secretariat of Lesotho, the KwaZulu Nature Conservation Service and the Global Environment Facility. This builds on the Giants Castle Declaration, which involved key stakeholders from Lesotho and KwaZulu-Natal, and which endorsed the concept of a transfrontier conservation and development area embracing the Lesotho Maloti Highlands and the KwaZulu-Natal Drakensberg mountains in South Africa. This would establish a transboundary protected area between the two countries – an important initiative which would promote more effective biodiversity conservation, as well as enhanced cooperation between South Africa and Lesotho.

4.2 Legal and Planning Framework

i) Legal

The Park is under an effective legal regime, with the key laws being the KwaZulu-Natal Nature Conservation Management Act and the Republic of South Africa National Forest Act. The Nature Conservation Management Act provides an excellent framework for conservation management.

The control and management of those areas within DP proclaimed under the National Forest Act lies with the Minister of Water Affairs and Forestry. Management of these areas has been assigned to the Nature Conservation Service and it is important that this arrangement continues, to ensure integrated management of all 12 protected areas comprising the nominated site. Ideally, control and management of all areas within DP should fall under the Nature Conservation Management Act.

ii) Management Plan

There are currently management plans for all of the individual component areas of DP. An overall master management plan for DP is being prepared and it is recommended that this be finalised as quickly as possible, to ensure integrated, effective long-term conservation management through all areas of the site.

(iii) Staff and budget

The DP is adequately staffed (604 permanent and part-time employees in 1999) and the budget available is adequate for effective conservation management.

4.3 Regional Planning and Integration

Existing land uses in the region outside DP include agriculture, plantation forestry and ecotourism. All of these activities have potential to impact on the natural values of DP, particularly if poorly planned and implemented. It is thus positive to note the Special Case Area Plan (SCAP) being developed through the KwaZulu-Natal Minister of Local Government and Housing for special natural environments, where restrictions on development need to be applied so as not to destroy special features. Studies associated with the SCAP in this region recognise the unique natural values of DP and the need for complementary regional planning. The study has drawn on the provisions of the Seville Strategy for Biosphere Reserves (UNESCO/MAB). These efforts are to be commended and there is potential to nominate all or parts of the SCAP region as an International Biosphere Reserve, with DP as the core zone. It is important that developments outside DP should be sympathetic to, and minimise impact on, the natural values of DP. It is also important that the KwaZulu-Natal Nature Conservation Service play an active role in the development of the Special Case Area Plan.

4.4 Local Community Issues

The KwaZulu-Natal Nature Conservation Service fosters a good neighbour relations policy with communities adjacent to its borders. This involves the development of community based programmes and “partnership forums” which assist local development objectives. These are important in developing a more positive image of DP on the part of local communities. It is important that such programmes build ownership, awareness and support for the protection of the natural values of DP. These local community programmes also include provision for sustainable harvesting of various grasses and collecting seed for medicinal plants within DP. It is important that the long term impact of such programmes on natural values be carefully monitored.

4.5 Management Issues

The management of invasive species and fire are major management challenges for DP. Currently 1% of DP is covered with alien vegetation, including existing plantations and wattle infestations. This poses a threat to the ecological integrity of the Park as well as to the yield of water from its wetlands and river systems. Park management is actively addressing the removal of alien vegetation and these efforts should be continued and, ideally, accelerated. The interaction between the management of invasive species and the management of fire should be carefully considered. For example, increasing fire frequency will favour the expansion of invasive species which are fire tolerant. The general management of fire within DP is comprehensive.

However, monitoring the ecological impact of fire, particularly in relation to fire sensitive fauna such as endemic frogs, should be expanded. Management of fire and invasive species needs to be addressed jointly by Lesotho and KwaZulu-Natal, ideally within the framework established for transboundary protected area cooperation.

4.6 Tourism and Infrastructure Development

There are a number of tourism developments within DP and these make a major contribution to visitor appreciation of natural values and to overall park revenue. Some 1,024ha of DP (0.4% of the total area) has been transformed by infrastructure developments. It is important to ensure that any further development does not compromise natural values and that limits of acceptable change are clearly defined. This should be clearly addressed within the integrated master plan for DP.

5. ADDITIONAL COMMENTS

DP is nominated under natural and cultural criteria. The IUCN assessment of whether the site meets natural criteria is set out in section 6.

6. APPLICATION OF WORLD HERITAGE CRITERIA

DP has been nominated under all four World Heritage natural criteria. The IUCN assessment is as follows:

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

The nomination also makes a case for inscription under criterion (i). There are excellent examples within DP of different geological sequences and processes of formation. However, this is not a rarity amongst mountains in general. It is also noted that similar geological processes and characteristics are better represented on the World Heritage list through the Simen Mountains in Ethiopia. IUCN does not consider that the nominated site meets this criterion.

Criterion (ii): Ecological processes

The nomination also makes a case for nomination under criterion (ii): Ecological and Biological Processes. DP represents an important African example of on-going ecological and biological process. It is an important example of an African montane grassland area large enough for ecological and biological processes to operate without interference. It is also significant as the upper watershed area for the immediate and downstream regions and thus is of national importance. IUCN does not consider that the nominated site meets this criterion.

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

DP has outstanding aesthetic value. Soaring basaltic buttresses, incisive dramatic cutbacks and golden sandstone ramparts all contribute to a spectacular environment. Other features which contribute to the exceptional natural beauty of DP are the rolling high altitude grasslands and the pristine steep sided river valleys and rocky gorges. DP includes areas that are essential for maintaining the beauty of the site. IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

DP contains significant natural habitats for *in-situ* conservation of biological diversity. It has outstanding species richness, particularly of plants. It is recognised as a Global Centre of Plant Diversity and endemism, and occurs within its own floristic region – the Drakensberg Alpine Region of South Africa. It is also within a globally important endemic bird area and is notable for the occurrence of a number of globally threatened species, such as the Yellow-breasted Pipit. The

diversity of habitats is outstanding, ranging across alpine plateaux, steep rocky slopes to river valleys. These habitats protect a high level of endemic and threatened species. IUCN considers that the nominated site meets this criterion.

7. RECOMMENDATION

That the Bureau recommend to the Committee that the Drakensberg Park, alternatively known as the oKhahlamba Park, be **inscribed** on the World Heritage List under natural criteria (iii) and (iv).

The Bureau may wish to invite the State Party to consider the following:

- that the overall integrated master management plan for DP be completed as quickly as possible and that it give priority to the management of fire and invasive species as well as visitor management;

- that the stated intention to work towards establishing additional conservation areas to give continuity to the site along the escarpment be pursued;

- that efforts to establish the Drakensberg-Maloti Transfrontier Protected Area be strengthened and consideration be given to transboundary extension to the World Heritage site, if Lesotho becomes a State Party to the World Heritage Convention; and

- that efforts to establish a Special Case Area Plan (SCAP) covering DP and adjoining areas be continued and that consideration be given to the future nomination of all or part of the SCAP as Biosphere Reserve.

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

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE GREATER BLUE MOUNTAINS AREA (AUSTRALIA)

ADDENDUM TO 1999 IUCN EVALUATION

1. DOCUMENTATION

The above nomination was reviewed by the 23rd. Session of the Bureau (5-10 July, 1999) which reached the following conclusion:

"The Bureau noted that the site is a deeply incised sandstone plateau with 300-metre cliffs, slot canyons and waterfalls. The area is thought to have acted as a refugia during recent geological history and thus enabled the survival of a broad spectrum of biota. The area is mostly forest covered and represents one of two "peaks" of eucalypt diversity in Australia, containing 90 eucalypt taxa or 13% of the global total. Though nationally important, it is not considered on its own to be a globally significant representation of eucalyptus-dominated vegetation.

The Bureau decided to defer the present nomination under natural criteria and to invite the Australian authorities to consider a serial nomination to cover the full range of values of eucalyptus ecosystems. The Bureau noted also 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 Bureau recommended that the Committee should not inscribe this site on the World Heritage List on the basis of cultural criteria, as recommended by ICOMOS.

The Observer of Australia noted that the evaluations from IUCN and ICOMOS raised a number of issues which the Australian authorities wish to clarify, including new information on the EIA process with regard to the airport. He also noted that Australia had not proposed a serial nomination in order to immediately ensure a high standard of site management."

The 23rd. Session of the Committee (24 November – 4 December, 1999) then also noted that complementary information from Australia was received in October 1999 and that further additional information would be provided by 30 January, 2000.

This Addendum to the original IUCN 1999 Evaluation (attached) is based on the above decision by the Bureau and the additional material provided by Australia. In arriving at the following conclusion, IUCN consulted with seven additional external reviewers, all of whom have had extensive experience on World Heritage and forests in Australia.

2. REVIEW OF SUPPLEMENTARY DOCUMENTATION

The additional information provided by the Australian authorities focussed on:

- verifying that eucalypt vegetation is of international significance;
- reviewing the values of eucalypt vegetation as they occur in the nominated site;
- providing comparative data relating to the eucalypt values in five existing World Heritage sites in Australia;
- reviewing issues relating to issues of integrity of the site; and

- providing comment on the natural beauty of the area.

The supplementary documentation does not address the request of the Bureau *"...to consider a serial nomination to cover the full range of values of eucalypt ecosystems"* because the authorities consider that the Greater Blue Mountains (GBM) merit designation on their own right. Some of the relevant points brought out in the additional documentation are:

- In scientific terms, there are a number of reasons why eucalypt vegetation is considered to have "outstanding universal value". These reasons will not be repeated here but the case presented by Australia (particularly in Attachments A and B) is much strengthened. It should however be noted that the distinguished authors and peer reviewers of this analysis do not specifically refer to the GBM.

- GBM provide a particularly good representation of eucalypt vegetation in terms of environmental variation, structural types, species diversity, eucalypt groups, significant taxa and representation of community types.

- Five existing World Heritage sites in Australia also have substantial areas of eucalypt vegetation including a total of 204 species. The GBM has greater representation, however, of eucalypt diversity which would increase the combined total of eucalypt species in Australian World Heritage sites from 29% to 37% of the global total number of species (700). (No comparative data were given on other non-World Heritage eucalypt areas, such as southwest Australia or East Gippsland).

- The past effect of previous land uses not mentioned in the original nomination is acknowledged. The supplementary documentation claims that none of these has significantly disrupted the integrity of the GBM.

- Impacts from the City of the Blue Mountains (population 80,000) which lies in a corridor through the site (but is not part of the nomination) do not pose a significant threat to the site according to the documentation.

- The proposed nearby new international airport at Badgery's Creek has been subject to a comprehensive EIA, but it is claimed that this development would not adversely affect the ecological processes or aesthetic values of the GBM.

- Caution is urged in making aesthetic value judgements but the natural beauty of the GBM is claimed to be "unique".

3. CONCLUSION

IUCN appreciates the detailed extra work undertaken by the Australian authorities in support of the case for the GBM as a World Heritage site.

IUCN believes that this has successfully demonstrated that Australia's eucalypt vegetation is worthy of recognition as of outstanding universal value, because of its adaptability and evolution in post-Gondwana isolation, thereby confirming the merits of the Bureau's earlier suggestion. The importance of eucalypt vegetation could be reflected in the establishment of a serial nomination of several sites in Australia. These are likely to include some existing World Heritage sites, and several new ones as well – quite possibly including the whole or part of the GBM site.

IUCN also appreciates that the Supplementary Documentation addresses many of the questions of integrity which were raised in the 1999 evaluation.

However, IUCN concurs with the 1999 Bureau decision that the GBM do not – on their own – meet World Heritage criteria. The additional information provided does not compare the site with

other important eucalypt sites that are not already on the World Heritage list, and so does not fully respond to the Bureau's request. Moreover, the increase from the 29% of total eucalypt global species now found in World Heritage sites to 37% if the site were added would not be sufficient justification for inscription.

So, while the value of the area in national terms is clear, its claim to be of outstanding international value can only be established as part of a serial nomination of a number of Australian sites of importance for eucalypt vegetation. IUCN sees this as an opportunity to give international recognition to the vegetation type which biologically defines Australia. Such a serial nomination would be challenging to put together, but the need for it has been amply demonstrated in the Supplementary Documentation provided by Australia and in particular by Dr. Barlow's report, and the supportive commentary by Profs. Slatyer, Mooney and Raven.

While appreciating the efforts made by the State Party in providing additional information, IUCN considers that the Bureau's decision of July, 1999 remains valid.

1999 WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE GREATER BLUE MOUNTAINS AREA (AUSTRALIA)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (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 dendogram 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 if 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 began 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.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

ISOLE EOLIE (AEOLIAN ISLANDS) (ITALY)

ADDENDUM TO 1999 IUCN EVALUATION

1. DOCUMENTATION

The above nomination was reviewed by the Bureau at its twenty-third extraordinary session (29 November to 4 December, 1999) which reached the following conclusion:

"The Bureau noted that the site has the 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 and to propose more sharply defined boundaries for the Nature Reserves and buffer zones.

The volcanic landforms of the site represent classic features in the continuing study of volcanology worldwide. With scientific studies on the site 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 volcanological studies of on-going geological processes in the development of landforms. The area also has a long history of land use, and subsequent abandonment, which has lead to an on-going processes of maquis recovery."

Following the Bureau's extraordinary meeting the World Heritage Committee, at its twenty-third session noted the examination and, after debate, noted that Italy and 1999 IUCN would clarify the management issues and that the site would be presented to the twenty-fourth Bureau session.

Additional information has been received from the Italian authorities in response to this request and is the subject of IUCN's review below. The Bureau may wish to refer to the IUCN Technical Evaluation submitted to its twenty-third extraordinary session (attached).

2. REVIEW OF SUPPLEMENTARY DOCUMENTATION

IUCN has examined the additional information received from the Italian authorities which comprised a response to questions of clarification on the legal and planning framework for the nominated area. IUCN notes the following:

- The additional information provides for clearer delineation of the area to be inscribed onto the World Heritage List (marked blue on the maps) and a buffer zone (marked red on the maps) which is not included in the nominated area. IUCN believes this to be a positive step which simplifies the boundaries and restricts the listing to those core areas of greatest value under criterion (i). The legal protection afforded to the buffer zones, which include modified natural landscapes and some historic areas, will significantly assist in the management and protection of the nominated area. IUCN retains some concerns with the inclusion of a number of developed areas within the nominated area. Specifically the settlement of Ginostra on Stromboli; Filicudi Porto on Filicudi; and the settlements of S. Marina Salina and Lingua on the south-eastern tip of Salina. The additional documentation provided by the State Party suggests these areas have traditionally been part of the volcanic landscape and do not adversely impact on the volcanic values of the nomination site. If requested IUCN would be pleased to work with the Italian authorities in addressing these concerns.

- The Italian authorities have adequately responded to a number of specific concerns on the protection and management of the nominated area through reference to a Territorial and Landscape Plan known as the PTP (Piano Territoriale Paesistico) for the Aeolian Islands. This plan, which covers the islands in their entirety, specifies an objective to manage the nominated area consistent with its outstanding volcanic landscape values.

- The Italian authorities have identified potential threats to the nominated area and the measures which are detailed within the PTP to address these.

- The supplementary information identifies the specific Sicilian Regional legal instruments which will provide adequate protection to the site's volcanic values and the authorities have given a commitment to legally identify the boundaries of the nominated area.

- A co-ordinated management structure has been in place since 1998 to oversee the management of the important heritage values of the Aeolian Islands. This is a syndicate of the four local municipalities which administer the Aeolians known as 'Ecosviluppo Eolie'. With the collaboration of this syndicate an individual Superintendent has been nominated and empowered to oversee protection of the entire nominated area.

- A significant commitment of resources has been identified toward preparing a separate Management Plan for the nominated area and implementing a range of protective and educational/interpretive actions. Specific funding sources are noted to address development, environmental restoration and professional training of staff.

- Specific actions are listed to monitor the on-going integrity of the nominated area.

3. CONCLUSION

IUCN holds by its conclusion that the site meets the requirements for inscription under natural criterion (i) based on it's outstanding volcanic values. the Italian authorities have further strengthened the nomination by simplifying the boundaries and creating a clear buffer zone.

The authorities have responded positively to the request for clarification on protection and management issues. The detail contained within the Territorial and Landscape Plan (PTP) provides sufficient assurance that the nominated area will be adequately managed, however, a separate management plan for the World Heritage area is needed. IUCN notes that the Italian authorities have initiated and are committed to the preparation of such a plan.

IUCN believes that the supplementary information provided satisfies the requirements of paragraph 44 (b) (v) of the Operational Guidelines concerning management plans.

4. RECOMMENDATION

That the Bureau recommend to the Committee that the Aeolian Islands be **inscribed** on the World Heritage List under natural criterion (i).

The Bureau may wish to commend the State Party for further strengthening the nomination by simplifying the boundaries of the nominated area and creating a clear surrounding buffer zone. The Bureau may wish to also commend the State Party for establishing a co-ordinated management structure and initiating a separate management plan for the nominated area.

The Bureau may wish to encourage the State Party to expedite the completion of the separate management plan and the process of legalising the nominated area boundaries. The State Party is encouraged to cooperate with IUCN in addressing the concerns regarding inclusion of a number of settlements within the legalised nominated area boundaries.

1999 WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ISOLE EOLIE (AEOLIAN ISLANDS) (ITALY)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** 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, Sendaco, 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 1,216km^2. The islands range in size from Panarea which is 34km^2 to Lipari which is 376km^2.

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 lead 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 volcanism.

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.

COMMENTS ON CULTURAL NOMINATIONS

C. Nominations of cultural properties to the World Heritage List

C.1. New nominations

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

SÖDRA ÖLANDS ODLINGSLANDSKAP (THE AGRICULTURAL LANDSCAPE OF SOUTHERN ÖLAND) (SWEDEN)

A field inspection of the site is scheduled for May 2000. As per previous practice, IUCN will provide input to the ICOMOS report, as well as participating in the field evaluation.