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Convention Concerning the Protection of the World Cultural and Natural Heritage

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

Report to the World Heritage Committee
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Prepared by IUCN - The World Conservation Union
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THE WORLD HERITAGE CONVENTION

IUCN TECHNICAL EVALUATION REPORTS OF WORLD HERITAGE NOMINATIONS

May 2006

1. INTRODUCTION

This technical evaluation report of natural and mixed properties 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 the 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 properties as "flagships" for conservation; and

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

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

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

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

During 2005 IUCN commissioned an external review of its work on World Heritage evaluations, which was carried out by Dr. Christina Cameron. This resulted in a number of recommendations to improve IUCN's work and the majority of these are currently being implemented. The final review and the IUCN management response are available on IUCN's website.

2. EVALUATION PROCESS

In carrying out the technical evaluation of nominations IUCN is guided by the Operational Guidelines of the Convention. The evaluation process is carried out over the period of one year, from the receipt of nominations at IUCN in April and the submission of the IUCN evaluation report to the World Heritage Centre in May of the following year. The process (outlined in Figure 1) involves the following key steps:

1. **Data Assembly**. A standardised data sheet is compiled on the nominated property by UNEP's World Conservation Monitoring Centre (UNEP-WCMC), using the nomination document, the World Database on Protected Areas and other available reference material;

2. **External Review**. The nomination is sent to independent experts knowledgeable about the property or the natural values it represents, notably members of WCPA, other IUCN specialist commissions and scientific networks or NGOs working in the region (approx. 100 external reviewers provided input in relation to the properties examined in 2005/2006);

3. **Field Inspection**. Missions composed of one or more IUCN experts are sent to evaluate the nominated property on the ground and to discuss the nomination with the relevant national and local authorities, local communities and other stakeholders. Missions usually take place

between May and November. In the case of mixed properties and certain cultural landscapes, missions are joint with ICOMOS.

4. **IUCN World Heritage Panel Review**. The IUCN World Heritage Panel of experts meets at least once per year, usually in December at IUCN Headquarters in Switzerland to examine each nomination. A second meeting or conference calls are arranged as necessary. The Panel intensively reviews the nomination dossiers, field mission reports, comments from external reviewers, the datasheets and associated background material, and provides its technical advice to IUCN on recommendations for each nomination. A final report is prepared and forwarded to the World Heritage Centre in May for distribution to the members of the World Heritage Committee.

5. **Final Recommendations**. IUCN presents, with the support of images and maps, the results and recommendations of its evaluation process to the World Heritage Committee at its annual session in June or July, and responds to any questions. The World Heritage Committee makes the final decision on whether or not to inscribe the property on the World Heritage List.

It should be noted that IUCN seeks to develop and maintain a dialogue with the State Party throughout the evaluation process to allow the State Party every opportunity to supply all the necessary information and to clarify any questions that may arise. For this reason, there are three occasions at which IUCN may request further information from the State Party. These are:

- **Before the field mission** – IUCN sends the State Party, usually directly to the person organising the mission in the host country, a briefing on the mission, in many cases raising specific questions and issues that should be discussed during the mission. This allows the State Party to prepare properly in advance.

- **Directly after the field mission** – Based on discussions during the field mission, IUCN may send an official letter requesting supplementary information before the IUCN World Heritage Panel meets in December, to ensure that the Panel has all the information necessary to make a recommendation on the nomination.

- **After the World Heritage Panel** – If the World Heritage Panel finds some questions still unanswered or further issues arising, a final letter will be sent to the State Party requesting supplementary information by a specific deadline. That deadline must be adhered to strictly in order to allow IUCN to complete its evaluation.

Note: If the information provided by the State Party at the time of nomination and during the mission is adequate, IUCN does not request supplementary information. It is expected that supplementary information will be in response to specific questions and should not include completely revised nomination documents or major changes.

In the technical evaluation of nominated properties, the Udvardy Biogeographic Province concept is used for comparison of nominations with other similar properties. This method makes comparisons of natural properties more objective and provides a practical means of assessing similarity. At the same time, World Heritage properties 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 properties are to be selected solely on this criteria. In addition, global classification systems, such as Conservation International Hotspots, WWF Ecoregions, Birdlife International Endemic Bird Areas, IUCN/WWF Centres of Plant Diversity and the IUCN/SSC Habitat Classification, and the recent IUCN Analysis of the World Heritage List are used to identify properties of global significance. The guiding principle is that World Heritage properties are only those areas of outstanding universal value.

Finally, 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.

3. THE IUCN WORLD HERITAGE PANEL

Purpose: The Panel advises IUCN on its work on World Heritage, particularly in relation to the evaluation of World Heritage nominations. The Panel normally meets once a year for a week in December. Depending on the progress made with evaluations, and the requirement for follow up action, a further shorter meeting in the following March/April may be required. Additionally, the Panel operates by email and/or teleconference, as required.

Functions: A core role that the Panel performs is to provide a technical peer review process for the consideration of nominations, leading to the formal adoption of advice to IUCN on the recommendations it should make to the World Heritage Committee. In doing this, the Panel examines each available nomination document, the field evaluation report, reviewers' comments and other material, and uses this to help prepare IUCN's advice, including IUCN recommendations relating to inscription under specified criteria, to the World Heritage Committee (and, in the case of cultural landscapes, advice to ICOMOS). It may also advise IUCN on other matters concerning World Heritage, including the State of Conservation of World Heritage properties and on policy matters relating to the Convention. Though it takes account of the policy context

of IUCN's work under the Convention, its primary role is to deliver scientific and technical advice to IUCN, which has the final responsibility for the recommendations made to the World Heritage Committee.

Membership: The members of the Panel comprise a) those IUCN staff with direct responsibility for IUCN's World Heritage work, and b) other IUCN staff, Commission members and external experts selected for their high level of experience with the World Heritage Convention. Thus the members are:

- The Head of the IUCN Programme on Protected Areas (Chair)
- Other staff of the Programme on Protected Areas (2)
- The IUCN World Heritage Senior Advisor (1)
- The WCPA Vice Chair for World Heritage (1)
- The Head of Protected Areas Programme at UNEP-WCMC (1)
- Up to three other technical advisors, whose expertise is recognized at a global level in relation to World Heritage (3)

The Panel's preparations and its meetings are facilitated through the work of the World Heritage Project Officer (who serves as the Executive Officer for the Panel).
The Panel may also be attended by other IUCN staff (particularly from other Global Programmes with expertise in the subject matter of particular nominations), Commission members (including the Chair of WCPA) and outside experts, upon invitation, for specific items as necessary. The Director General of IUCN and the Director of Global Programmes are also invited to attend a session of the Panel for a full briefing on the process and recommendations.

4. FORMAT OF EVALUATION REPORTS

Each technical evaluation report presents a concise summary of the nominated property, a comparison with other similar properties, a review of management and integrity issues and concludes with the assessment of the applicability of the criteria, and a clear recommendation in the form of a draft decision to the World Heritage Committee. Standardised data sheets, prepared for each natural or mixed nomination by UNEP - World Conservation Monitoring Centre (UNEP-WCMC), are available separately on request. In addition, IUCN has carried out desk reviews for cultural landscapes containing natural values, and provided its detailed comments to ICOMOS. This report contains a short summary of IUCN's comments on each cultural landscape nomination reviewed.

5. PROPERTIES EXAMINED IN 2005 / 2006

15 nomination dossiers were examined by IUCN in the 2005/2006 period, involving 11 field inspections. These comprised:

- 9 natural property nominations (including 8 new nominations, and 1 extension),
- 2 mixed property nominations (including 1 new nomination and 1 referral), and
- 4 cultural landscapes.

Joint missions were carried out with ICOMOS for the mixed property and one cultural landscape.

6. COMMENTS ON 31 MARCH DEADLINE FOR SUPPLEMENTARY INFORMATION

In the 2005 / 2006 period, IUCN has sought to ensure that States Parties have the opportunity to provide all the necessary information on their nominated properties through the process outlined in section 2 above. As per the decision of the World Heritage Committee at its 28th session in July 2004 (28 COM 14B.57), IUCN has not taken into consideration or included any information submitted by States Parties after 31 March 2005. It is noted that, as per the decision of the Committee at its 7th Extraordinary session in December 2004 (7 EXT.COM 4B.1), the viability of the deadline of 31 March is to be evaluated at the 30th session of the Committee.

Based on this trial period during 2005 and 2006, IUCN considers that the 31 March is too late to receive supplementary information for the following reasons:

i) All IUCN evaluation reports must be completed and translated by mid-April so that they may be, formatted and printed in time for submission to the World Heritage Centre in mid-May;

ii) IUCN needs to consult widely with its evaluators, external reviewers, regional offices and the World Heritage Panel, on supplementary information received and requires adequate time to do this properly;

iii) The majority of States Parties who submitted supplementary information in 2006, submitted this at the very last minute, often on the 31 March;

iv) A number of States Parties submitted substantial amounts of new information, including revised nomination documents without highlighting the new information therein, on the 31 March;

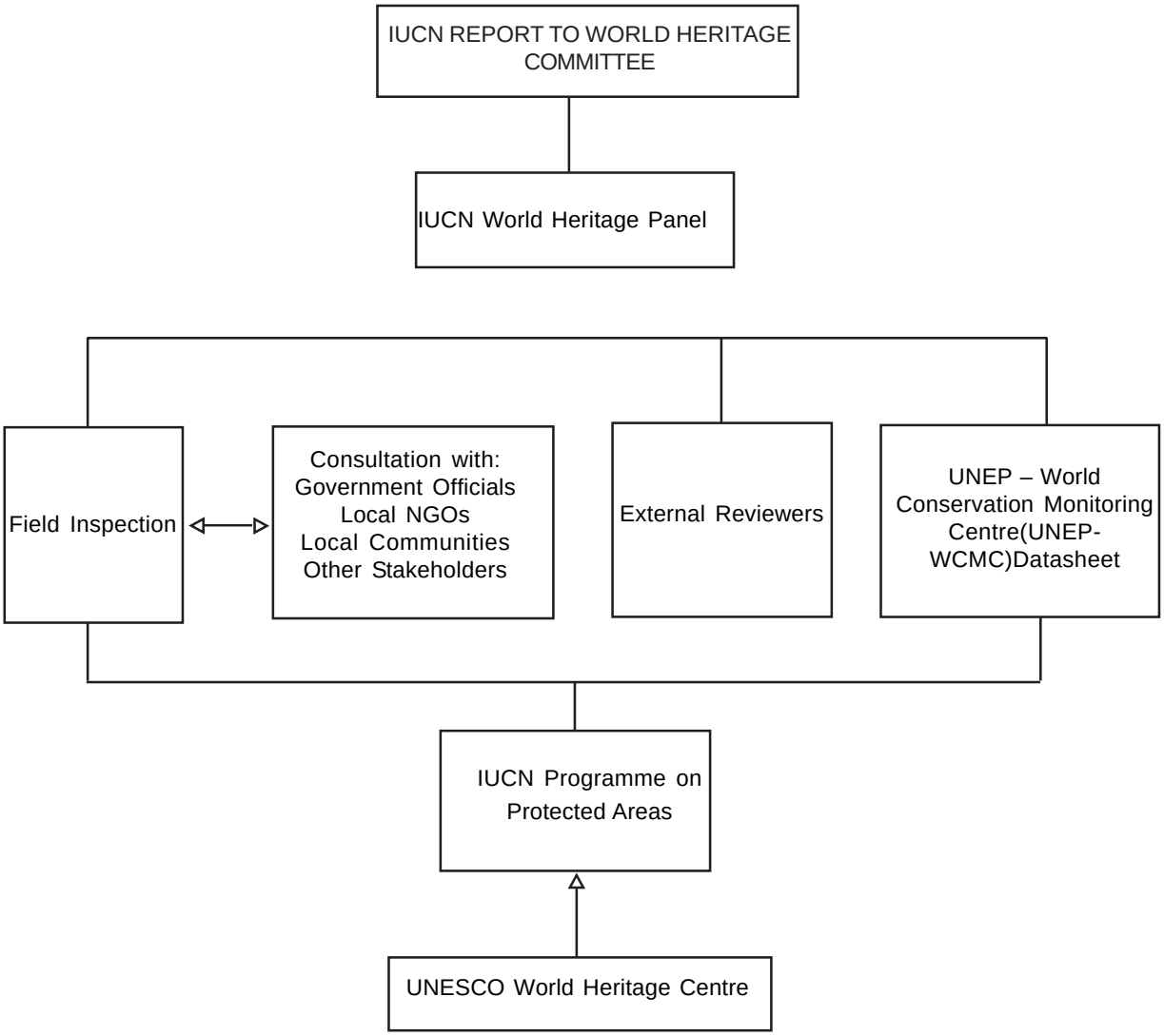
As a result of the above issues, IUCN was put under enormous pressure in 2005 and 2006 to complete its evaluations within the timeline provided. ***Therefore, IUCN recommends that the deadline for the submission of supplementary information be brought forward to the 28 February of the year of examination of the nomination.*** IUCN would then ensure that it requests supplementary information from States Parties before the end of December.

In addition, IUCN recommends that the World Heritage Committee clearly define the meaning of supplementary information, so that States Parties cannot submit substantial new information and revised nominations at the last minute. IUCN considers supplementary information to include responses to specific questions raised by the Advisory Bodies.

7. ACKNOWLEDGEMENTS

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 field inspections. This support is acknowledged with deep gratitude.

Figure 1: IUCN Evaluation Process



A. Nominations of Natural Properties to the World Heritage List

A1 New Nominations

ARAB STATES

TOUBKAL

MOROCCO

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

TOUBKAL (MOROCCO) ID N° 1168

1. DOCUMENTATION

i) Date nomination received by IUCN: April 2005

ii) Additional information requested from and provided by the State Party: IUCN requested supplementary information following the IUCN World Heritage Panel on the 31 January 2006, and the State Party response was received on the 28 March 2006.

iii) IUCN/WCMC Data Sheet: 4 References.

iv) Additional Documentation Consulted: Aubert J., 1956. **Contribution à l'étude des Plécoptères d'Afrique du Nord,** Bulletin de la Société entomologique Suisse, CH, 17pp; Aubert J., 1961. **Contribution à l'étude des Plécoptères du Maroc**, Bulletin de la Société entomologique Suisse, CH, 10pp; Maselli D., 1995. **L'écosystème montagnard agro-sylvo-pastoral de Tagoundaft (Haut-Atlas occidental, Maroc) : ressources, processus et problèmes d'une utilisation durable**, Geographica Bernensia, Université de Berne, CH, 198pp.; Galland N., 1988. **Recherche sur l'origine de la flore orophile du Maroc, Etude caryologique et cytogéographique**, Travaux de l'Institut scientifique, Rabat, 169pp.; Galland N., 1990. **Les taxons boréo-montagnards des hautes montagnes d'Afrique du Nord : leur signification biogéographique pour les domaines atlasique et alpien**, Rev. Valdotaine Hist. Nat., 7pp.; Higgins L.G. et Riley N.D., 1975. **Guide des Papillons d'Europe, Rhopalocères**, Delachaux et Niestlé Ed., Neuchâtel et Paris, 421pp.; Lamnaouer D., 2002. **Programme de l'UICN en Afrique du Nord : Phase III, Etat d'avancement : Détermination des espèces en danger dans le Parc National d Toubkal**, 8pp., http: www.chm.ma/gestion et conservation/parcs nationaux. htm; Lafontaine R.-M., Beudels - Jamar R.C. et Devillers P., 1999. **Rapport sur l'état et les perspectives d'une espèce, Gazella cuvieri**, in CMS Technical Series Publication No 4, UNEP/CMS Secrétariat, Bonn, D.,10pp.; Shackleton D.M.,1997. **Wild Sheep and Goats and their Relatives**, **Status Survey and Conservation Action Plan for Caprinae**, UICN, Gland, CH et Cambridge, UK, 390 + VIIpp., (includes an article on Barbary Sheep in Morocco, IUCN/SSC Caprinae Specialist Group, pp 34-38); Boitani L. et al., 1999. **Gazella cuvieri, Ammotragus lervia** (in: **A Databank for the Conservation and Management of the African Mammals**, European Commission et IEA-Istituto di Ecologia Applicata, Roma, I,) 8pp.; Haut Commissariat aux Eaux et Forêts et à la Lutte contre la Désertification, 2004. **Parcs Nationaux et Réserves Naturelles du Maroc**, Rabat, 21pp.; El Graoui M., 2005. **Catalogue, Le Patrimoine Rupestre Marocain**, Ministère de la Culture, Centre National du Patrimoine Rupestre, 11 planches doubles + 4pp. de couvertures; El Graoui M., 2005. **Sauvegarde et mise en valeur de l'aire rupestre de l'Oukaïmeden, (Haut-Atlas)**, projet du Ministère de la Culture, Direction du Patrimoine Culturel, Centre National du Patrimoine Rupestre, 10pp. (non publié).

v) Consultations: 9 external reviewers. The mission met with the Secretary General of the Ministry of Culture, the Inspector of Historical Sites and Monuments of Marrakech (Ministry of Culture), the Regional Director for Water and Forests of the High Atlas, the Director of the Toubkal National Park, the President of the District (Commune) of Toubkal, the President of Guides of Imlil Mountains and the Authorities of the Isle tribe.

vi) Field Visit : Pierre Goeldlin, December 2005

vii) Date of IUCN approval of this report: April 2006

2. SUMMARY OF NATURAL VALUES

The nominated property, Toubkal, comprising Toubkal National Park (TNP), is located in the Central High Atlas Mountains, including the Djebel Toubkal, which at 4,167m is the highest point of the Atlas Mountain Range, and the highest mountain in North Africa. The total area of the nominated property is 103,678 ha, and includes a core zone of 38,526ha and a buffer zone of 65,152 ha. The core area of the property is approximately 25 km long and 15 km wide. It is nearly entirely above an altitude of 2,000m and includes a number of peaks that reach above 3,000 m. A very small area located to the North West of the core zone rises up from an altitude of 1,400 m, and lies adjacent to the Takherkhort protected area, a part of the buffer zone of the nominated property.

The High Atlas range was formed as the result of the collision of the African plate against the European continent. The High Atlas range is more than 700 km long, is orientated along a West SW-East NE axis from Cape Gir on the Atlantic coast to the Algerian-Morocco border. It is divided into three sectors distinguished by their underlying geology; the Western High Atlas, the largest portion of the Atlas where peaks do not rise above 3,700 m, running from the western end of the Tizi-n-Test (Oued N'Fiss) mountain range; the Central High Atlas, including the highest peaks (Djebel Toubkal at 4167 m) extending from Tizi–n–Test to Tizi–n–Tichka; and the Eastern High Atlas, from Tizi–n–Tichka to the eastern end of the High Atlas mountain range (Galland N. 1988). The slopes of the Western High Atlas include areas of crystalline rocks as well as very large areas of schist and the Eastern High Atlas comprises folded limestones. By contrast, the high mountain ranges of the Central High Atlas comprise Precambrian volcanic rocks structures (Galland N. 1988), as well as Cambrian and Quaternary sedimentary strata.

TNP is part of the Mediterranean climatic realm, a temperate zone characterized by a dry summer season and a colder wet season. Precipitation ranges from 250-300 mm in lower elevation areas and 1200 mm at high elevations including snowfall (above 800-1,000 m in winter).

A transect running from the foot of the nominated property to its highest peaks shows a bioclimatic transition from thermomediterranean to an oromediterranean (Alpine) climate. At the foothills of the southern slopes of the TNP an inframediterranean or presaharian climate is found, thus within a short distance there is a transition from a hot desert climate to a cold desert climate. The latter climate is only found at the boundaries of the TNP and within its buffer zone. The High Atlas, and more specifically the Toubkal mountain range, constitutes a natural climatic barrier between the Mediterranean climate of Morocco and the world's largest hot desert, the Sahara.

525 species and sub-species of vascular plants, within 67 plant families are found in the TNP. This represents 43% of the known flora of the High Atlas and 13% of Morocco's flora. Overall, much of the flora may be categorized as being of Mediterranean origin, however several species, such as Spring and Fringed Gentian are also commonly found in northern and central Europe and even in Asia. The flora also includes limited occurrences of tropical species. The flora of the TNP is characterized by a high degree of endemism, comprising 154 taxa comprising 58% of the endemic species of the High Atlas and 25% of all endemic species found in Morocco.

The bulk of the nominated property lies above 2,000m and the landscape above this altitude is characterized by a wooded steppe with thorn bushes. Some species of trees, including Juniper and Evergreen Oak have adapted to this rugged environment and are found up to 2,500 – 3,000 meters. The only flora above 3,000m are sparsely scattered grassy Moroccan species (35 species in all, of which 25 are endemic). Sixty-one aromatic, medicinal, endemic, rare or endangered plants are found in the TNP (D. Lamnaouer, 2002), of which 23 species are considered to be extremely rare. Summer grazing by livestock is quite intense above the treeline.

Only 12% of the TNP and its buffer zone is forested, though the forest is mainly secondary, fragmented, overgrazed and over-exploited. Forests include Berber Thuya, endemic to the Magreb (with a few scattered stands reported in Malta and in the southeastern parts of Spain), Red Juniper, Evergreen oak, Juniper and the highly threatened Atlas Cypress, endemic to Morocco and the Aghbar forest (5000 ha) located in the N'Fiss valley at the extreme western edge of the buffer zone.

Most of the bird fauna of the TNP is Palearctic. 95 nesting species have been reported including several raptors such as Bearded Vulture, Egyptian Vulture, Golden Eagle, Bonelli's Eagle and Booted Eagle. In all, twelve species of raptors exist in the TNP. Several species and sub-species of butterflies have been described, six of which are endemic to Morocco. Fourteen species of amphibians and 15 species of reptiles have been reported in the TNP region, including seven endemic to Morocco. Nineteen of these amphibians and reptiles are likely to inhabit the central zone of the TNP, most others are found in the buffer zone.

The nomination document lists 33 mammals based on the Overall Management Plan for Morocco's Protected Areas (Plan Directeur des Aires Protégées du Maroc (1992)). Since the presence of certain species in the TNP is based on old literature, the actual number is uncertain but could be lower. Three of the 33 species mentioned in the list are vulnerable, namely: Barbary sheep, Horseshoe Bat and Barbary Ape. Finally the Cuvier's Gazelle is classified as endangered. It should be noted that the nomination document has a number of information gaps for several species.

3. COMPARISON WITH OTHER AREAS

Since 1978 the Committee has inscribed 71 mountain World Heritage properties, making it the best represented biome in the World Heritage List. From these 8 properties are in the Afrotropical Biogeographical Region (Udvardy, 1976), where the nominated property is located. TNP has been nominated under criteria (i), (ii) and (iv).

In relation to criterion (i) the geology of the property is characterized by Cambrian and Quaternary strata. These geological periods are well represented already on the World Heritage list with properties that include the best examples of such periods, such as Burgess Shale in the Canadian Rocky Mountain Parks (Canada) for the Cambrian, and Naracoorte in the Australian Fossil Mammal Sites (Australia) for the Quaternary. While the nomination argues that another key feature of the property is that it represents the result of the collision of the African plate against the European continent, this is in fact a common origin for most mountain ranges on the planet. Besides, a number of World Heritage properties already represent the best examples of tectonic and structural features, such as Gros Morne National Park (Canada);

Uluru-Kata Tjuta National Park and Macquarie Island (Australia); and the Three Parallel Rivers of Yunnan Protected Areas (China), just to mention a few. The IUCN Global Thematic Study on Geological Heritage (IUCN, 2005) has not identified this as a priority area.

Criterion (i) makes reference to the existance of ***significant geomorphic or physiographic features*** which represent the landscape ***products*** of active or past processes, which can be identified as significant physical landscape features. The nominated property represents a portion of the Atlas Mountain range but, as noted above, this biome is well represented in the World Heritage List by more impressive examples such as Sagarmatha National Park (Nepal, including Mount Everest the highest peak in the world with 8,848m); Huascaran National Park (Peru, at 6,768m); Kilimanjaro National Park (Tanzania, including the highest peak in Africa at 5,963m); Rwenzori Mountains National Park (Uganda, with 5,109m in Mount Margherita) and Yosemite National Park (USA, with a number of peaks over 4,000m). All these examples also include a number of other outstanding geomorphological features such as deep gorges and glacial features. TNP is only the 23rd highest peak in Africa (highest in North Africa/Atlas) and the Atlas Mountains are the third highest range in Africa. Overall IUCN concludes that TNP is of national and regional importance but not of Outstanding Universal Value (OUV) in relation to this criterion.

In relation to criterion (ii) one key element considered by IUCN in assessing OUV of mountain properties is the extent to which nominated properties are able to protect ecological processes occurring within mountain ecosystems. In this regard TNP is far below the median size of mountain World Heritage properties which is 285,000ha. The nomination argues the case for consideration of OUV based on its interest as a climatic barrier. In fact this is a common feature of mountain ranges as they normally produce such an effect in local and regional climatic conditions. There are other mountain ranges already represented in the World Heritage List that have the same "climatic barrier" features as the High Atlas. For instance, the Jungfrau-Aletsch-Bietschhorn (Switzerland), where on the Bernese side there is high precipitation while on the Rhône valley (Valais) side to the south, the climate is the driest found in Switzerland. A similar influence is associated with the mountains within the Humboldt National Park (Cuba) which captures at its northern-most part over 90% of the rain occurring in this area, thus creating in its southern portion a desert area with less than 400mm of rain per year. Furthermore, there are other World Heritage mountain properties that exhibit and maintain much more complex ecological processes such as Huanglong in China, which protects snow-capped peaks, glaciers, a variety of forests ecosystems and karst processes. Also Lorentz National Park (Indonesia) is the only protected area in the world to protect a continous transect from snowcap to tropical marine environments, including extensive lowland wetlands. IUCN therefore considers that TNP is of regional importance but not of global significance in relation to criterion (ii).

In relation to criterion (iv) the nomination reported the presence in TNP of 525 species and sub-species of vascular plants (29% are endemics), 33 mammals, 95 nesting species of birds; 14 species of amphibians and 15 species of reptiles. As noted above, the nomination presents major gaps in relation to biodiversity data, thus making it difficult for IUCN to make a proper assessment of this criterion. However, it is unlikely that TNP would rank highly in relation to this criterion when compared to other mountain properties on the World Heritage List. For example: Waterton Glacier International Peace Park (Canada/USA) comprises 5 large ecoregions that provide habitats for 1,258 species of vascular plants, 280 birds and 60 mammals; and the Three Parallel Rivers of Yunnan Protected Areas (China) protects 6,000 plants in 22 vegetation types, 173 mammals, 414 birds, 59 reptiles, 36 amphibians and 76 species of fish. Other mountain properties on the World Heritage List have a higher percentage of endemic species; for example, 67% of species in the Humbolt National Park (Cuba) are endemic.

Finally it is important to note that the IUCN Global Thematic Study on Mountain Protected Areas, which identified potential properties which may merit consideration for World Heritage listing (IUCN, 2002), did not identify this property as having potential for meeting natural criteria for OUV. This study in fact noted the potential of this property to be considered as a Biosphere Reserve due to the human population living in and around its boundaries.

4. INTEGRITY

4.1 Legal Status and ownership

The TNP was established under the name "Parc National du Toubkal" on the 19 January 1942, by a Vizirial Order. This had been preceded by two Vizirial Orders on the 11 of September and on the 26th of September 1934 defining the procedure that had to be followed to create a National Park. The TNP was established with an area of 36,000 ha which today represents the central zone. At present, only a general code of good conduct that does not have force of law governs the behavior of visitors to the area. The law on forests (1917) specifically allows a citizen to use the wood and pasture areas in forested zones. This law is not conductive to, or coherent with, the sustainable management of natural resources. Several subsequent Dahirs (Vizirial Orders) have amended this law in order to reinforce it in relation to forest conservation.

Supplementary information provided by the State Party has confirmed that at the present time there is no specific legal protection for either the TNP or its buffer zone. The State Party considers there are difficulties in both instituting and enforcing such protection due to the levels of human use within the area. Nevertheless, a law establishing the status of National Park and other categories of protected areas is currently being reviewed, and, if adopted, will permit the development of both measures to secure better protection and effective management of the area.

Land ownership within the TNP area is understood to be 10 % in private hands; 33% in common lands and 57% in public forest domains.

4.2 Boundaries

The boundaries of the TNP have been slightly modified recently to integrate certain significant topographic features and contour lines, to facilitate its control and management. There are plans to mark its boundaries with posts. Most of the TNP's boundaries are above 2,000m and above the tree line, which is not favorable for many species with habitat requirements that are larger than TNP and its buffer zone. There are several rivers and streams within the buffer zone that have been classified as sites with specific biological and ecological interest (SIBE-sites d'intérêt biologique et écologique). In addition there areas of rare vegetation, such as the cypress forest of Aghbar, which are of scientific and conservation interest and their inclusion within the TNP would allow their protection. Overall IUCN considers that the boundaries of the property are not adequate to ensure the protection of its values, particularly its wildlife.

4.3 Management

The TNP is managed by the Regional Directorate for Water, Forest and Conservation of Soils of the Ministry of Agriculture, through the Parks' Management unit. A tri-annual management plan (2005-2008) has been prepared and is being implemented; however the legal status of this plan is not clear from the nomination document. The management unit directly in charge of implementing the plan is currently understaffed and the level of management is low. The management zoning of the TNP is based on a central zone and a buffer zone. The central zone is further sub-divided into three types of zones: natural protected zones, natural managed sanctuaries and managed natural resource zones. This implies that different human activities such as nomadic grazing, collecting of firewood and tourism are permited within the central zone of TNP but the lack of adequate control and management of these activities are in fact threatening the sustainability of the Park's natural resources. On the other hand the management and protection regime of the buffer zone is based on the goodwill of the local population that lives in or close to this area. The buffer zone does not have the legal framework nor the management capacity required to fully fuction as a true buffer zone for the park. It would be very useful to develop and implement a set of rules governing the use and management of this area so that it could become an effective buffer zone for the TNP and contribute towards the sustainable development of the region.

4.4 Threats

Key threats to TNP are mainly associated with the impacts of land use practices. Erosion of the landscape and the loss of a considerable forested biomass due to cutting of wood for domestic use, as well as large-scale clear cutting for the production of charcoal, have occurred. Significant erosion has reduced the availability of pastureland and in particular the evergreen oak areas. Loss of biological productivity and a higher human population in the area has led to more intense grazing by livestock which in turn leads to loss of forest cover and overgrazing of the open areas. The carrying capacity of the area has been greatly exceeded which has accelerated soil erosion.

It has been estimated (based on a 1993 census) that up to 32,000 inhabitants live in the buffer zone of the TNP. Only one village, Amenzel, is located inside TNP's central zone. Overall, 55% of the total population live on the northern slopes of the mountain range and is very poor, depending on a local subsistence economy for survival.

The overuse of water for irrigation could lead to problems with the natural freshwater ecosystems of the area. Because of increased human populations, rivers are being increasingly polluted by livestock and other inappropriate human activities.

The area's key species of fauna are affected by habitat destruction, illegal hunting as well as threats due to feral dogs, and these factors also impede conservation efforts and reintroduction programmes for certain game species. The collection of medicinal and aromatic plants by pulling the plants out of the ground is threatening the survival of many rare and/or endemic species.

Tourism is gradually increasing. If it is not strictly regulated within a framework of rules and regulations it will develop inappropriately and will threaten the area's natural and cultural values. This is already happening with the cave drawings in Oukaïmeden.

At the present time, IUCN concludes that the nominated property does not meet conditions of integrity.

5. ADDITIONAL COMMENTS

There are a number of cultural values such as cave drawings, dry stone wall terraces, traditional villages (douars) that require attention in preparing and implementing an integrated management plan for this area.

Two UNESCO Biosphere Reserves are located close to the nominated property, namely: The Oasis du Sud Marocain Biosphere Reserve and the Arganeraie Biosphere Reserve that includes the world's only forest of Argania spinosa. The TNP has excellent potential as a Biosphere Reserve and could potentially be linked with these Biosphere Reserves.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

Toubkal is nominated on the basis of natural criteria (i), (ii), and (iv).

Criterion (i) Earth history and geological features

The geology of the nominated property is characterized by Cambrian and Quaternary strata. These geological periods are well represented already on the World Heritage List with properties that include the best examples of such periods. Whilst the nomination argues that another key feature of the property is that it represents the result of the collision of the African plate against the European continent, this is in fact a common origin for most mountain ranges on the planet. Moreover, a number of World Heritage properties already represent the best examples of tectonic and structural features. TNP is only the 23rd highest peak in Africa and the Atlas Mountains are the third highest range in Africa, thus there are other World Heritage properties, as well as other mountain protected areas, that display more impressive and complex geomorphological features. The IUCN Global Thematic Study on Geological Heritage has not identified this as a priority area. IUCN considers that the nominated property does not meet this criterion.

Criterion (ii) Ecological processes

TNP does not have a size that allows it to protect the key ecological processes occurring on this mountain range. The nomination argues the case for Outstanding Universal Value based on its interest as a climatic barrier. In fact this is a common feature of mountain ranges as they normally produce such effects in local and regional climatic conditions. There are other mountain ranges already represented in the World Heritage List that have the same "climatic barrier" features as the High Atlas. Furthermore there are other World Heritage properties that exhibit and maintain much more complex ecological processes, such as Lorentz National Park (Indonesia), which is the only protected area in the world to protect a continous transect from snowcap to tropical marine environments, including extensive lowland wetlands. IUCN considers that the nominated property does not meet this criterion.

Criterion (iv) Biodiversity and threatened species

The nomination presents major gaps in relation to data on biodiversity, making it difficult for IUCN to make a proper assessment of this criterion. However, it is unlikely that TNP would rank highly in relation to this criterion when compared to other mountain properties inscribed in the World Heritage List on the basis of this criterion which protect habitats comprising higher number of species of flora and fauna, as well as higher percentages of endemism. IUCN considers that the nominated property does not meet this criterion.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee **not to inscribe** Toubkal on the World Heritage List on the basis of natural criteria.

IUCN further recommends that the World Heritage Committee encourage the State Party to address the range of issues impacting on the integrity of Toubkal National Park, and take the following actions:

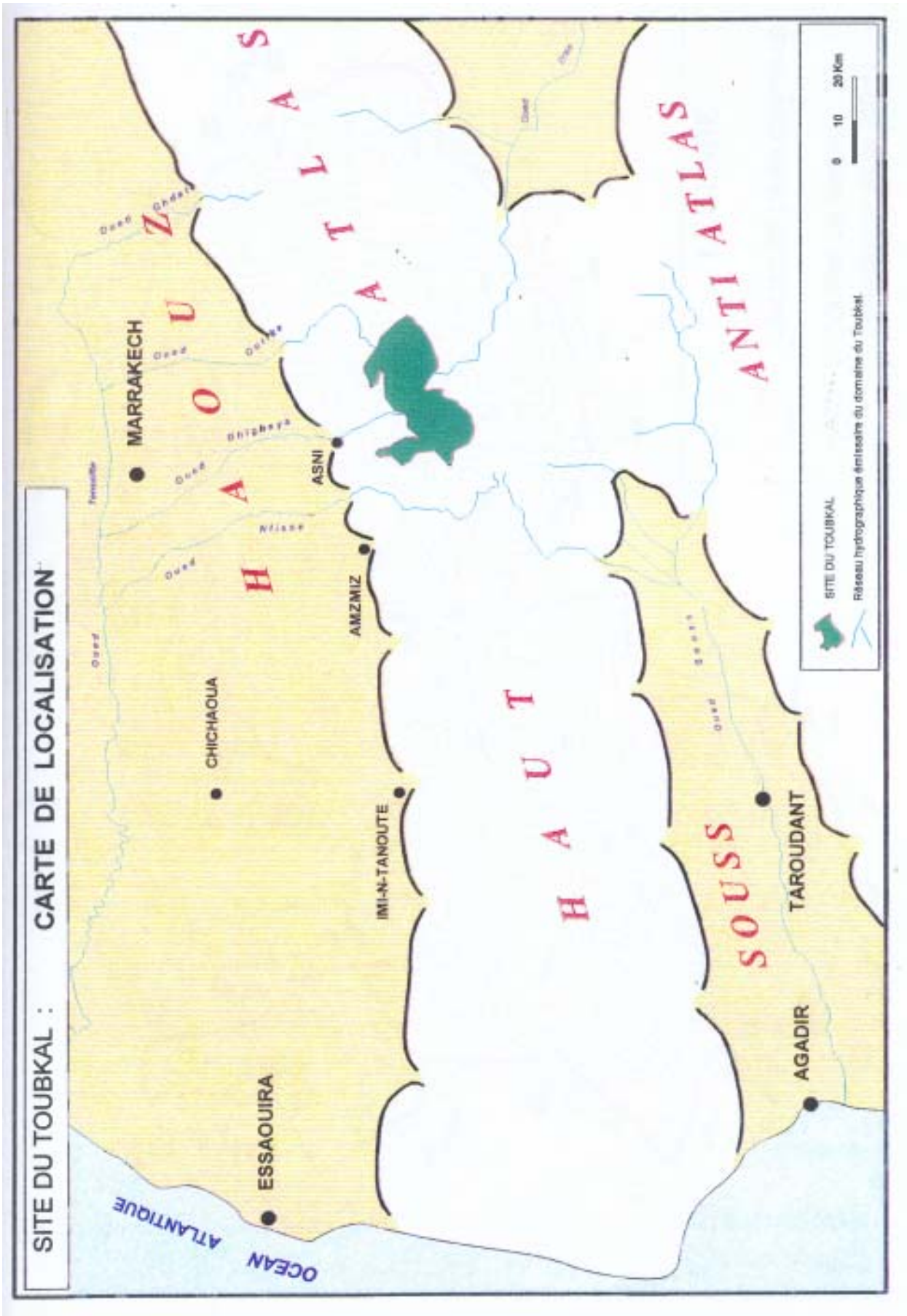
a) To provide effective legal protection for Toubkal National Park, and other protected areas in Morocco;

b) To reinforce Toubkal National Park's management capacity both in relation to human and financial resources;

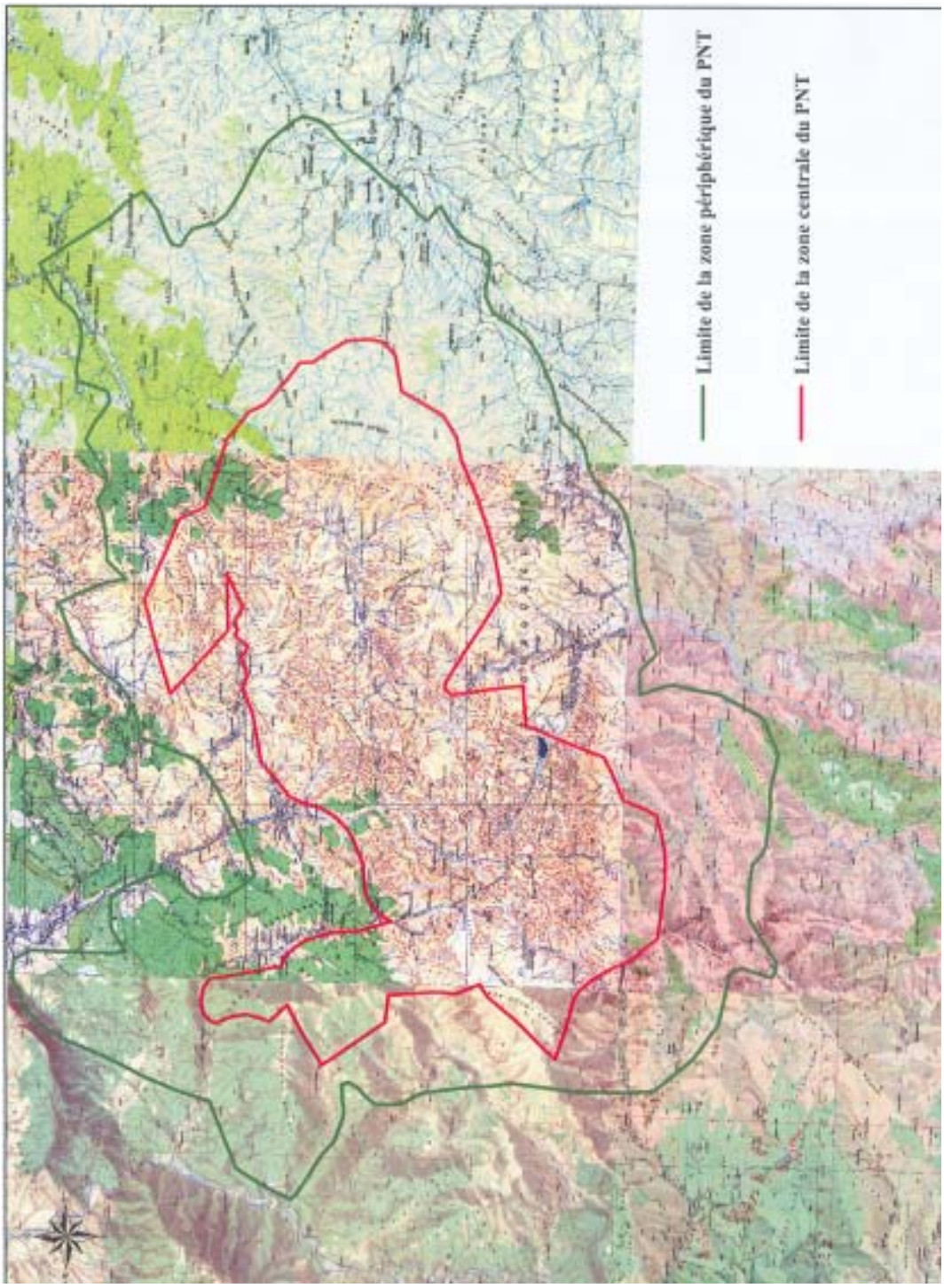
c) To implement suitable measures to bring the use of natural resources in Toubkal National Park and its buffer zone within sustainable limits; and

d) To consider the scope for including Toubkal National Park within the framework of other Biosphere Reserves existing in this region.

Map 1: Location of nominated property



Map 2: Boundaries of nominated property



ASIA / PACIFIC

SICHUAN GIANT PANDA SANCTUARY
WOLONG, MT. SIGUNIANG AND JIAJIN MOUNTAINS

CHINA

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

SICHUAN GIANT PANDA SANCTUARY – WOLONG, MT. SIGUNIANG AND JIAJIN MOUNTAINS (CHINA) - ID N° 1213

INTRODUCTORY NOTE: This is the third time the State Party (China) has nominated a natural World Heritage property for the protection of Giant Pandas. Parts of the currently nominated property have been included within the two previous nominations, specifically the Wolong National Nature Reserve (nominated in 1986 as the Wolong Giant Panda Reserve) and the Mt Qingcheng and Dujiangyan National Park (nominated in 2000 as part of the Mt Qingcheng and Dujiangyan Irrigation System). In both cases the World Heritage Committee noted the potential of the property to meet natural criteria but deferred the proposal to enable the State Party to bring forward a larger nomination and to address management issues.

1. DOCUMENTATION

i) **Date nomination received by IUCN:** April, 2005

ii) **Additional information requested from and provided by the State Party:** IUCN requested supplementary information on the 28 October, 2005 following the IUCN Evaluation Mission. The State Party response was received on 5 December, 2005, including revised boundaries and responses to all the issues raised by the IUCN mission. Additional information was requested from the State Party on 31 January, 2006 following the IUCN World Heritage Panel meeting in January 2006. A response to this request was received from the State Party on 23 March, 2006.

iii) **IUCN / WCMC Data Sheet:** five references

iv) **Additional Literature Consulted :** IUCN/WWF. 1995 **Centres of Plant Diversity**. Vol. 2; MacKinnon, J., Xie Y., Lysenko s., Chape S., May I., and Brown C. **GIS Assessment of the Status of Protected Areas in East Asia.** IUCN/UNEP-WCMC; Myers, N., Mittermeier, R.A., Mittermeier, C.G., Gustavo, A.B., Kent, J., 2000. Biodiversity hotspots for conservation priorities. **Nature**, 403, 853-8; Thorsell, J., and Hamilton, L., 2002. **A Global Overview of Mountain Protected Areas on the World Heritage List**. Working Paper 6. IUCN; Xie, Y., Wang S., and Schei, P. (Eds), (2004) **China's Protected Areas**. China Council for International Cooperation on Environment and Development; Mackinnon, J. et al 1996. **A Biodiversity Review of China**. WWF; Ministry of Construction (2002); China State Environmental Protection Administration (1998). **China's Biodiversity: A Country Study**, China Environmental Science Press, Beijing

v) **Consultations :** 15 external reviewers. Extensive consultations were undertaken in China during the field visit, including with representatives of relevant government agencies, local communities, researchers and other stakeholders.

vi) **Field visit :** David Sheppard and Bill Bleisch, September/October 2005.

vii) **Date of IUCN approval of this report:** 11 April, 2006

2. SUMMARY OF NATURAL VALUES

The nominated property, the Sichuan Giant Panda Sanctuary (SGPS), is located in the Qionglai and Jiajin Mountains between the Chengdu Plateau and the Qinghai-Tibetan Plateau. It fringes the Sichuan basin on the west and is located approximately 100 km from Chengdu City. SGPS includes seven nature reserves and nine scenic parks in four prefectures and covers an area of 924,500 ha, surrounded by a buffer zone of 527,100 ha. The high ranges of the Qionglai Mountains are predominantly Triassic siltstone, limestone and slate, while the western half of the Jiajin Mountains, their continuation to the south, are mainly Permo-carboniferous rock. On the east side of the mountains the land is heavily ridged, forested and deeply dissected by the valleys and gorges of perennial rivers falling from the glaciated snow-covered peaks and alpine meadows. The range of landforms within the nominated property contributes to its high scenic value. More than 20 special scenic areas have been identified within the property, each possessing its own unique features. These include steep forested valleys, scenic rivers, rocky crags, wide alpine meadows and the mountain peaks of Mt Siguniang.

Fauna: The nominated property protects the main habitat of the giant panda, which is recognized as a "National Treasure" of China and is a flagship for global

conservation efforts. The giant panda is listed as an endangered species under the IUCN Red List of Threatened Species and is inscribed as a Class 1 Protected Animal by the Chinese Government. This species is a relict species from the paleo-tropic forests of the Tertiary Era and has evolved into a unique specialized herbivore of the Order Carnivora. The giant panda feeds almost exclusively on bamboo in the wild and its preferred habitat is between 2,200m to 3,200m. As a unique single species and family the giant panda is highly significant in taxonomy and is very important for studying mammal classification and evolution. Within the nominated property the main centres of giant panda population are in the Wolong Reserve in Wenchuan county in the northeast; Fengtongzhai Reserve in Baoxing county in the southeast; and in Mt. Jiajin Provincial Park in the Jiajin Mountains to the southwest. The nominated property features a number of other endemic and threatened animal species. There are 542 species of vertebrates, including 109 species of mammals in 25 families (more than 20 % of all Chinese mammals). Globally endangered mammals, apart from the giant panda, are the red panda, the snow leopard and clouded leopard. The nominated property is an important centre of endemism for some bird taxa and features 365 birds in 45 families, 300 of which breed locally.

Flora: The total flora of the nominated property is between 5,000 and 6,000 species in over 1,000 genera. 50 genera are endemic to China (20% of its total) and 67 plant species are nationally protected. The reasons for this diversity include the wide range of different habitat types afforded by the large altitudinal range, sharp climatic gradation, the variety of rock and soil types and the wide and complex connections with other major floristic regions. Within the nominated property there are 794 angiosperm genera, (77% of China's total), 24 gymnosperm, 70 pteridophyte and 102 bryophyte genera. Many species are relicts, isolated during the extreme climatic fluctuations of the Pleistocene in the moisture trap created by the high plateau to the west. The nominated property has many representatives of plants with long evolutionary histories; species such as the dove tree are often referred to as living fossils. It is probable that there are many species yet to be discovered. The nominated property is a significant global diversity centre for many plant groups such as roses, peonies, magnolias, maples, primroses, bamboos and rhododendrons. More than 100 species of rhododendron are listed for the area. Of the property's 22 orchid species, nearly 40% are endemic. Many western ornamental garden plants were discovered in these mountains. The property is a major source and gene pool for hundreds of traditional medicinal plants, many now rare and endangered.

3. COMPARISON WITH OTHER AREAS

Comparison for giant panda conservation: There is particular emphasis on the importance of the property as habitat for the giant panda. The giant panda occurs only in China in a very narrow belt within Western Sichuan, south western Gansu and southern Shaanxi. It is estimated that the nominated property includes approximately 500 giant pandas representing more than 30% of the global population (1,600 Pandas). Giant pandas are conserved in nearly 40 other nature reserves in China, including the nature reserves in Minshan Mountains, Qinling Mountains, Liangshan Mountains and Xiangling Mountains. However, the nominated property constitutes the largest and most significant remaining contiguous area of panda habitat in China and thus the world. It is also the most important source of giant panda for establishing the captive breeding population of the species. The presence of giant pandas within the nominated property and in other nature reserves in China underlines the importance of effective landscape level planning which protects the habitat within these reserves, and the areas between them, to ensure the long term survival of the giant panda.

Worldwide comparison with similar World Heritage properties: The nominated property features significant altitudinal zonation, with an altitudinal range of 5,670m, from the subtropical, through temperate to alpine zones. A comparable altitudinal zonation exists in the Three Parallel Rivers World Heritage property in Yunnan, China (5,980m), which also rises from the subtropical to the alpine, and in Kinabalu Park in Malaysia (3,943m). Figure 1 compares flora, bird and mammal species of the nominated property with other comparable World Heritage properties worldwide, (including Kilimanjaro with a range of 4,065m and the temperate site of Yosemite).

The nominated property compares favourably with other comparable World Heritage property. The concentration of diversity on Kinabalu, a property of three-quarters the area, is similar, but its iconic mammal, the orang-utan, is more widely dispersed in Malaysia and Indonesia than the panda is in central China. The nominated property is one of the botanically richest sites of any temperate region in the world or indeed anywhere outside of the tropical rain forests. It is important for bird conservation and two Endemic Bird Areas (as defined by Birdlife International) occur within the nominated property. This significance is reinforced by its classification as one of the world's top 25 Biodiversity Hotspots selected by Conservation International (CI) (Myers et al, 2000) and as one of the Global 200 Ecoregions defined by WWF. Underlining the comparative importance is the large size of the nominated property and the fact that it protects a wide variety of topography, geology, and plant and animal species.

Comparison with other World Heritage properties in China: Four other Chinese World Heritage properties have been inscribed under natural criterion (iv): Mount Emei Scenic Area, Mount Huangshan, Mount Wuyi and the Three Parallel Rivers of Yunnan. Comparative biodiversity data are summarized in the Figure 2 below.

The nominated property has significantly higher biodiversity values and global significance than all other Chinese World Heritage properties except the Three Parallel Rivers of Yunnan property, which is much larger. In addition, the nominated property has some features in common with Jiuzhaigou (72,000 ha) and Huanglong (70,000 ha), both within the Minshan in northern Sichuan. These properties are primarily listed for their scenic beauty and geochemical phenomenon, especially their travertine terraces and pools. They are high altitude

Figure 1. Comparison of nominated property to other comparable World Heritage properties worldwide

World Heritage property	Size (ha)	Plant species	Mammal species	Bird species
Yellowstone (USA)	899,200	1,050	58	290
Yosemite N.P. (USA)	308,200	> 1,400	74	230
Olympic N.P. (USA)	369,600	500	50	180
Great Smoky Mountains N.P. (USA)	209,000	1,500	> 50	> 200
Sagarmatha N.P. (Nepal)	233,000	c. 2000	28	152
Kinabalu Park (Malaysia)	75,300	5,000-6,000	112	326
Kilimanjaro N.P (Tanzania)	18,300	2,500	140	179
Nominated Property	924,500	> 4,000	132	> 365

Figure 2. Comparison of nominated property to other comparable World Heritage properties in China

World Heritage property	Size (ha)	Plant species	Mammal species	Bird species
Mount Emei Scenic Area	15,400	3,200	51	256
Mount Huangshan	15,400	c.800	48	170
Mount Wuyi	99,975	2,888	71	256
Three Parallel Rivers	1,680,000	6,000	173	417
Nominated Property	924,500	> 4,000	132	> 365

properties and do not have the altitudinal range, topographical complexity and biodiversity of the nominated property.

4. INTEGRITY

4.1 Legal Status

The nominated property is covered by a range of laws and regulations at national and provincial levels. These include the “Regulations of the People’s Republic of China on Nature Reserves” and “Regulations on the Management of Nature Reserves of Sichuan Province”. A specific regulation relating to protection of World Heritage in Sichuan Province has been developed, to apply to the nominated property, and this represents the first of its kind in China. These regulations provide an adequate legal framework for protection of the nominated property. The challenge is to ensure their effective implementation and to ensure there is effective coordination between all relevant agencies and stakeholders.

4.2 Boundaries

The boundaries of the nominated property have been designed to maximise the protection of panda habitat based on the latest panda survey data, carried out in 2003-2004, as well as the distribution of existing natural habitat. The original boundary of the nominated property included towns, agricultural development and a number of infrastructure developments. The issue of boundaries was discussed in detail by the IUCN evaluation mission in October 2005, and IUCN requested the boundaries of the nominated property be revised to address a number of key issues. An amended boundary was submitted by the State Party in December 2005 to respond to these points. The key features of the new boundary are that it has been revised to:

(a) Allow a clearer and simpler zonation: The boundary of the nomination has been revised to delineate the strictly protected core zone and a surrounding buffer zone in which agriculture and some other human activities are allowed. Only the core area constitutes the nominated property.

(b) Exclude towns, villages, agriculture land, major infrastructures and sites of high impact tourism: The townships of Wolong (Shawan) and Gengde within the Wolong Nature Reserve are now excluded from the nominated property. All other townships are located outside the boundary of the nominated property. The old Tibetan town of Yaoji lies in the centre of the nominated area. The town has extensive agricultural farmland and it is proposed to build a dam and establish a 400 ha reservoir at this site. This site is therefore not suitable for inclusion within the World Heritage property and is excluded as an enclave. This is discussed further under point 4.4 below. The earlier proposed boundary has been

adjusted at several other peripheral valleys where agricultural lands need to be excluded from the World Heritage property. An exception is made for the valley of Dengchigou. Although this valley is largely agricultural and houses a number of farmers, it constitutes a very important scientific type locality collecting site. The marble mines of Guobaiyan (Baiyunshan and Hongjunzhandao) are excluded as enclaves from the nominated property. Other small scattered mines and factories within the nominated property will be closed, infrastructure removed and the areas rehabilitated. Other minor infrastructure exists within the nominated property, including roads, bridges, trails, scattered farms and water pipes and electricity pylons. Approval of this nomination would give the management agencies greater authority to control and, where necessary, eliminate their impacts and allow habitat restoration. The total of such partially disturbed areas remains less than 5% of the area of the nominated property. The long term objective should be to relocate or remove infrastructure which is not essential for on going management of the property.

(c) Coincide with existing reserve boundaries, particularly core zones: The nominated property corresponds with the boundaries of a number of existing protected areas, apart from a few areas of state forest lands that will be added for reasons of size and completeness. A process should be initiated to complete the boundary rationalization, including the addition of areas of state forest and other areas, to ensure that all areas within the nominated property have the highest level of protective status. This should be completed within a period of two years.

(d) Include the most important habitats for conservation, particularly for panda conservation: The boundaries of the nominated property have been designed to maximise the protection of giant panda habitat based on the latest panda survey data, carried out in 2003-4, as well as the distribution of existing natural habitat. Conservation International (CI) has undertaken a GIS overlay exercise to identify areas of high biodiversity priority and two very detailed surveys of giant pandas (survey 2: 1986-8 and survey 3: 1998-2002) give precise locations of the extent of giant panda occupation. The data points from both these surveys have been overlaid over the boundary maps and satellite background to show the contiguity and degree of inclusion achieved. Minor boundary revisions have marginally improved this cover and opened up future potential for eventually relinking the Qionglai panda populations with other populations in Minshan (across the Min River in Dujiangyan sector) and with populations in south east Tianquan; as well as to narrow the gap at Baoxing township where occasionally pandas may cross the Baoxing river. Accordingly, the revised boundary now constitutes the most important portion of remaining giant panda habitats out of the mountain systems still containing wild pandas. It has the largest connected area of occupied giant panda habitat in Sichuan, the largest area of suitable “potential” habitat for giant panda and is less fragmented than other mountain ranges in Sichuan.

4.3 Management

General Government agencies at different levels in China have shown great enthusiasm and commitment to safeguard the biodiversity values of the nominated property. It is important that this enthusiasm is matched with a commitment to ensure the nominated property is adequately staffed and resourced. The level of management between the different components of the nominated property varies considerably at present, with the highest level of management at the Wolong Nature Reserve and with lower levels of management in the other reserves within the nominated property.

Management Plan A management plan has been prepared for the nominated property and has the following goal: “*The biodiversity, ecosystem and habitat of the giant panda will be effectively protected in the world heritage site and social and economic development of the human population in the area will be harmonized with the natural environment guidelines for the area and for management of different types of use”.* The management plan identifies a number of management objectives and a zoning plan which flow from this goal. There is a general aim of maintaining a higher standard of protection within the core zone, and also to avoid further habitat fragmentation and loss of connectivity, particularly between centers of current giant panda distribution. The management plan is a comprehensive document and provides a sound framework for site management. However, management arrangements within the nominated property are complex, including seven nature reserves and nine scenic parks in four prefectures and a range of different prefectural, provincial and national government management agencies. Effective coordination, as well as the clarification of responsibilities of the different agencies involved, will be essential if the management plan is to be effectively implemented.

World Heritage Management Committee (WHMC) The management plan establishes a mechanism to achieve coordination, through the establishment of a World Heritage Management Committee formed under the Provincial Government. With this arrangement a management office has been established under the Department of Construction with executive responsibility for management of World Heritage properties. The WHMC will play a particularly significant role in relation to: building consensus among individual agencies; developing and coordinating new management programmes; and monitoring the effectiveness of conservation efforts. It is essential that the WHMC be given sufficient powers and has real authority and financial resources to ensure it can carry out its role effectively. Direct involvement of national government in World Heritage management and in the Committee is essential in providing authority and coordination to strengthen site management. In particular, the central Ministry of Construction Office should play a strong role. The WHMC must be involved in the review and approval of major development proposals which may impact on the natural values of the nominated property. In addition, any subsequent revision of the management plan and associated site development plans within the nominated property should be approved by the WHMC.

Staffing and training: There are currently more than 500 conservation staff working within the nominated property, including more than 40 senior professional staff. The majority of these staff work in the Wolong Nature Reserve. It is important that the level of staffing is progressively increased within all reserves within the nominated property, with the aim of ensuring the level of staffing and management is equivalent to that within the Wolong Nature Reserve within a ten year period. Training should be based on a training needs assessment, and should be coordinated through the Sichuan World Heritage Administration Office. It should include aspects such as training in basic protected areas skills, such as monitoring and the application of GIS methods, as well as the development of study tours and training workshops to other relevant natural World Heritage properties to broaden the experience of local staff.

Budget: The funding for protected area management within the nominated property from 1963 to 2000 was RMB 320,000,000 (USD 38,325,000 at 2000 rates). This funding is provided from the national government, the Sichuan Provincial government, and from relevant prefectural and county governments. In addition there has been substantial donor investment, particularly within the Wolong Nature Reserve. From 2003 to 2010 the projected budget is RMB 1,956,000,000 (about USD 233,500,000). This increased funding proposed appears to be adequate but this should be regularly reviewed. It is important that: (a) funding is allocated in line with the provisions of the management plan for the property; (b) that current levels of government funding, at all levels, are increased; and (c) that planning and implementation of the budget for the nominated property is overseen by the WHMC.

4.4 Threats

Dam Construction at Yaoji: The town of Yaoji is located in a valley in the middle of Baoxing county just south of Wolong, thus placing it within the geographic centre of the nominated property. Yaoji has been a Tibetan town for hundreds of years and agricultural development around the town is of long standing. Giant pandas have retreated to higher elevations where there are wide habitat connections on both the north-west and south-east sides of the valley. This area has limited natural values and has been excluded from the nominated property as an enclave. It is noted that the World Heritage Committee has previously approved the inscription of enclaves within natural World Heritage properties, such as is in relation to the Kakadu National Park in Australia. Plans are well advanced to build a hydroelectric dam at Yaoji and to establish a 400 ha reservoir at this site. The town of Yaoji is adjacent to the proposed dam site and the State Party provided the following advice on the dam at Yaoji in December, 2005 and in March 2006: (a) dam construction and associated flooding will displace approximately 2,000 people who will be resettled within the boundary of the enclave, within existing farmland and degraded secondary forest/scrub land; a re-settlement plan has been developed and is being implemented; (b) the dam impoundment, when it is full at a height of 2,140m, is entirely within the boundary of the enclave and does not encroach on the nominated property; (c) water from the dam will be channeled along 18 km of low bore (3-4 meters diameter) underground pipes which will be tunneled several hundred meters deep through the mountains and will not affect the surface vegetation or panda habitat above; (d) The State Environmental Protection Authority will undertake hydrological monitoring of the river; and (e) there is no panda habitat loss involved in the construction of this dam.

It appears that dam construction will not have a major impact on the nominated property, in view of the fact that impacts are concentrated within the existing enclave. There may be potential for indirect impact on the nominated property but this cannot be ascertained at this stage. Should the property be inscribed on the World Heritage List, it is critical that: (a) the impact of the dam and the associated relocation of people from Yaoji, on the values of the property be closely monitored; (b) effective mitigation measures are applied to minimize the impacts associated with dam construction, the impoundment and the relocation of the village; where possible measures to encourage the establishment of panda habitat should be implemented; and (c) impacts and mitigation measures be assessed two years after inscription.

Ecotourism and the Wolong Tourism Development Plan: There is considerable potential for the growth of tourism within and adjacent to the nominated property. For example, it is reported that the tourist growth to the nominated property exceeded 48% (from 430,000 to 640,000) over the last three year period. Tourism can have both positive and negative impacts and it is essential that it is carefully planned and sympathetic to the values of the property. There are a number of proposals to develop tourism within and adjacent to the nominated property. The nomination document notes that 12 scenic resources are ‘to be developed’ within the nominated property and there are currently major tourism proposals, within the Wolong Valley, concentrated in two towns, Wolong (Shawan) and Gengda, through the development and implementation of the Wolong Tourism Development Plan. This Plan includes proposals for major development, including expansion of accommodation, up to a limit of 7,300 beds. The appropriateness of some of the proposed developments has been questioned such as proposals to build a cable car in Panda Valley. The following principles should apply to the development of tourism within the property: (a) all major tourism development and associated infrastructure should be outside the nominated property, and should be located either within the buffer zone or adjacent areas; (b) clear limits should be established on tourism development, specifically accommodation, within and adjacent to the nominated property; (c) carrying capacity limits should be defined for sensitive natural areas within and adjacent to the property; and (d) the focus on tourism development within and adjacent to the nominated property should be to encourage appreciation and understanding of the natural values of the property, particularly the important role of the property in panda conservation; and (e) any income deriving from tourism in and adjacent to the nominated property should benefit conservation efforts within the property. In relation to the Wolong Tourism Development Plan it is considered that an independent expert review should be undertaken of the existing plan, under the direction of the World Heritage Management

Office, to assess the impacts of the proposals on values within the nominated property and to recommend modifications that may be required.

Road Construction - Yingxiu – Xiaojin road: There is currently a proposal to upgrade the county road that now crosses from Yingxiu through Wolong Nature Reserve, across Balangshan Pass and down to Xiaojin. Upgrading will involve widening parts of the road and also developing a 10 km tunnel at the Balangshan Pass. Alternative routes are currently under consideration for this tunnel. This road is currently located within the buffer zone and within part of the nominated property. The development of a tunnel at Balangshan Pass will reduce traffic flow across the pass and would thus reduce noise pollution and disturbance to alpine fauna, flora and environment. An environmental impact study has been undertaken and a number of mitigation measures proposed. It is not anticipated that there would be major adverse impact on the values of the nominated property from this upgrading. However, there may be potential for increased traffic flow within the Wolong Valley and this should be carefully monitored by the World Heritage Management Office.

5. ADDITIONAL COMMENTS

5.1 Scientific Research and Education

The nominated property is very important for research and education. Substantial research programmes have been implemented within parts of the nominated property, particularly within the Wolong Nature Reserve, for many years. A number of national panda surveys have been conducted and these have progressively improved the state of knowledge regarding panda distribution and ecology. Assistance from international NGOs, including WWF and CI has been very important in assisting research and monitoring programmes within the nominated property. The successful Wolong Panda Breeding Centre at Hetaoping was set up in 1983 and is the world's largest and most successful captive breeding centre for giant panda. It has provided a major focus for research efforts, as well as being a major source for pandas sent to many domestic and international zoos. The nominated property has thus made an important contribution to scientific research, public education and international cooperation. This should continue. It is important that field research be continued and expanded throughout all of the nominated property. A clear research programme should be developed for the property. All applications for conducting research must be submitted to the responsible management agency concerned, but must also be communicated with and coordinated by the Sichuan World Heritage Administration Office.

5.2 Landscape Level Planning

Fragmentation of habitat makes it essential that large intact areas of panda habitat are adequately protected and also that green corridors are established to enable movement of panda species and to avoid inbreeding of panda populations. Accordingly, it is very important to ensure habitat connectivity between the nominated property and surrounding areas where pandas are located. Special attention should be placed on maintaining connectivity across vulnerable bottlenecks or corridors in the distribution of giant pandas. The location and design of corridors should be based on the best information, particularly that available from satellite images and field surveys, especially the third national panda survey and ongoing monitoring by staff within the nominated property. Where corridors have been encroached by logging or agricultural activities, an active programme of habitat restoration should be applied involving planting of relevant native species, particularly those which improve panda habitat.

5.3 Cultural Values

The nominated property appears to have important cultural values. Records of the giant panda date back 2,500 years, and a Han emperor once set up a panda breeding house. The temples of Mount Qingcheng where Taoism is believed to have been founded, and the 2,200-year old Dujiangyan irrigation system to the north of the nominated property, were inscribed on the World Heritage List for cultural values in 2000. Mount Siguniang, within the nominated property, is considered to be a sacred mountain by Tibetans. To the south in Baoxing are early Han buildings and the 19th century Franco-Qing mission station at Dengchigou, where Père David, the French missionary who first described the panda, was based. It is important that cultural values within the nominated property are identified and appropriately protected.

5.4 Local Populations

Following the revision of the boundaries, all county towns are located outside the nominated property; 41 townships seats are located within the buffer zone. Local communities have shown a strong interest in panda conservation and their involvement in supporting the management of the nominated property should be encouraged. There have been a number of direct and indirect impacts on local communities in and around the property in recent years. These include: (a) the closure of a number of development projects, including 176 mines and polluting factories; (b) the suspension of a number of small to medium hydropower projects inside the nominated property and the buffer zone; (c) and a logging ban associated with the Natural Forest Protection Programme and the "grain to green" habitat restoration programme. These are positive initiatives which should be supported but it is important that local communities are not unfairly deprived of opportunities for satisfactory livelihoods. Local people should be allowed and assisted to derive benefits from appropriate tourism associated with the property. They should also be informed and involved, where possible, in management of the property.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Sichuan Giant Panda Sanctuary has been nominated under all four natural criteria. Previous IUCN evaluations of giant panda nominations in China have noted the potential to meet natural World Heritage criteria.

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

The high ranges of the Qionglai Mountains are predominantly Triassic siltstone, limestone and slate, and the western half of the Jiajin Mountains are mainly Permo-carboniferous rock. The property has evidence of glacial and tectonic activity and has features a diverse range of rocks of different ages and types. There are a number of glaciers, and a high region of U-shaped valleys, horns, cirques and arêtes. The property provides good examples not only of glaciation (past and present) but also of fluvial incision under relatively pristine sub tropical conditions. There is the prospect for future geomorphological research on the processes operating in a dynamic range of biomes, including landslides, debris flows, flood events and seismic effects. These characteristics are of interest but are not of outstanding value. The key features of the property are not uncommon in other areas of the world and they are also represented within other World Heritage properties. IUCN considers that the nominated property does not meet this criterion.

Criterion (ii): Ecological Processes

The nominated property protects a range of natural systems, reflecting the high level of altitudinal zonation. Many elements of the flora and fauna 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 Himalayan/ Qingzang Plateau. Accordingly, the property plays a key role in understanding the evolution of the flora and fauna of Central and South West China. However, the diversity of natural systems is better represented within other mountain / forest sites in China, particularly the Three Parallel Rivers of Yunnan Protected Areas, where the dramatic expression of ecological processes has resulted in a far more dramatic mix of geological, climatic and topographical effects. The range of natural systems is also better expressed in a range of World Heritage properties outside of China. IUCN considers that the nominated property does not meet this criterion.

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

The property has important scenic value, reflecting the range of landforms and features within the nominated property which contribute to its high scenic value. A number of scenic areas have been identified within the property, including representation of steep forested valleys, scenic rivers, wide alpine meadows and mountain peaks. The scenery of Mt Siguniang itself is dramatic. However, IUCN concludes that the scenic values within the property are better displayed within many other World Heritage properties. Mountain scenery, for example is better represented within properties such as Sagarmatha National Park, Nepal. IUCN considers that the nominated property does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

There is a strong and compelling case for inscription of the nominated property under this criterion. The property includes more than 30% of the world's population of giant panda and constitutes the largest and most significant remaining contiguous area of panda habitat in the world. It is also the most important source of giant panda for establishing the captive breeding population of the species. The nominated property is also one of the botanically richest sites of any temperate region in the world or indeed anywhere outside of the tropical rain forests. This significance is reinforced by its classification as one of the world's top 25 Biodiversity Hotspots selected by Conservation International and the Global 200 Ecoregions defined by WWF. Underlining the outstanding value is the large size of the nominated property and the fact that it protects a wide variety of topography, geology, and plant and animal species. The nominated property has exceptional value for biodiversity conservation and can demonstrate how ecosystem management systems can work across the borders of national and provincial protected areas. IUCN considers that the nominated property meets this criterion.

7. RECOMMENDATION

IUCN recommends that the Committee **inscribe** the Sichuan Giant Panda Sanctuary: Wolong, Mt Siguniang and Jiajin Mountains (China) on the World Heritage List on the basis of natural criterion (iv).

IUCN also recommends that the State Party be requested to:

a) ensure the "Sichuan World Heritage Management Committee" has sufficient powers, resources and authority to ensure it can effectively carry out its role in relation to management of the property, including in relation to the review and approval of any major development proposals which may impact on the natural values of the nominated property;

b) review existing infrastructure within the property with a view to better controlling impacts and, where possible, removing infrastructure and allowing habitat restoration with native species;

c) review the possibilities for future addition of areas of high nature conservation value to the property, with priority to those areas which are particularly important for panda habitat and which are close to, but outside, the property. Options for developing conservation corridors linking the property with other suitable areas of panda habitat should also be reviewed;

d) progressively increase the level of staffing and resources within all reserves within the property, with the aim of ensuring that the level of staffing and management in all areas of the property is equivalent

to that within the Wolong Nature Reserve within a ten year period;

e) in relation to the existing and proposed dams, ensure that: (a) the impact of the dam at Yaoji, and the associated relocation of people, on the values of the property be closely monitored; (b) effective mitigation measures are applied at Yaoji to minimize the impacts associated with dam construction, the impoundment and the relocation of the village; with priority to implementing measures to encourage the establishment of panda habitat; and (c) no additional dams are built within the property;

f) in relation to the Wolong Tourism Development Plan, undertake an independent expert review of the existing plan, under the direction of the World Heritage Management Office, to assess the impacts of the proposals on values within the nominated property and to recommend modifications that may be required. The World Heritage Office should also play a role in establishing tourism development guidelines, review of proposals and development of recommendations for mitigation of impacts for any major tourism development which may affect the values of the property;

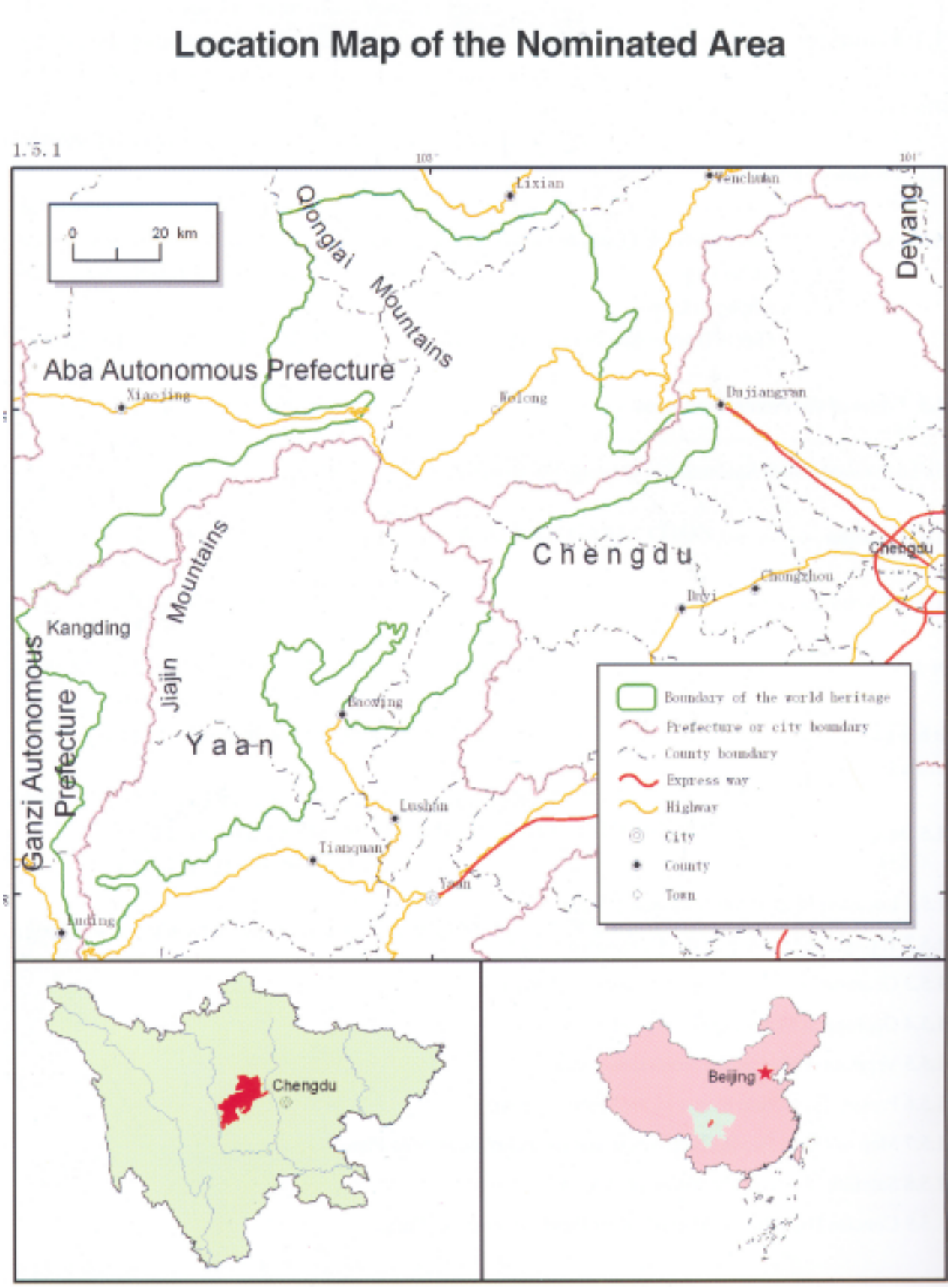
g) address other management issues included in this evaluation report, including in relation to local populations, scientific research and education; and

h) consider changing the name of the nominated property to “The Sichuan Giant Panda Sanctuaries” from the currently proposed name of: “The Sichuan Giant Panda Sanctuary: Wolong, Mt Siguniang and Jiajin Mountains”

IUCN recommends that Committee encourage the State Party to invite a mission to the property in 3 years to assess the implementation of the above recommendations and other recommendations outlined in the IUCN Evaluation Report.

Finally, IUCN commends the State Party for the process of consultation and scientific research involved in the preparation of the nomination dossier for this property, and for effectively addressing IUCN recommendations to enhance the conservation and management of the property.

Map 1: Location of nominated property



Map 2: Boundaries of nominated property

ASIA / PACIFIC

TRANSBORDER RAINFOREST HERITAGE OF BORNEO

INDONESIA & MALAYSIA

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

TRANSBORDER RAINFOREST HERITAGE OF BORNEO

(INDONESIA AND MALAYSIA) – ID N° 1197

1. DOCUMENTATION

i) **Date nomination received by IUCN:** April 2005.

ii) **Additional information requested from and provided by the State Party:** IUCN requested supplementary information on 31 January 2006, after the first IUCN WH Panel meeting. Responses were received from the States Parties of Indonesia (24 March 2006) and Malaysia (27 March 2006), including supplementary information on transboundary management arrangements.

iii) **IUCN/WCMC Data Sheet:** 6 references.

iv) **Additional Literature Consulted:** Kuswanda. M., Chai. P.P.K, Nengah Surati Jaya. I. (Eds) (1999) **The 1997 Borneo Biodiversity Expedition to the Trans-boundary Biodiversity Conservation Area of Betung-Kerihun National Park and Lanjak-Entimau Wildlife Sanctuary**. ITTO, WWF Indonesia, PHKA; **Management Plan Betung Kerihun National Park, West Kalimantan 2000-2024: Executive Summary.** WWF, 2004. **Treasure Island at Risk – Status of Forest, Wildlife and related threats.** WWF, 2004. **Borneo's Lost World. Newly discovered species of Borneo.** WWF, 2005. **Proceedings of Workshop "Heart of Borneo: Three Counties, One Conservation Vision"**. EU and Indonesian Ministry of Forestry, 2004. **Penanganan Kasus Illegal Logging di Taman Nasional Betung Kerihun.**

v) **Consultations:** Five external reviewers. Representatiives of Sarawak Forestry Department, Sarawak Forestry Corporation, Malaysian National Commission for UNESCO, Malaysian Ministry of Culture, Arts and Heritage, Indonesian Directorate General of Forest Protection and Nature Conservation, Kapuas Hulu District local government and WWF Indonesia.

vi) **Field visit:** Geoff Vincent, December 2005.

vii) **Date of IUCN approval of this report:** 11 April 2006

2. SUMMARY OF NATURAL VALUES

The nominated transboundary property, the Transborder Rainforest Heritage of Borneo (TRHB), is composed of three contiguous protected areas, two in Sarawak, Malaysia and one in West Kalimantan, Indonesia. Lanjak Entimau Wildlife Sanctuary (LEWS) in Malaysia is an IUCN Category IV area (Habitat/Species Management Area) although it is managed more like a Category Ia protected area (Strict Nature Reserve) because "human manipulation for optimum management" (as required under the IUCN Category IV definition) is at present minimal or absent. Batang Ai National Park (BANP) in Malaysia and Betung Kerihun National Park (BKNP) in Indonesia are Category II areas (National Parks). The property is located on the northern border of West Kalimantan Province and in adjoining southern Sarawak, in the Kapuas Hulu mountains. The nominated property is characterized by a humid wet tropical climate, receiving between 2800 mm and 5500 mm of rainfall annually with relative humidity between 30% and 100% and diurnal temperatures between 21°C and 27°C.

BKNP, the largest site (approx. 800,000 ha), occupies the headwaters of the Kapuas River in the local government district of Kapuas Hulu, north of its major town, Putussibau. LEWS (219,000 ha) and BANP (32,000 ha) lie 230 km and 250 km respectively due east of Kuching. The total area of the nominated property is about 1,050,000 ha excluding buffer zones.

The property is composed of rainforest-covered mountains ranging in altitude from 60 m (in LEWS) to 1960m (in BKNP). The three sites are in the western Boven Kapuas Mountains in Sarawak and on the south side of the Kapuas Hulu Mountains in West Kalimantan.

LEWS in Sarawak comprises most of the rugged hilly watersheds of the Rajang River in the north and the Lupar River in the south. The bedrock is composed of shales and calcareous sandstone. This is strongly dissected in the south where the tributaries run in deeply eroded valleys of shale. The tributaries draining to the north are broad. The land rises from 60m in river flood plains to 1285m in Bukit Lanjak. Most of the Sanctuary is covered by skeletal soils. The watersheds receive a mean annual rainfall of 3,500mm, with a very small percentage infiltrating into the soil thus generating flash

Table 1. Extent of the nominated transboundary property

Nominated property	State Party	Province	Area (ha)
Lanjak Entimau Wildlife Sanctuary (LEWS)	Malaysia	Sarawak	219,000
Batang Ai National Park (BANP)	Malaysia	Sarawak	32,000
Betung Kerihun National Park (BKNP)	Indonesia	West Kalimantan	800,000
TOTAL			**1,051,00**

floods that can rise to 6 meters in two hours. LEWS contains eight distinct forest types which are home to 2,807 species of vascular plants comprising 65% of tree species. There are 53 species of mammals including, in the southern part of the Santuary, the highest density of orangutans reported for Borneo with 1.73 individuals per km². There is a rich diversity of birds with 241 species recorded in the Sanctuary, representing 40% of all the birds species reported for Borneo. It also includes a rich herpetofauna with 51 amphibians, 12 lizards and 13 snakes. The Sanctuary's river sytem supports a rich aquatic fauna consisiting of 82 species of freshwater fishes. A total of 62 species of animals are threatened according to the IUCN Red List (IUCN, 2000).

BANP covers the small Batang Ai catchment which drains to a hydro-electric dam. Forest covers the terrain which rises steeply from 100m to 975m on Bukit Ensanga. Almost the whole area of the national park is covered by four different types of forest; although a large proportion is secondary forest more than 30 years old that have grown in areas used for agriculture until the early 1960s. BANP contains 19 species of mammals, 121 species of bids and 63 species of freshwater fishes.

BKNP in West Kalimantan stretches about 350 km along the southern side of the Kapuas Hulu Mountains and the western slopes of the Muller Mountains. Its terrain is hilly to mountainous rising from 150m to 1960m on Mt. Kerihun, the highest of the 179 peaks in the park. The bedrock of the Kapuas range is composed of much-folded crystalline schists, with slate, sandstones and limestone. The Park's hundreds of streams and rivers are the headwaters of the great westward flowing Kapuas River. Its main tributaries in the Park are between 50 km and 100 km long. They are, from west to east, the Embaloh, Sibau-Menjakan, Mendalam, Hulu Kapuas/ Koheng and Bungan rivers. The soil types are varied; podzolic yellow-red soils with latosols predominate, with alluvial and decomposed glei and organosols in low-lying areas. BKNP is influenced by high rainfall that can reach over 5,500mm/year. The vegetation is characterized by 8 forest types that harbor 1,254 species of flora with a relatively high diversity of orchids comprising 97 species. It also contains 54 species of mammals, 300 species of birds, 59 amphibians, 53 reptiles and 186 species of fresh-water fishes. The wildlife protected by BKNP includes 81 threatened species of fauna according to the IUCN Red List (IUCN, 2000)

The nominated property as a whole includes ten patches of relatively undisturbed tropical rainforest ecosystems. In the three protected areas, 2,807 plant species have been identified. 145 plants were listed as globally threatened in the 2000 IUCN Red List of Threatened Species. Of these 49 species are critically endangered, 29 endangered and 42 vulnerable. Current records for the whole nominated property's wildlife include 73 species of mammals, 300 species of birds, 218 species of fishes, and over 1,000 species of insects. The property is the last remaining natural habitat of a population of up to 4,000 endangered Bornean orangutan, which are concentrated towards the western end of the property, straddling the international border. The bay cat, once thought to be extinct, also occurs. The property provides habitat for 75 Bornean endemic species: 3 mammals, 26 amphibians, 6 reptiles, 2 tortoises, 25 birds and 13 fish. Discoveries of plants and animals, either new to the area or new to science, are frequent.

3. COMPARISONS WITH OTHER AREAS

The nominated transboundary property has been nominated on the basis of natural criteria (i), (ii) and (iv) (according to paragraph 44(a) of the Operational Guidelines (OG, 2002)).

In relation to **criterion (i)**, the nomination document argues that the property meets this criterion based on its importance in representing several geological ages from Paleozoic to the beginning of the Oligocene. However, neither the statement of significance, nor the comparative analysis within the nomination outlines its geological and paleonthological values, and the justification under natural criterion (i) provides only a description of the geology of the nominated property. Due to the tropical vegetation of the area, the levels of geological exposures are very low, and scope for in-depth study is limited. Geological values for the periods represented by the geology reported from the nominated property are well represented by a number of spectacular geological WH properties, such as Dinosaur Provincial Park (Canada), Dorset/East Devon (U.K.), Ischigualasto-Talampaya (Argentina) and Monte San Giorgio (Switzerland). No specific features of international geological or paleonthological significance have been noted in the nominated property.

The nomination document makes a case for criteria (ii) and (iv) on the basis of the diversity of ecosystems and species existing in TBRH. However, the rainforest

covering the mountains of this property have a flora and fauna comparable in richness with those of other tropical rainforest WH properties located in Malaysia and Indonesia, as shown in Table 2 below.

As noted in Table 2 there are five similar and complementary WH properties in Indonesia and Malaysia; all are forested, with great diversity of flora and fauna, and rise from low lands to mountain peaks.

In relation to **criterion (ii)** Gunung Mulu and Kinabalu, both in Borneo, cover a much higher variety of ecosystems and, in the case of Gunung Mulu, it contains 17 floristic regions. Lorentz National Park and the Tropical Rainforest Heritage of Sumatra in Indonesia also cover a high variety of ecosystems and, in the case of Sumatra, which is double the size of the nominated property, it also includes an active volcano. In addition Ujong Kulon (Indonesia) covers important lowland forest ecosystems as well as rich coral reefs formations. All these properties are closely related but each is characteristic of a different island of the archipelago; Gunung Mulu being the most similar to the nominated property.

In relation to **criterion (iv),** the nominated property, when compared to the other five existing WH properties in Malaysia and Indonesia, has proportionately fewer recorded species of plants, mammals and reptiles. However the nominated property contains more species of fish and considerably higher number of endemic and threatened species. It also represents the last remaining natural habitat of a population of up to 4,000 endangered Bornean orangutan.

In conclusion the nominated property does not rank highly in relation to criteria (i) and (ii) when compared to other World Heritage properties in Malaysia and Indonesia; however it is of higher importance in relation to criterion (iv).

4. INTEGRITY

4.1. Legal Status and ownership

Malaysia declared LEWS a protected forest in 1940 and a wildlife sanctuary in 1983. The 600,000 ha Bentuang Kerimun Nature Reserve was declared by Ministry of Agriculture decree in 1982, enlarged to 800,000 ha by Ministry of Forestry Decree #118/Kpts-II, declared a National Park by Ministry of Forestry Decree #467/Kpts-II in 1995, and renamed Betung Kerihun National Park, its current name, by Ministry of Forestry Decree #510/Kpts-II in 1999. BANP is a fully constituted National Park in accordance with the National Parks and Nature Reserves Ordinance (cap. 127) of the State of Sarawak, Malaysia. The park was opened to the public in 1994. In the same year the Indonesian and Malaysian governments created a Transboundary Conservation Area covering the three sites.

BKNP is owned by the Republic of Indonesia and the State Government of West Kalimantan. It is administered by the BKNP Management Authority under the Director-General of Forest Protection and Forest Conservation (PHKA) within the Indonesian Ministry of Forestry. LEWS and BANP are owned by the State Government of Malaysia and administered by the Protected Areas and Biodiversity Conservation Division of the Sarawak Forestry Corporation in accordance with a management services agreement with the Minister of Forests.

4.2 Boundaries

Boundary integrity of the property is compromised by the deeply dissected boundary of LEWS and to a lesser extent, BANP, and by the imprecise and unsurveyed southern boundary of BKNP. In the former case, it is proposed by the state government of Malaysia to add three areas to LEWS and two areas to BANP to substantially resolve this issue. These are remainining forest areas that will significantly enhance the integrity of these sites, although it is not yet clear when the decision to expand LEWS and BANP will be adopted.

The southern boundary of BKNP was established by Ministerial decree and has not been surveyed. Apart from the identification of this boundary by the installation of posts and small signs at a few key riverside locations, no work has been done to really enforce the boundary. This is a significant impediment to effective management. Illegal activity is difficult to control without accurate boundary identification and there is the risk that adjacent land use will advertently or inadvertently encroach upon the park. Boundary identification in BKNP is also hampered by the lack of accurate large-scale topographic maps. The 2000-2024 Management Plan for BKNP proposed rationalisation of the southern boundary. Two options were considered, the first based on catchment boundaries and the second on local landmarks. The catchment boundary proposal would incorporate more land into BKNP and add to the area of karst partially incorporated in the Tanjung Lokang area at the south-eastern end of the Park. It is essential that the chosen option for boundary rationalisation be implemented and the southern boundary of BKNP appropriately marked on the ground to ensure surveillance and patrolling.

4.3 Management

All three protected areas have management plans, but all require updating and revision. The plan for BANP was prepared by the Wildlife Conservation International (WCI) and published in 1993 with an intended span of application of 3 years. The LEWS plan was prepared by the International Trade in Timber Organisation (ITTO) and Sarawak Forest Department and published in 1996 with an inferred span of 5 years. The management Plan for BKNP was prepared by ITTO, WWF and PHKA and published in 1999 to be implemented over 25 years, 2000-2024. This plan is seen by a number of experts as excessively optimistic and over-ambitious in the scope, objectives and resources required for its implementation.

The extent to which any of these plans has been implemented is unclear as systematic evaluation programmes have not been carried out. The extent to which interested communities and stakeholders were engaged in the planning process is equally unclear. The

Table 2: Comparison between the nominated property and other properties located in the same region

Property	Area (ha)	Plant Sp.	Wildlife	Others
TRHB (nominated property)	1,050,000	2,807 (145 plants listed as globally threatened)	-73 sp. mammals, 300 sp. birds, 218 sp. fishes, and over 1000 sp.of insects. - 75 Bornean endemics. - Last remaining natural habitat of a population of up to 4,000 endangered Bornean orangutan	- 60m - 1,960m altitudinal range. - It includes 10 floristic zones.
Gunung Mulu National Park (Malaysia)	52,000	3,500 (111 palm especies)	- 8 mammals, 270 birds, 55 reptiles, 48 fishes, over 200 sp. of cave fauna.	- It includes 17 floristic zones - Important geological values. - Impressive karst scenery.
Kinabalu Park(Malaysia)	75,000	5 to 6,000	- 112 mammals, 326 birds, two-thirds of all Bornean reptiles.	- Reaches 4,090m - Centre of Plant Diversity for SE Asia.
Lorentz National Park (Indonesia)	2,505,600	1,200 - 2,000	- 164 sp. of mammals, 650 sp. birds, 100 sp. of freshwater fish and 150,000 sp. of insects	- Reaches 4,800m - 5 five altitudinal vegetation zones.
Tropical Rainforest Heritage of Sumatra(Indonesia)	2,500,000	10,000 (17 endemic genera)	-240 sp. of mammals, 580 birds, 200 sp. of reptiles and amphibians, 30 sp. of fishes.	- Reaches 3,800m (includes active volcano) - Part of one WWF's 200 Global Ecoregions for Conservation
Ujung Kulon National Park(Indonesia)	120,000 (from which 44,337 ha marine)	Over 500 sp.	- Last remaining viable l refuge for Javan rhinos. - 270 sp. of birds. - Rich coral reefs formations.	Includes the Krakatoa volcano and rare Javan lowland forest.

manager of BKNP has expressed the view that a more relevant, practical operational plan is required and has commenced development of a more modest 5 year plan for the Park.

All three sites proposed in this transboundary nomination are experiencing difficulty in securing and retaining qualified staff that can contribute to the effective management of the sites. This is particularly the case in LEWS, where all seven professional roles are vacant and apparently have been since the creation of the Sarawak Forestry Corporation in 1996. Both BANP and LEWS employ local people on either rotational contracts between families in longhouses, or on a permanent basis. BKNP employs few local people; park staff are mostly appointed to posts from elsewhere in Indonesia. Whilst the Sarawak Forestry Corporation has more modern systems than PHKA, management capacity in all cases is hampered by the lack of up-to-date management plans, lack of modern business support systems and lack of management reporting and evaluation systems, including established management objectives, performance indicators, measures and annual performance targets.

In terms of paid staff, BANP has one warden (professionally qualified) located at Nanga Delok Ranger Station and eight field staff located at three Ranger stations (one of which is shared with LEWS). LEWS has one professional manager located in Kuching and 16 field staff located at three Ranger Stations (one shared with BANP). BKNP has one professional park manager located in Putussibau, 24 professional staff, 29 field staff and five technicians located at Park headquarters in Putussibau and two section offices. When in the field, BKNP staff work from seven outposts.

Despite a number of requests during the field mission, no budget information was made available from the Sarawak Forestry Corporation (SFC) for the management of BANP and LEWS. Experts and institutions interviewed, however, suggest that the SFC budget may be under some pressure in the coming financial year and operational budgets may need to be cut. It was suggested that this may be by up to 50%. The current budget of BKNP is in the region of IDR 2-3 billion per annum (or approx. USD 215,000-320,000). The Indonesian government has recently declared 20 National Parks in the country's "model parks" programme and has dramatically reconfigured the allocation of resources to ensure that the identified parks receive a greater share of resources. The result of this programme for BKNP will see its budget double in 2006 to IDR 6 billion (about USD 640,000).

Each of the three Parks has, or is developing, one research station: BANP at Lubang Baya Ranger Station as a centre for mammal research, concentrating on Bornean Orang-utan; LEWS at Nanga Bloh Ranger Station as a centre for botanical research; and BKNP at the junction of Sungai Menyakan and the Sibau River. This latter facility was built by WWF and is used for ranger and local community education, as well as a base for monitoring forest plots established by a Japanese university in 2000. None of the facilities has permanent research staff; all rely on externally funded research projects to maintain programmes. Capacity-building programmes for local communities funded by NGOs, principally ITTO and WWF, include the establishment of plots to determine the potential of native plants for medicinal or agricultural production.

The lack of an integrated management framework for the conservation and management of the property is of concern. The additional information provided by the States Parties of Malaysia and Indonesia (March 2006) noted that a transnational forum has been established for discussing conservation and management issues and addressing them in a concerted and integrated way. However, this forum neither includes mechanisms for implementing activities on the ground nor dealing with issues associated to adjacent landuses such as commercial logging. It is important to note, however, that more effective transbounddary cooperation was in place when ITTO was sponsoring cross-border collaboration through conservation projects. The State Party of Malaysia, in its supplementary information, recognises the need to reactive transboundary conservation projects as a mechanism to support effective collaboration between the countries.

4.4 Threats

Adjacent and intrusive land uses, both legal and illegal, threaten the integrity of the transboundary property, at least the boundaries of the three protected areas.

4.4.1 Logging

Licensed logging operations in Sarawak have, or are in the process of harvesting timber from the entire area bordering the northern boundary of BKNP. Despite the existence of codes of practice for sustainable timber harvesting in Sarawak, logging concession holders, their contractors and sub-contractors appear not to be held accountable for harvesting operations, with the result that significant erosion and siltation occurs downstream of their concessions, including within LEWS. The development of logging roads for timber felling and extraction has also opened this remote border region to access for other purposes, including illegal logging, hunting, fishing, wildlife and agarwood collection, particularly across the national border in Indonesia.

In Indonesia there has been a policy since 1998 of decentralised administration. This has weakened the ability of the central government to preserve protected areas and to control their economic exploitation by local interests. Despite local government having declared the Kapuas Hulu District a conservation district, there is little effort being applied to educate and involve the community in appreciation of the benefits that may flow from such a declaration. Local government still considers the presence of BKNP a drain on its resources. Leadership and guidance for local government should be provided nationally by PHKA, supported if necessary by national conservation legislation. At the national level, a memorandum of understanding has been signed between PHKA and the police to control illegal logging. A meeting of key Indonesian officials including the Ministers of Forests and Justice, the Chief of Police and regional representatives, was proposed in Jakarta on 16-17 January 2006 to address the issue. Internationally, a joint Indonesia / Malaysia committee has been established to regulate illegal logging, although responsible agencies have found it difficult to get the matter onto the agenda of Malindo, the key bilateral forum for Malaysia and Indonesia. A key issue for both States Parties to address will be to devise and implement complementary processes in each country aimed at consistent regulation and documentation for timber harvested and traded within and out of the region.

It has been reported that illegal logging crews are heavily armed and will violently repel intrusion by law-enforcement agencies. The Indonesian army (TNI) has primary responsibility for border control but displays little interest in controlling the traffic of illegal timber or other forest products, including endangered wildlife, across the border. Locally, however, there are encouraging signs of cooperation between local government, police and park management in BKNP. The prosecution and jailing of three Malaysians and the pending prosecution of six others, for the illegal construction of 33 km of road and the illegal extraction of timber from BKNP in December 2004 is a much-celebrated example in Kapuas Hulu District of West Kalimantan. However, there is some doubt about the integrity of the operation, given that a significant amount of seized logging equipment, including bulldozers, log trucks, log loaders, etc. was not properly secured and quickly disappeared back to Malaysia. Some smaller seized plant items and milled timber are still on public display in the police yard in Putussibau.

4.4.2 Oil Palm Plantations

In October 2005 the Indonesian government announced a plan to plant 1.8 million ha of oil palm in the border region of West and East Kalimantan. There was significant adverse reaction to this proposal as it was unclear whether protected areas would be affected or not. In contrast, a survey conducted by the Ministry of Agriculture revealed that less than 200,000 ha of undeveloped or under-utilised land in Kalimantan is suitable for palm oil production. Local NGOs are concerned about palm oil development because it is not part of indigenous culture and will not benefit local communities. Two meetings were held in January 2006 to discuss oil palm development in Kalimantan: the first between government agencies and the second involving NGOs, research institutions and local communities. A letter was sent from the Minister of Forestry to the President of the Republic of Indonesia requesting confirmation that he will not allow any further conversion of natural forest to palm oil plantation. The additional information provided by the State Party of Indonesia confirmed that further conversion of natural forest will not occur. However it does not provide information on

how this decision will be effectively enforced.

4.4.3 Other threats & community involvement

Other land use pressures on the integrity of the nominated property include illegal gold-mining in the east of BKNP, which causes considerable erosion and water pollution. Communities generally retain rights to harvest forest resources from the property, including fish, other non-protected fauna, timber, rattan, fruit and medicinal plants, provided it is not used for commercial gain. However there is evidence of over-harvesting of agarwood and the premature harvesting of swiftlet nests. Also the property suffers some illegal encroachment and poaching of timber, wildlife and forest resources. To deal with these pressures, significant resources have been invested by both the management agencies and NGOs (principally ITTO and WWF) to provide alternative sources of income for local communities, some of which still live within the protected areas. These communities, principally Iban and Dayak, are being provided with funds and training through capacity building projects to establish native fruit orchards and vegetable gardens, medicinal plant nurseries, fish farms, craft making, tourist homestay programs and some ecotourism products.

A potential benefit from this investment is yielded through local community acceptance of the protected areas as alternative sources of income and a reinforcement that protection from exploitation will lead to a sustainable level of production for local purposes. Sarawak is well advanced in developing this idea, with a comprehensive programme involving the appointment of honorary wildlife rangers in local communities and the appointment of local people on contract (either rotating between longhouses or on a permanent basis) to provide park maintenance assistance. There is consequently a reasonably high level of acceptance of protected areas from local communities living within or adjacent to the property in Sarawak.

The same cannot be said of Indonesia. Community engagement programs are much less advanced in and around BKNP, with the result that there is some community resistance to the Park and an inclination to be influenced by others who seek to gain illegal access to timber, gold and other resources, including fish and wildlife. To offset this, WWF has a significant programme running from Putussibau, the major town of the Kapuas Hulu local government district which borders BKNP. This programme seeks to raise awareness about the potential benefits of BKNP and, through broad-based social programmes, educate and build capacity and self sufficiency in local communities. Through a memorandum of understanding with PHKA, WWF funds projects in the Park including research expeditions, management planning and training programmes for park staff in ecology and related subjects.

BKNP management has recognised that management and protection programmes will only progress if the local community is effectively engaged. The Park manager has recently embarked upon the development of a "collaborative" 5-year plan for the Park, involving local communities and NGOs. It is intended that this plan will be more realistic and operationally grounded than the 25-year Management Plan developed in 1999. In this way, BKNP management seeks to construct a "social fence" to strengthen the integrity of the park.

Based on the issues discussed above, IUCN considers that the transboundary nominated property does not meet the conditions of integrity.

5. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Transborder Rainforest Heritage of Borneo (Indonesia and Malaysia) has been nominated under natural criteria (i), (iii) and (iv).

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

The nomination document outlines the geological evolution of the island of Borneo but fails to make significant direct linkage to the nominated property. The nomination records the geological formation existing in the nominated property but it does not articulate how they might be significant in the wider context of the geological evolution of Borneo, let alone their global significance. The nomination document argues that the property meets this criterion based on its importance in representing several geological ages from Paleozoic to the beginning of the Oligocene. Geological values for the periods represented in the nominated property are however well represented by a number of spectacular geological WH properties, such as Dinosaur Provincial Park (Canada), Dorset and East Devon Coast (U.K.), Ischigualasto-Talampaya (Argentina) and Monte San Giorgio (Switzerland). IUCN concludes that the geological values of the nominated property are of national importance, but do not provide any case for outstanding universal value. IUCN considers that the nominated transboundary property does not meet this criterion.

Criterion (ii): Ecological processes

Whilst the nominated property supports important ecological and biological processes; there are other WH properties in Indonesia and Malaysia that contain a greater diversity of ecosystems and therefore support a higher variety of ecological processes. Gunung Mulu and Kinabalu, both in Borneo, cover a much higher variety of ecosystems and, in the case of Gunung Mulu, it contains 17 floristic regions. Lorentz National Park and the Tropical Rainforest Heritage of Sumatra in Indonesia also cover a high variety of ecosystems and, in the case of Sumatra, which is double the size of the nominated property, it also includes an active volcano. In addition Ujong Kulon (Indonesia) covers important lowland forest ecosystems as well as rich coral reefs formations. IUCN considers that the nominated transboundary property does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

The nominated property ranks highly when compared to other exisiting WH properties in the region for its high

number of endemic and globally threatened species, including 75 endemic Bornean species of plants and animals, in one of the two largest aggregations of protected areas on the island of Borneo. Discoveries of plants and animals, either new to the area or new to science, are frequent. The tropical rainforest ecosystems also protect the last remaining natural habitat of a population of up to 4000 endangered Bornean orangutan, which are concentrated towards the western end of the property, straddling the international border. IUCN considers that the nominated transboundary property meets this criterion.

6. RECOMMENDATION

IUCN recommends that the Committee **defer** the inscription of the Transborder Rainforest Heritage of Borneo (Indonesia and Malaysia) on the World Heritage List on the basis of natural criterion (iv) as the transboundary property does not meet the required conditions of integrity at present.

IUCN recommends the Committee that the future inscription of the transboundary property should be dependent on the effective implementation by the States Parties of Indonesia and Malaysia of the following recommendations:

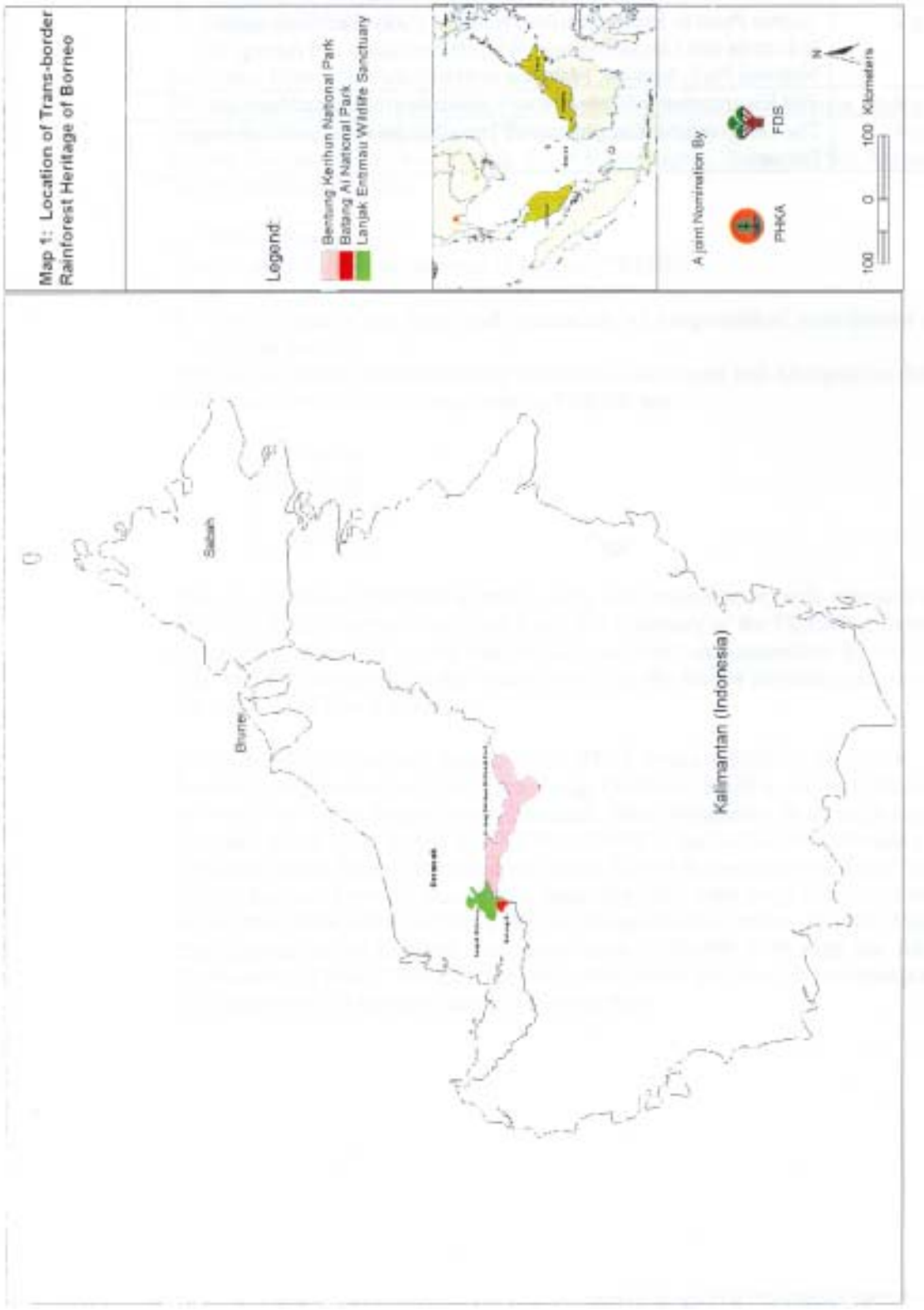
a) Joint preparation and implemention of a bilateral management framework for the transboundary property, which should be supported by adequate institutional arrangements and adequate human and financial resources to ensure the effective implementation of joint conservation and management actions in the field.

b) Joint preparation and implementation of an emergency action plan in order to prevent, detect and control illegal, unregulated activities impacting the long-term integrity of the property.

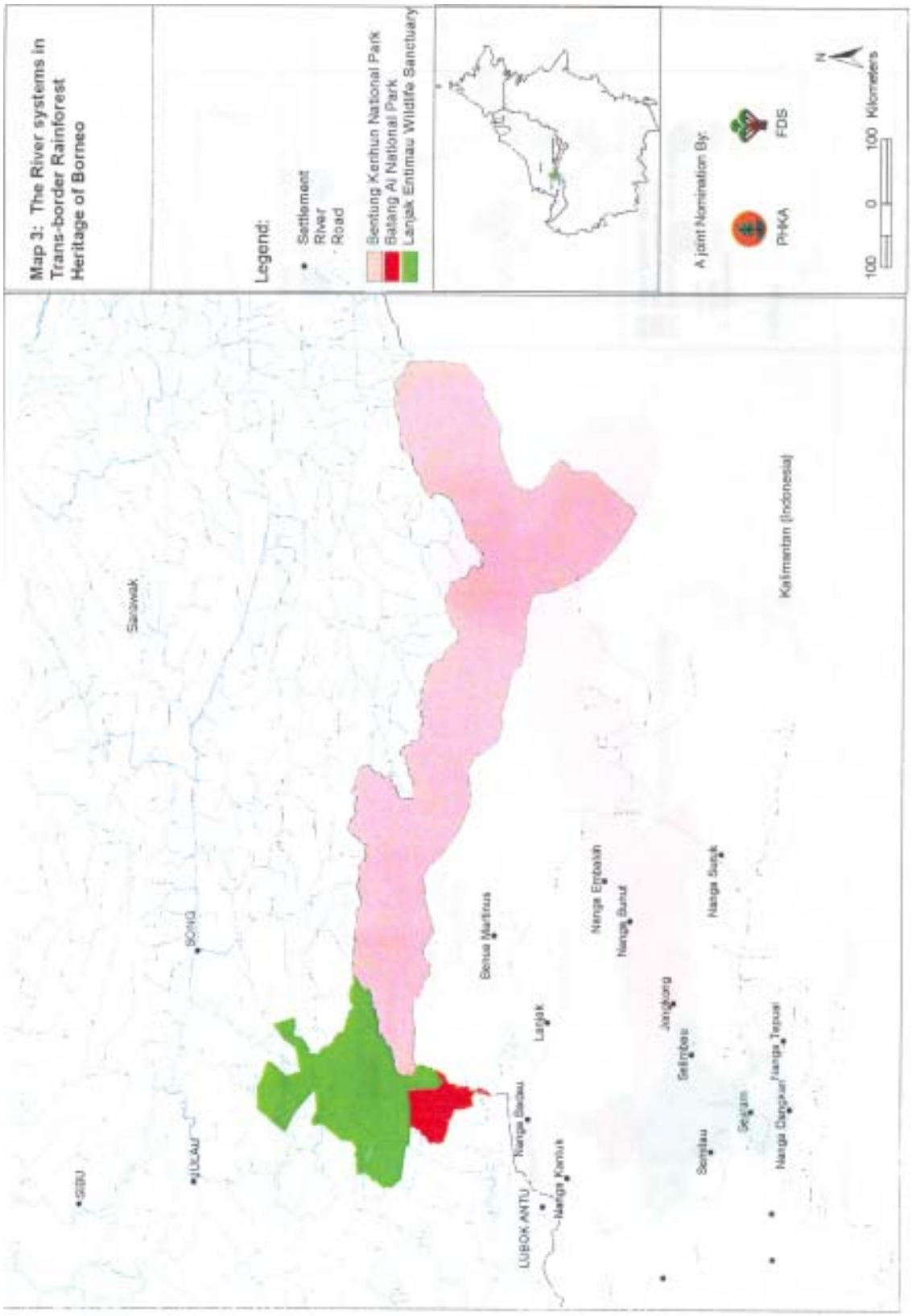
c) Rationalisation by the State Party of Indonesia of the southern boundary of Betung Kerihun National Park and the necessary statutory measures enacted to ensure effective control of illegal logging.

IUCN commends the States Parties of Indonesia and Malaysia for their efforts in promoting transboundary cooperation for the conservation and management of the Transborder Rainforest Heritage of Borneo.

Map 1: General Location of Nominated transboundary property



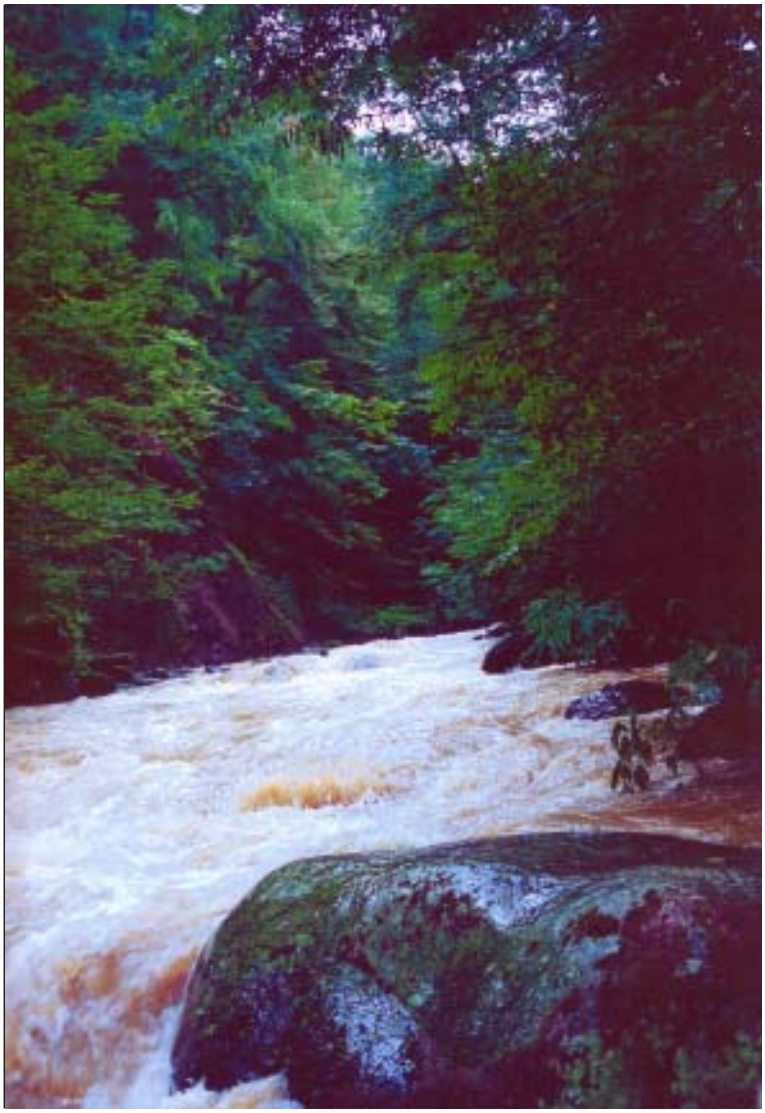
Map 2: Boundaries of nominated transboundary property



EUROPE / NORTH AMERICA

HIRKAN FORESTS OF AZERBAIJAN

AZERBAIJAN



WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

HIRKAN FORESTS OF AZERBAIJAN (AZERBAIJAN) ID N°: 1212

1. DOCUMENTATION

i) **Date nomination received by IUCN:** April, 2005

ii) **Additional information officially requested from and provided by the State Party:** IUCN requested supplementary information on the 26 August, 2005 following the IUCN evaluation mission. The State Party response was received on the 19 October, 2005. Additional information was requested from the State Party on 31 January, 2006 following the IUCN World Heritage Panel meeting in January, 2006. A response to this request was received from the State Party on 29 March, 2006.

iii) **IUCN/WCMC Data Sheet:** 7 references

iv) **Additional Literature Consulted:** Nosrati, K. et al. (ed.) (2004). **Schutz der biologischen Vielfalt und integriertes Management der Kaspischen Wälder (Nordiran)**. Bundesamt für Naturschutz, Bonn-Bad Godesberg; Schmidt, P.A. (2005). **Naturschutz in Kaukasien**. Handbuch Naturschutz und Landschaftspflege, Landsberg; Schmidt, P.A. (2005). **Biologische Vielfalt und ihr Schutz in der Kaukasusregion**. Bundesamt für Naturschutz, Bonn-Bad Godesberg; Schroeder, F.-G. (1998). **Lehrbuch der Pflanzengeographie**. Quelle & Meyer, Wiesbaden.

v) **Consultations:** 11 external reviewers. Consultations were undertaken during the evaluation mission including with representatives of relevant government agencies, local communities and other stakeholders.

vi) **Field Visit:** Gerhard Heiss, 7 – 15 August, 2005.

vii) **Date of IUCN approval of this report:** April 2006

2. SUMMARY OF NATURAL VALUES

The Hirkan Forests of Azerbaijan (HFA) covers an area of 21,435 ha and is located in the south-eastern region of the country, within the Talish Mountains and Lenkoran lowlands ecoregions. The area is mountainous and almost completely covered with broadleaved deciduous forests. The Main Talish ridge stretches from the north-west to the south-east along the border with Iran and has side ridges into Azerbaijan which run from the south-west to the north-east. The nominated property covers several of these side ridges (ridges Ulyasi and Shandangalasi) in the south-eastern part of Azerbaijan and includes the main ridge at the peak Shandan-Qalasi, which forms the highest point of the property.

The nominated property mainly includes features from the tertiary period (from Paleocene to mid Miocene inclusively). The oldest features of the Paleocene period are found in the south-eastern part of the property. Cliffs of limestone are found in many places with fossils of upper cretaceous fauna. Low Eocene features, the so-called Kosmalyan Assise, stretch along the border between Azerbaijan and Iran. Shandan-Qalasi is one of the volcanic centres of the Main Talish ridge and is located in the south-eastern section of the nominated property. The dominant soil types of HFA are various types of yellow soils, the so-called Ferrasols.

The Astarachay river is the main river within the property; it runs along the border with Iran and forms the southern boundary of the property. Its side tributaries, the Istisuchay and Nivyshtaruchay rivers, have their sources within the property near Shandan-Qalasi and join with the Astarachay river before leaving the reserve. They cut through volcanogenic, volcanogenic-sedimentary and sedimentary rocks and form valleys with steep slopes. The rivers of the northern part cross the HFA or form its boundary but most of these river systems are located outside the property.

The property comprises the westernmost part of the Caspian Forests which, together with the Euxinian Forests, are considered as important refuges of arcto-tertiary vegetation. It is assumed that Caspian Forests have provided a continuous forest cover for 2.5 million years and feature the highest species diversity among summergreen broadleaved deciduous forests of West Eurasia. There are 95 tree species and over 110 shrub species found within the Caspian Forests and all of them are found within the nominated property. The westernmost position, with its warm, humid climate and the enrichment by many species of the Caucasus region, make HFA the richest floristic site of all Caspian Forests. HFA includes 1,296 species of vascular plants of which 29 species are endemics of Azerbaijan and 29 species are endemics of Caucasia.

Caspian Forests comprise four main forest types:

- The Hirkanian lowland forests with chestnut oak, ironwood, Caucasian elm and date-plum, partly in combination with different alder species in alluvial forests;
- The Hirkanian colline forests with chestnut oak and hornbeam up to 750 m a.s.l;
- The montane forests with oriental beech and Hirkanian box-tree up to 1,800 m a.s.l; and
- The alto-montane forests with Persian oak and oriental hornbeam over 1,800 m a.s.l.

Besides tiny patches which are seriously affected by various human activities, Hirkanian lowland forests have been destroyed completely. HFA includes Hirkanian colline and montane forests of which 40% belong to the colline and 60% to the montane zone. Ironwood, Caucasian elm and date-plum, characteristic tree species of lowland forests, can also be found in the Hirkanian colline forests. Important tree species found within the property include the endemic ironwood, the Caucasian elm, and Albizia julibrissin. The property is very rich in mosses, lichens and fungi but scientific research on those groups has not been undertaken yet.

The HFA helps protect several regionally significant and endangered species of fauna. The fauna within the property includes 47 mammals, including local endemics of Shelkovnikov's vole and Hirkan wood-mouse, brown bear, lynx, wolf, golden jackal, jungle cat, European otter and the leopard. 118 species of birds occur, including the white-tailed eagle, cinereous vulture, Egyptian vulture, osprey, peregrine falcon and endemic subspecies of Caspian tit and great spotted woodpecker. 22 reptile species and 10 amphibian species, including the Caucasian parsley frog, also occur in the property.

3. COMPARISON WITH OTHER AREAS

The nominated property is located within the Caucasian-Iranian Highlands biogeographical province. This province is presently represented by the Western Caucasus World Heritage property, covering 301,068 ha, which was inscribed on the basis of its floral diversity, as it represents one of the global centres of plant diversity.

Many similar habitats, landscapes and species occur within the existing Western Caucasus property and the HFA, although the Western Caucusus property is much larger (over 300,000 ha compared to over 21,000 ha). The nominated property is not normally considered to be part of the Caucasus mountain range; rather, it is within the neighbouring Talish mountains, which lack the high mountainous belt of the Caucasus mountain range. Both properties are covered by deciduous forests characterized by oak and hornbeam forests and have similar wildlife, although the Western Caucasus property also includes an introduced population of European bison. The Western Caucasus World Heritage property represents a high mountain vegetation complex with forests of mixed coniferous and deciduous type. Dominant tree species are Caucasian fir, oriental spruce and oriental beech. Towards the Black Sea on low altitudes, a small part of the property is covered with mixed oak forests of submediterranean character.

The HFA represents the relict Hyrkanian Forests found in the eastern Caucasus region. The importance of the HFA by comparison with the Western Caucusus property rests on the distinctiveness of the Hyrkanian forests as nemoral forests, i.e. temperate deciduous broad-leaved forests, which differ from the typical mesophytic deciduous broad-leaved forests; their peculiarities characterize them as hygro-thermophilous mixed deciduous broad-leaved forests. The uniqueness of these forests reflects their status as arcto-tertiary elements providing continuous forest cover since the Upper Tertiary (Pliocene Epoch) period, thus providing important refuges for natural woodland of Tertiary origin.

The climate is similar within the existing Western Caucasus World Heritage property and the HFA, although the Russian property, as it is north of the Azerbaijan property, is colder in both the summer and winter seasons. The Russian property also shows somewhat greater variations in climate, landscapes and wildlife due to its greater range of relief (up to 3360 metres versus 2400 metres).

The Hirkan forests extend across the international frontier into Iran and are recognised as an important forest community in Iran. Specifically, the same type of Hyrkanian forest ecosystems within HFA occur in the Elburs mountain range of Iran. The Golestan National Park covering 91,895 hectares is part of the Caspian Forests and is located in the east of Iran, near the border with Turkmenistan. This site is considered to be one of the best protected areas in Iran. There are other nature reserves and forest reserves which protect Caspian (Hirkan) Forests within the Islamic Republic of Iran, including the Alborz-e Markazi and Lisar Nature Reserves, and the Siavoude Roudbar Forest Reserve. The presence of these important areas would suggest there may be potential for a future transnational serial World Heritage property between Azerbaijan and Iran to protect Hyrkanian forest ecosystems. There is an important need for close and effective cooperation between the two countries to ensure effective forest and wildlife conservation.

Deciduous broad leaved forests, represented within the HFA, are also found in other World Heritage properties around the world, including the Greater Smoky Mountains National Park (USA), Belovezhskaya Pushcha/Bialowieza Forest (Belarus/Poland) and Plitvice Lakes National Park (Croatia) and Mt Emei and Leshan Giant Buddha (China) and Yakushima and Shirakami-Sanchi (Japan). The Great Smoky Mountains National Park represents the richest and most diverse forests of the temperate deciduous broad-leaved forest region of North America. It is much larger than HFA (209,000 ha) and includes summergreen broadleaf deciduous forests with high tree species diversity (130 species). This property was the major North American Pleistocene refuge for temperate fauna and flora and features a large number of endemic

species as well as rich species biodiversity, with over 3,500 plant species. The Mt Emei and Leshan Giant Buddha World Heritage property was inscribed for its high plant species diversity and large number of endemic species (320). The high plant species diversity reflects the location of the property at the interface of two floristic regions and its wide vertical zonation. The Belovezhskaya Pushcha/Bialowieza Forest is located in the transition-zone of boreal (coniferous) and nemoral (broadleaf deciduous) forest types. It is a lowland forest of the plains and dominated by different types of mixed English oak and spruce-pine forests. Although, it is considered as one of the richest forests of Europe its number of vascular plants is about 60% of that within the HFA property.

In conclusion it is clear that the HFA has important natural values. The property has a relict flora that survived the ice ages and protects a rich assemblage of plant species that are not found together elsewhere. It has a high diversity of plant species that is at a similiar level with some other comparable forest properties inscribed on the World Heritage List. It is noted that there are very important areas of the same forest type in Iran which underline the potential of the property as a transnational serial World Heritage property.

4. INTEGRITY

4.1 Legal status

The Hirkan National Park was established in 2004, by Presidential Decree 81 of 9th February 2004. The Hirkan National Park is composed by the former Hirkan Strict Nature Reserve with 2,904 ha (Lenkoran district) enlarged by 18,531 ha forests of the Astara (17,909 ha) and Lenkoran (622 ha) districts. The Hirkan forests were first protected in 1936, through the establishment of the Hirkan Strict Nature Reserve. The protected area has undergone several name and status changes since it was first established. The total area of the nominated property is owned by the state.

4.2 Boundaries

A number of issues were identified by the IUCN evaluation in relation to the original boundaries submitted by the State Party, including: (a) a number of legal and illegal villages, 18 in total, were included within the original boundary of HFA; (b) a number of important areas, including the Hirkan Forest Sanctuary, were not included; (c) there was no buffer zone surrounding the nominated property; and (d) the corridor linking the northern section of the HFA was less than 500 metres wide which is insufficient to allow for adequate wildlife movement. These issues were raised by IUCN during the evaluation mission in August 2005 and in subsequent correspondence from IUCN. The State Party responded by a number of boundary changes which: (a) excluded three of the largest villages (comprising an area of 100 ha); (b) widened the narrow part of the nomination from 500 metres to 1,500 metres by adding an area of State Sanctuary the same size as that excluded for the villages, i.e. 100ha; and (c) identified plans to establish a buffer zone around the nominated property.

IUCN commends the positive response from the State Party to the suggested boundary changes. However, it is noted that the nominated property is small and that the Hirkanian forest is more extensive than that included in the nominated property and extends across the international frontier to Iran. The relatively small size of the nomination, especially for mammal viability, combined with the long and convoluted boundaries is a cause for concern. Options for expanding the boundaries of the property should be further considered, including additional forest areas of high conservation value. It is also noted that the majority of the current boundary runs through difficult terrain, making boundary demarcation and supervision difficult. IUCN further notes that the buffer zone has not formally been established and is still in the planning stage.

4.3 Management

A management plan has been prepared by the State Party, with assistance from WWF, and is awaiting official approval. Long term management of HFA requires clear and effective direction through an approved management plan and the management plan should be finalized as quickly as possible. Financial and staff resources are currently inadequate for the effective management of the property at the level required for a World Heritage property and more resources are required to ensure the effective management. Priority needs to be placed on increasing the level of funding, ensuring adequate equipment for protected area management and increasing the level of staff training within the property. Close cooperation with international NGOs (such as WWF Caucasus and NABU) offer very useful support for the future management of HFA, however long-term site integrity will require additional investment by the State Party. Thus, finalization of the management plan and a guarantee of adequate resources to ensure its implementation are essential.

4.4 Threats

A number of legal and illegal settlements within the nominated property pose a threat to the integrity of the property, particularly through activities such as grazing. The commitment by the State Party to exclude three of the settlements, comprising an area of 100 ha, from the nominated property is a positive development. Options for further rationalization and removal of settlements from the nominated property should be reviewed and assessed and priority should be given to the removal of illegal settlements.

Grazing by cattle is another issue affecting the integrity of the nominated property. More than 5,000 cattle currently graze within the property and there is currently neither sufficient staff nor equipment for keeping them out of the core zones.

Two roads intersect the northern part of the nominated area. Both are in poor condition (without asphalt) with low traffic intensity. However, traffic intensity of the northern road connecting settlements of Daster and Miki should be regulated by giving higher planning priority to a road running around HFA.

About 35 ha are listed in the management plan draft as being used for agricultural use, mainly located around the settlements. The exclusion of the biggest settlements from the nomination area will decrease the area of agricultural use. Some illegal cutting of timber also occurs but this is of a low intensity.

At present IUCN considers that the nominated property does not meet the conditions of integrity.

5. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The HFA has been proposed under all four natural criteria.

Criterion (i): Earth history and geological processes

HFA exhibits features of Earth history and geological processes which are of national or regional interest. Volcanic features represented within the property are not comparable with other properties already inscribed on the World Heritage List for volcanic features. It is noted that Shandan-Galasi is not the centre of ancient volcanic eruptions but is the southeastern most summit within the volcanic Talish ridge. Diversity of geomorphologic and physical-geographic features within the nominated property are common and are represented in many other areas. This small property does not seem to represent a *globally* significant example of a specific stage of Earth history. In summary, IUCN considers the geological values of this property to be of regional rather than global interest. IUCN considers the nominated property does not meet this criterion.

Criterion (ii): Ecological processes

The nomination claims that the property meets this criterion due to the age of the forests within the property, and the fact that they might have been largely undisturbed by human activity since the tertiary period. An interesting range of altitudes, climate, and wildlife is located in the property. However, this does not by itself demonstrate outstanding universal value as the ecological processes occurring on this property are better manifested in other World Heritage properties such the Western Caucasus. As a result of evolutionary processes, the Hirkan forests represent a tertiary relic, and include several endemic tree, insect, bird and mammal species. However, the size of HFA is small, the level of isolation is high and anthropogenic pressures on the small corridor in the north of the area as well as woodland grazing of cattle do not provide favourable conditions for maintaining natural ecological processes. This property demonstrates strong national and regional significance, rather than a global level of significance. IUCN considers that the nominated property does not meet this criterion.

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

HFA includes areas of high scenic value. However these features are of national or regional, rather than global significance. The area is characterized by round shaped mountains and V-shaped valleys. The aesthetic beauty of forests which are the overall dominating landscape feature is clear but is not comparable with other similar properties inscribed on the World Herirage List under this criterion. It is also noted, whilst the forests and gorges are of high scenic value, there are many similar landscapes in Armenia, Georgia, Turkey, Iran, Russia and even Azerbaijan itself. IUCN considers that the nominated property does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

The property has a relict flora that survived the ice ages and protects a rich assemblage of plant species that are not found together elsewhere. It has a high diversity of plant species that is at a similiar level with some other comparable forest properties inscribed on the World Heritage List. HFA is the richest floristic site of all Caspian Forests, including 1,296 species of vascular plants of which 29 species are endemics of Azerbaijan and 29 species are endemics of Caucasia. This vascular plant diversity is comparable with World Heritage properties in North America and East Asia. However, IUCN notes that this property is of small size and only protects part of the Hirkanian Forests which also occur in a number of areas within the neighbouring country of Iran. IUCN considers that the nominated property may have the potential to meet this criterion, particularly if it was linked as a transnational serial property with other Hirkanian forest sites in Iran.

6. RECOMMENDATION

IUCN recommends that the Committee **defer** examination of the nomination of the Hirkan Forests of Azerbaijan to the World Heritage List on the basis of natural criterion (iv), to allow the State Party to consider options for renominating the property as part of a transnational serial property with other Hirkanian forest areas in Iran.

IUCN recommends that the State Party also consider the following issues relating to the integrity of the nominated property:

(a) options for expanding the boundaries of the property to include additional forest areas of high conservation value;

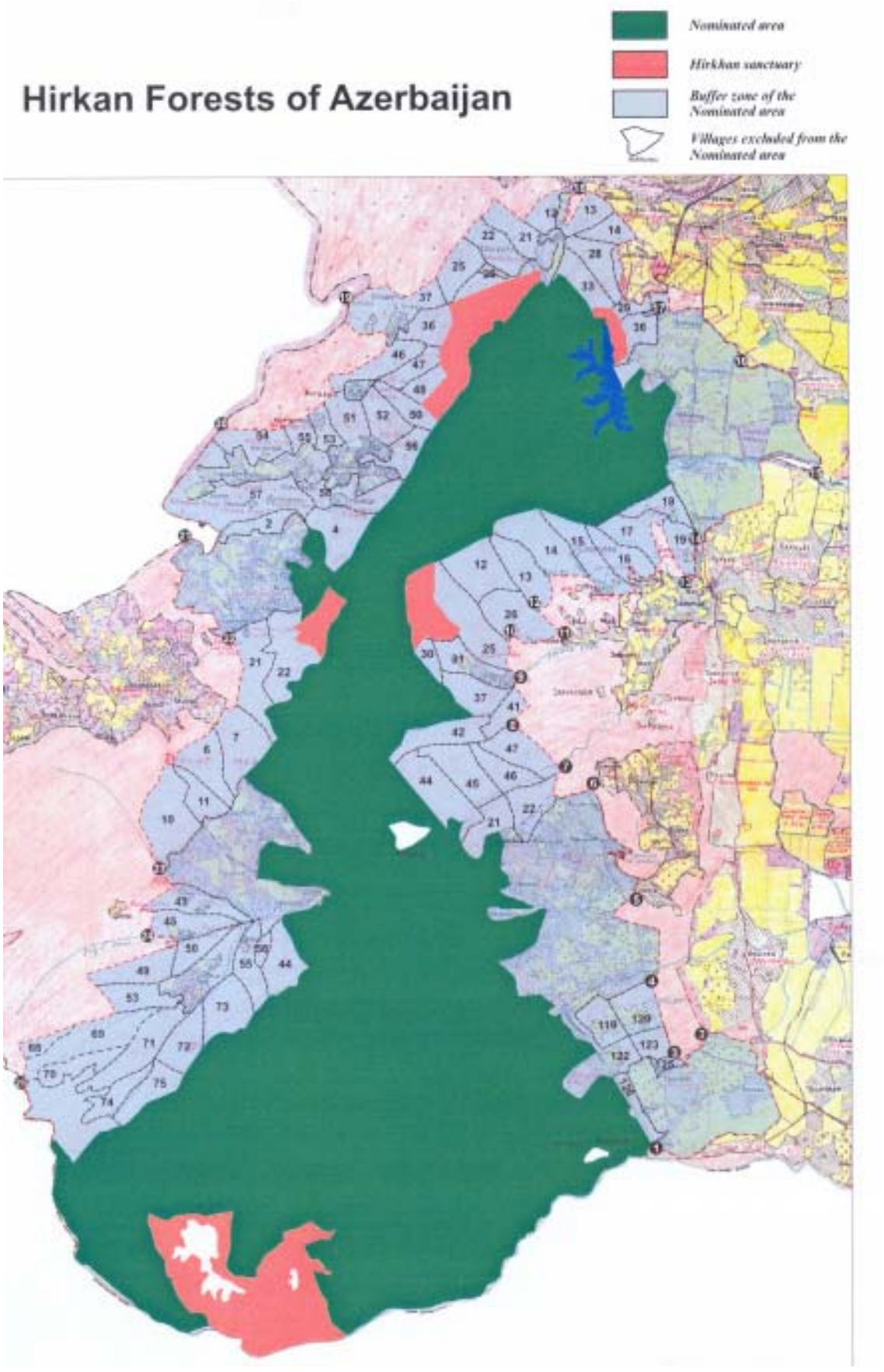
(b) the need to formally establish the buffer zone for the property;

(c) the need to finalise and adopt the management plan and ensure adequate resources for its implementation; and

(d) the need to effectively address threats to the property, including the removal of illegal settlements and the management of grazing.

Map 1: Location of the nominated property

Map 2: Boundaries of the nominated property



EUROPE / NORTH AMERICA

BALTIC KLINT

ESTONIA

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

BALTIC KLINT (ESTONIA) – ID N° 1210

1. DOCUMENTATION

i) **Date nomination received by IUCN:** April 2005

ii) **Additional information requested from and provided by the State Party:** IUCN sent a letter with a number of questions to the State Party following the field visit on the 17 November 2005. The State Party, in response provided supplementary information, dated 3 January 2006, including a revised justification for inscription, comparative analysis and information on integrity issues. The State Party also decided to nominate the property under natural criterion (i) only, instead of all four natural criterion as in the original submission. The IUCN evaluation is based mainly on this supplementary information.

iii) **IUCN/WCMC Data Sheet:** 13 references

iv) **Additional documentation consulted:** Dingwall, P. , Weighell, A., Badman, T. 2005. **Geological World Heritage: A Global Framework**, IUCN. 51p. Wells, R.T. 1996 **Earth's geological history - a contextual framework for assessment of world fossil site nominations**. Working Paper No.1, Global Theme Study. IUCN, 43p. Raukas, A. (Ed) 1996. **Estonian Environment: Past, Present and Future.** Ministry of the Environment of Estonia, Environment Information Centre. Suuroja, K., 2005. **Põhja-Eesti Klint** OÜ Eesti Geloogiakeskus; Talvi, T. (Ed) 1999. **Osmussaar - an island in the Baltic Sea**, *Estonia Maritima*, No.4, 210p. Webby B.D., et al. 2004. **The Great Ordovician Biodiversification Event**, Columbia University Press. Stanley, S.M. 1999**. Earth System History**, W H Freeman and Company, 615p. Wicander, R. & Monroe, J.S. 1993 (2nd Ed) **Historical Geology: Evolution of the Earth and Life Through Time**, West Publishing Company, 640p.

v) **Consultations:** 10 external reviewers. Various government officials from the Ministry of the Environment, geologists from the Geological Survey of Estonia and the Institute of Geology, Tallinn Technical University, representatives of UNESCO Estonia office, officials of the Lahemaa National Park and representatives of local authorities, the business community and NGOs.

vi) **Field visit:** Chris Wood, 4-9 November, 2005.

vii) **Date of approval of report by IUCN:** 11 April 2006

2. SUMMARY OF NATURAL VALUES

The Baltic Klint is a linear escarpment, that extends W-E for 1200km from the Swedish island of Öland, across the Baltic Sea and North Coast of Estonia to the southern shore of Lake Ladoga, east of St. Petersberg, Russia. The escarpment is formed in Cambrian and Ordovician (Lower Palaeozoic) sedimentary rocks, c.540-460 million years old. For a considerable part of its length, east of Öland, the Klint lies below sea level, but it emerges in north-west Estonia on the island of Osmussaar. The Klint's next eastward occurrence is on the Pakri Islands, after which it forms the major part of the north coast of Estonia. Throughout its length in Estonia the Klint forms a low plateau, truncated by a north-facing sea cliff. The cliff ranges in height from 6-7m at Osmussaar to almost 56m at Ontika. It is this 250km long coastal cliff section in Estonia that forms the subject of this nomination. The nominated property is proposed as a serial property, comprising eight separate reserves spaced evenly along the length of the northern coastline of Estonia. The total area of the nominated property is 3760ha.

The eight reserves are considered to protect the best geological exposures, landforms and habitats within the Klint escarpment:

Osmussaar Landscape Reserve: Only 6-7m of the geological succession is represented here, where it exposes Middle Ordovician fossiliferous limestone beds overlying Lower Ordovician glauconitic sandstone.

The **Pakri Landscape Reserve** is located on the adjacent Väike-Pakri and Suur-Pakri islands and Pakri Peninsula. At the tip of the peninsula the full Cambrian-Middle Ordovician succession is exposed in a 24.8m high cliff, while the succession on Väike-Pakri cliff is 13m, exposing only Ordovician strata.

The **Türisalu Landscape Reserve** contains an important 37m high cliff that displays the full Cambrian - Middle Ordovician succession.

The smallest of the reserves is the **Ülgase Nature Conservation Area**. This protects the higher of two klint

Table 1: Extent of nominated serial property

Nominated property	Size (ha)
Osmussaar Landscape Reserve	479
Pakri Landscape Reserve	1453
Türisalu Landscape Reserve	27
Ülgase Nature Conservation Area	22
Tsitre-Muuksi escarpment	62
Ontika Landscape Reserve	1212
Päite Landscape Reserve	128
Udria Landscape Reserve	377
TOTAL	**3760**

escarpments, lying approx. 1km inland from the coastline (the lower is just 100-200m from the coastline). The site exposes Ordovician carbonate rocks above a 20m wide talus slope covered with deciduous forest. This site also preserves evidence of mining of phosphorous.

The **Tsitre-Muuksi escarpment** is located in the Lahemaa National Park and lies approx. 1km inland from the coastline. The site represents a former, now uplifted coastline, with two peninsulas, and an embayment. The upper part of the 32m high Muuksi escarpment exposes Ordovician limestones, while the more westerly located Tsitre cliff has cut Upper Cambrian siltstones and sandstones. The 6m high Turjekelder waterfall is a notable feature here.

The **Ontika Landscape Reserve** contains the longest (20km) and highest (55.6m) stretch of the Klint within the nomination. The reserve has a sheer cliff, below which a talus slope tumbles onto the beach. The full succession of Cambrian and Ordovician strata is exposed here, starting with blue clays at the bottom and dolomitized and richly fossiliferous limestones at the top. Estonia's highest waterfalls tumble over the klint at Valaste (30m high), Saka (12m) and Karjaoru (9m).

The **Päite Landscape Reserve** and adjacent **Udria Landscape Reserve** are located near the border with Russia. The combined length of the cliff in these two reserves is 2.5km and it reaches 30m in height. The reserves protect virtually the full succession of Cambrian and Ordovician strata.

The nomination also mentions the nationally / regionally significant feature of the Neugrund Meteorite Crater, which lies offshore of the Estonian coast but is not included in the nomination.

The rocks of the Baltic Klint form an uninterrupted outcrop of Lower Cambrian to Middle Ordovician strata, exposing a sucession of c. 80 million years, deposited in a shallow, nearshore seas. The stratigraphical sequence begins with Lower Cambrian clays and sandstones, overlain by Upper Cambrian and Lower Ordovician sandstones and argillites. These beds are followed by Lower and Middle Ordovician glauconite-bearing rocks, in turn overlain by Middle Ordovician limestones and dolostones. The rocks have not been substantially affected by tectonics, and so the rock strata have considerable lateral extent and show consistency from west to east. The stratigraphy is notable as it has not been thermally altered or metamorphosed, and it includes several internationally important type sections which form the basis of regional and local stratigraphical schemes. The rocks of the Baltic Klint are regarded as amongst the best successions of Cambrian-Middle Ordovician rocks associated with Baltica - one of the main continents present on Earth during the Lower Palaeozoic. However it is noted that the geological stability has led to a sequence which is condensed, and within which some periods of time are not represented in the rock record. Sequences for Baltica in Norway, Siljan and in South Estonia and Latvia are reported as being more complete in stratigraphic terms.

The strata contain a rich fossil record of the groups that thrived in the seas of the around the Baltica continent. In the Cambrian, fossils of trilobites, brachiopods, molluscs, conodonts and acritarchs are common, while in the Ordovician a much greater diversity is represented. The microfossil remains of the Klint have also been the subject of a number of studies that are important on an international scale, whilst several fossil species have their type locality in sections of the Klint). The Klint is therefore of notable scientific importance in relation to evidence of Lower Palaeozoic shallow-water biota and of particular, although not unique, importance for the fossil record of the faunal province of Baltica. The geology of the Klint has been the subject of scientific study both by Estonian and international researchers over a considerable period of time, with the earliest description provided by Hupel (1737-1819). Fossils from the Klint are included in the collections of museums around the world, including those of the British Museum, Smithsonian Institute, and the Swedish Museum of Natural History.

Two particularly important biotic events fall within the time span of the geological record of the Klint: the 'Cambrian Explosion of Life' and the 'Great Ordovician

Biodiversification Event'. While the Cambrian fossil record of the Klint is not especially representative of the first event, the Ordovician part of the succession has made a contribution, along with the evidence from a number of other localities worldwide to the understanding of the most rapid increase in biodiversity during the Ordovician. The development of the Klint as a landform may have begun as early as the end of the Ordovician. However, its present form is the result of processes active in the Cenozoic, and more recently during the Pleistocene and Holocene and its present form was moulded under the effects of a retreating ice sheet and changing land/sea levels.

The nominated property has significant associated natural values. All of the eight sites of this serial nomination are members of the European Natura 2000 network, and the vegetation of forest and alvar meadows is of regional (European) importance. The western end of the Estonian Klint is on a major migratory flyway (East Atlantic Flyway) for waterbirds and coastal species and the coastline and sea adjacent to the Osmussaar, Pakri and Türisalu landscape reserves has been identified by BirdLife International as a European Important Bird Area (IBA). All reserves have good representation of nationally and regionally important animal species.

3. COMPARISON WITH OTHER AREAS

3.1 Escarpment landform

Escarpments can form through a number of means, and are very common landscape features, ubiquous throughout the world. Many sites on the World Heritage List contain escarpments, but in these cases they have been deemed to be supportive of the principal values for which the properties were inscribed. As such the existence of an escarpment is, in principle, a weak basis of a claim of outstanding universal value, unless it has spectacular form or geological significance.

The Baltic Klint is certainly a very long escarpment, even though a significant part lies beneath the surface of the Baltic Sea (and much of it lies outside Estonia). However, it does not rise to any great height (maximum of 55.6m in the Ontika Landscape Reserve). Scientifically better known escarpments, such as the Cotswolds (UK) rise to greater heights , but are not so long (max. 200km). Some other escarpments in the world are longer, usually higher and far more spectacular than the Baltic Klint. These include, the Great Escarpment of South Africa (up to 1000m high), the escarpments of the African Rift Valley (fault scarps), and the Great Escarpment that parallels virtually the entire east coast of Australia. The nomination document describes a number of other comparable escarpments. The Bandiagara Escarpment is an existing World Heritage property in Mali, formed in Cambrian/ Ordovician sandstones. It is higher (100-500m), but not as long (150km) as the Baltic Klint, and does not have the same scientific value in its geomorphology, stratigraphy and palaeontology. The escarpments of the Southern Ontario Lowlands of Canada (Black River Escarpment, the Magnesium Limestone Escarpment and the Niagara Escarpment), have, like the Baltic Klint, formed at the transition zone between shield and platform. The Black River Escarpment is a low (7-23m high) cuesta formed in Upper Ordovician limestones, while the longer (750km) and higher (540m) Niagara Escarpment is locally reported to contain 'some of the best exposures of rocks and fossils of the Ordovician and Silurian Periods (405-500 million years old) to be found anywhere in the world.' Another well-known North American example is the 300m high Helderberg escarpment, near Albany, New York State, formed of Middle and Upper Ordovician rocks, in places with a capping of Silurian and occasionally Devonian strata. The nomination ascribes a particular significance to the age of the Klint landform, but whilst it is clear that the rocks of the Klint are unusual in having remained near the Earth's surface for a long period of time, the landform itself has a complex history and its present form probably owes much to recent and ongoing processes operative during the Quaternary.

The cliff face of the Klint has a distinctive physical form, particularly in the east of the country. However it never rises more than 56m above sea level and rarely is the unbroken face more than 30m high. As a physical feature it does not rank with the great sea cliffs of the world, such as Ireland's cliffs of Moher (230m high) or the Giant's Causeway Coast; the Kalaupapa peninsula, Molakai, Hawaii; Disembarco del Granma, Cuba; the Nullabor coast, Australia; or even the post-glacial raised cliff-line that borders the southern coast of Iceland. There are also a number of marine cliff sites on the World Heritage List, such as the Dorset and East Devon Coast, which demonstrate much greater scale and variety of forms.

In summary, IUCN considers that the geomorphological interests of the Klint are of regional importance, but fall short of the standards required to demonstrate outstanding universal value.

3.2 Stratigraphy and Palaeontology

The Klint is formed of Upper Cambrian and Lower and Middle Ordovician marine deposits, with an associated fossil fauna. There are many other exposures of strata of these ages around the world. The stratigraphy is distinguished by being relatively unaltered by geological processes since deposition, however it has many comparators in terms of the record of earth's history of greater extent, completeness and importance relative to historic and modern study.

In relation to the record of life, the Cambrian and Ordovician periods were important in seeing a planet-wide Cambrian Explosion of Life, followed by a rapid diversification of marine life (termed the Great Ordovician Biodiversification Event). The most important of the world's Lower Palaeozoic fossil sites are Chengjiang (China), the Sirius Passet Formation (Greenland), the Baltic 'Orsten'-Alum Shale (Sweden), the Soom Shale (South Africa), the the Utica Shale of New York State (USA), the Burgess Shale in Yoho National Park (Canada), and the Gros Morne National Park (Canada). The last two are existing World Heritage properties. In comparison with the Baltic Klint, with the exception of Gros Morne, all of these are sites where soft-bodied animals have been preserved, and the Burgess Shale, the Chengjiang and the Soom Shale are recognised as

the most important Lower Palaeozoic lagerstätten. The Klint deposits are a very good, but not globally outstanding, example of the more normal preserved (i.e. preserving hard but not soft parts) fossil remains of the Lower Palaeozoic, which are known from a substantial number of localities worldwide. The fossils of the Baltic Klint certainly have a particular importance within Europe as one of the best records of the fossil faunas of the Baltica palaeo-continent, and have made a number of contributions to international studies of various Lower Palaeozoic groups. However these values are not sufficient to be regarded as being of outstanding universal value, and are considerably removed from the values embodied in fossil sites that have been inscribed on the World Heritage List to date.

4. INTEGRITY

4.1. Legal Status and Ownership

All eight reserves in the serial nomination are protected under the Act on Protected Natural Objects (1994 and 1998) and the Nature Conservation Act (2004) and as such are subject to special protection measures. The status of the sites is shown in Table 2, although it should be noted that land reform is still underway in Estonia.

In legal terms, Osmussaar, Pakri, Türisalu and Ontika Landscape Reserves were designated under the Act on Protected Natural Objects (1994 and 1998). The Tsitre-Muuksi escarpment forms a part of the territory of Lahemaa National Park, revised protection rules for which were approved in 1997. The Ülgase Nature Conservation Area and Päite and Udria Landscape Reserves are currently subject to temporary restrictions of economic activity under Ministerial Regulation 24, April 2004, until protection rules receive state approval. IUCN considers that the legal protection for the property meets the necessary integrity requirements of the Operational Guidelines.

4.2. Boundaries

The boundaries of the properties are clear and uncontroversial. None of the reserves have a buffer zone, which, because they are primarily geological and landscape reserves, is not deemed necessary. The sensitive zones of each reserve are the seaward facing cliff, the Klint forest and the beach; these being naturally protected between the cliff and the sea. As there is negligible tide in the Baltic, there is no intertidal zone to protect and the property stops at the shore line. The only properties that do not have a coastline are Ülgase and Tsitre-Muuksi escarpments, but these are buffered within other protected areas (Rabala Historical/Cultural Reserve and Lahemaa National Park respectively). In relation to the representation of the Baltic Klint as a whole, the extent of the landform included within the nominated series is relatively small, and the nomination does not give a clear account as to whether the interests in Russia and Sweden are adequately represented by the series in Estonia. It is, however, understood that the majority of good exposures of the Klint lie within Estonia.

4.3. Management

The eight reserves of the serial property are zoned into special or limited management zones. In Special Management Zones all use of natural resources is prohibited, while in Limited Management Zones some economic activity is allowed but is regulated. Permissible or non-permissible activities in these zones are the subject of protection rules and each protected area has its own set of protection rules.

The management authority of the reserves lies with the Ministry of the Environment and is executed centrally through its recently formed (1 January, 2006) State Nature Conservation Centre (SNCC). The SNCC is also the body responsible for administering the overall management of any possible future World Heritage property. As all the 8 component sites are Natura 2000 sites, the SNCC is responsible for regular reporting on the conservation management of these areas to the European Commission.. Day-to-day management of the reserves is undertaken by four staff of the relevant SNCC Regional Departments. Co-operation with local municipalities and county governments in the management of the reserves remains an important priority. Under these new arrangements on-going ecological research and monitoring, and conservation and recreational management tasks will continue to be funded by the State (Environment Ministry and Environmental Fund), local authorities, and with the help of volunteers. A specific budget for the management of the proposed World Heritage property has not been decided.

Management plans and site-specific protection rules have been agreed for three reserves (Osmussaar, Pakri and Türisalu Landscape Reserves). Management plans for Ontika Landscape Reserve and Lahemaa National Park (Tsitre-Muuksi Escarpment) are under preparation, while those for the Ülgase Nature Conservation Area, and the Päite and Udria Landscape Reserves, remain to be started.

4.4. Threats and Human Use

The only reserve with any permanent residents is the Ontika Landscape Reserve, which has about 200 residents in the Limited Management Zone and Osmussaar which has 3 permanent residents. The main economic pressures in the reserves come from animal grazing (mainly sheep) and recreation. The most intensively visited reserves are Pakri, Türisalu and Ontika. Visitor numbers are also high at the Tsitre and Muuksi escarpment. However, neither grazing pressure nor recreational impacts on the reserves are serious. The only exception is at Türisalu, a site adjacent to a principal road and car park, which suffers from high seasonal visitor numbers to the beach, with resulting trampling and littering. The dumping or wind-blow of litter (and in some cases substantial objects, such as cars) over the cliff of most reserves remains a problem. There are good attempts throughout the property to manage visitors through construction of designated pathways and the distribution of interpretation panels and leaflets, while visitor viewing platforms have been constructed at the Pakri and Ontika reserves.

Table 2. Legal status of component sites in nominated property

Reserve	State ownership	Private ownership	Comment
Osmussaar Landscape Reserve	100%		
Pakri Landscape Reserve	30%	70% private ownership or due to be released to private hands	All still in state use. Area beneath the Klint (Special Management Zone) to remain in state ownership
Türisalu Landscape Reserve		100%	
Ülgase Nature Cons. Area		100%	
Tsitre-Muuksi Escarpment in Lahemaa National Park	100%		State ownership as part of Lahemaar National Park
Ontika Landscape Reserve	90%	10%	More land above Klint likely to pass to private ownership. Area beneath the Klint (Special Management Zone) to remain in state ownership.
Päite and Udria Landscape Reserves	57%	43%	

Many of the reserves are beginning to experience increased visitor pressure. The Lahemaa National Park receives an estimated 100,000 visitors annually, while the Türisalu and Ontika landscape reserves are heavily visited, especially the former which is located near Tallinn and has a good beach. The national and regional authorities are investing in the interpretation of sites, with all now displaying good information panels. There is also a range of very good interpretive literature and a number of visitor centres have been opened in recent years. Perhaps of greatest influence in linking all of the reserves is the opening of the Estonian section of the E9 European Long-distance Footpath, which traverses the whole of the north Estonian coastline.

Due to their coastal locations, all of the reserve areas were formerly in the possession of the Soviet Army. While there have been considerable efforts to clean-up the most seriously polluted sites, residual impacts remain (e.g. abandoned buildings and military hardware littering sites, and possible residual ground pollution). In the Pakri and Türisalu reserves old military debris remains a problem, while material dredged from the Paldiski harbour occasionally washes ashore. A principal concern is the impact that a possible future oil spill related to the Alexela Oil Terminal, Paldiski, might have on the Pakri Landscape Reserve, although a contingency plan to protect the geology and wildlife of this reserve is apparently in place. At the eastern end of the site a similar threat occurs at Sillamäe, where a large tailing pond for settling the highly polluted water (radio-active waste and oil shale ashes) discharged from the SILMET plant has been built into the Baltic Sea. This site is currently undergoing clean-up, but until this is complete there remains the threat of leakage into the Gulf of Finland. In the same area, the Ontika Landscape Reserve suffers from poor air quality because of the nearby Kohtla-Järve chemical and thermal power plants.

5. ADDITIONAL COMMENTS

5.1. Justification for serial approach

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

(a) What is the justification for the serial approach?

A serial approach is justified for this nomination because good exposure and accessibility is discontinuous. The eight reserves that make up this serial property represent the best scientific and most accessible sites for geological research, public enjoyment and nature conservation. They are well-chosen to show the variations in the geology and landform of the Klint, at least within the Estonian sections.

(b) Are the separate components of the property functionally linked?

There are tangible scientific linkages between the sites, and they are linked functionally as reserves managed by the SNCC of the Ministry of the Environment (although not as yet with a single dedicated management programme), and for recreational purposes by the E9 European Long-distance Footpath.

(c) Is there an overall management framework for all of the components?

While all of the component parts fall under the management authority of the SNCC, they are managed individually on the ground by regional staff. However, consistency of management is ensured by the centralised planning and administration provided by the recently re-organised SNCC and the necessity of managing the eight reserves as Natura 2000 sites to a common high standard. An overall administrative unit within the SNCC is foreseen should the propoerty be inscribed on the WH List.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

Although the original nomination cited three natural World Heritage criteria, the State Party has subsequently confirmed that this serial property is nominated under natural criterion (i) only.

Criterion (i): Earth history and geological features

The Baltic Klint is notable as a long coastal escarpment. However such features are ubiquitous and commonplace on the surface of the Earth. Within the world's escarpments, the Baltic Klint is surpassed by many sites in terms of both height and length. As a coastal landform the Klint is also surpassed by many sites world-wide in terms of scale and diversity.

The Klint displays a geological significance related to the history of the earth and record of life that is of regional importance in providing an understanding of the palaeogeography and palaeontology of the 'Baltica' continent. However, taking a global basis for comparison, there are a large number of sites of equivalent or greater value for stratigraphy and palaeontology of these periods elsewhere in the world. IUCN, therefore, considers that the nominated serial property does not meet this criterion.

7. RECOMMENDATION

IUCN recommends the World Heritage Committee **not to inscribe** the Baltic Klint (Estonia) on the World Heritage List on the basis of natural criteria.

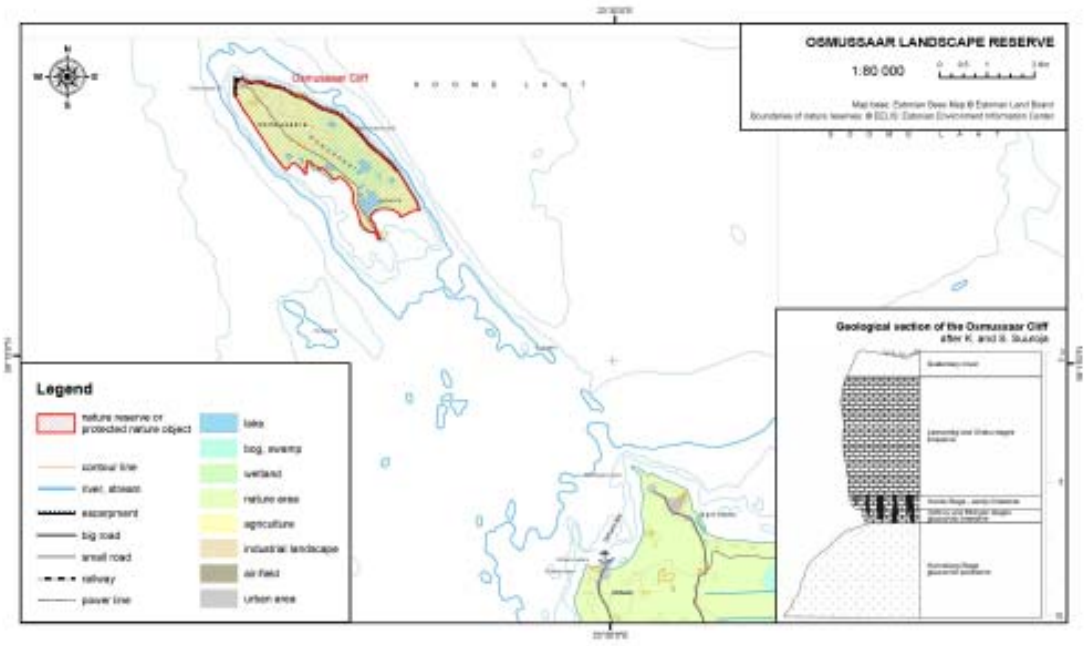
The World Heritage Committee may, however, wish to congratulate the State Party on the development of a coordinated approach to the management of the Baltic Klint. IUCN recommends that the Committee encourage the State Party to further develop the valuable work put into preparing the World Heritage nomination through the investigation of more appropriate mechanisms to recognise the values of the Baltic Klint, and through continued support for the management of the protected sites that make up the nomination. Appropriate mechanisms might include promotion via the European and UNESCO Geoparks programmes.

IUCN recommends that the World Heritage Committee should note with appreciation the leadership and continuing commitment by the State Party to restoring the integrity of the coastal environment, following previous environmental pollution.

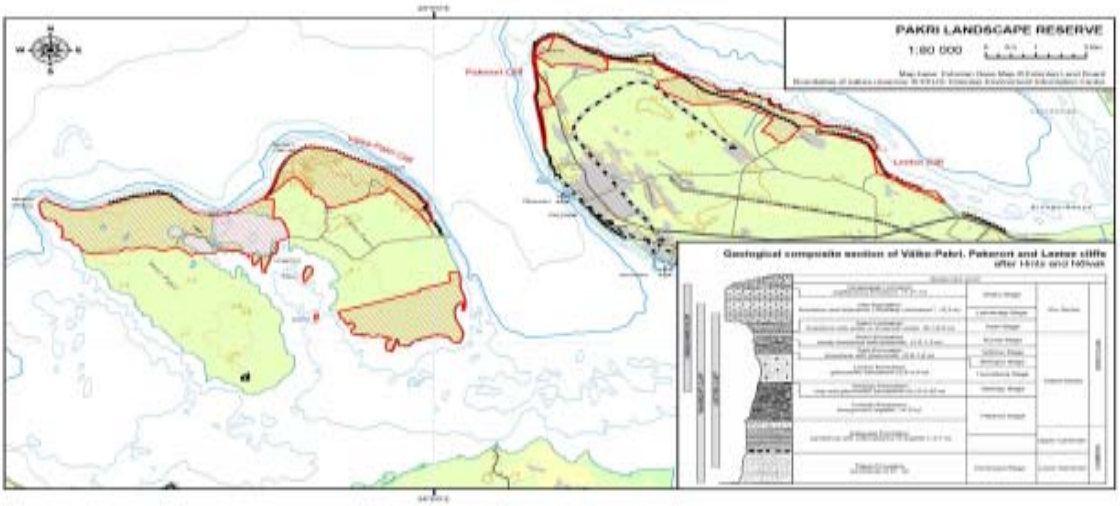
Map 1: General Location of Nominated serial property

Fig. 1. Locality map showing the full extent of the Baltic Klint from Öland, Sweden, through North Estonia to NW Russia and the eight sites from North Estonia included in the nomination.

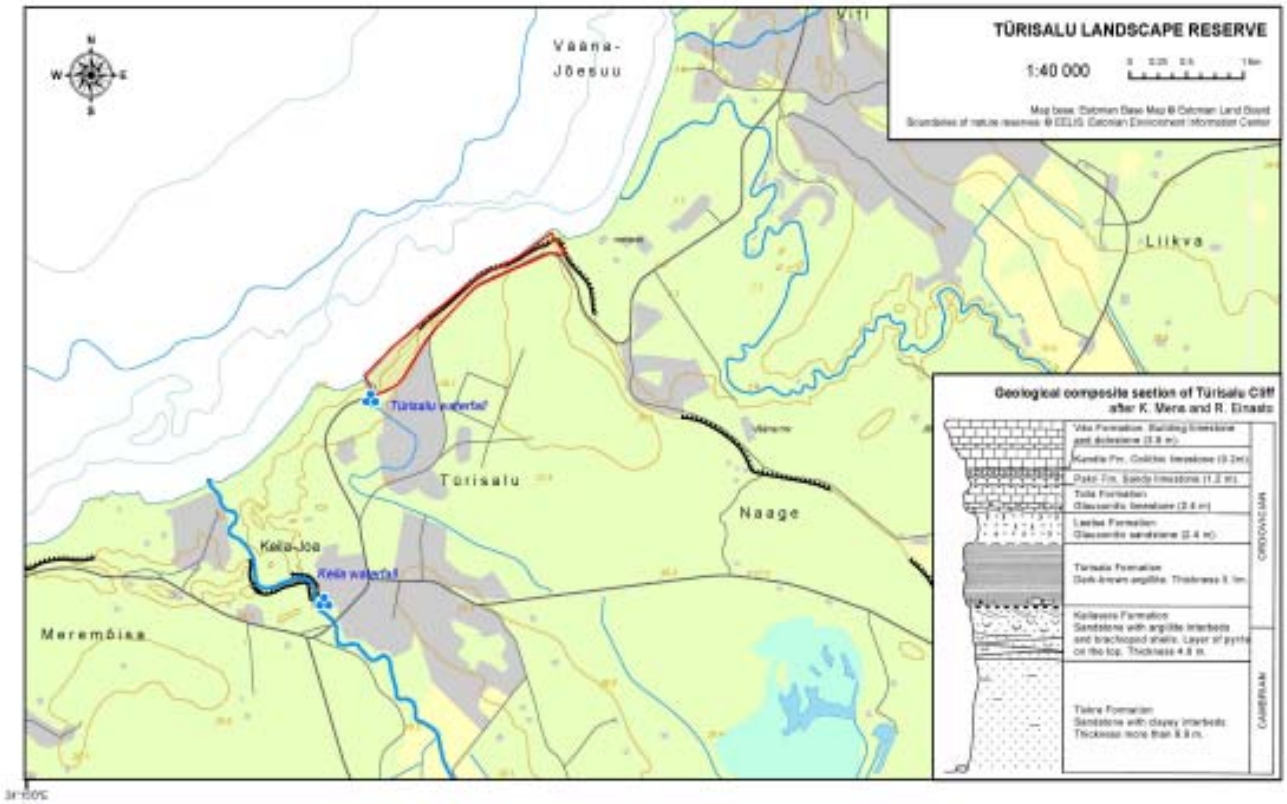
Map 2: Osmussar Cliff



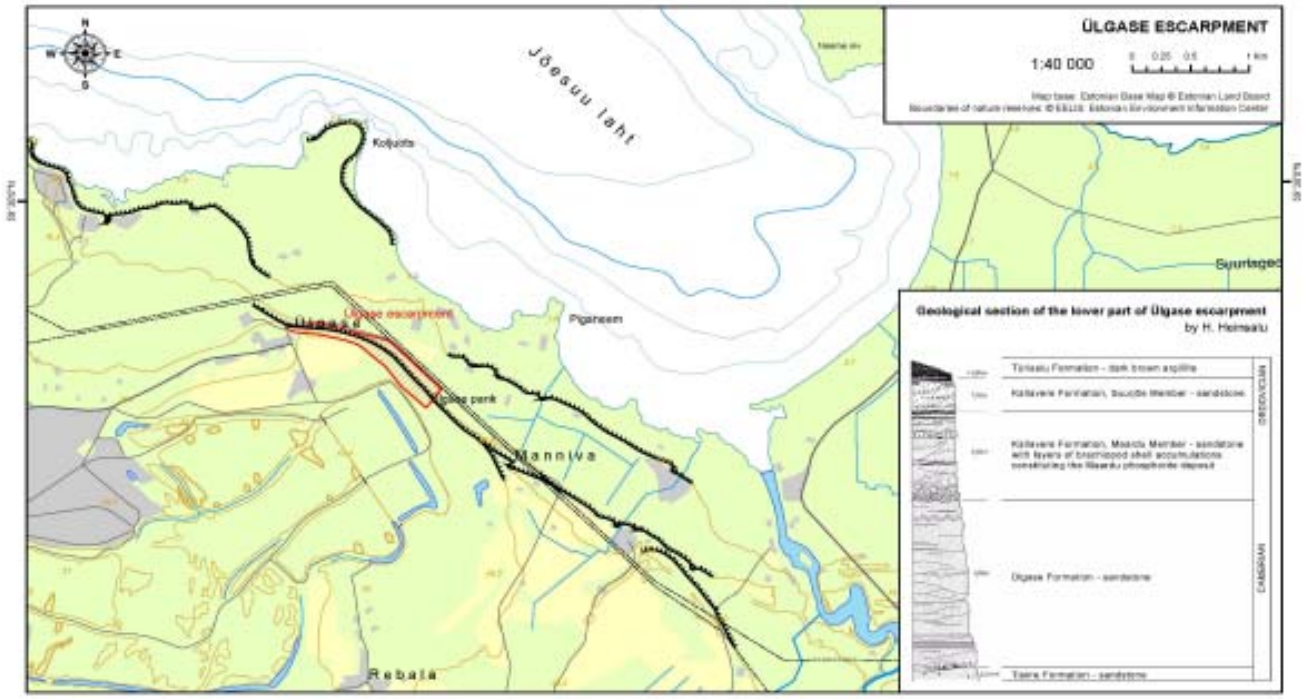
Map 3: Pakri



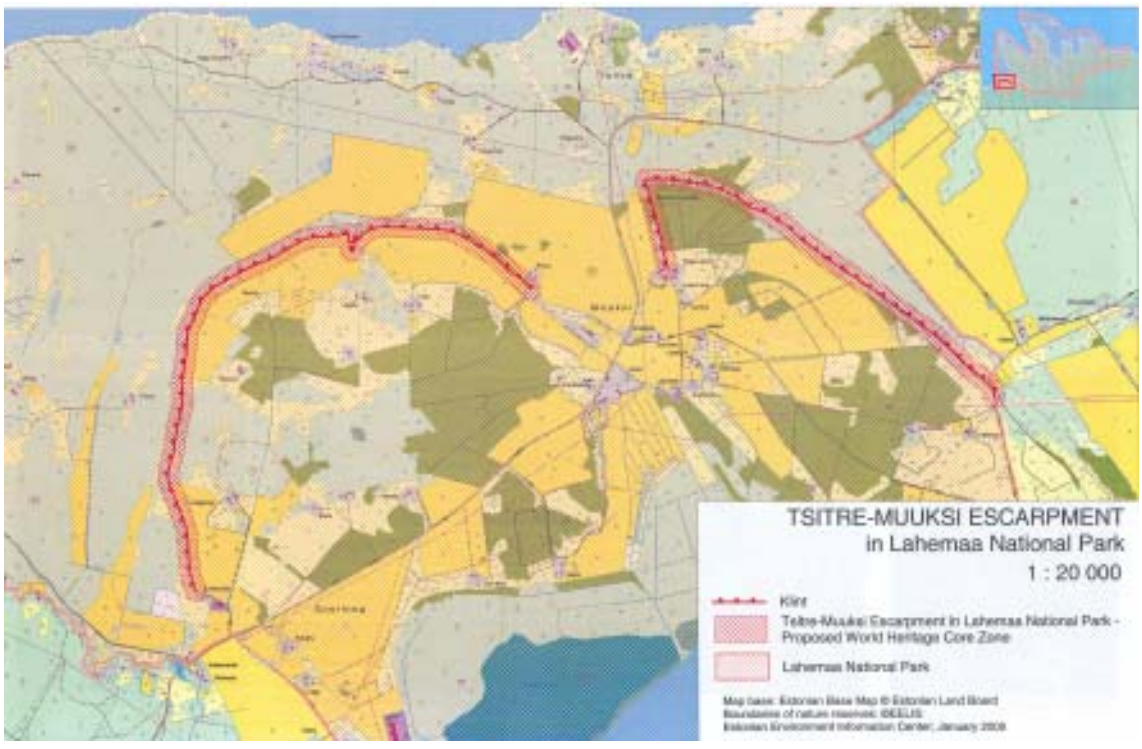
Map 4: Türisalu Cliff



Map 5: Ulgase



Map 5: Tsitre- Muuksi Escarpment



Map 6: Saka-Ontika-Toila Cliff

Map 7: Paite and Udria

This map shows both the Päite and Udria component of the proposed serial World Heritage property. Päite Cliff, which was previously proposed as a part of Udria Landscape Reserve, was established as a separate Päite Landscape Reserve with its own protection rules in 2005.

EUROPE / NORTH AMERICA

THE GREAT RIFT VALLEY MIGRATION FLYWAY
THE HULA

ISRAEL

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE GREAT RIFT VALLEY MIGRATION FLYWAY, THE HULA (ISRAEL) – ID N° 1219

1. DOCUMENTATION

i) Date nomination received by IUCN: April 2005.

ii) Additional information requested from and provided by the State Party: IUCN requested supplementary information on 15 December 2005 and 31 January 2006, after the field visit and the first IUCN WH Panel. The State Party responses were received on 13 January and 26 March 2006, including supplementary information on Biodiversity and a draft Summary Nomination Statement for the first site in a potential serial transnational nomination.

iii) IUCN / WCMC Data Sheet : 5 references

iv) Additional Literature Consulted : Anonymous, 2002. **Bridging the Rift. Final Report and Recommendations of the Great Rift Valley Expert Meeting**, The Dead Sea, Israel, 30 September-4 October 2002. Israel National Commission for UNESCO, 59 pp. + annexes. Baruch, U. & Bottema, S. 1999. **A new pollen diagram from Lake Hula, vegetational, climatic and anthropogenic implications**. In: Kawanabe, H., Coulter, G.W. & Roosevelt, A.C. (Eds.). **Ancient Lakes, their cultural and biological diversity**. Kenobi Productions, pp. 75-86. Ministry of the Environment 2005. **The right of nature to water in Israel.** 3 pp. www.unep.org/gc/gc23/documents/Israel.pdf. Thorsell, J., Ferster Levy, R. & Sigaty, T. 1997. **A global overview of wetland and marine protected areas on the World Heritage List. A Contribution to the Global Theme Study of World Heritage Natural Sites.** Natural Heritage Programme, IUCN, Gland, Switzerland, 23 pp. + maps + annexes. BirdLife International 2005. **Migrating Soaring Birds in the Middle East and North Africa.** BirdLife International 2005. **Middle Eastern Important Bird Areas.** Scott Weidensaul. 1999. **Living on the wind: Across the hemisphere with migratory birds.** North Point Press, a division of Farrar, Straus and Giroux, LLC, New York, USA. Pistorius, Alan. 1981. **The Country Journal Book of Birding and Bird Attraction.** Norton NY, USA. Buttler, R. Davidson, N and Morrison, G. 2001. **Global-scale shorebird distribution in relation to productivity of near-shore ocean waters.** In Waterbirds, Vol. 24(2).

v) Consultations: 10 external reviewers. Representatives of the Israel National Commission for UNESCO, the Vice Prime Minister's Office, the Hula Valley Administration, Hula Management Committee such as Keren Kayementh Leisreal (KKL), the Lake Kinneret Basin Authority, the Water Commission, the Israel Nature and Parks Authority, several agriculture and tourism stakeholders, the Hula reserve and Lake Agmon area managers, representatives from scientific and monitoring bodies, environmental NGOs, a water law expert, and the National Committee of IUCN, were also consulted.

vi) Field visit: Olivier Hamerlynck, November 2005.

vii) Date of IUCN approval of this report: 11 April 2006

2. SUMMARY OF NATURAL VALUES

The Hula Valley is situated at the northern end of the Great Rift Valley where it is at its narrowest part (4-8 km across). It is a key migratory pathway for close to a million soaring birds over the narrow land bridge that connects Europe, Asia and Africa. The nominated property includes two core areas, the Hula Reserve and Lake Agmon, which are closely connected protected wetland areas (869 ha). The southernmost is the Hula Reserve, a Ramsar site, on a rehabilitated part of the former Lake Hula and connected to the small Einan Springs Reserve. It contains the world's most northerly Papyrus swamp. About 2 km to the north, the 482 ha Lake Agmon is a man-made wetland on the subsided peat soils of the former Hula marsh, fed by a rehabilitated meandering section of the Jordan River, which provides high quality fresh water from the upper part of the watershed. These two protected areas are surrounded by a buffer zone of 5,227 ha which comprises peat lands, agricultural and fish pounds. The total area of the nominated property, including its two core areas and the buffer zone, is 6,096 ha.

The property has been nominated based on its significant role in the Great Rift Valley migratory pathway. The existing freshwater wetlands in a water-stressed region, though small, are the last (or first) staging post before (or after) the migratory birds cross a vast expanse of desert. Considering the current trends in wetland

protection and management in the Levant, where most wetlands have been drained, or so altered that they are no longer ecologically functional for wildlife, the relative importance of the Hula wetlands can be expected to continue to increase. The wetlands provide breeding habitat for two globally threatened resident waterbird species and 18 globally threatened migratory species (IUCN, 2000); most notably for Marbled Teal, Pigmy Cormorant and Ferruginous Duck. The property is of high functional significance for wintering Greater Spotted and Imperial Eagle. There are significant populations of an additional 16 waterbird species at various times of the year, with over 50,000 wintering waterbirds, 10,000 cranes, as well as over 1000 pairs of five heron species. Breeding success of many species in the Palearctic may also be positively influenced by the feeding opportunities the Hula Valley stopover offers in Spring.

The nominated property is also recognised as a major bottleneck[1] for migratory birds (BirdLife International, 2006). In autumn, the one million birds crossing the area include the entire world population of Lesser Spotted Eagle, the entire Palearctic population of White Pelican and Levant Sparrowhawk, and significant populations of White and Black Stork, Common Crane and Honey Buzzard. During migration it is possible to view over 100,000 birds in one day.

In addition to its bird population, the nominated property also offers protection to the Eurasian River Otter and Allenby's Gerbil, both considered threatened (IUCN, 2000). Another 41 mammal species (including a globally threatened subspecies of Fallow Deer), 20 reptiles and amphibians and 21 species of fish are present in the nominated property. Some 357 species of plants have been recorded, eight of which are nationally endangered. The biological diversity across different taxonomic groups is linked to the location of the nominated property at the crossroads of five biogeographical provinces where Palearctic (Eurasian, Mediterranean, Irano-Turanian) and Ethiopian (Paleotropic, Saharo-Arabian) species intermingle.

3. COMPARISONS WITH OTHER AREAS

The property has been nominated under natural criteria (ii), (iii) and (iv) according to paragraph 44(a) of the Operational Guidelines (2002). The State Party is proposing this property as a stand-alone nomination whilst considering its potential as a first step in a serial transnational nomination across the Great Rift Valley.

The case for Outstanding Universal Value is based on the importance of the property in relation to bird migration, particularly for Palearctic birds, in the context of the Great Rift Valley Migration Flyway. This opens a number of key ***technical*** issues and ***integrity*** challenges that require careful considerations by the World Heritage Committee. These are:

Technical issues:

- Bird migration has evolved over a long period of time due to the influence of glaciation and warming of the climate. Therefore, migration is considered a ***global biological*** *phenomenon* in response to a process (cooling and warming of the planet) rather than a process in itself (reviewer's comment, 2006). However, the World Heritage Convention and its Operational Guidelines (OG) are particularly oriented to include outstanding examples of "on-going ecological and biological processes".

- The main purpose of the World Heritage Convention (Article 2) is to ensure the protection of natural features, physiographical formations and natural ***sites***, which should be clearly delineated in the field (paragraph D.43; OG 2002). Thus the Convention is not well suited for dealing with natural phenomenon such as migration that occurs across different geographical patterns over different periods of time.

- In relation to bird migration, the concept of Outstanding Universal Value and associated criteria for natural properties have been applied by the Committee until now to properties that play a significant role for migratory birds; such as Banc d'Arguin National Park (Mauritania); Djoudj National Bird Sanctuary (Senegal); and Ichkeul National Park (Tunisia); just to mention a few examples. The 'case-law' applied by the Committee is in line with expert advice received by IUCN on the crucial need to conserve 'mega-sites' that are critical for the conservation of a variety of migratory species throughout the different existing global migratory routes. A number of these 'mega-sites' have already been well defined through monitoring and research.

Integrity issues:

- Migration is not a discrete phenomenon that can easily be confined to a particular site as different species of birds have different patterns of migration and those patterns may change over time influenced by climate change, destruction of key habitats associated to stop-over areas, and the development of certain types of infrastructure (telecommunications systems, lighthouses, energy transmission lines, etc).

- The property has been nominated under natural criteria. However, it is in itself a modified landscape, subject to active management including economic practices and ecological restoration activities. Furthermore, the case of Outstanding Universal Value for the nominated property is based on the diversity of species that can be ***viewed*** from the Hula Valley twice a year during migration when the birds fly ***over the property***. The maintenance of this phenomenon is not ***depending*** on the nominated property but on the occurrence of a number of conditions at global and regional scales as noted in the point above.

[1] A migration bottleneck is a site at which, during certain, usually relatively short, well-defined seasons of the year, large numbers of migratory birds regularly pass through or over. The concentration of birds at these sites at such times is a consequence of both the site's geographical location and their local topography (BIrdLife International, 2001).

- The nominated property is just one site within the northern part of the Great Rift Valley Migration Flyway that stretches over 7,000 km. In itself the nominated property does not ***contain***, as requested in the conditions of integrity (paragraph 44.b), the necessary elements to ensure the conservation of migratory birds along the flyway. This fact is recognized in the nomination which rightly argues for the need to apply a transnational serial approach along the Great Rift Valley.

The nomination makes a case for criterion (ii) on the basis of its importance as a significant bird migration route and a site that allows the observation, appreciation and study of bird migration. From these assumptions, and taking into account the key points noted above, there are two key questions that need to be addressed in making a comparative analysis for this criterion:

Table 1. Soaring bird migration data for major bottleneck sites worldwide

Route	Country	Annual Count	Number Species	Threatened Species (IUCN)
Nearctic Birds				
Central America	Veracruz, Mexico	3-5 million	29	1
	Panama	2-3 million	15	1
Central North	US (Texas)	1 million	28	1
North America	US (Michigan)	200,000	21	1
	US (Massachusetts)	2-3 million	19	2
Palearctic Birds				
Northern Rift Valley	Israel	1 million	47	5
	Suez (Egypt)	500,000	17	2
Central Rift Valley	Djibouti (Africa)	500,000	26	2
Eastern Europe	Bosphorus (Turkey)	300,000	25	3
Western Europe	Strait of Gibraltar (Spain)	300,000	35	6

Sources: Nearctic migration from www.Hawkwatch.org, Palearctic migration: www.birdlife.org, www.osme.org, www.iucn.org, http://ims.wcmc.org.uk, Weidensaul, S. 1999.

1. How important is the Northern Rift Valley Migration bottleneck in the global context?

From Table 1 it can be noted that, while the Northern Rift Valley is the most import flyway for Paleartic Birds, it is of secondary importance at the global level when compared to the flyway for Nearctic Birds. In addition, the nominated property is just one of the several stop-over sites and other points from which this natural phenomenon can be observed and studied; even within Israel where soaring bird migration occurs as reflected in the map on the following page.

2. How important is the nominated property when compared to other stop-over sites in the global context?

The nomination document and the additional information provided by the State Party argue a case for the property meeting criteria based on its importance as a stop-over site for migrating birds. Therefore, it is essential to also address a global comparison on this issue.

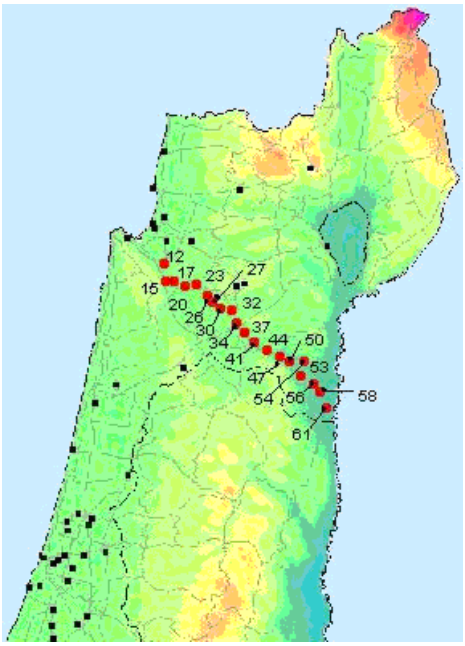
From table 2 it is clear that, while the nominated property is important particularly at the regional level, it does not rank highly at a global level when compared to critically important 'mega-sites' for bird migration, such as the Wadden Sea, Banc d'Arguin National Park and the North coast of Suriname, French Guiana and Brazil.

The property has been nominated under natural criteria (ii), (iii) and (iv). Thus it is necessary to assess how to property stands on these criteria when compared to other World Heritage properties.

The nomination argues that **criterion (iii)** is applied on the basis of the phenomenon of massive, concentrated bird migration. However, as shown in table 1, there are other important migration bottlenecks where this phenomenon can be observed. In fact it is noted that the scientific community considers that Veracruz (Mexico) represents the largest concentration of migrant raptors in the world, and one of the most critical migratory bottlenecks on the planet. Over the years the total count has averaged more than 3 million raptors each autumn (Weidensaul, S. 1999).

Criterion (iii) has been applied to 23 natural World Heritage properties with major wetlands as a result of these being a combination of large natural areas and the wildlife they contain. The nomination argues that in such World Heritage properties "the birds are spread out over time and space, which limits a visitor's ability to

Observing stations for the Northern valleys soaring bird migration survey in Israel



view a few tens of thousands of birds at any time". However, the same argument can be applied to the nominated property as its richness in relation to birds occurs during the migration period, mainly in autumn and spring. The nomination also fails to recognize that properties inscribed under criterion (iii) are the result of a combination of exceptional physiographic features and not only justified on the existing wildlife. This is, for example, the case of Pantanal Conservation Area (Brazil) where the spectacular landscape existing in the area is enriched by the diversity and abundance of wildlife, not only birds. According to previous decisions taken by the World Heritage Committee, it is the quality of the overall natural landscape which merits the application of this criterion. Furthermore, according to the Operational Guidelines, criterion (iii) is applied to properties that "contain" superlative natural phenomena or areas of exceptional natural beauty. In the case of the nominated property, the area does not "contain" a large concentration of birds as the majority of them are in fact just flying over the property or staying as winter or summer visitors. This is a major difference with, for example, the Pantanal World Heritage property as most birds are permanent residents in the property.

In relation to **criterion (iv)**, the nomination document claims the importance of the Hula Valley within the Great Rift Valley Migration Flyway as its wetlands and associated agricultural areas represent an important stop-over site for migrating birds crossing this arid zone. However, as the nomination document fully recognises, there are other important wetlands that serve as stop-over sites for migrating birds using this flyway. From these wetlands, 17 have been recognised under the Ramsar Convention, including the wetlands complex of Lakes Baringo, Bogoria, Nakuru and Naivasha, which has also been nominated for World Heritage status (Great Rift Valley Lake Reserves, Kenya) but deferred for further work by the State Party. In a flyway that stretches over 7,000 km it is, as recognised in the nomination document, essential to apply a serial approach. However, the first property for inscription in a phased approach should be of Outstanding Universal Value in its own right, as noted in the Operational Guidelines. Considering the results from the comparative analysis it is not clear that the Hula Valley is fulfilling this requirement.

4. INTEGRITY

4.1 Legal status and ownership

The State of Israel owns all the land of the core areas in the nominated property. The non-reserved land is leased under special agreements by various farming associations from settlements under the jurisdiction of the Upper Galilee Regional Council. Within the core area, the Hula Nature Reserve was established in 1964 and designated as a Ramsar site in 1996. A Keren Kayementh Leisreal (KKL) started the Lake Agmon restoration project in 1994 and its protection and management is governed by the hydrological and ecological provisions under this project, which ensures an adequate status of protection. Since 1999, its immediate surroundings are designated for tourism development, operated by a local cooperative.

4.2 Boundaries

The two core areas of the nominated property and the buffer zone form a distinct and logical management unit within the Upper Jordan River catchment. However, the freshwater wetlands that form the core areas are small and dependent on human intervention for their water supply. Upstream from the property the emphasis is on maximising water quality and flow to Lake Kinneret. The property uses part of this water to maintain the wetland functions and to minimise the contamination of the water by nutrients from the peat. Most of the peat water, as well as the outflow from the fishponds and the town are locally purified, partially pumped out of the catchment for use in orchards on the western flanks of the Naftali range and partially diluted for use in the Reserve. The core areas and buffer zone are functionally linked and the two core areas are geographically close.

Table 2. Comparison showing key stop-over sites for migrating birds.

SITES	TOTAL NO. OF BIRDS	COMMENTS/SOURCE
Europe		
Wadden Sea (The Netherlands, Denmark and Germany)	2.2 - 2.6 million	Coastal wetland, small islands (Meltofte et al, 1994) (Included in Tentative List of SPs)
Sivash Gulf (Ukraine)	0.98 - 1.24 million	Chernicko et al, 1991
Greater Thames Estuary (UK)	300,000	Wetlands ecosystems (sources International Waterbird Census)
Doñana National Park (Spain)	420 - 450,000	World Heritage property, 365 species of birds (OAPN, 2004).
Africa		
Banc d'Arguin National Park (Mauritania)	2.06 million	World Heritage property, 20 species of birds recorded (Zwarts et al, 1998)
Archipelago dos Bijagos (Guinea Bissau)	750,000	Islands and Wetlands ecosystems (Zwarts, 1988)
Djoudj National Bird Sanctuary (Senegal)	1.5 - 2 million	World Heritage property, 123 species of birds (UNEP-WCMC, 2003).
Ichkeul National Park (Tunisia)	400,000	World Heritage property, 185 species of birds (UNEP-WCMC, 2003).
Lake Bogoria National Reserve (Kenya)	2 million	Deferred site for WH listing, 351 species of birds, located within Rift Valley Migratory route (IUCN, 2001)
Lake Nakuru National Park (Kenya)	1.5 million	Deferred site for WH listing, 480 species of birds, located within Rift Valley Migratory route (IUCN, 2001)
Middle East/ Indian Ocean		
Arabian Gulf (Gulf States, Saudi Arabia and Iran)	4 million	Wetland ecosystems associated to dessert ecosystems (Zwarts et al,1991).
Hula (Israel)	1 million	Wetland ecosystems associated to dessert ecosystems, 313 species of birds (Nomination document)
North America		
Central Yukon-Kuskokwim River Delta (USA)	1 - 2 million	Riverine and coastal wetland system (Gill and Handel 1990)
Everglades National Park (USA)	450 - 480,000	Largest mangrove ecosystem in the Western Hemisphere, 400 species of birds, (UNEP-WCMC, 2002).
Laguna Ojo de Liebre (Mexico)	100 - 150,000	It forms part of El Vizcaino WH property, 127 species of birds (UNEP-WCMC, 2001)
South America		
North coast of Suriname, French Guiana and Brazil	2.1 million	Include some of the best pristine natural areas in the continent, a number of sites considered in the Tentative lists of States Parties, over 300 species of birds (Morrison & Ross, 1989)

The trend in the agricultural land in between is for an increased role of management for conservation (woodlands, temporary wetlands). Though the process of peat subsidence has been slowed, the areas to the north of the Lake Agmon are still losing agricultural value and this is likely to lead to expansion of the wetlands in the near future. However, this nomination also poses the question of whether the boundaries should include the airspace above the nominate property in order to enforce the protection of birds flying over the property.

4.3 Management

The core areas contain a variety of wetland types with flowing, permanent and temporary open water, floating vegetation, marshes, reedbeds, etc. in a predominantly dryland area. Though small and largely rehabilitated or man-made, the core areas have an adequate level of protection especially since the quality and quantity of water supplied has improved (2002) and its provision has become legally binding (2004).

There are two approved management plans under implementation, one for the Hula Reserve (1975) and one for Lake Agmon and the buffer zone (1999) and a comprehensive plan for the entire nominated property is being developed within the framework of the development plan for the entire catchment. The managing authority of the property is a nested set of committees dealing with a variety of issues, working under the auspices of an overarching Hula committee in charge of the entire valley. Each committee includes representatives from different levels of government, from non-governmental and community organisations and from other stakeholders.

There is substantial management capacity on the property. The reserve has six permanent staff and Lake Agmon has two, which is adequate as the stakeholder association runs the visitor centre and manages the tourism. Stakeholder-farmers in the buffer zone have a high level of understanding of the management issues and are actively involved. The entire watershed is closely monitored and intensively researched and the results are directly fed into management through the four committees. There is additional support on management and conservation issues from various KKL departments, from the science division of the Nature and Park's Authority and environmental NGO's. This is especially effective in the prevention of damage to crops and fishponds, important to ensure continued farmer stakeholder support. The main source of income for management activities is from entry fees; whilst the Water Commission and KKL are the main contributors to Lake Agmon. Local farmers also contribute financially to the management of the nominated property, representing 10% of the budget.

In the buffer zone there are detailed instructions on land use practices (permanent green cover, high water table) and restrictions on pesticide and fertiliser use. There is close collaboration between the farmers and the conservation organisations to reduce damage to crops and fishponds while still providing enough food for bird energetics (fish stocking in the reserves, crane feeding, etc.). Because of the importance of the catchment for the nation's water, the development plans for the Upper Galilee Region are restrictive on industrial and housing development and emphasize the maintenance of high quality open areas, favouring the development of conservation and ecotourism. Local farmers are actively investing in tourism, which is increasingly a source of income to replace farming.

The hydrological management of Lake Hula, the establishment and rehabilitation of the Hula Reserve, and the creation of Lake Agmon, have all been accompanied by substantial research efforts and these are continuing with a strong component of international collaboration, e.g. EU Life 'land of flowing waters', Duke University, the German funded programme 'Global change in the hydrological cycle' (GLOWA) on five river basins including the Jordan River. Bird migration has become a hot research topic internationally and a number of top researchers are actively involved in research within the nominated property and the overall Great Rift Valley Flyway.

4.4 Threats

In contrast to much of the region, where hunting is considered the main threat to migratory birds (BirdLife International, 2003), hunting is not a major activity in Israel (5000 licences, 80% of which are mainly targeting non-migratory dryland species such as partridges and wild boar).

Visitor management is well regulated and includes obligatory parking at the visitor centres, the provision of a range of internal transport options at Lake Agmon (bicycles, electrical carts, buses, mobile hide, etc.), tourist trails and viewing opportunities from hides. However, visitor pressure is on the increase, with 250,000 visitors per year at present and it is expected to reach 500,000 in the next 2-3 years. The expanding network of nature trails and hides on the property will accommodate this, though portions will remain closed and dedicated to conservation and research. Increasingly the public is diverted to the wider surroundings by the development of trails to the north of the property and in the Naftali range, where additional lookouts are under construction.

Long-term severe drought could seriously damage the area, even though the water supply is legally guaranteed. In such a situation, water shortage in the core areas will harm breeding birds in particular. Climate change is an important driving force in the evolution of bird migration and current trends will affect migrating birds, e.g. by shortening some migration flyways with more birds remaining in more northerly areas and making it difficult for others when staging posts in between are lost. Actively managed and conserved stop-over sites will tend to become more important for the survival of individual birds species. In addition, the security situation in the region remains volatile and armed conflict, with damage to management infrastructure, is a possibility.

Finally, whilst this section addresses the conditions of integrity of the nominated property, it is essential to emphasize that, as noted in section 3 above, the property on its own cannot ensure the conservation of the different birds species using the Great Rift Valley Migration Flyway. This, as noted in the nomination document, requires a concerted effort of the States Parties sharing this important natural phenomenon.

5. ADDITIONAL COMMENTS

5.1 Other values: The peat soils of the nominated property contain an excellent paleo-ecological record, quite unique in a region where wetlands that accumulate organic matter over extended time periods are scarce. Whilst some areas have been analyzed for pollen, the peat may still yield additional information on climatic

and ecological changes in the region over the past few hundred thousand years.

5.2 Justification for Serial Approach: The Great Rift Valley is a unique geological feature but also an important migration route for wildlife, mainly for mammals and birds. The flyway contains a number of stopover sites, usually wetlands, as well as bottlenecks for migratory birds, where large concentrations can be observed and where birds are also most vulnerable for their conservation. A serial nomination is expected to link up the most important sites along the flyway, from which the Hula Valley should potentially be one of them. However, the nomination as well as the additional information provided by the State Party, whilst recognising the need for a serial approach, does not include any plan for nominating a number of sites that should form such serial transnational nomination; neither is it clear what the actual commitment from different States Parties is in order to work together in preparing such a serial nomination. Therefore, at this point, IUCN considers it premature to make any assessment on a potential serial nomination for the Great Rift Valley Migration Flyway.

6. APPLICATION OF CRITERIA/ STATEMENT OF SIGNIFICANCE

The Great Rift Valley Migration Flyway, the Hula has been nominated under natural criteria (ii), (iii) and (iv).

Criterion (ii): Ecological processes

Bird migration is a global natural phenomenon that cannot be associated to a single site. Whilst the nominated property offers an important window into this phenomenon, it cannot be considered in itself the best example representing it. The essential ecological processes occurring in the nominated property are currently maintained by human intervention. Furthermore the migration process can only be sustained if other key sites along the Great Rift Valley can continue to provide stop-over functions to migratory species. As noted in section 3 there are other sites along this flyway that play a much more important role as stop-over sites for migratory birds. Therefore, the nominated property cannot be considered outstanding in its own right to support the conservation of migratory species along the Great Rift Valley Migration Flyway, which requires a serial transnational approach. IUCN considers that the nominated property does not meet this criterion.

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

The visible part of the autumn bird migration observed at the nominated property, where thousands to tens of thousands of soaring birds of dozens of species can be seen in a single day, is a result of a global phenomenon instead of being directly linked to the natural features of the nominated property. Whilst the property and wider surroundings including the Great Rift Valley escarpments are aesthetically pleasing, these features do not rank highly when compared to other properties already inscribed under this criterion in the World Heritage List. IUCN considers that the nominated property does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

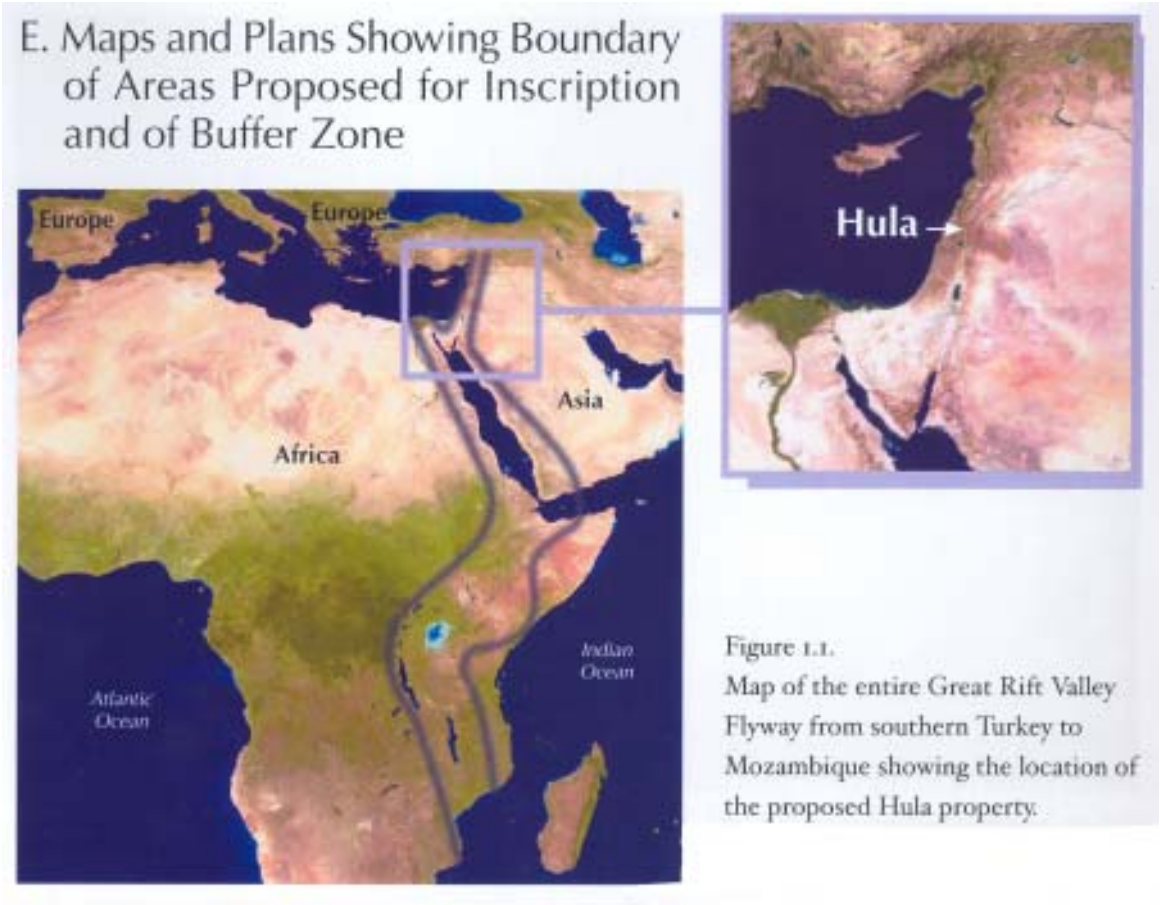
Whilst the nominated property is an important stop-over site for a number of globally threatened bird species such as for the Marbled Teal (breeding) and Greater Spotted and Imperial Eagles (migrating and wintering), the nominated property is functionally of regional significance in the context of the Great Rift Valley Migration Flyway and does not rank as highly as other important stop-over sites worldwide. IUCN considers that the nominated property does not meet this criterion.

7. RECOMMENDATION

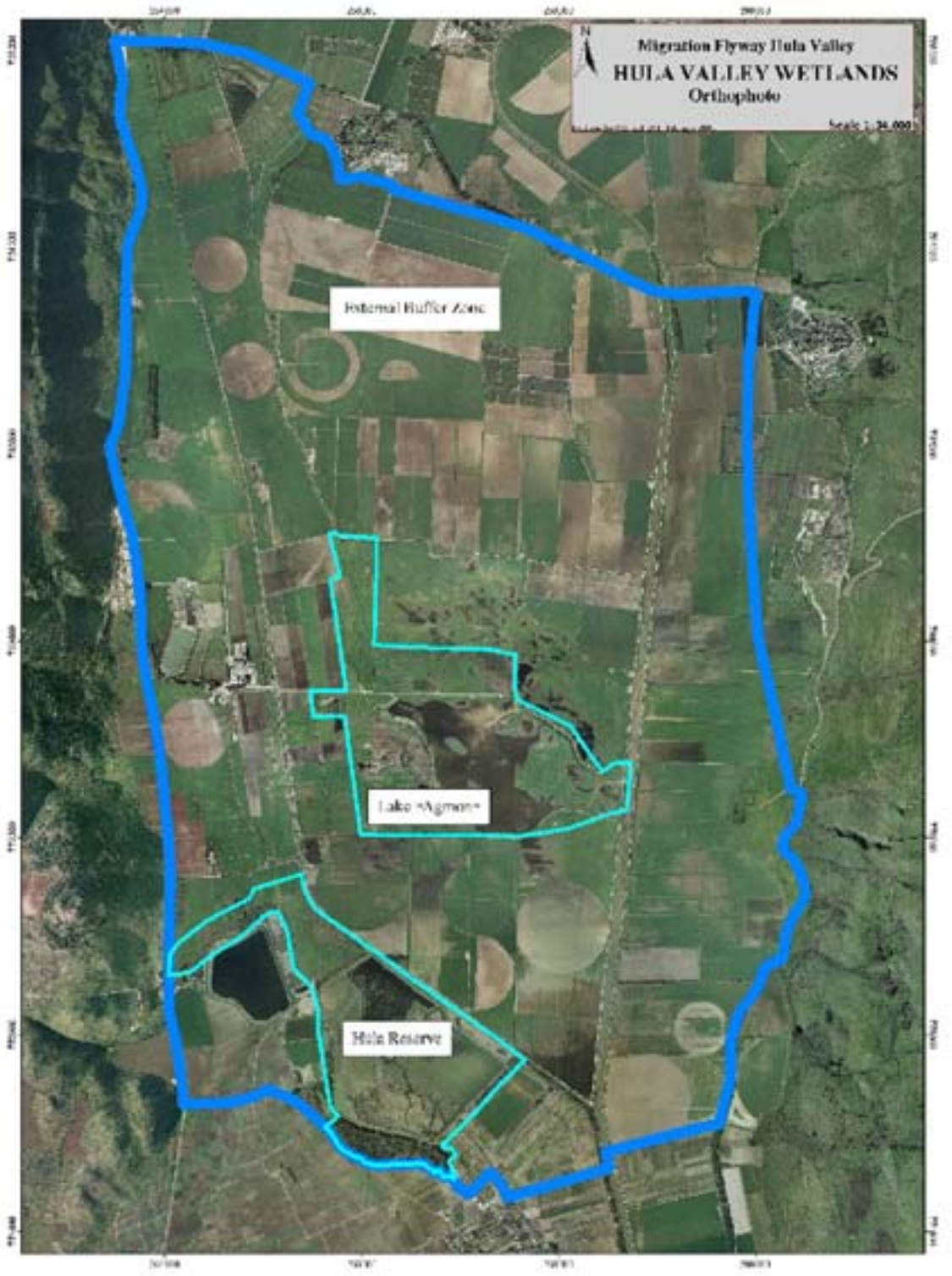
IUCN recommends the Committee **not to inscribe** the Great Rift Valley Migration Flyway, the Hula (Israel) on the World Heritage List on the basis of natural criteria.

IUCN congratulates the State Party of Israel for its efforts in promoting a serial nomination for the Great Rift Valley Migration Flyway, and encourages other States Parties located within this region to work together in preparing a serial transnational nomination addressing the different values existing in the Great Rift Valley.

Map 1: Location of nominated property



Map 2: Boundaries of nominated property



EUROPE / NORTH AMERICA

DINOSAUR ICHNITE SITES OF THE IBERIAN PENINSULA

SPAIN

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

DINOSAUR ICHNITE SITES OF THE IBERIAN PENINSULA[1] (SPAIN) – ID N° 1204

Explanatory note on the extent of the nomination: The nominated property comprises 216 surface exposures of rocks containing dinosaur footprints in Spain. These localities are identified by the State Party as the 'basic sites' of the nomination. The nomination identifies and describes in detail 35 sites selected from within the 216 basic sites. In fact these 35 'selected sites' include 51 of the basic sites as some of these have been grouped in a number of clusters. IUCN's evaluation report is based on the evaluation mission, which visited the 35 'selected sites' described in the nomination document, and where maps have been received to the scale and level of detail required by the Operational Guidelines. The reports received from external reviewers also focused on the assessment of the 35 'selected sites'. As noted in section 5 of this report there remain issues regarding the extent of the nominated property, and the practicalities of inclusion of 216 basic sites.

1. DOCUMENTATION

i) Date nomination received by IUCN: April 2005

ii) Additional information requested from and provided by the State Party: The State Party provided supplementary information on the 2 November 2005 following the IUCN field visit, and on the 29 March 2006 (by email), following questions from the IUCN World Heritage Panel in January 2006. Hard copies of the supplementary information, including detailed maps not received by email on 29 March, arrived on the 3 April at the World Heritage Centre and 10 April at IUCN. The new maps were therefore not examined.

iii) IUCN/WCMC Data Sheet: four references

iv) Additional Literature Consulted: Thulborn, A. (1990). **Dinosaur Traces**. Chapman and Hall, London, 394pp.; Lockley, M. and Meyer, C. (2000). **Dinosaur Tracks and Other Fossil Footprints in Europe**. Columbia University Press. New York, 323pp.; Lockley, M. (1991). **Tracking Dinosaurs.** Cambridge University Press, 252pp.; Lockley, M. and Hunt, A. (1995). **Dinosaur Tracks and Other Fossil Footprints of the Western United States**. Columbia University Press. 336pp.; Gillette, D. and Lockley. M. (1989). **Dinosaur Tracks and Traces.** Cambridge University Press. 480pp. Pérez-Lorente, F. (2003). **Dinosaurios Y Otros Reptiles Mesozoicos En España**. Gobierno de La Rioja, 444pp.

v) Consultations: 7 external reviewers. The mission also met with representatives of the State Party, regional and local government representatives, scientists and local communities.

vi) Field Visit: Dr Gérard Collin and Dr Patrick McKeever, 22 September – 1 October, 2005

vi) Date of IUCN approval of this report: 11 April 2006

2. SUMMARY OF NATURAL VALUES

The fossil localities: The nominated serial property, the Dinosaur Ichnite Sites of the Iberian Peninsula (Icnitas de Dinosaurio de la Península Ibérica - IDPI), comprises 216 fossil localities, or surface exposures of rocks containing dinosaur footprints (ichnites), within the territory of six Autonomous Communities in Spain: Asturias, Castilla y León, La Rioja, Aragón, Valencia and Catalunya. These localities are identified by the State Party as the 'basic sites' of the nomination. The nomination also identifies 35 sites selected from within the 216 basic sites. These 35 'selected sites' include 51 of the basic sites – some of which have been grouped. The numbers of basic and selected fossil sites within each Autonomous Community is shown in the Table 1.

The landscapes within which the fossil localities are found are varied. In **Asturias** the localities are situated on the seashore, generally on the cliffs or associated to the layer of loose rock debris at their feet. The localities of **Castilla y León** are all located in the northern part of the region (Provincias de Burgos and Soria). The main landscape is a high plateau ("meseta") characterised

[1] The nomination dossier and supplementary information alternatively uses 'in','on' and of in the title of the serial property. IUCN considers that 'of 'may be the most appropriate wording in English.

Table 1. The numbers of basic and selected fossil sites within each autonomous community

Autonomous Community	Selected sites	Basic sites
Asturias	4	18
Castilla y León	9	48
La Rioja	13	110
Aragón	4	17
Catalunya	4	14
Valencia	1	9
Total	**35**	**216**

by a scarce low vegetation and some forestations of pine trees. The areas near the sites are rural, including only small villages. The localities in **La Rioja** are situated at the south of the beginning of the Ebro plain. They are found in the sierras or in the narrow valleys that flow toward the Ebro. The areas near the sites in La Rioja are also rural, although some places in Arnedillo receive a lot of tourist visits. **Aragón** is a mountainous region directly related to the Pyrenees. The localities are situated in remote parts of the region and the landscapes are dominated by sedimentary hills covered by low vegetation. In **Valencia** the localities are located in a landscape of dry plateaus, covered by dry forest and shrubs, most of the streams are seasonal (the site of Tambuc is located in one these dry valleys). The area is rural with mainly fields of almond and olive trees. The sites of **Catalunya** are situated in the mountainous counter forts of the Pyrenees (Serra de Montsec, 1677m high). The landscape is characterised by pasture lands and forests.

The fossil localities are all situated in rural areas, in places where the quality of the landscapes gives an additional interest to the dinosaur ichnite sites. Many of the sites are close to protected areas (Natural Reserve of the Ria de Villaviciosa in Asturias, National Game Reserve of Santa Cruz de Yanguas in Castilla y León, Specially Protected Area of the Canyon del Rio Leza in La Rioja, Biosphere Reserve of Munilla in La Rioja, National Game Reserve of Muela de Cortes de Pallars in Valencia, and Serra del Montsec in Catalunya). These areas protect a range of regionally and nationally important plant species

The fossils: Unlike body fossils which are the static remains of dead animals, trace fossils (or “ichnites”) are sedimentary structures which were made by living animals. As such they provide information directly about the behaviour and ecology of the living animal. However, interpretation of ichnites requires caution. Ichnite shape and size may reflect a number of conditions and not just the physical size of the feet of the animal that made it. The same animal or indeed the same foot can be represented by various types of trackway and print dependent on such things as substrate conditions, speed of movement of the animal at the time and subsequent erosion (leading to undertracks).

The nominated property includes dinosaur ichnites from each period within the age of the dinosaurs (Triassic, Jurassic and Cretaceous periods), although it is questionable whether the property can really be claimed to represent the entire period in question. The record is strongly biased towards second half of the Age of Dinosaurs from the Oxfordian / Kimmeridgian of the Upper Jurassic to the Maastrichtian at the close of the Cretaceous Period some 90 million years later. None of the 35 selected sites, and only one of the 216 basic sites, is from the Triassic Period.

The IDPI localities represent a broad range of environments from a deltaic channel overflow system, as at Faro de Tazones (Asturias) to a lacustrine environment, as at La Cela (La Rioja), to muddy floodplains, such as at Fumanya Sud (Catalunya). These environments represent just some of the Mesozoic environments in which dinosaurs lived. The ichnites themselves are fully representative of the main groups of dinosaur (theropods, sauropods and ornithopods) and often more than one such group is represented at each site.

The 35 selected sites together help to build up a picture of north-east Spain during the second half of the Mesozoic and, in particular, of the lifestyle and behaviour of different groups of dinosaur. The quantity and quality of the trackways, however, is somewhat variable, ranging from large sites of widely acknowledged international importance such as those at Fumanya (Catalunya) and La Era del Peladillo (La Rioja), to sites of more regional or local interest, such as those at Galve (Aragón) and Serrantes (Oris, in Castilla y León). Furthermore the quantity of information is very variable. While this is not to be unexpected given that dinosaur ichnology is a relatively recent area of dedicated geological study, it does mean that the real scientific value of understudied sites such as La Pellejera (La Rioja), where only an estimated 25% of the site has been studied, or Los Tormos (Soria, in Castilla y León) where no behavioural analysis has yet been carried out, has yet to be fully realised. Of course this also clearly means there is wide scope for future study and research.

As a whole, the 35 ‘selected sites’ of the nominated property provide a series of insights into the life of

dinosaurs during the second half of the Mesozoic. The sites provide evidence of a dynamic group of animals with complex social behavioural patterns. While most tracks yield evidence of walking animals, others indicate running, swimming or even jumping animals (La Virgen del Campo, La Rioja). Many of the trackways appear random in orientation while others at individual sites show preferred alignments indicating preferred walking directions or herding. Some surfaces are trampled by numerous prints and trackways and in one spectacular example at Fumanya (Catalunya), two trackways remain parallel to each other even through turns, demonstrating beyond doubt the gregarious nature of these animals. Across the 35 'selected sites', print size is variable from small ornithopod prints such as those at Las Cerradicas (Aragón), to sauropod prints of 125cm across (Playa de la Griega, Asturias), which (the variables involved in print formation aside) are bigger than any skeletal fossil remains recovered anywhere in the world to date. The sites also provide evidence of animals of different ages from family groups with young such as at La Era del Peladillo (La Rioja), to the trackways of old animals such as at La Cuesta de Andorra (La Rioja). The sites of the IDPI are distributed across a substantial area of Spain, although this arguably a relatively small area on the global scale.

3. COMPARISONS WITH OTHER AREAS

While the first dinosaur trackways were recorded in 1802, the study of dinosaur ichnology has only recently become a significant subject of study. Over the last three decades the number of recorded sites of dinosaur trackways across the world has multiplied. The nominated property is certainly rated by reviewers as an area of international importance in relation to the study of dinosaur footprints, but it is not the only such area, and not necessarily the primary area of importance. New findings in Bolivia, dating from near the end of the Age of Dinosaurs, include one trackway over 350m long. The Lark Quarry site in Australia includes 3000 prints and is considered to record a stampede of small dinosaurs some 95 million years ago. At Goseong, Republic of Korea, trackways belonging to Sauropods, ornithopods and therapods are recorded from mid-Cretaceous times. Sites across Colorado, Texas, New Mexico and Utah in the USA record many other types of dinosaur behaviour including herding.

The find in Bolivia at Cal Orcko is the subject of an approved international preparatory assistance request to the World Heritage Fund. In 1998 an international team of palaeontologists assessed this site as the largest site of dinosaur tracks in the world, with the highest diversity of tracks and the longest dinosaur trackway ever found. This site in Bolivia is not discussed in the comparative analysis prepared by the State Party as part of this nomination.

The age of the dinosaurs is already represented on the World Heritage List by three properties with terrestrial fossil remains, although none of these were inscribed on the basis of trackways alone. Ischigualasto-Talampaya in Argentina was inscribed because it contains a complete sequence of fossiliferous continental sediments representing the entire Triassic Period (45 million years) of geological history. The property includes evidence of the earliest dinosaurs as they made their transition from the archosaurs. Moreover it also records the contemporaneous evolution of mammals. Dinosaur Provincial Park (Canada) has yielded over 150 complete dinosaur skeleton, as well as additional disorganised concentrations of bones dating from 75 million years ago in the late Cretaceous. The Dorset and East Devon Coast (United Kingdom) contains rocks, and a series of internationally important fossil localities from all three periods of the Mesozoic, including in an outstanding and accessible marine sequence of Jurassic strata. Terrestrial sediments are rarer and dinosaur trackways here are limited to a short period of time at the Jurassic – Cretaceous boundary. Other palaeontological sites inscribed on the World Heritage List do not contain the remains of dinosaurs.

IUCN notes that the World Heritage Committee has previously taken a strong position regarding the need for fossil sites to be accompanied by a thorough global comparative analysis. Whilst IUCN recognises that the evidence of dinosaurs provided by traces is different from, and complementary to, the evidence provided by skeletal and body remains, it considers that dinosaur fossil sites as a whole should be taken as the framework within which comparison is carried out. The comparative analysis provided by the nomination document is deficient in considering only dinosaur footprint sites, rather than all dinosaur fossil sites, and in providing a clear distinction of the nominated property in relation to the relevant importance of other World Heritage fossil properties[2].

IUCN noted in its request for further information to the State Party (31 January 2006) that such a comparative analysis was required in order to consider in more detail whether a nomination of dinosaur ichnites on the Iberian Peninsula (in conceptual terms) could be demonstrated to meet the requirements of *outstanding universal value*. The State Party has agreed that such an analysis would be more appropriate than that offered to date, which is essentially quantitative. The State Party provides considerable detail about its proposed methodology to enhance the comparative analysis within its supplementary information.

A further key issue in relation to both the comparative analysis and the analysis of the conditions of integrity of the nominated property is that it refers to the Iberian Peninsula but does not consider other Iberian track sites in Portugal. IUCN notes that five track sites in Portugal are designated as national monuments, and are stated to include the world's longest sauropod trackway, and the most accessible Middle Jurassic track. These sites

[2] Although a fossil checklist is normally completed by IUCN in relation to fossil properties, IUCN considers that the range of potential revisions required, including further global comparative analysis by the State Party of Spain makes the completion of the checklist premature at this stage

would appear therefore to display complementary values to those in Spain. IUCN raised this as a further key issue in its request for supplementary information from the State Party of Spain. The State Party has responded by initiating a dialogue with the State Party of Portugal regarding possible participation in a serial transboundary nomination. IUCN is not aware of the response of the State Party of Portugal at the time of finalising the present evaluation report.

4. INTEGRITY

4.1 Legal Status and ownership

The protection of the nominated palaeontological sites is provided by the Spanish Historical Heritage Law (16/1985) and its Royal Decree (111/1986) as a cultural heritage. Article one, second paragraph, of the Spanish Historical Heritage Law guarantees the maximum protection to sites declared as "Properties of Cultural Interest" (*Bien de Interés Cultural* or *B.I.C.*). The protection of palaeontological sites is also provided by the Spanish Law (6/2001) and its Royal Decree (1302/1986) on Environmental Impact Assessment that obliges private and public promoters of works to make a previous study of the impacts on the environment and on the heritage.

In every one of the Autonomous Communities, complementary laws and decrees exist in order to protect the different components of this nominated serial property:

- In Asturias, they are protected as Natural Monuments (Law 5/1991 on protected natural areas) and as Cultural Sites (Law 1/2001 on cultural heritage).
- In Castilla y León, the sites are protected as Natural Monuments (Law 8/1991 on protected natural areas) and Historical Sites (Law 12/2002 on cultural heritage).
- In La Rioja, the sites are protected as cultural, historical and heritage properties (Decree 20/2001 on the regulations concerning the administrative competences) and as Historical Sites (Decree 34/2000 on the declaration of 40 dinosaurs ichnite sites as historical sites). They are also protected by the laws on environmental protection (5/2002) and the law on the conservation of natural areas (4/2003).
- In Aragón, the sites are protected by the law on cultural parks (12/1997), the law on protected natural areas (6/1998), and the law on cultural heritage (3/1999) and, finally, with the decree (22/01/2003) that has given them a status of Property of Cultural Interest.
- In Catalunya, the sites are protected by the law on cultural heritage (9/1993) that gives them the status of Property of Cultural Interest, as well as by the law on natural protected areas (12/1985).
- In Valencia, the sites are protected by the law on natural protected areas (11/1994) which gives them the status of Sites of Interest, as well as by the law on the cultural heritage (4/1998), that gives them the possibility of being classified as Properties of Cultural Interest, as Properties of Local Relevance, or as Palaeontological Vigilance Areas.

Despite the complexity of the Spanish administrative organisation, legal protection arrangements are in place. The national and regional interests for the protection of the dinosaur ichnite sites are fully demonstrated by the set of laws and decrees. The specific quality of this heritage (partially natural, partially cultural) is respected by protection related to both fields.

The ownership of the nominated dinosaur ichnite sites is primarily public, although significant numbers are in private ownership (up to 25% of the 216 basic sites).

4.2 Boundaries

Each of the 35 'selected sites' is composed of two areas: a core area and a buffer zone. The core area includes the exposures where ichnites have been observed, scientifically recorded, protected by law and eventually conserved by physical means. The limits are defined by the coordinates identified using a Global Positioning System (GPS). The core area is also defined by cartography at 1:50000 scale (Ministry of Defence Geographical Institute). A general table gives the reference data of the core areas organised by Autonomous Communities (registration number, name of the site, name of the municipality, apices, surface, access, geological period). Buffer zone boundaries have been defined based on the possibility of extension of the ichnites outside of the already discovered tracks.

The mapping of the remaining 165 'basic sites' was not completed to the same level of the 35 'selected sites' as part of the original nomination. Additional information provided by the State Party appears to include detailed maps for all the basic sites but these were not received before the deadline of 31 March. Due to practical considerations, it was also not possible to visit the large number of 'basic sites' during the evaluation mission and IUCN is therefore unable to comment on the adequacy of these boundaries in the field.

A further issue in relation to the boundaries is the extent of the serial nomination and this is discussed in the section below on the justification of a serial approach.

4.3 Management

Each Autonomous Community works in the fields of research, conservation, protection, and communication for the dinosaur ichnite sites. Research studies are set up every year by different universities and museums. A yearly symposium is also organised by La Rioja Autonomous Community, with the participation of international experts in the field of dinosaur ichnites.

Studies on ichnite management are led at the level of each Autonomous Community. They are then used for the preparation of risk maps and plans of restoration and consolidation. A private agency, composed of specialists in archaeology, palaeontology and

conservation, is contracted regularly for the in situ conservation, and training is provided by the Teruel Palaeontological Complex Foundation (Aragón).

The fossil localities are protected using various techniques, depending on the type of site and the administration in charge of management. This can include sealing the small cracks in surface or covering excavations with earth following study. Pesticides are employed in order to avoid the development of vegetation. Some localities are protected from heavy visitation by barriers; and from rain and temperature change by shelters or stone walls to divert rainwater.

There has been considerable effort to communicate the interest of the ichnites to visitors. Signposts exist at every site, including short information on the status of protection or more detailed interpretation on the ichnites. In each Autonomous Community visitors are able to access leaflets and booklets on the dinosaurs and their tracks in general and on the specific sites of the region. Various museums and interpretation centres provide complementary information, including large facilities at Museo del Jurásico de Asturias, and Dinopolis in Aragón, or small exhibitions, such as in the villages of Salas de Los Infantes (Castilla y León) or Igea (La Rioja).

A Coordinating Committee of the six Autonomous Communities and the Spanish State was created in March 2003. This Committee is responsible for a palaeontological research support plan; a plan for the declaration and delimitation of Properties of Cultural Interest; and a plan for the dissemination and evaluation of Palaeontological Heritage. In order to help the work of the Committee, a Technical Standing Committee has been established with a group of scientific and heritage experts. Its work is carried out within a management plan and is concerned with technical activities (documentation, conservation, research, protection); administrative activities (authorisations, inspections, co-ordination, prescriptions, procedures); and promotion and dissemination activities (valuation of the properties, drafting of dissemination projects, drawing up of the promotional plans).

Each Autonomous Community has a set of plans for the research related to the dinosaur ichnite sites; the conservation and protection of the sites; and the communication relating to the sites. Castilla y León is currently developing an ambitious general project for the management of the heritage of the region. Based on the field evaluation and review of available documentation, IUCN considers that there remains some lack of precision on the organisation of the activities in terms of firm timescales, except for those within Castilla y León. The additional information provided by the State Party on 29 March 2006 noted that the different Autonomous Communities involved in this nomination are already progressing in preparing a common management framework for the serial property which will be implemented through funding allocated by each Autonomous Community.

IUCN's evaluation mission consistently noted the great interest and pride felt among local people for the dinosaur trackways from right across the north and east of Spain. This interest was not limited to scientists, curators and public servants, but includes local mayors and politicians, who are supportive of and directly involved in activities related to the ichnites. This includes both preservation measures and the equipping of information centres and interpretive and research programmes. The conservation and the interpretation of the fossil localities are clearly seen as valuable for sustainable economic development in a number of the regions that are both relatively poor and isolated.

4.4 Threats

Natural pressures are important considerations in the conservation of dinosaur ichnite sites. The action of the sun, wind, water, and differences of temperature, can lead to the creation and enlargement of cracks and fissures in the rocks and the flaking of surfaces. In Asturias, the sites are all situated along the sea shore and are subjected to continuous mechanical, chemical and biological erosion of waves and tides. Vegetation growing on the surface itself (mosses, lichens, algae) or plants using the fissures or cracks can also affect the conservation of the tracks. Effective measures (covers, rock restoration, regular cleaning of the vegetation) limit the impact of the environmental pressures. In some cases, the tracks have been moulded as a precaution or even the originals have been taken off the sites (the moulds or the original are conserved in the regional museums).

There are no polluting industries in the neighbourhood of the sites, and analysis of a number of sites has not identified any damage from atmospheric pollution. Tourism is currently limited to a few very accessible localities and viewing points, paths, raised walkways and passing points have been created to avoid the visitors stepping on the tracks. The risk of removal of tracks by collectors exists but does not represent a real threat at the moment. State legislation provides for heavy penalties for acts of vandalism or looting.

In conclusion, on the basis of the sites visited during the evaluation mission, IUCN considers that the nominated property is well managed in relation to both natural and man-made threats, at a level that meets the best of international standards for dinosaur footprint localities.

IUCN considers that the level of legal protection and management of the nominated property is sufficient to meet the conditions of integrity. However the nomination does not meet conditions of integrity in relation to the extent of the property and adequacy of boundaries. Adequacy of management can only be fully assessed when more information on the extent of a final nomination is defined and understood.

5. ADDITIONAL COMMENTS

5.1 Discrepancy of information

IUCN raised with the State Party its concern that, within the 'selected sites', key points such as the extent of the nominated areas varied within the nomination

documentation. The State Party noted in response (29 March 2006) that there are four sources of discrepancy in the information provided, that the nomination needs to be updated, and that this will affect the data on the values within the nominated property. The State Party has also agreed that section 2 and 3 of the nomination need to be rewritten because *'the vast quantity of complementary information sent subsequent to the official submission of the file has got to the point that it makes it harder for the evaluators to understand'.*

5.2 Justification for Serial Approach

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

a) What is the justification for the serial approach?

In principle a serial approach to the recognition of fossil sites is justifiable. Rock exposures from a coherent group of strata can be geographically separated due the nature of the structural geology, local geomorphology and land cover. In practice, however, IUCN considers that the nominated serial property in this case is too extensive. The series includes a suite of properties that range from those of a demonstrable international importance to those which on their own are, at the most, of national interest. Whilst these properties may contain detailed aspects not seen in other Spanish ichnite localities, their inclusion establishes an open-ended potential for further small, nationally important sites to be added to the series. IUCN considers that the State Party needs to rethink its conceptual framework to make a more focussed selection of sites that represent the values of the IDPI that are considered to be of 'outstanding universal value'.

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

There are two key issues that need to be considered when assessing this point. Firstly, whilst the key entry point to argue for a link between the different components of this serial nomination is their geographical distribution in the Iberian Peninsula (keeping aside the fact that only sites in Spain have been nominated), this is hardly convincing as an appropriate basis for defining a serial nomination of dinosaur ichnites as the geography of the world of the 'Age of the Dinosaurs' was completely different from the present day. Secondly, as noted in point (a) above, the conceptual framework of this nomination is inadequate as it has not demonstrated a coherent and distinctive rationale that links these footprints. In other words, what is the distinctive claim of these traces that would make them of 'outstanding universal value' in the global context? In the absence of this clear conceptual framework they are arguably no more linked than other dinosaur footprint localities that can be found in other countries around the world. Thus, based on the present nomination document, IUCN believes that the functional link of the different components of this serial nomination has not been clearly demonstrated.

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

There is an overall coordinating structure for the IDPI and a range of management arrangements. However IUCN is concerned that the series proposed is too large to be practicably manageable as a coherent World Heritage property. IUCN considers that the logistical challenges for the State Party in managing the selected and basic sites at the level required under the World Heritage Convention to be too large. At the same time, the size and complexity of the nominated property would be extremely difficult for the World Heritage Committee to monitor effectively.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Dinosaur Ichnite Sites in the Iberian Peninsula have been nominated on the basis of natural criteria (i), (ii) and (iii).

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

IUCN considers that the nominated serial property is of international importance in relation to the record of dinosaur ichnites, and thus of importance in understanding dinosaur evolution and behaviour. The IDPI record the fossil traces of living, active dinosaurs from the upper part of the Mesozoic era. Taken as a whole, they provide, in a relatively small geographical area, a valuable insight into the behaviour of the largest group of animals the Earth has ever seen, across a large span of time during which they lived.

However the nomination has not demonstrated that a nomination based solely on dinosaur footprints can be regarded as being of *outstanding universal value*, nor has a thorough, global comparative analysis been carried out to demonstrate the importance of the property relative to other known dinosaur sites. Other individual dinosaur trackway sites elsewhere in the world are cited as being longer, larger or more diverse, and may provide equivalent or better behavioural evidence to that provided by the nominated serial property. The nomination also has a significant weakness as it does not consider sites of known international significance in Portugal. IUCN considers that a more conceptually focused nomination, including at least key Portuguese footprint localities, may have potential to meet this criterion. However the serial property, as currently nominated, does not meet this criterion.

Criterion (ii): Ecological processes

The sites of the IDPI record the traces of once living animals. However, they do not provide evidence on the evolution or development of dinosaurs as a group of animals; they give evidence only of how these animals behaved. Furthermore, as these are the fossil traces of long-extinct animals, they do not represent on-going ecological and biological processes. In addition, whilst the fossil traces are located in rural areas containing natural and semi-natural landscapes, the ecological

processes associated to these areas are only of local or national significance. IUCN considers that the nominated serial property does not meet this criterion.

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

Whilst several of the IDPI series are large and internationally important fossil localities, overall the series does not include sites and landscapes of internationally exceptional aesthetic value. Fossil localities have consistently been assessed under natural criterion (i) alone and there are no reasons to adopt an exceptional approach for this nominated property. IUCN considers that the nominated serial property does not meet this criterion.

7. RECOMMENDATIONS

In view of the need for in-depth assessment and substantial revision of this nomination, IUCN recommends the World Heritage Committee to **defer** examination of the nomination of the Dinosaur Ichnite Sites of the Iberian Peninsula to the World Heritage List on the basis of natural criterion (i).

IUCN further recommends that, in reconsidering the potential to strengthen the possible case for Outstanding Universal Value of the nomination, the State Party give particular attention to:

a) A definition of a more focused conceptual framework that can clearly demonstrates the relationship of dinosaur ichnite sites in Spain to other important fossil sites in Portugal;

b) The relationship of any revised nomination to the interests of the footprint site in Bolivia, currently the subject of preparatory assistance funded by the World Heritage Fund;

c) The need for a thorough, global comparative analysis, including justification for a property based on dinosaur ichnites to be considered as being of *outstanding universal value;*

d) The need for a serial nomination to be coherent and manageable, focussed around a much smaller number of localities and with all the elements selected relating to global significance.

IUCN recognises and highly commends the exceptional amount of detailed work that is represented by the present nomination and the exemplary cooperative and participatory approach to site conservation and research. IUCN recommends the Committee to note and commend the significant commitment that has been given to the recognition of the values of the nominated serial property by the State Party, the Autonomous Communities, the different communes involved and their citizens.

Map 1: Locations of the nominated serial property

Map 2: Locations of the 214 sites in the nominated serial property

LATIN AMERICA / CARIBBEAN

GORGONA AND MALPELO ISLANDS, COASTAL AND OCEANIC NATIONAL MARINE PARKS OF COLOMBIA'S EASTERN TROPICAL PACIIFC

COLOMBIA

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

GORGONA AND MALPELO ISLANDS, COASTAL & OCEANIC NATIONAL MARINE PARKS

OF COLOMBIA'S EASTERN TROPICAL PACIFIC (COLOMBIA) – ID N° 1216

1. DOCUMENTATION

i) **Date nomination received by IUCN:** April 2005

ii) **Additional information requested and provided by the State Party:** IUCN requested supplementary information on 7 December 2005, after the field mission, and on 31 January 2006 after the first meeting of the IUCN WH Panel. State Party responses were received on 10 January, 2006 and 13 March, 2006 respectively.

iii) **IUCN/WCMC Data Sheet:** 10 references

iv) **Additional Literature Consulted: Proceedings of the World Heritage Marine Biodiversity Workshop, Hanoi, Vietnam,** World Heritage papers 4; **A Global Representative System of Marine Protected Areas. Vol. III,** GBRMPA, WB, IUCN, 1995;. **Biota y Ecosistemas de Gorgona**, Aguirre, J. and O. Rangel (eds), Fondo para la Protección del Medio Ambiente –FEN- Colombia; **Estudio Petrográfico y Geoquímica de las Rocas Volcánicas y Plutónicas de la Isla Gorgona,** Arndt, N. and Revillon, S. 1998, informe, Universidad de Rennes, Francia; **Malpelo Islas Oceánicas de Colombia**, Brando, A., Pral. H.V., and Cantera J.R., 1992, Banco de Occidente; **Geología de la Isla Malpelo**, Informe Final de la Investigación Presentado a la Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales, 2004; **Monitoreo de Aves Acuáticas (Marinas y Playeras) y su Articulación como Herramienta en la Planificación, Manejo y Conservación de Tres Áreas Protegidas del Pacífico Sur de Colombia,** Calidris, 2004; **Plan de Manejo Preliminar de los Recursos Icticos del Parque Nacional Natural Gorgona y Su Área de Influencia**, Castillo B. et al, 2004; **Gorgona Marina, Contribución al Conocimiento de una Isla Única,** INVEMAR, serie Publicaciones Especiales No. 7, Santa Marta, 2001; **Plan de Manejo, Sanctuario de Fauna y Flora Malpelo, 2005-2009**, Unidad Administrativa del Sistema de Parques Nacionales Naturales, Fundación Malpelo; **Plan de Manejo, Parque Nacional Natural Gorgona, 2005-2009,** Parques Nacionales Naturales de Colombia, Dirección Territorial Suroccidente, Cali.

v) **Consultations:** 4 external reviewers; Directors and Staff of the General Directorate of National Natural Parks and the National Academy of Sciences; Naval Officers in Bogota and Buenaventura; staff of INVEMAR, Fundación Malpelo and Conservation International/Colombia; Municipal authorities and community organisations of Guapi.

vi) **Field Visit:** Carl Gustaf Lundin. 15-26 November, 2005.

vii) **Date of approval of this report:** April 2006

2. SUMMARY OF NATURAL VALUES

The nominated serial property, Gorgona and Malpelo Islands (GMI), comprises two main areas and covers a total area of 919,187 ha as detailed below:

Gorgona Natural National Park (GNNP) is located approximately 35 km off the coast of Cauca (Department). Gorgona has a total land area of 1333.29 ha and a marine area of 60,353.71 ha including the continental shelf slope down to more than 1000 m.

Malpelo Fauna and Flora Sanctuary (MFFS) is located 506 km from the closest Colombian sea port, Buenaventura, Valle del Cauca (Department) and comprises a land area of 350 ha, and a marine area of 857,150 ha to a depth of 3,400 m.

There is no marine buffer zone connecting these two areas.

Though separated by approximately 440 km, the two marine protected areas included in this serial nomination share the same marine currents (California Current, North Equatorial Countercurrent, Equatorial Undercurrent, Equatorial Countercurrent, South Equatorial Countercurrent, Humboldt Current, Colombian Current and the Panamanian Cyclonic Countercurrent). However, due to the proximity of Gorgona to the continent, the ecological processes and oceanographic regime occurring around this island are much more influenced by the continent. On the other hand, Malpelo represents the farthest Colombian island from the continent in the Pacific Ocean and it is highly important for the dispersion and recruitment of benthonic

Table 1. Extent of the nominated serial property

Nominated property	Land (ha)	Sea (ha)	Total (ha)
Gorgona NNP	1333.29	60,353.71	61,687
Malpelo FFS	350	857,150	857,500
	1683.29	917,503.71	919,187

larvae and for maintenance and re-population of fish stocks in the surrounding oceanic waters, as reported for other islands around the world.

GNNP and MFFS are linked in an ecological marine corridor along the waters of the Eastern Tropical Pacific (ETP) which includes other islands such as Revillagigedo, Cocos, Galapagos, Coiba and Clipperton. This corridor is essential for the survival of emblematic species, such as the humpback whale, the whale shark, the devil ray, and 2 sea turtles.

At least 208 fish species, 43 birds species, 11 hard coral species, 44 crustacean species, 18 echinoderms species, 42 mollusk species and 11 marine mammals species are present at both GNNP and MFFS. Taxonomic studies are currently incomplete, especially with respect to invertebrates, and therefore the number of species could be even greater.

Biogeographically the marine habitats of Gorgona and Malpelo are complementary. Malpelo exhibits typical oceanic habitats (to a depth of 3400 m), while Gorgona includes coastal habitats, such as superficial soft bottoms (less than 80 m in depth) which are influenced by coastal runoff. Coastal species such as catfish and the Pacific anchovy, as well as oceanic species such as tuna fish, and sailfish are frequently observed in the serial property. However, the landscapes of both islands and the ecological processes occurring on them are very different. Malpelo Island is almost free of vegetation and subject to an oceanic regime that conditioned the existence of extreme ecological conditions, while Gorgona Island is much more influenced by the continent and contains tropical rainforest and abundant fresh water.

These marine protected areas preserve important habitat for endangered marine and terrestrial species under several categories of threats. According to the IUCN Red List of Threatened Species (IUCN, 2000) this includes 4 spp. in the critical risk category (Hawaiian petrel, giant grouper, and the hawksbill and leatherback turtles), 8 spp. in the endangered category, and 17 spp. in the vulnerable category.

Gorgona Natural National Park (GNNP)

The geology of GNNP includes a large variety of mafic and ultramafic volcanic rocks (basalts, tuff, breccias, pyroclastic rocks, komatiites, gabbros and peridotites). This allows a detailed and complete study in a single locality of the whole original material which developed during the formation of the Caribbean-Colombian Volcanic Province (Arndt and Révillon, 1998). The island is noted in particular for the occurrence of the most recent (Mesozoic) komatiites known in the world. Komatiites are an unusual type of lava with low silica content, and a high magnesian concentration (MgO). Almost all komatiites are known from Archaean rocks of up to 3 billion years old, whereas the Gorgona komatiites are much younger at c.90 million years. The Gorgona komatiites are currently an important element within a number of the studies of the interior structure and cooling history of the Earth.

GNNP protects important ecosystems of the tropics: coral reefs and very humid tropical rain forest. Gorgona's coral reefs are some of the most developed and diverse in the Eastern Tropical Pacific (ETP) (Zapata, 2001a). With an approximate extension of 30 hectares, coralline life cover extends over 75% of the reef and supports 19 species of scleractinian corals and a complex arrangement of other invertebrates and reef fishes. Additionally the forest in Gorgona, with a canopy of over 30m high, is well conserved, with patches of primary forest in some areas and second growth forest, with over 20 years of re-growth, in others. This is the result of the development of a penal colony on the island, which was in operation between 1958 and 1985. During this period much forest was cut and exotic species introduced. This forest represents critical habitat for twelve endemic species or subspecies such as the blue lizard, the bananaquit and the red-legged honeycreeper.

The confluence in GNNP of continental marine environments on the leeward side of the island, with depths of less than 85m, and of oceanic environments on the seaward side, with depths down to 1000m, adds to the variety of marine habitats (submarine rocky outcrops, coral reefs, sand bottoms and several depth profiles) and terrestrial environments (very humid tropical rain forest, cliffs, beaches and emergent rocks). This provides the conditions for the existence of high biological diversity in an insular marine area of relatively small size (381 fish species, 154 bird species, over 500 species of mollusks), making GNNP an area of scientific interest.

GNNP provides important habitat for 29 species in several threatened categories. It is estimated that around 10% to 30% of the estimated population of 2600 individuals of the ETP´s humpback whales, considered vulnerable by IUCN, visit the park during their annual migration from June to December, 36% of which are calves (Flórez-Gonzalez and Capella, 1995; Soler et al, *in review*). The giant grouper, listed as critically endangered by IUCN and listed in Appendix I in CITES, inhabits the waters of Gorgona. GNNP is also a breeding area for green turtle and a feeding area for black turtle (Amorocho *et al*, 2001). Both species are considered endangered by IUCN and also listed in Appendices I and II of CITES. The numbers of some species within the property, particularly of marine mollusks and other

lower taxonomic groups are likely to increase, once deeper water investigations are conducted.

Malpelo Fauna and Flora Sanctuary (MFFS)

Malpelo, a seamount considered as the maximum elevation of the Malpelo Ridge, is widely recognized as one of the top diving sites in the world (Shark Diver, June 1998; Plongeurs International, June 2003; Sub, 2003; Plongee Magazine, August 2004; Ca m'interesse, February 2004; Buceadores, June 2004; Skin Diver, 2004). It provides important critical habitat for a number of internationally threatened marine species, and is a major source of nutrients and an important area of aggregation of marine biodiversity.

The influence of several marine currents and the varied bathymetry of the Malpelo Range are the key factors which give rise to this complex and rich ecosystem. The surrounding waters of this oceanic island support massive populations of pelagic bony fishes, sharks, marine mammals and sea turtles (Brando *et al*, 1992). One of the most outstanding features of Malpelo is that it is one of the few places in the world to record confirmed sightings of the short-nosed ragged–toothed shark, a deepwater shark. Additionally very large aggregations of pelagic species, including outstanding schools of over 200 individuals of hammerhead sharks, over 1000 individuals of silky sharks, whale sharks and tuna have been recorded around the island (*Malpelo Foundation's observation*). There are also barracuda, endangered eagle and manta rays, and great numbers of striped bonito, snappers and travelly. Also to be found are the vulnerable Pacific seahorse and two endemic species of sea stars. Many more marine species probably remain to be described, especially among the invertebrates.

Terrestrially, Malpelo's ecosystems provides habitat to five endemic species of plants. The rocky outcroppings support the largest colony of masked boobies in the world with over 40,000 individuals (Pitman and Jehl, 1998; Calidris, 2004). Furthermore, this island supports important populations of endangered bird species such as the swallow-tailed gull, masked booby, and Hawaiian petrel.

3. COMPARISON WITH OTHER AREAS

Of the 160 natural properties currently included on the World Heritage List (2005), only 18 have been nominated predominately for outstanding marine attributes. Additionally the Pacific Ocean, which accounts for 40% of the Earth's surface, is represented by eight natural World Heritage properties: East Rennell, Hawaii Volcanoes, Henderson Island, Galapagos, Coiba Island, Cocos Island, Lord Howe Island and the Great Barrier Reef.

This serial property has been nominated under all four natural criteria.

In relation to **criterion (i)** the geological significance of GMI is mainly claimed based on Gorgona's geological features. However, whilst the komatiites of Gorgona are unusual because of their young age, komatiites are better known and much more extensive in Archaean exposures in Australia, South Africa, Canada and the Baltic Shield. The type locality for these rocks is the Komati River in South Africa, after which they are named. The Caribbean-Colombian Volcanic Province is one of numerous Large Igneous Provinces recognized on the Earth, and Gorgona is a key locality for its study. Overall the komatiites of Gorgona are far too specific and specialised a feature to be accepted as being of outstanding universal value. On the other hand, whilst Malpelo is a seamount considered as the maximum elevation of the Malpelo Ridge, there are other World Heritage properties also associated to seamounts, such as Brazilian Atlantic Islands, that present a more complex geological and geomorphological setting. In addition the Galapagos Islands, also in the Eastern Pacific, show active volcanism.

The case on **criterion (ii)** is made primarily on the claim that MFFS and GNNP are important components of the marine corridor connecting the islands and seamounts of the Eastern Tropical Pacific (ETP). Whilst the marine ecosystems of GNNP are important in the context of this corridor the ecological processes that it supports are not different or unique in relation to other World Heritage properties located in the Eastern Tropical Pacific. In fact, Coiba National Park is by far more important due to the protection it offers from the effects of the El Niño/Southern Oscillation (ENSO) phenomenon, thus playing a critical role in maintaining a more stable marine environment than the other pacific islands, and providing larval and post-larval "seeds" of many marine species.

However, Malpelo Island is particularly noteworthy as an oasis in an "oceanic desert" for a large number of pelagic boney fishes, such as tuna, and many species of sharks, as well as for marine mammals and turtles. This oasis effect is enhanced by the effective no-fishing zone established around the island, which is the largest no-take reserve in the Eastern Tropical Pacific[1]; by the absence of fisheries in or around the area; and by the non-existence of invasive species. In addition, fishing close to the limits of the MFFS will remain limited because of the lack of biogeographic features that aggregate fish to the surrounding oceanic waters. Thus, the ecological processes associated to MFFS, supported by its effective protection, provides a true "reservoir" for sharks, giant grouper and billfish which can be expected to continue to thrive in the area free from the fishing pressures. This ecological role is essential to maintain and replenish the population of these species in the ETP if populations in other existing marine protected areas eventually collapse due to over fishing.

In relation to **criterion (iii)** the terrestrial environments of GNNP and MFFS do not compare highly when compared to the exceptional beauty of other World Heritage properties, such as the Galapagos Islands. It is important to note that Cocos Island exhibits impressive coastal cliffs, partially covered by tropical forests producing a much more impressive landscape than that exhibited by GNNP and MFFS, and yet Cocos was not inscribed under criterion (iii) as it didn't rank highly when compared to other properties. On the other hand, the submarine environment of the MFFS, characterized by steep walls, caves, and large aggregations of large

predators and pelagic species, is indeed a phenomenon of outstanding natural beauty and aesthetic importance. It is one of the few areas in the world where large predators and pelagic species can be observed in large numbers in an undisturbed environment where they maintain behavioral patterns relatively free from human influence. The superlative nature of this area is well recognized by the major diving magazines of the world, which rank it as a top dive destination. On the contrary, the submarine environment of GNNP does not rank highly when compared to those existing in Galapagos Islands, Coiba and Cocos; all of them characterized by a variety of submarine forms with abundant marine life in very clear waters, as opposed to GNNP where turbidity associated to sediments coming from the continent substantially limits its aesthetic value. Most of the large fishes have also been removed from the GNNP marine environment. In addition the forests of Gorgona are largely secondary growth and not particularly significant in terms of their beauty.

In relation to **criterion (iv)** it is important to compare the nominated property with other World Heritage properties in the same region. Table 2 provides a comparison between three existing properties and the nominated serial property. These islands are all suitable for comparison as they form part of the Eastern Tropical Pacific (ETP).

Based on existing studies on marine biodiversity reflected in table 2, it can be concluded that the Colombian nominated serial property ranks higher than Cocos Island in terms of fish and mammal species. However the nominated serial property ranks lower than Galapagos Islands and Coiba National Park. Gorgona is the richest in terms of birds, which is expected due to its proximity to the continent that allows the presence of a variety of both terrestrial and marine bird species. Malpelo, with its extended marine protected area, including seamounts, is likely to add a number of new marine species, including endemic species.

The oceanic World Heritage properties included in table 2 all include the same charismatic species but in numbers that vary considerably. For example, Malpelo has the largest masked booby colony, but Galapagos has larger colonies of red footed boobies and blue footed boobies. The high degree of rainfall and proximity to the continent makes Gorgona, as well as Coiba particularly rich in terrestrial species. The mid-oceanic location and associated upwelling of Cocos, Galapagos and Malpelo provide conditions that attract large oceanic species of fish.

However, the ecological isolation of Malpelo is only comparable to that of the Galapagos Islands and, contrary to Galapagos, Malpelo does not suffer from any reported alien invasive species. The relatively low number of visitors makes it unlikely that introductions will be made, either on land or in the ocean. This is not the case for Cocos and Galapagos, where alien invasives are prevalent and remain a difficult management issue to addresses. The situation of Malpelo makes it the 'easiest' reserve for fisheries control since there is no domestic fishing industry targeting the reserve, unlike both Galapagos and Cocos that have significant domestic industries and quite conflictive relationships with the protected area administrations. Gorgona, due to its low level of development, also suffers less risk in terms of a new introduction of invasive species than the other areas.

The uniqueness of the oceanic islands (Cocos, Malpelo and Galapagos) is greater due to their isolation from sedentary species. The coastal islands, such as Coiba and Gorgona, however, receive considerable influence

Table 2. Basic information of key protected areas of the ETP.

WH Properties in ETP	Area (km2)	Type of Island	Key Biodiversity Data	Other Key Features
Cocos Island National Park (Costa Rica)	2,000	Oceanic	+300 fishes, 95 birds, +10 marine mammals	- Covered mainly by primary humid tropical forest. - Protects large pelagic species.
Coiba National Park (Panama)	270,125	Continental	735 fishes, 147 birds, 19 marine mammals	- Patches of primary humid tropical forest. - Protects hotspot of marine biodiversity, including several endemic species.
Galapagos Islands (Ecuador)	133,000	Oceanic	444 fishes, 150 birds, 24 marine mammals	- Melting pot of several marine currents conditioned high marine biodiversity. - Active volcanism. - High level of endemism.
Gorgona Natural National Park (Colombia)	616.8	Continental	381 fishes, 154 birds, 15 marine mammals	- Maintains few patches of tropical rainforests. - Important coral reef areas.
Malpelo Fauna and Flora Sanctuary (Colombia)	8,575	Oceanic	394 fishes, 49 birds, 17 marine mammals	- Very large aggregations of pelagic species. - Support the largest colony of masked boobies in the world

from adjacent continental areas. Thus, the terrestrial habitat of these islands is a subset of the more biologically diverse continental areas, showing similarities in relation to the existing terrestrial ecosystems and the species they contain.

4. INTEGRITY

4.1 Legal status

The nominated serial property is owned entirely by the Colombian government. Legal protection of the Malpelo FFS began in 1995 when the island was declared a protected area by Ministerial Resolution. In 1996, the protected area was extended to include a marine component 6 nautical miles around the island, and in 2003 the marine area was extended once again to its current size. The same year, the International Maritime Organisation declared the Malpelo FFS a Particularly Sensitive Sea Area, making it off-limits to commercial shipping. The Gorgona National Natural Park was created by Ministerial Decree in 1985. A marine buffer zone was established in 1995 by Ministerial Decree to include the breeding habitat of the humpback whale.

4.2 Boundaries

The Gorgona NNP has been in place for 20 years and includes a significant part of the marine area surrounding the island; however its current size is considered by a number of experts as not sufficient to conserve its marine biodiversity. The Malpelo FFS has recently been expanded to include a significantly larger marine area (14 times than the original extension when established), thus providing better protection to marine biodiversity. There are currently no plans for further extensions to the two areas.

4.3 Management

Management of the areas is carried out by the Colombian Park Service. A single administrative unit has been created for the management of Malpelo and Gorgona under the coordination of a single Park Director. The Management Plans of the two component sites were developed using the same methodology, though it should be noted that they are largely descriptive and provide little guidance for day-to-day management. The proposed management programmes aim at establishing integrated management for the two component sites. Furthermore, these areas are key for the National Fisheries Management Plan of the Colombian Pacific region, since they are important recruitment areas for larvae for the adjacent waters, and integral components of the Eastern Pacific Seascape Project being led by Conservation International with funding from the United Nations and Walton Family Foundations.

There is a concession programme under way in Gorgona that will give a private operator the right to run the facilities on the island. Local fishermen sometimes seek shelter on Gorgona, but are not allowed to fish in the marine park. On Malpelo there will be no land facilities available for tourism development, as it will all be boat-based using an existing mooring. All trips on land will be of short duration, and with limited impact.

Given their remote locations, sustainable finance for management of these two protected areas is an ongoing concern. However, steps are being taken by the Colombian Park Service, the Colombian National Protected Areas Conservation Trust Fund, and interested NGOs, to develop the mechanisms to assure that sustainable finance is attained within a relatively short period.

Gorgona is currently managed with limited resources and maintenance is insufficient, which, in the humid climate of the island, leads to a sense of decay. The many facilities left behind from the penal colony times are all in different levels of dilapidation. The high humidity makes upkeep central to any management effort, and that is lacking at this time. Since the concessioning of facilities to a private operator has not yet taken effect, it is hard to assess if this will improve overall maintenance. The relatively high number of scientific studies that have been conducted in Gorgona should make it a key site of future scientific studies and in particular restoration efforts. However, given the poor state of the library and the limited effort that has gone into restoration, it is as yet unclear whether the scientific potential can be fulfilled.

Conflicts with the coastal population are currently minimal. However, with high population growth and fisheries being the main economic activity of poor coastal communities, the lack of effort by the current park administration to address these issues is notable. Community leaders seemed relatively unaware of the values of Gorgona, and there was no sense of ownership of, or pride in, the property. The overall effectiveness of the management regimes for the Malpelo FFS and Gorgona NNP have not been evaluated on a systematic basis, but it appears that significant effort will be required to bring that of Gorgona NNP up to the level of World Heritage standards.

The situation in Malpelo is very different. A joint patrol vessel is, manned by the park service and the navy and carries out periodic patrolling. This will reduce, if not eliminate, the main threat of commercial fishing to Malpelo. Currently, this is the only threat to the environmental quality of Malpelo. Strong NGO engagement has led to increased sources of finance which ensure that, even if the government is unable to raise the necessary funds, sufficient funding will remain available to continue the patrols for the foreseeable future. Limited dive tourism will generate some of the revenue needed to cover management costs. The remoteness of Malpelo makes community relations rather simple, particularly since there is virtually no domestic pressure to exploit the fisheries resource. Regular patrols by the Navy and Park Service should be sufficient to discourage most illegal activities. The current level of management should be adequate to manage Malpelo FFS for the benefit of coming generations.

4.4 Threats and Human use

4.4.1 Human Occupation

Gorgona is currently inhabited only by Park Service personnel. This will change later this year with the arrival of the tourism concessions. Malpelo has a population of 6 military personnel that rotates every couple of months. There are no local inhabitants in either Gorgona

or Malpelo. With the arrival of the patrol boat, an additional 10 or so people will be in the Malpelo FSS permanently, but on a rotating basis. Both areas receive visitors; on Gorgona they will be based on land, and in Malpelo at sea.

4.4.2 Fisheries

Fishing in Gorgona is primarily conducted by local fishermen and has led to depletion of many of the top predators and large fishes. The size of the area makes maintaining healthy fish populations difficult and it is unlikely that there will be any significant recovery in the short term. On the contrary, in Malpelo the fish stocks are in good condition with large numbers of top predators and well preserved ecosystems. Illegal fishing from neighboring countries could be a potential problem, but with the semi-permanent presence of a patrol vessel in the areas, the threat is likely to be significantly reduced.

4.4.3 Research

Due to its isolation from civil conflict, Gorgona has been a refuge not just for flora and fauna, but for conservationists as well. Research began some 20 years ago, and today university research programmes are ongoing, complemented by NGOs implementing monitoring and conservation programmes. The island provides an opportunity to study one of the wettest places in the world with annual rainfall of 6900 mm and no dry season. Its proximity to the continental shelf provides relatively easy access to a great variety of habitats, though most are influenced by continental processes.

The two parks are well placed for study of climate induced changes (ENSO) due to their proximity to a variety of ocean currents. Evolution and colonization are being studied to great effect in these parks, especially given the diversity of habitats they contain.

Malpelo with its rich oceanic life permits the study of large predators in a largely pristine environment. With the risk of pollution and predatory fisheries being very small, Malpelo is likely to remain in very good condition. While comparatively little research has conducted around Malpelo, some of the recent studies are of high quality.

However, the level of scientific research in the two reserves is still not globally significant. In comparison with Galapagos, these areas are still poorly understood. In particular, Malpelo has much scientific work still to be done. The status of collections in Gorgona is also a constraint for further work. Neither site has had research conducted below a depth of 200 m.

4.5 Other threats

Climate change induced shifts in water temperature remains a great threat. Events in Galapagos over recent years illustrate how significant such a threat can be with significant loss of live corals and reduction in the abundance of many species. To date there have been no similar impacts on Malpelo and Gorgona. The local oceanographic conditions are probably the main explanation for this lack of devastation.

Nutrient runoff from the Colombian mainland has the potential of significantly impacting Gorgona NNP. At this time there are no clear signs of smothering of the reefs, but visibility can be poor at times, and the runoff effects are likely to be of some significance in the medium term future if adequate measures to control erosion from the continent are not designed and implemented.

5. ADDITIONAL INFORMATION

When IUCN evaluates a serial nomination, such as this one, it asks the following questions:

(a) What is the rational for a serial nomination? The rationale for serial nomination is based on the ecological connections between GNNP and MFFS, the complementarities of terrestrial and marine habitats diversity between these sites and the need to ensure their integrated management to enhance the protection of marine biodiversity. As noted above, there are a limited number of species that are present in both sites and further research may find that the number of shared species could be higher than current estimates. However the sharing of species is quite common in the marine environment and it is not a sufficiently strong element to argue for a serial approach.

(b) Are the separate components of the property functionally linked? As noted previously, though separated by 440 km, there is an ecological and biological connection between MFFS and GNNP. The connection is the product of shared marine currents and oceanographic regimes which also influenced the sharing of a number of marine species. However, as noted above, this is a common feature in the marine environment and the degree of ecological connectivity has yet to be determined by genetic connectivity studies. Such studies are being designed for some groups such as corals and zooxanthels. For sharks, the use of telemetry tracking technology will help in future to determine the connectivity between these sites. While it is expected that both areas are probably important for the dispersion and recruitment of benthic larvae, and for the maintenance and re-population of fish stocks in the surrounding waters, there is no specific scientific evidence that the MFFS and GNNP are actually functionally linked in this way. In the specific case of MFFS, there is probably a stronger case for a serial nomination with Galapagos, Cocos Island and Coiba on which the survival of highly migratory and emblematic species depends, such as the humpback whale, the whale shark, the devil ray, and sea turtles.

(c) Is there an overall management framework for the two components? As noted previously, a single administrative unit has been created for the management of the MFFS and GNNP; the same planning methodologies and management programmes are being used in each area; both protected areas are important components of the regional fisheries management plan; and both

areas are usually included in recreational diving tours. However, these linkages are common among many protected areas that are managed as part of their broader landscape/seascape and do not necessarily constitute an argument for serial nomination.

In conclusion, it is the view of IUCN that the case for a serial nomination has not been demonstrated. There are no studies completed as yet that clearly show a strong functional link between the two nominated areas. From a management perspective the issues to be addressed are quite different and few if any of the same technologies and technical personnel will be engaged on a day to day basis.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The serial property has been nominated under all four natural criteria.

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

Only the geological values for Gorgona Island have been described in the nomination document. The geology of Gorgona is of regional importance in relation to the understanding of the Caribbean-Colombian Volcanic Province. However this is one of many such provinces and does not have a special claim to global geological preeminence. The komatiites of Gorgona are distinguished as the youngest known examples of this unusual volcanic rock type, however this is too specific and specialized a feature to be accepted as being of outstanding universal value. IUCN considers that the nominated serial property does not meet this criterion.

Criterion (ii): Ecological Processes

Malpelo and Gorgona are important for the conservation of the marine biodiversity associated to the Eastern Tropical Pacific Seascape. However, only Malpelo FFS is particularly noteworthy as an oasis in an "oceanic desert" for a large number of pelagic boney fishes such as tuna and many species of sharks, as well as for marine mammals and turtles. This oasis effect is enhanced by the protection existing around the island, which is the largest no-fishing zone in the Eastern Tropical Pacific. Thus, the ecological processes associated to Malpelo FFS, supported by its effective protection, provides a true "reservoir" for sharks, giant grouper and billfish, which can be expected to continue to thrive in the area free from the fishing pressures. This ecological role is essential to maintain and replenish the population of these species in the ETP if populations in other existing marine protected areas eventually collapse due to over fishing. IUCN considers that the Malpelo FFS meets this criterion, but that the Gorgona NNP does not.

Criterion (iii): Superlative Natural Phenomena or Beauty and Aesthetic Importance

The marine environment of the Malpelo FFS, characterized by steep walls, caves, and large aggregations of large predators and pelagic species, is indeed a phenomenon of outstanding natural beauty and aesthetic importance. It is one of the few areas in the world where large predators and pelagic species can be observed in large numbers in an undisturbed environment where they maintain behavioral patterns relatively free from human influence. The superlative nature of this area is well recognized by the major diving magazines of the world, which rank it as a top dive destination. On the contrary most of the large fishes of the marine environment of the Gorgona NNP have been removed, and these environments are affected by sedimentation from continental sources, thus limiting its natural beauty for divers and snorkelers. The forests of Gorgona are largely secondary growth and not particularly significant in terms of their beauty. IUCN considers that Malpelo FFS meets this criterion, but that Gorgona NNP does not.

Criterion (iv): Biodiversity and threatened species

The levels of biodiversity and number of threatened species of the Malpelo FFS and Gorgona NNP do not vary significantly from that found in Cocos Island; however they rank lower than the levels of biodiversity existing in Coiba National Park and the Galapagos Islands. Furthermore Galapagos Islands are characterized by the presence of a large number of endemic species. IUCN considers that the nominated serial property does not meet this criterion

7. RECOMMENDATION

IUCN recommends that the Committee **inscribe** the Malpelo Fauna and Flora Sanctuary on the World Heritage List on the basis of natural criteria (ii) and (iii).

On the other hand, IUCN recommends the Committee **not to inscribe** Gorgona Natural National Park on the World Heritage List on the basis of natural criteria.

Furthermore, the Committee may wish to recommend the State Party to:

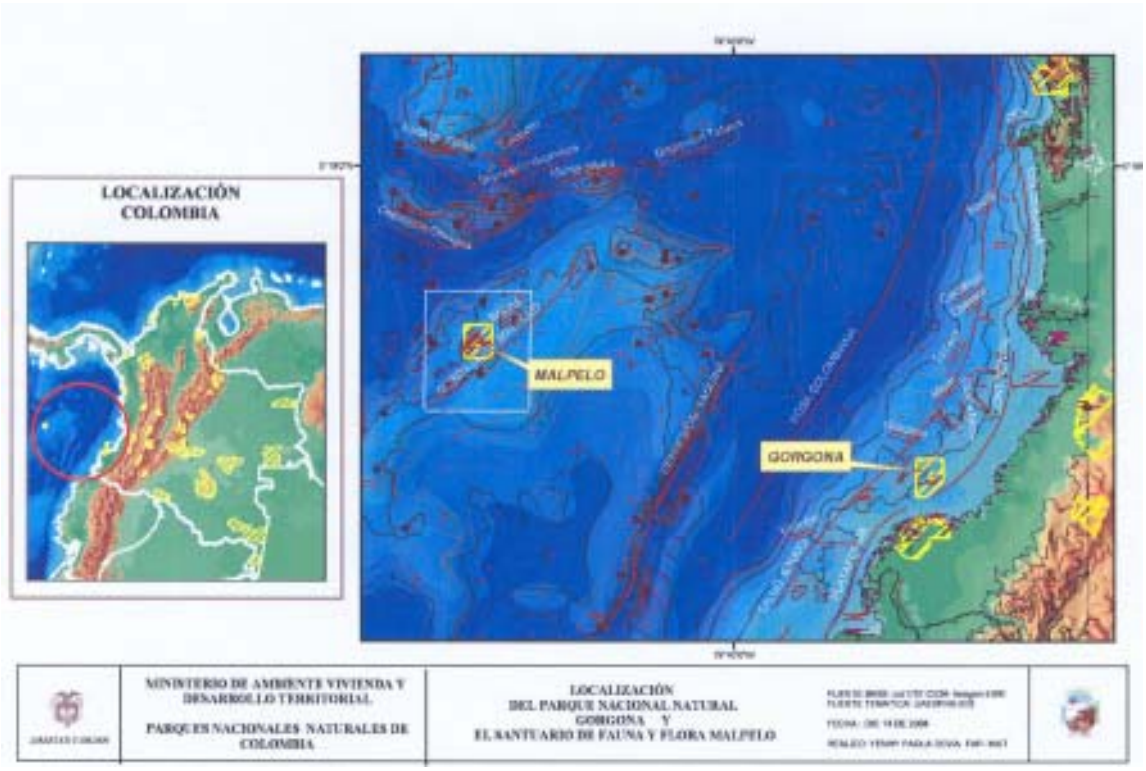
a) improve the management of Malpelo Fauna and Flora Sanctuary, including through the implementation of a programme to ensure that illegal fishing pressure is avoided permanently in the areas in and around the sanctuary;

b) strengthen tourism management and develop the funding base for long term management of both Gorgona Natural National Park and Malpelo Fauna and Flora Sanctuary; and

c) commence research on the deeper waters in both areas, including seamounts within them.

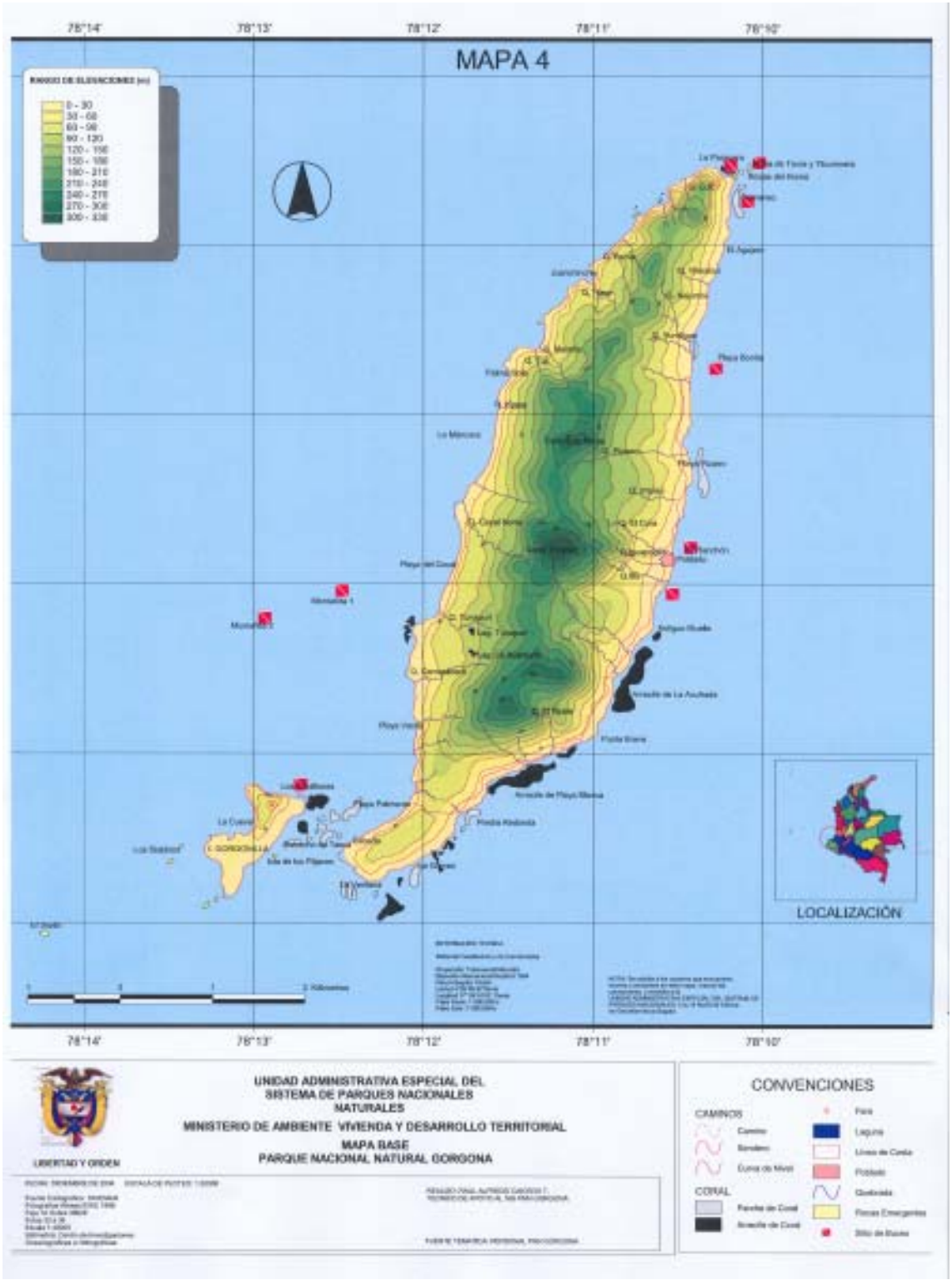
IUCN commends the State Party for its continued efforts in conserving these important protected marine areas, as well as the NGOs, other institutions and private partners that are contributing to their conservation and management.

Map 1: General Location of Nominated Serial Property



Map 2. Boundaries of Malpelo Flora and Fauna Sanctuary (before extension of marine boundaries)

Map 3: Boundaries of Gorgona Natural National Park



A. Nominations of Natural Properties to the World Heritage List

A2 Extension of Natural Properties inscribed on the World Heritage List

EUROPE / NORTH AMERICA

THE KVARKEN ARCHIPELAGO

(proposed extension to the High Coast of Sweden)

FINLAND

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE KVARKEN ARCHIPELAGO (FINLAND) - ID N° 898 Bis

(Proposed extension to The High Coast of Sweden)

Background note: The Kvarken Archipelago is proposed as an extension to the existing World Heritage (WH) property of the High Coast of Sweden, inscribed on the WH List in 2000. The High Coast was inscribed under natural criterion (i) as one of the places in the world that is experiencing isostatic uplift as a result of deglaciation. The Committee was also informed at the time by the delegate of Finland that a nomination (serial transboundary) for the nearby KA area was in preparation.

1. DOCUMENTATION

i) Date nomination received by IUCN: April 2005

ii) Additional information requested from and provided by the State Party: At the conclusion of the IUCN field evaluation in August, 2005, it was decided by the Finnish State Party that a reduction in boundaries of the property was needed to provide a more focused and coherent nomination. Documentation was adjusted and new maps were prepared and sent to the WH Centre and IUCN on 29 September, 2005.

iii) IUCN-WCMC Data Sheet : 7 references

iv) Additional Literature Consulted: Nordic Council of Ministers. 1996. **Nordic World Heritage: Proposals for New Areas for the UNESCO World Heritage List**; Dingwall, P. et al. 2005. **Geological World Heritage: A Global Framework.** Global Theme Study. IUCN; Gilligan, B. et al. 2005. **Management Effectiveness Evaluation of Finland's Protected Areas.** Metsahallitaus, Helsinki; Anon. 2003. **The High Coast – A World Heritage Site.** Vasternorrland County; Lammi, S. and Sevola, P. 2004. **New Land.** Vaasa; Geological Survey of Sweden. 1994. National Atlas of Sweden; Ehlers, J. et al. 1995. **Glacial Deposits in NE Europe.** Rotterdam; Flint, R. 1971. **Glacial and Quaternary Geology.** Wiley; Seppala, M. ed. 2005. **The Physical Geography of Fennoscandia.** Oxford University Press; Larsen, C.F. et al. 2005. Rapid viscoelastic uplift in southeast Alaska caused by post-Little Ice Age glacial retreat, in **Earth and Planetary Science Letters** 23, 548-560.

v) Consultations: 9 external reviewers. Officials from Ministry of Environment, West Finland Natural Heritage, Geological Survey of Finland, West Finland Regional Environment Centre, Regional Council of Ostrobothnia, Municipality mayors.

vi) Field Visit: Jim Thorsell, August, 2005

vii) Date of IUCN approval of this report: 11 April 2006

2. SUMMARY OF NATURAL VALUES

The Kvarken Archipelago (KA) in the Gulf of Bothnia off the west coast of Finland extends over some 70 kilometres from east to west and by 60 kilometres from north to south. The total Archipelago consists of 6,550 islands and islets formed of glacial moraines that are slowly rising from the sea. The nomination consists of two core areas within this region with a total area of 194,400 ha of land (15%) and sea (85%). The KA extension, if approved, would more than double the size of the existing High Coast WH property in Sweden (142,500 ha).

Area of proposed KA extension to High Coast WH property

Core site A:	160,000 ha
Core site B:	34,400 ha
Total area:	**194,400 ha**

The nominated area includes 5600 islands, the highest of which is 20m asl. Landforms in the KA were created mostly by glacial action over a pre-Cambrian peneplain during the last Ice Age, between 10,000 - 24,000 years ago. They are characterised by extensive moraine deposits, a shallow brackish sea of low salinity, and a shoreline 2416 kilometres long. The major geomorphologic feature is the unusual ridged washboard moraines or "De Geer moraines" formed by the melting of the continental ice sheet. Several

formations are represented in the property: mainland, island, coasts and open sea including relatively unaltered underwater geological features. As a consequence of the advancing shoreline, islands appear and unite, peninsulas expand, lakes evolve from bays and develop into marshes and peat fens, resulting in an unusual variety of environmental gradients, both topographic and hydrographic.

The formation of new islands occurs because the property is in the centre of the Fennoscandian land uplift area, which is continually emerging from the sea as a result of isostatic rebound. This occurs when land previously weighed down under the weight of a glacier slowly lifts after the glacier has disappeared. The property complements the High Coast WH property in Sweden, 150 kilometres to the southwest, which is also rising at a similar rate. The last glacier to cover the whole Scandinavian Peninsula drained on the east and south towards the present White Sea, Gulf of Finland and Baltic Sea with the Earth's crust depressed beneath it. The total initial depression is assumed to have been about 900 - 1,000 meters when the Scandinavian Ice Sheet was 3,400m-3,700 meters thick. The land started to lift 20,000 years ago, as de-glaciation began. During the first thousand years of uplift, the rebound rate was up to 100mm per year. The present uplift rate is 8 to 8.5mm per year, increasing the land area of the archipelago by one square kilometre a year. The sea at the Northern Kvarken strait is only 25m deep at a sill across the mouth of the Bay of Bothnia. At the present rate Finland and Sweden will be connected by a land bridge across the strait within 2,500 years, when the Bay will become the largest freshwater lake in Europe. Isostatic rebound is likely to continue for 10,000 - 12,500 years in the Kvarken area and the uplift will probably be between 100 and 125 metres.

The islands are covered by deposits both glacial and post-glacial: drumlins and flute lines parallel to the flow; hummocky, transverse, terminal and de Geer moraines at right angles to it as well as thick till deposits and a great number of boulder fields. The profusion of the De Geer moraines is the most notable feature. The melting and disintegrating ice front reached the Kvarken area 10,600-10,400 years ago when the area was covered by a 250-270m deep glacial lake. A floating and fracturing ice front with calving icebergs was typical of glacial marine conditions during this stage. Varved clay chronology has shown that the annual withdrawal of the ice margin was fast, up to 200-500m per year, leaving the regular ridges of till which reflect the probable positions of the intermittently retreating margin of ice.

The climate is southern boreal, influenced by the sea. Snow and ice cover lasts between 140-150 days a year and rainfall is 400mm. KA is a dynamic landscape, most obvious in flat and shallow areas where uplift is supplemented by sedimentation. The continually emerging shores are colonized by pioneer species which are gradually replaced by a succession of plant communities as the land rises in various ways due to the large number of environmental gradients. Seashore habitats are very heterogeneous and represent several Natura 2000 coastal habitat types. The Archipelago is on an important migratory route and offers excellent breeding habitats for birds. There are important Baltic populations of black guillemot (6,000 pairs, a quarter of the Baltic population) and razorbill (1,000 pairs); also Caspian and Arctic terns, whitetailed eagle (35 pairs), osprey and great scaup. Thousands of roughlegged buzzards and cranes also migrate through. Marine mammals living in the KA are typical for the Baltic region such as grey and ringed seals. As with the plants, the mild climate encourages many southern species of animals which come to their northern limit of distribution here.

3. COMPARISON WITH OTHER AREAS

This section closely follows the text of the IUCN evaluation on the comparison of the High Coast in Sweden as presented to the Committee in 2000.

3.1 Comparison with other World Heritage properties

There are 200 protected areas in the West Eurasian Taiga Biogeographic Province, including one mixed WH property in Sweden (The Laponian Area) and three natural WH properties (the High Coast of Sweden, the Virgin Komi Forest in Russia and the West Norwegian Fjords). Apart from the High Coast (HC), these existing properties are much larger and also display a wide range of geological features. They do not, however, illustrate the isostatic uplift phenomena that occurs in the KA, except, of course, the HC, to which KA is being proposed as an extension.

Many other areas in the Baltic Sea region and Gulf of Bothnia contain archipelagos with moraine landforms which display raised coastlines including several identified in the 1996 Nordic World Heritage report of proposed natural sites. None of these have the geological diversity of the KA nor have the extent of uplift.

There are 71 properties inscribed on the WH List under geological/earth science criteria, many of which contain glacial landforms and several of which have and are experiencing uplift (e.g. Gros Morne, Los Glaciares and Macquarie Island). The only property, however, inscribed under the theme of "Ice Ages" in the Global Geological Theme Study (IUCN, 2005) is the HC in Sweden. There are also 10 natural WH properties under the coastal systems earth sciences theme (IUCN, 2005), some of which (e.g. St. Elias Parks, Henderson Island, Te Wahipounamu - Southwest New Zealand and the Pitons Management Area) illustrate raised coastline phenomenon. Recent research along the coast of southeast Alaska including parts of the St. Elias Parks WH property indicates uplift rates three times that of those found in Fennoscandia (i.e. as high as 32mm per year). Part of this is due to the tectonic setting of coastal Alaska which is fundamentally different than the continental shield of Fennoscandia, but nevertheless, the rate of uplift in Alaska is the highest yet recorded in the world. The distinctiveness of the KA (along with the HC) is that the isostatic uplift is entirely due to the disappearance of a continental ice sheet, the long period of uplift (up to 20,000 years) and the range of coastal and marine landform features displayed as a result.

3.2 Comparison with other areas experiencing isostatic rebound

Another major area with comparable isostatic uplift is found in Richmond Gulf in south-eastern Hudson's Bay (Canada). This area has a similar history of glaciation and uplifted land. Deglaciation occurred about 1,000 years later and the present uplift rate is higher at 11-13 mm per year. It also lies on a Precambrian bedrock peneplain, with deep paleozoic sediments, but unlike the boulder-rich moraine of the archipelago, the moraines of Hudson Bay are boulder-poor, owing to softer rocks. De Geer moraines, drumlin fields, transverse moraines and hummocky moraines occur there but do not form archipelagoes. The wide low-lying western coasts of Hudson Bay area are a wetland-dominated landscape, which is lacking in the Northern Kvarken. The east coasts resemble it more, having a more broken topography and thin stunted forests. But the climatic, topographic, and geomorphological differences are considerable and make the area less nutrient-rich and diverse than the archipelago. The sub-arctic macroclimate of Hudson Bay with permafrost, salt water, strong winds, and a deep, long lasting snow cover affect the structure and dynamics of its coastal ecosystems more than land uplift, the effects of which are more obvious in the Kvarken Archipelago.

Isostatic phenomena are also evident in the northern and western shores of the White Sea on the periphery of the Fennoscandian shield. The land uplift rate is only 1,0-2,5 mm per year. Drumlins, end moraines and De Geer moraines (also called "washboard" moraines) do occur there but do not form archipelagos. The Stockholm Skargard in Sweden is a larger archipelago with some 24,000 islands. It has also experienced some uplift, but is mostly lacking in glacial till deposits which characterize other coastal areas in the Bothnian Sea Region.

In conclusion, the KA and the HC are one of several places in the world that are experiencing uplift as a result of deglaciation. Isostatic rebound is well-illustrated in this area and is among the highest known, although recent data from Alaska suggest that uplift rates are much more rapid there (but over a much shorter period of time). Both the HC and the KA have been well-documented scientifically, and are essentially the "type area" for research on isostacy, the phenomenon having been first recognised and studied there (Flint, 1971).

Other natural values of the KA (wildlife and vegetation succession processes) are also important but relatively common and do not stand out as unique at an international level. Useful information is also provided on the aquatic environment in Appendix 3 of the nomination which indicates the regionally important values of the marine area.

Similarly, the scenic values of the KA, consisting of a blend of farmland, coastline and islands, are harmonious, but typical of much of the rural landscape of northern Europe

3.3 Relation of the Kvarken Area to the High Coast

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

While the HC and the Kvarken have isostatic rebound in common, they are geologically contrasting areas with marked differences in topography. This in turn has important implications for differences in plant and animal life. The HC has a dramatic land surface of bedrock hills, high islands, steep shores and deep bays and straits -features that do not otherwise occur in the Baltic region. The KA is a low-relief area of extensive archipelagos of till and intervening shallow sea and unique depositional features notable the De Greer (or washboard) moraines. The HC is also much older, revealing 10,000 years of geological evolution, as opposed to the corresponding 2,000-year history of the Kvarken.

The HC is, therefore, a relatively stable biological environment, while the KA, whose low-lying landscape is constantly changing due to rising land, is biologically highly dynamic, with plants and animals continuously colonising newly emergent land surfaces and successional habitats. Thus, the HC and KA areas differ considerably in the ways land uplift processes act on the biota. They are, in fact, complementary in terms of their biophysical evolution. They represent, respectively, the high and low topographical extremes of post-glacial uplifted landscapes in the Baltic.

4. INTEGRITY

4.1 Legal status and ownership

A variety of protective measures cover 80% of the property, including several sites in the Natura 2000 Network (governed by EU Directives on Habitats and Birds and in process of expansion), a RAMSAR site and national measures under the Nature Conservation Act. In the remaining 20% the geological values are also protected under national legislation. As in the HC, there is also a portion of the land area and sea frontage owned privately or by village communities. A much greater extent of land and sea, however, in KA, as compared to the HC, is owned by the State.

4.2 Boundaries

Definition of boundaries of the property went through several iterations and much input from the Geological Survey of Finland. Final deliberations resulted in two core areas of land and sea where the major focus of geological features occurs. Only the most superlative terrestrial formations and formations lying in the shallow

sea are included in the two core areas as well as the majority of the moraine features. While the geological boundaries of the property do not coincide with legal or administrative boundaries, the science behind their selection is justified and IUCN considers that the two core areas incorporate the essence of the KA. A *de facto* buffer zone around the property is provided for in the regional plan for Ostrobothnia, and the geological values will be taken into consideration in local and regional planning.

4.3 Management

The Regional Council of Ostrobothnia promotes the sustainable development and protection of the archipelago and funnels the funds for various EU financed programs. It is also including special status for a buffer zone around the nominated area as part of the regional plan. The main responsibility for nature conservation and environmental protection rests with the Metsähallitus (Forest and Park Service) and the West Finland Regional Environmental Centre which controls most land-uses, regulates and permits small-scale farming, fishing and forestry. The municipalities are responsible for planning and land use within their jurisdictions. Detailed management plans for the area include recent local shore master plans for the Archipelago by the municipalities of Malax, Vaasa and Korsnäs. Cooperation is planned with the Swedish HC property where the geologic processes are complementary. For public presentation there are two nature stations and one museum within the area. A visitor centre ("House of the Sea") is also planned near the road entrance to the property.

4.4 Threats

Although there are some threats to the biological values of the property (e.g. environmental toxins, agricultural runoff and dredging), there are no threats to the geological values of the KA. The resident human population of 2500 in the KA (compared to 4500 in the HC) is engaged in small scale traditional farming, forestry and fishing, all of which have negligible impact on geological values. Tourism pressures are not at a high level (200,000 annually) but will certainly increase in future. Some 600 summer cottages are found throughout the KA but these also pose minimal threats. Both of these issues are adequately addressed in tourism and recreation plans for the property. A long term change in the area may come from the effects of global warming (sea level rise) which may moderate the rate of uplift.

4.5 Serial property

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

a) **What is the justification for the serial approach?** The nominated property was selected by a panel of experts who determined that two focus areas contained the full range of glacial features that comprise the international values of the property. Each of the two core areas as well as the contrasting site of the HC has a different morphology and geology and displays a different range of geomorphological features. The two parts of the nomination are thus complementary and reinforce the rationale for addition to the existing HC WH property.

b) **Are the separate elements of the property functionally linked?** At their closest point, the two core areas are 7 km apart and are separated only by open sea and a few islands. KA is some 150 km from the HC on the east coast of Sweden. The entire area was covered by the Scandinavian continental ice sheet and its features are derived from the after effects of its retreat.

c) **Is there an overall management framework for all the components?** Under the Regional Environmental Centre two working groups are to be established once the property is included as an extension of the Swedish HC. One to coordinate the land-uses, conservation and management of the existing mix of protected and unprotected private, municipal and state lands. The second will promote sustainable tourist and other enterprises. Both eventually will share common guidelines with their Swedish counterparts. The Kvarken Council is a cross-border association to promote cooperation between Finnish and Swedish municipalities. The entire area on the Finnish side is covered under the regional plan prepared by the Regional council of Ostrobothnia.

5. ADDITIONAL INFORMATION

5.1 Name of property: In a letter from the Swedish Minister for Education, Research and Culture dated 31.01.2005, it was noted that Sweden had "…no objection to the designation of the Kvarken archipelago as a serial nomination to form an international extension of Sweden's High Coast World Heritage site." In a follow-up letter of 19.09.2005, the same office agreed to the name High Coast/Kvarken Archipelago as the collective name for the property.

5.2 Public support: A five year process of consultation was involved in the preparation of this nomination. Also, a "Statement of Intent" regarding future sustainable management for the property has been signed by all the local management authorities and municipalities concerned (Appendix 10 in the nomination). The process is thus both "bottom up" and "top down" and ensures long term cooperation for the KA.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Kvarken Archipelago has been nominated as a transboundary serial property under natural criterion (i).

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

The Kvarken Archipelago, with its 5600 islands and surrounding sea, is of exceptional geological value for two main reasons. First, it is an area of rapid glacio-

isostatic uplift with rates that are among the highest in the world. The uplift has been ongoing for thousands of years and is associated with major changes in the water bodies in post glacial times. The Kvarken, along with the existing High Coast, its Swedish equivalent on the west coast of the Gulf of Bothnia, are key areas for the understanding of the processes of crustal response to the melting of the continental ice sheet. Second, the Kvarken area possesses a distinctive array of glacial depositional landforms, such as De Greer moraines, which add to the variety of glacial landscapes features in the region and reinforce the previous validity of the High Coast inscription. IUCN considers that the nominated property meets this criterion

IUCN also notes that this property has other important and complementary natural values but these are secondary to the criterion used in the nomination. They are, however, being considered in the integrated management of KA region.

7. RECOMMENDATION

IUCN recommends that the Committee **extend** the High Coast World Heritage property (Sweden) to include the Kvarken Archipelago (Finland) on the basis of natural criterion (i).

The property thus becomes a serial transboundary property of both Finland and Sweden with the new name of *High Coast / Kvarken Archipelago* (Sweden/Finland). The total size of the transboundary serial property will be 336,900 ha as detailed below.

Total area of property:

State Party	Property name	Land (ha)	Sea (ha)	Total (ha)
Sweden	High Coast	62,500	80,000	142,500
Finland	Kvarken Archipelago (Core A)	26,560	133,440	160,000
Finland	Kvarken Archipelago (Core B)	2,683.2	31,716.8	34,400
				336,900

Map 1: Location of nominated property

Map 2: Boundaries of nominated property

B. Nominations of Mixed Properties to the World Heritage List

B1 New Nominations

AFRICA

NYIKA NATIONAL PARK

MALAWI

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

NYIKA NATIONAL PARK (MALAWI) – ID N° 290 REV

Background Note: The Nyika National Park was first nominated as a natural property in 1983 and evaluated by IUCN for the 8th Session of the World Heritage Committee (1984). The IUCN evaluation at the time noted that "*the Nyika National Park is of scientific interest for its montane flora and avifauna and of conservation importance for its watershed protection values. However, the area is not seen to have 'superlative' values of international significance and many of its features are found in other protected areas in the region, including two existing World Heritage Sites*". The Committee decision (1984) states: "*Although this property does not fulfil the World Heritage criteria of outstanding universal value, the Committee however noted the importance of this property on the national and regional levels*." It is noted in paragraph 158 of the Operational Guidelines (2005) that, "if the Committee decides that a property should not be inscribed on the World Heritage List, the nomination may not again be presented to the Committee except in exceptional circumstances……new discoveries, new scientific information about the property, or different criteria….".

1. DOCUMENTATION

i) Date nomination received by IUCN: April 2005

ii) Additional information requested from and provided by the State Party: IUCN requested additional information on 31 January 2006, notably in relation to the comparative analysis, and the State Party responded with an updated nomination document on the 31 March 2006.

iii) IUCN-WCMC data sheet: 2 references (the nomination contains a bibliography of 162 references)

iv) Additional literature consulted: **Nyika National Park Master Plan** (2004) Department of National Parks and Wildlife, Malawi; **Plants of the Nyika Plateau**, (2005) J Burrows and C Willis SABN Report 31, South African Botanical Network; **Biosearch Nyika: Scientific Exploration of the Nyika NP, Malawi** [ed] M J Overton (several volumes), Biosearch, Lincolnshire – source of much of the data on species; **Endemic Bird Areas of the World** (1998) A J Stattersfield et al, Birdlife International; Cambridge; **Centres of Plant Diversity volume 1: Africa** (1994) [eds] S D Davies, V H Heywood and A C Hamilton; WWF, Gland; **The Nyika Experience: Reminiscences of Malawi's first National Park;** [eds] F and R Dorward, The Wildlife Society of Malawi; **Terrestrial Ecoregions of Africa and Madagascar: A conservation assessment** (2004) [eds] N Burgess et al, WWF and Island Press; **Study on the Development of Transboundary Natural Resource Management Areas in Southern Africa**: Environmental Context (1999) D Cumming, Biodiversity Support Program; **The World List of Threatened Trees** (1998) S Oldfield, C Lusty and A MacKinven, World Conservation Monitoring Centre and IUCN, Cambridge; **The Kingdon Field Guide to African Mammals** (1997) J Kingdon, A&C Black Publishers, London; **Birds of Eastern Africa** (1995) Ber van Perlo, Harper Collins, London; **Biomass Assessment** (1989) A Millington et al, Earthscan and ETC Foundation, London; **Rare Birds of the World** (1988), G Mountfort, Collins, London; **Review of the Protected Areas System in the Afrotropical Realm** (1986), IUCN/UNEP, Gland; Eastern Arc Mountains and Southern Rift in **Hotspots Revisited** (2005), R A Mittermeier et al, Conservation International, Washington.

v) Consultations: 6 external reviewers. Staff at the Department of National Parks and Wildlife; National Park staff including research, outreach, education, enforcement and rangers; staff at ecotourism lodge and guides; staff at the museum; three local chiefs whose traditional lands cover the whole protected area.

vi) Field visit: Nigel Dudley (IUCN) and Edward Matenga (ICOMOS), September 2005.

vii) Date of IUCN approval of this report: 11 April 2006

2. SUMMARY OF NATURAL VALUES:

Nyika National Park (NNP), IUCN protected area category II, covers 313,400ha of which 94,000ha is high plateau. It is located in northern Malawi, with a 20 km area bordering a national park of the same name in Zambia. There is no buffer zone. The property is nominated as a mixed World Heritage property.

The Nyika plateau is bounded by the Rift Valley to the north, and by major faults marked by Lake Malawi and the Luanga Valley. Most of the area is above 1800 metres, rising to 2600 metres at the highest point and the geology

is mainly made up of crystalline and granitic gneisses. The NNP area has been impacted by humans for thousands of years but retains a largely natural ecology. Immediately prior to its establishment, around 5,000 people lived in NNP practising a mixture of hunting and farming and a relatively low level of settlement has taken place for thousands of years. Vegetation on the lower slopes is predominantly *Brachystegia* woodland with the large majority of the upland plateau covered in short grass and herbaceous plants. In addition, there is a rich orchid flora, small patches of evergreen woodland and important fragments of juniper forest, some extremely old, marking the southernmost limit of *Juniperus procera.* Some individual trees are at least several hundred years old. There is also a 500ha Scots pine plantation in one part of the plateau. The landscape is dominated by rolling hills with occasional rocky outcrops, some of which include caves. There are relatively few rivers and one small permanent body of standing water, known as Lake Kaulimi. The weather is cool, falling below freezing on some nights in the winter, and rainfall is relatively high. The catchment supplies 40 per cent of water for the northern part of Malawi.

NNP is one of the seven high plateau afromontane regions in sub-Saharan Africa. It is in the Southern Rift Montane Forest-Grassland Mosaic Ecoregion. The plateau is a centre of endemism and is included in the Tanzania-Malawi Mountains Endemic Bird Area and as a Centre of Plant Diversity and Endemism. NNP has moderate levels of endemism, across a wide range of groups. Much additional information about species has been collected over the last twenty years including by park staff, from regular volunteer scientific expeditions and work by the South African Botanical Network. Endemism is hard to prove conclusively, particularly when so much of the surrounding area has not been surveyed, but the following figures are indicative: 33 endemic flowering plants (mainly in grassland zone) including 4 endemic orchid species; 1 endemic species of frog (not 6 as stated in the nomination); 8 endemic species of small mammals, including 3 species of mole rat and 2-3 species of shrew (data not confirmed); and 5 endemic butterfly species.

On a Malawian scale, the NNP contains less habitat diversity than Mount Mulanje (the latter also has more endemic species). Diversity is particularly high for orchids, with over 200 species recorded to date. In total, 1817 taxa of flowering plant have been recorded, from 684 genera and 160 families. Around 95 species of mammals and 426 species of birds have been recorded, 47 reptile species, 34 amphibian species and many insects including 220 species of butterfly. Key larger mammals include reedbuck, eland, roan antelope, zebra, warthog and common duiker. There is a healthy population of leopard, a small and declining population of elephants and occasional visits from lions, but no resident population. Unfortunately, since the NNP was originally nominated in 1984, there have been catastrophic declines in reedbuck and eland populations (reduced to 20-30% of their previous numbers). Census figures of roan antelope and zebra, however, have remained relatively stable.

In addition to the endemic species described above, several other species have important populations within NNP. For example, the park hosts the world's largest breeding population of blue swallow.

3. COMPARISON WITH OTHER SITES

NNP is a part of one of 7 isolated highland plateaus in Africa (see map below). These "afromontane" zones can be likened to an archipelago of islands of montane habitat separated by a sea of lowland forests, woodlands and savanna. Throughout this archipelago, approximately 90 protected areas have been established, of which nine are WH natural properties (Simen, Mt Kenya, Ngorongoro, Drakensberg, Bwindi, Rwenzori, Virunga, Kahuzi Biega and Mount Nimba) which all include afromontane habitats. In addition, a decision on Bale Mountains in the Ethiopian highlands has been deferred. All of these areas have varying physiography with some being of volcanic origin, several being uplifted sedimentary strata, and several related to the rift zone of the African Rift Valley System (as in the case for NNP). Although precise data is not available, NNP has much less habitat diversity than the nearby Southern Highlands of Tanzania which is in the same eco-region (Kitulo Plateau National Park). The Eastern Arc Mountains in neighbouring Tanzania also display a much higher level of endemism and biodiversity and are on the Tentative List submitted by that country.

The 7 components of the afromontane biogeographical unit are of exceptional biological value for their distinct flora and (to a lesser extent) fauna, and landform features, and there is much overlap in vegetation, species and communities. Some comparative data on selected afromontane protected areas indicates the relative importance of the NNP:

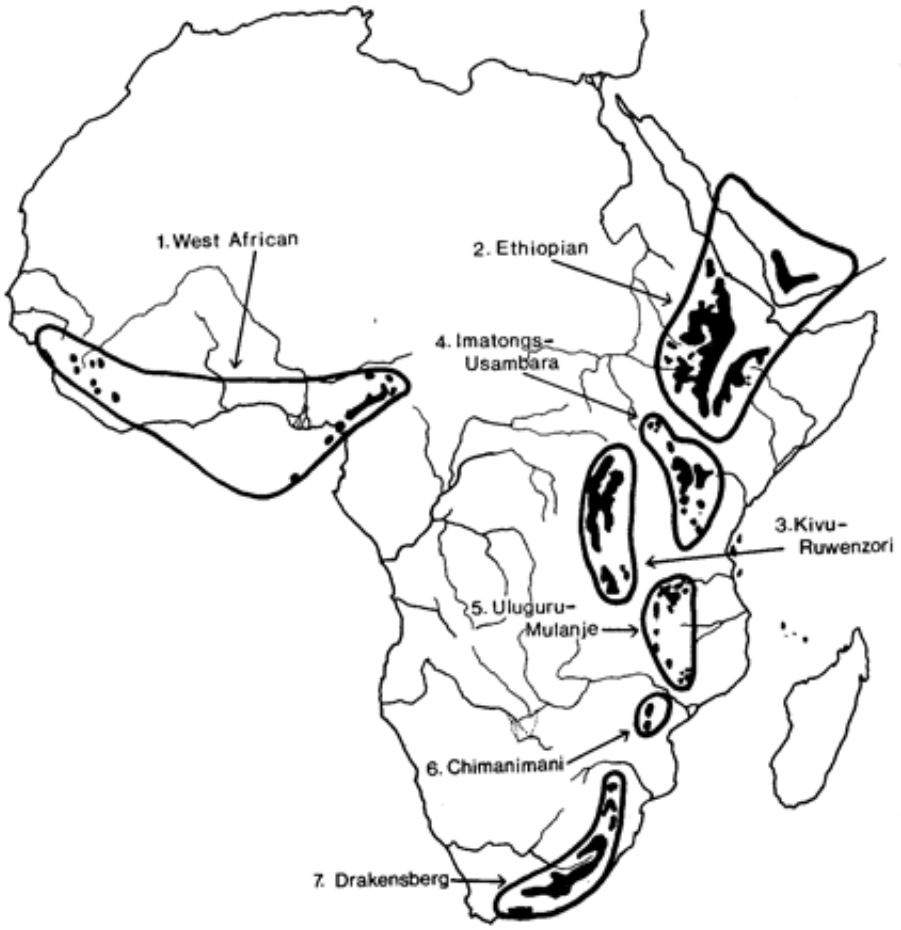
- NNP is of intermediate size (313,400ha) as compared to existing afromontane WH properties, exceeded by Ngorongoro Conservation Area (829,000ha) Virunga National Park (790,000ha) and Kahuzi-Biega National Park (600,000ha);

- The altitudinal range (and thus habitat diversity) of NNP (2026m) is exceeded by all but one of the nine existing WH properties where relative reliefs of 3000 to over 4000 metres are recorded;

- Although floral diversity in NNP is high (1225 species), almost double these amounts are recorded in the Drakensberg (2153 species), Mount Nimba (2004 species) WH properties, as well as sites in the Albertine Rift, which itself is home to about 5800 plant species (data not available for individual sites). The Southern Rift ecoregion, where NNP is situated, is also known to be biologically less diverse than the adjacent Eastern Arc mountains in Tanzania;

- The mammal diversity in NNP (95 species) is also substantially lower than in Virunga National Park (200 species), Kahuzi-Biega National Park (194 species), Kilimanjaro (140 species) and Bwindi Impenetrable Forest (120 species). Similarly, bird diversity in NNP (426 species) is exceeded by several other afromontane sites such as Virunga (800 species),

Map1: Afromontane zones



Map of Seven Afromontane Systems (after White, 1978).

Ngorongoro CA (over 500 species) and the Rwenzori mountains (543 species);

- Endemicity is high in all afromontane areas but once again the levels in the NNP are less than those found in all groups in other WH properties as well as with Mt. Mulanje Biosphere Reserve (77 endemic plants versus 33 in NNP), a site also on Malawi's Tentative List.

Despite some gaps in data and recognising broad regional differences in species composition, several conclusions can be drawn from the above figures:

- NNP is one of 90 protected areas in the afromontane regions of Africa. It is of medium size compared to the existing 9 WH properties in this biogeographic region but has less altitude variation than most.

- Endemism levels are higher in most existing afromontane WH properties than in NNP, though there is a lack of comparative data on all sites.

- Habitat variety and biodiversity levels are high but are generally less than for most groups in existing afromontane WH properties and other sites on the Tentative Lists for Malawi and Tanzania.

- Many montane plant species and plant communities found in NNP also occur in other African highland areas. All of these areas have a number of plant species and communities that are distinctive in specific ways. For example, NNP has a greater extent of *Brachystegia* woodlands than other sites. Similarly, NNP's large fauna is typical of the region and does not contain significant populations except for roan antelope for which it is regionally important.

- NNP's landscape is characterised by open rolling grasslands bordered by dissected valleys, which, together with some small wetlands and waterfalls combine to provide high scenic value. It does not, however, contain any landform feature comparable to the spectacular scenery found in the existing WH properties in other afromontane regions, such as Simen Mountains, Kilimanjaro, the Drakensberg and the Rwenzori Mountains (all inscribed under criterion (iii)).

In summary, as the Committee concluded in 1984, NNP is an area of clear significance at the national and regional level but its international significance has not been demonstrated. Although further information has become available on the natural values of the property since the original nomination, this is not of a magnitude to modify the conclusion reached in 1984. Most of the natural values are already contained or exceeded in importance in other WH properties in the afromontane region.

4. INTEGRITY

4.1 Legal status

NNP is a legally gazetted, state-owned protected area under the control of the Department of National Parks and Wildlife. Parts of the plateau have been protected since the 1930s, when fragments of the unusual juniper forest were reserved. The national park was established in January 1966 under the Game Ordinance, when it covered 93,000ha. The area was more than tripled in size in June 1978, when the current borders were set (and when many people were removed from the park).

4.2 Boundaries

The boundaries of the property are clear and accepted by the surrounding population. NNP is large enough to provide protection for the ecosystem. The property stretches across most of the width of Malawi at this point, stopping a few miles from the shore of Lake Malawi. There is no buffer zone, nor a realistic chance of creating one as people who were moved from the property when it was established have in many cases settled close to the boundary. Actual encroachment seems to be rare although as discussed below there are a number of problems relating to poaching and fire. Agricultural use of surrounding areas is increasing. Virtually no Miombo woodland remains along the road to the entry gate and the woodland corridor connecting NNP to the Vwasa Marsh wildlife reserve has disappeared. Some of the boundary of the property follows the national border with Zambia, where it is contiguous with a much smaller (8000 ha) protected area, the similarly named Nyika National Park. Currently a Memorandum of Understanding has been signed between the two parks but discussions about a formal joint management approach are still ongoing.

4.3 Management

Management responsibility lies with the park manager, who reports to the Department of National Parks and Wildlife, with headquarters in Lilongwe and a regional office in Mzuzu. NNP is being managed to a Master Plan developed in 2004. The Park's current staff members include a Manager, Research officer and Education and Extension officer, 9 Technical Officers, 46 technical assistants and 4 maintenance staff. It is admitted that this is currently insufficient to manage the park, being just over half the number of positions identified. A private trust is providing voluntary support, particularly with fire control and there is considerable volunteer effort in research.

4.3.1 Local communities: No people live permanently within the national park although there are workers at the lodge and some rangers. Around 5000 people were relocated when the park was expanded in 1978, usually to less productive land and areas with higher incidence of malaria, and this has created resentment. These issues are being addressed by the development of a series of collaborative management initiatives, with 78 natural resource committees, 66 beekeeping clubs and a revenue sharing scheme, which transfers a proportion of the gate money to local communities. Although local people were at one time completely excluded from the park, these restrictions have been relaxed. Local people are allowed to place beehives in the park, generating around 8 tonnes of honey a year, and to collect natural resources, e.g. medicinal plants, wild fruit and grass, which are monitored. Communities can also now use a range of sacred sites (a waterfall, mountain and lake) for rain-making ceremonies and this takes place whenever elders believe it to be necessary. Managers admit that problems remain. However, the three chiefs whose traditional lands include part of the park all stated that their attitudes to the NNP were changing to being more positive than in the past. They all expressed support for the World Heritage nomination. The current apparent softening of opposition needs to be built upon. In particular, NNP should capitalise on its protected status to build income amongst local communities, for example by investigating value added options for products from the protected areas, such as organic certification of honey for export; this generates considerable revenue for rural communities in Zambia.

4.3.2 Staffing: Managers, technical staff and rangers are well informed, appeared to have a good understanding of the ecology and were clearly used to being in the field; however staffing levels are currently less than they need to be. Staff have uniforms, vehicles, a well-appointed headquarters building, computers and email connection and roads are well maintained in the park.

4.3.3 Monitoring: The NNP has a system of monitoring in place, focusing on bracken expansion, illegal fires, staffing levels, visitor numbers, poaching data, levels of those natural resources where extraction is allowed and populations of key species (elephants, roan antelope, eland, zebra and reedbuck). Priorities for additional monitoring would be for those other mammal and bird species identified as being of regional importance. It will also be important to monitor implementation of the new management plan and associated annual work plans and a standardised system for reporting will be needed.

4.3.4 Visitors: There are currently about 1500 visitors a year to the property. This is the same as twenty years ago although is recovering from a dip in between. Accommodation is limited to one lodge complex, some simpler accommodation and camping grounds but is not currently being fully utilised. Accommodation at the park remains too expensive for many national visitors. Visitors can go walking with a guide, horse riding and on game drives. There is a small exhibition in a dedicated building at the edge of the park, which provides a lot of useful information and has some exhibits; there were some inaccuracies in information given (for instance species listed which staff said were not present). Over-visitation is clearly not a problem at the current time, indeed there is an argument for increasing visitor numbers as this would not impact significantly on wildlife and would increase income flow to both the park and neighbouring communities.

4.4 Threats

4.4.1 Poaching: Poaching of wildlife is currently a major problem and unless stopped will lead to the extirpation

of some species. It is estimated that there are around 280 professional part-time poachers, deploying around 220 mainly locally made muzzle-loading firearms and taking 400-500 antelope a year. Some antelope populations have fallen by 75% in the last decade. In the immediate term, the poaching of antelope is the most critical problem facing NNP and failure to reduce this has resulted in serious loss of wildlife values; however, there does now seem to be a serious attempt to address this issue. A new law enforcement officer has been appointed, who has had success in controlling poaching in other protected areas and has an action plan agreed for addressing the problem. In the first half of 2005 there have been 24 convictions and confiscation of 20 firearms; eight poachers caught with animals have been sentenced to four years in prison. The officer predicts a downturn in poaching in 2-3 years but clearly this issue needs to be monitored. Other forms of poaching are also problematic, including removal of orchid tubers and timber.

4.4.2 Fire: The Nyika plateau is managed through patch burning to reduce the risks of intense fires; some research suggests that this has few impacts on biodiversity but further investigation is warranted, particularly with respect to its role in encouraging invasive species. Illegal fire setting is a major problem. Fires are set accidentally by poachers, or to maintain open habitat for hunting or sometimes as revenge (for instance if a poacher is arrested). Park managers believe that deliberate patch burning is needed to maintain the ecosystem but that major fires at the wrong time of year are damaging and amongst other things may increase the risk of spread of invasive species. Fire patrols are mounted but there is much evidence of uncontrolled burning.

4.4.3 Invasive species: The existing Scots pine plantation creates some problems with invasion although this is not out of control and there is a gradual programme to reduce the plantation to a fifth of its current size using the remaining timber in the tourism lodge. A much more serious problem is invasion by bracken fern from Europe which is spreading in many patches throughout the park. It appears that bracken tends to flourish after fire being a primary coloniser and gaining a rapid foothold on bare ground. Currently no control mechanisms are in place and if unchecked this could in time seriously compromise the integrity of the ecosystem. In the longer term, invasive bracken could be a critical challenge in maintaining the integrity of the high level grasslands that are at the heart of the region's importance.

5. ADDITIONAL COMMENTS

5.1. Cultural Values

The property is nominated as a mixed property. As in many apparently natural sites, evidence of human habitation in NNP can be seen very widely and there are clear links between natural and cultural values. Some of the most distinctive geographical features – including the pool, largest waterfall, caves and the most distinctive rock outcrop – have sacred values. Cave paintings are also found along with sites of iron smelting and the remains of smelters. Although some of the results of human activity pose management challenges, such as the pine plantation and the invasive bracken, others have important values of their own. Continued use of *Brachystegia* woodland for collection of honey and medicinal plants continues this tradition and does not undermine conservation efforts. The cultural aspects appeared to be only partly developed by the park staff and further work is recommended, particularly with respect to slave routes and remains of the Ngomi invasion.

5.2 Nomination Document

It was pointed out by several reviewers that the document submitted did not include a sufficient comparison section and contains a number of errors, inconsistencies and gaps in data. IUCN has provided a list of corrections to the Malawian authorities but the document is still deficient in some sections.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The property is nominated under both natural and cultural values but only the former are considered in this report. NNP has been proposed under natural criteria (iii) and (iv).

Criterion (iii) : Natural phenomena, beauty and aesthetic importance

NNP has important aesthetic values, and is different from most mountain islands in the afromontane region, being a rolling incised plateau. Compared to more dramatic landscapes found in other existing afromontane World Heritage properties, however, aesthetic values are of secondary importance and are not regarded as globally significant. IUCN does not consider that the nominated property meets this criterion.

Criterion (iv) : Biological diversity and threatened species

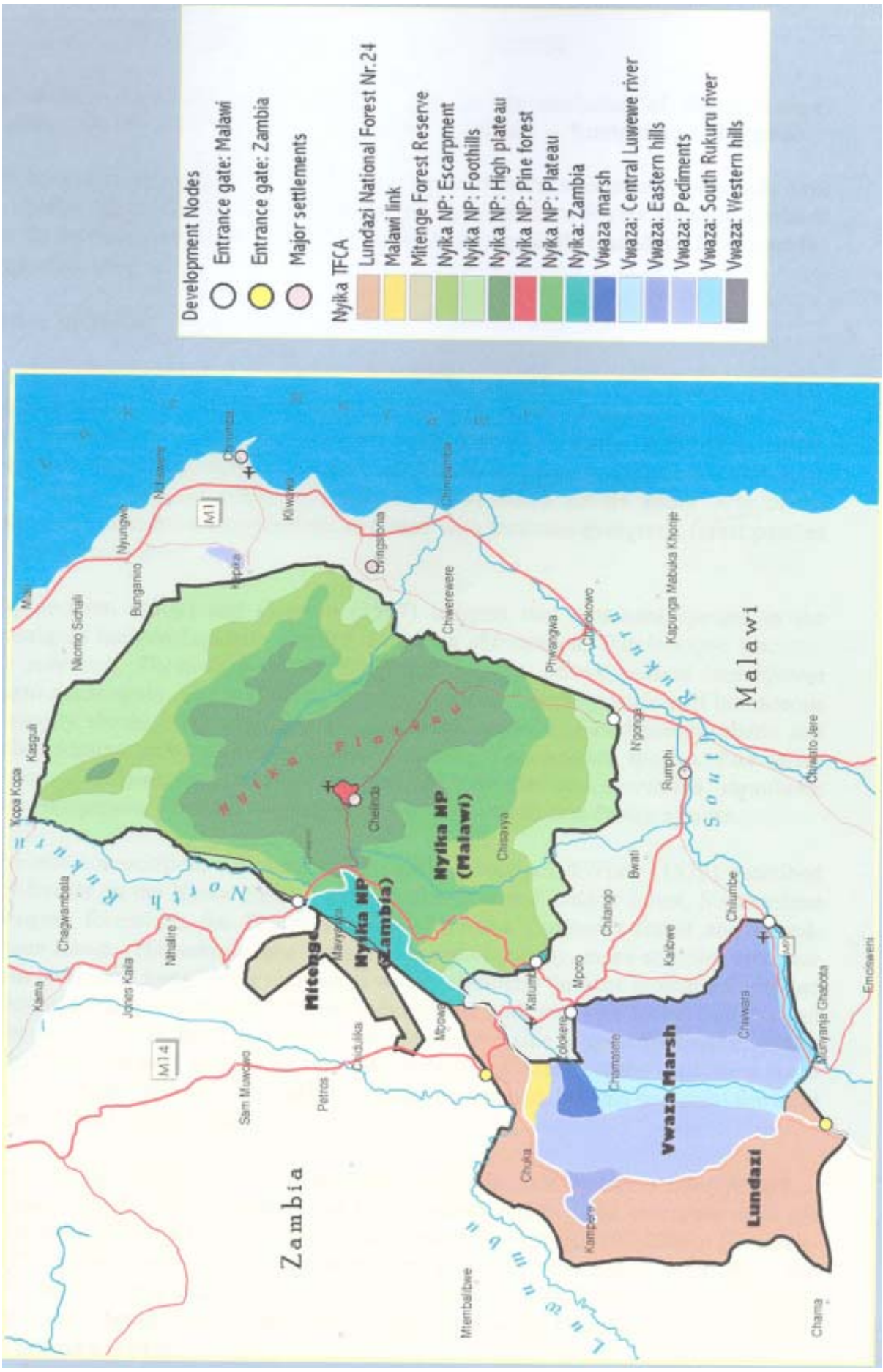
As is true for all portions of the afromontane regions, NNP is one of several centres of endemism, although the level of endemism is not as high level as in other World Heritage properties in the same region. Important populations of roan antelope and several bird species occur, as well as rich orchid flora, but these are regarded at the regional rather than international level of importance. Woodland areas in the lowland (which make up two thirds of the property) are also very important in a region where deforestation and loss of forest quality have been rampant. NNP, however, is surpassed in biodiversity values by the nine existing World Heritage properties in the Afromontane region and is not judged to be of international significance as previously decided by the 8th session of the World Heritage Committee (1984). IUCN does not consider that the nominated property meets this criterion.

In addition, IUCN has a number of concerns over integrity issues as outlined in section 4.

7. RECOMMENDATION

IUCN recommends the Committee **not to inscribe** Nyika National Park on the World Heritage List on the basis of natural criteria.

Map 1: Location and boundaries of nominated property



B. Nominations of Mixed Properties to the World Heritage List

B2 Mixed referred nominations for which additional information has been recieved

AFRICA

ECOSYSTEM AND RELICT CULTURAL LANDSCAPE OF LOPE-OKANDA

GABON

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

ECOSYSTEM AND RELICT CULTURAL LANDSCAPE OF LOPÉ-OKANDA

(GABON) - ID Nº 1147 REV

Background note: The IUCN technical evaluation of the Ecosystem and Relict Cultural Landscape of Lopé-Okanda, nominated by Gabon as a mixed property and cultural landscape in 2004, was presented to the 29th Session of the World Heritage Committee (Durban, 2005). IUCN's evaluation noted that the property had the potential to meet natural criterion (ii), but, because "*it does not emerge as a key property in terms of the biodiversity prioritisation systems examined by IUCN, nor was it identified as a key tropical forest property for WH designation*", IUCN considered that the nominated property did not meet criterion (iv). The evaluation recommended that the State Party undertake a process to revise the Tentative List so that it clearly identifies priorities for World Heritage in Gabon. It stressed the need to substantially increase management capacity at the property to effectively address the integrity issues and to give priority to (a) adopting and implementing a management plan; (b) increasing staff levels within the Lopé National Park; and (c) clarifying the leading management authority and the respective roles and responsibilities of the Conseil National des Parcs Nationaux (CNPN) and the Direction de la Faune et de la Chasse (DFC) in the management of the Park.

IUCN, therefore, recommended the property be deferred. However, following discussion at its 29th session, the World Heritage Committee decided (Decision 29 COM 8B.17) to **refer** the nomination back to the State Party of Gabon, on the basis of natural values, in order "*to allow the State Party to provide an improved comparative analysis that demonstrates the outstanding universal value of the property, considering other protected areas in Gabon and the region, and in relation to detailed inventories of fauna and flora, as available.*" The Decision also requested to increase management capacity at the property "*to effectively address integrity requirements, and to confirm the long term management, planning and staffing arrangements, to ensure the overall sustainable management of the property, including the relationship of its cultural and natural values"*. It also recommended that "*the position of the nominated property be confirmed in relation to other potential World Heritage properties in Gabon. In relation to natural values, this should include the examination of possibilities for serial and transboundary nominations".* The Committee also referred the nomination on the basis of its cultural values, and these are the subject of a separate report by ICOMOS.

1. ADDITIONAL INFORMATION

On 30 January 2006, the Gabon State Party submitted a new, updated nomination document for the same property, but with slightly modified boundaries to include a number of sites of cultural importance in response in particular to the ICOMOS evaluation of 2005. The new nominated property includes Lopé National Park (LNP) (491,292 ha) and its buffer zone (150,000 ha). The boundary has been "*extended to include the 7 historical complexes*" (distinct clusters of archaeological sites, most of them non contiguous to LNP, encompassing a total of 20,700 ha).

The document provides a limited amount of additional data on the natural values of the property. It stresses the abundance of newly discovered endemic plants, and gives updated figures for the number of species known (or estimated) in various taxa, as well as new estimations for populations of primates. Compared with the previous document, it is noted that one species of primate (*Miopithecus ogoouensis)* was added. The presence of a few individuals of hippopotamus (*Hippopotamus amphibious)*, thought to be extinct in this area, is now reported. Recent discovery of 3 new species of amphibians and reptiles suggests that Mt Iboundji (an historical complex 15km SE of the Park, but included in its buffer zone) is an important refuge for these species.

The State Party also submitted:

- A letter from the Ministry of Arts and Culture, in charge of Popular Education, introducing the nomination "*in accordance with the recommendations adopted by the World Heritage Committee meeting in Durban (South Africa,) in July 2005"*.
- A new Management Plan for Lopé National Park (2006 - 2011) including a zoning map;
- A new map of the nominated property, including the limits of LNP, its buffer zone, and the location of the 7 historical complexes;
- Copies of new legislation related to the gazettement of 7 historical complexes by the Ministry of Culture and Arts.

2. EVALUATION OF ADDITIONAL INFORMATION

This revised nomination for the Ecosystem and Relict Cultural Landscape of Lopé-Okanda has not fully addressed the recommendations of IUCN and the World Heritage Committee (Durban, 2005). IUCN's evaluation of the revised nomination, in relation to the decision of the Committee is as follows:

- No adequate comparative analysis is offered in relation to the case for outstanding universal value of the property. The revised nomination brings some new arguments stressing the biological importance of LNP in terms of its biodiversity richness, but it is only focussed on a description of the values of Lopé, and does not compare these data with similar sets from other rainforest areas in the region and worldwide. The new proposed formulation of the outstanding universal value for which the property is nominated under natural criterion (iv), is now geographically restricted to "Atlantic Central Africa"; thus making a regional approach to the Outstanding Universal Value (OUV) concept which relates to global significance;

- Although the nominated property is included within the Tentative List of Gabon, a critical evaluation of the justification for LNP did not form part of the revision of the Tentative List of Gabon, nor did this process consider potential serial and transboundary nominations with other forest areas identified as part of the Tentative List;

- Staffing levels appear to remain inadequate. While the zoning map locates 7 control posts, the new nomination document only states that staff level was increased from 5 (2003) to 8 (2005) but that a staff level of 40 is necessary. The document states that the staff is assisted in its work by neighbouring brigades and by 50 agents working for projects managed by the Wildlife Conservation Society (WCS) and the Zoological Society of London (ZSL). The revised nomination recognizes that the low level of park staff "*renders the organization of any protection and conservation activity very problematic*".

- The Park Management Plan has been noticeably improved since 2004, however it still does not provide details on many aspects of the long term management, planning and staffing arrangements that are necessary to ensure the overall sustainable management of the property. Although financial input in 2005 by Gabonese institutions (CNPN and DFC: 45,000$) and contributions from partners (est. 1,080,000$) are given, there is no long term funding commitment from partners and no indication of the level of funding that the Government plans to reserve annually for salaries, operations and investments in the nominated property over the next few years;

- The document does not clearly state what the respective roles and responsibilities of the CNPN and the DFC are in the management of the park. While the CNPN (an Inter-Ministerial Committee depending from the Presidency) is technically in charge of the Park, the staff depends from the DFC (under the *Ministère des Eaux et Forêts et de l'Environnement*). As in 2003, this document states that a Scientific Committee and a *Commission du Site* "are in the process of being formed".

- While the link between the natural and cultural values of the property are more explicitly presented in the revised nomination, the link between the management of the Park and the management of the 7 Historical Complexes situated in the Park's Buffer Zone is still unclear. While LNP staff is responsible for the protection of the Park and the control of activities in its 5km-wide Buffer Zone, the document does not state any formal arrangement between Ministries giving CNPN full responsibility for the conservation and management of the Historical Complexes. The *Arrêtés Ministériels* (17 January 2006) of the Ministry of Arts and Culture, in charge of Popular Education, gazetting these Complexes as "*Aires Culturelles Protégées*" do not even mention their proximity to LNP or a joint management regime.

IUCN considers that it has not yet been convincingly demonstrated in the revised nomination that the integrity requirements in relation to the nominated property have been met.

3. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The property is nominated as a mixed property and a cultural landscape Its natural values are proposed for inscription on the basis of natural criteria (ii) and (iv) :

Criterion (ii): Ecological processes

The nominated property demonstrates an unusual interface between forest and savannah environments, and an interesting manifestation of evolutionary processes in terms of habitat adaptation to post-glacial climatic changes. However, the global – as opposed to the regional – significance of the area has still not been demonstrated by the limited additional information provided in the revised nomination. IUCN considers that the nominated property may have potential to meet this criterion.

Criterion (iv): Biodiversity and threatened species

The nominated property is regionally important in terms of the species that it contains but the additional information provided in the revised nomination does not support the case for meeting this criterion. As noted in the 2005 evaluation of this nominated property it does not emerge as a key property in terms of the biodiversity prioritisation systems examined by IUCN, nor was it identified as a key tropical forest property for WH designation at the Berastagi meeting in 1999. For these reasons, IUCN considers that the nominated property does not meet this criterion.

In conclusion IUCN considers that, whilst there has been some progress towards improving the management arrangements of Lopé-Okanda, the lack of comparative analysis and the limited additional data and information provided on the ecosystems and biodiversity of the nominated property are still not addressing the uncertainty over whether or not the property meets criterion (ii). Therefore IUCN's conclusions regarding the evaluation of this property as presented to the 29th Session of the World Heritage Committee remain essentially unchanged.

4. RECOMMENDATION

IUCN acknowledges the decision of the 29th session of the World Heritage Committee to refer this nomination, rather than accept IUCN's recommendation of deferral. IUCN considers, however, that more work needs to be done and more time is required by the State Party to develop the case for this nomination. .Therefore IUCN recommends that the World Heritage Committee **defer** examination of the Ecosystem and Relict Cultural Landscape of Lopé-Okanda, Gabon to the World Heritage List on the basis of natural criterion (ii) in order to:

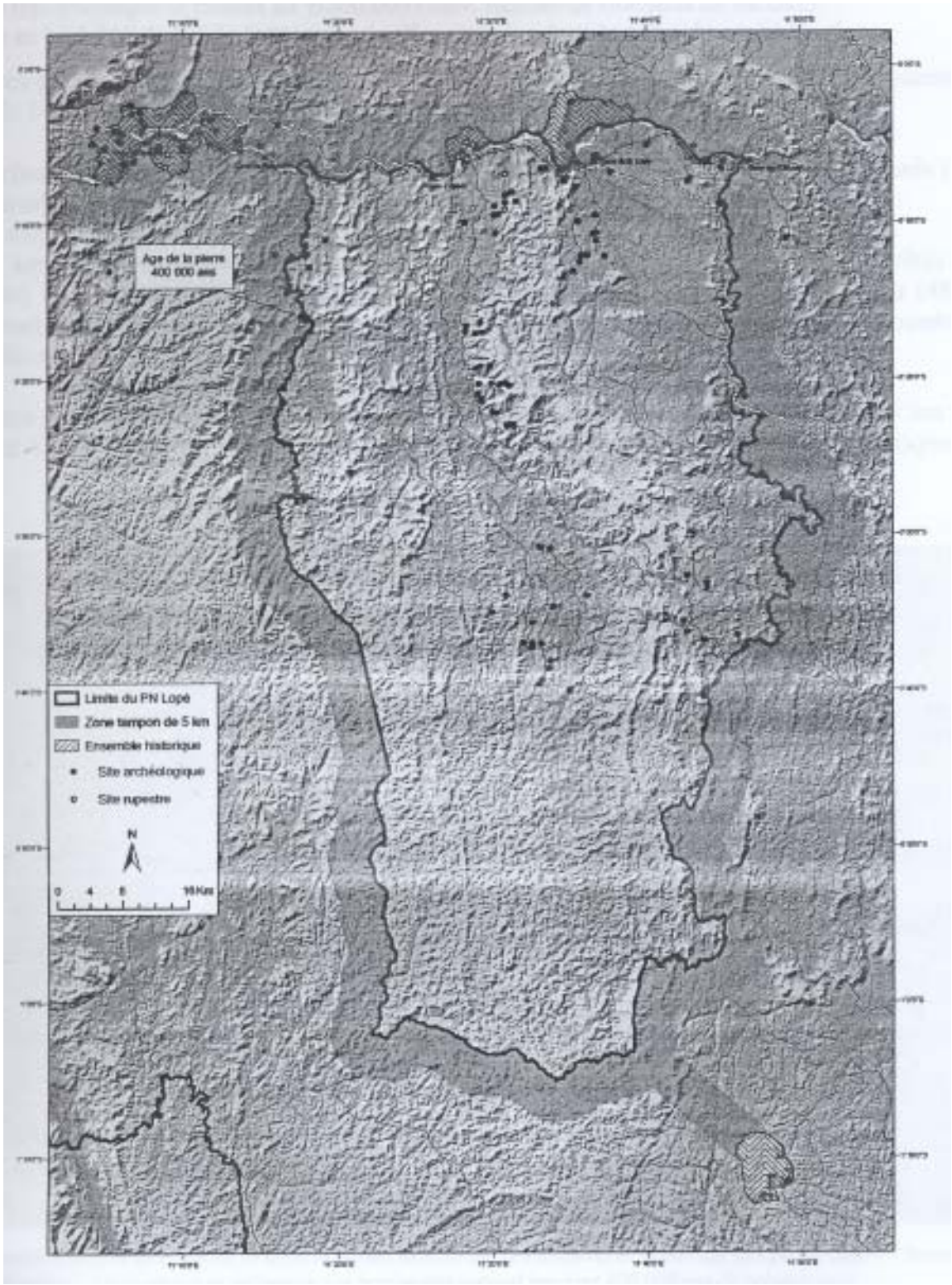
a) Allow the State Party to provide a full and thorough global comparative analysis that demonstrates the outstanding universal value of the property, considering other protected areas in Gabon and the region, and in relation to detailed inventories of fauna and flora, as available.

b) Address the need for increased management capacity at the property to effectively meet the conditions of integrity and to support the implementation of the new Management Plan of Lopé National Park, placing priority on confirming staffing arrangements and long term financing commitments, to ensure the overall sustainable management of the property, including the relationship of its cultural and natural values.

IUCN also recommends that the Committee express its appreciation to the State Party for the work that has been carried out to improve the management plan for Lopé National Park, and that the States Parties of Gabon, Congo and Cameroon be invited to discuss the feasibility of preparing a serial transnational nomination of rainforest protected areas, whilst enhancing their existing collaboration in the framework of COMIFAC and RAPAC initiatives.

Map 1: Location of nominated property

Map 2: Boundaries of nominated property



C. New Nominations for Cultural Landscape Properties

ASIA / PACIFIC

RIVER ISLAND OF MAJULI IN MIDSTREAM OF BRAHMAPUTRA RIVER IN ASSAM

INDIA

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

RIVER ISLAND OF MAJULI IN MIDSTREAM OF BRAHMAPUTRA RIVER IN ASSAM

(INDIA) ID N° 1206

IUCN carried out a desk review of this cultural landscape nomination, the full text of which was provided to ICOMOS as an input to their evaluation process. This is a brief summary for the information of the World Heritage Committee.

Natural Values

The nominated property consists of the river island of Majuli, located in the mid-river delta system of the Brahmaputra River, the largest mid-river delta system in the world, and a number of small wetlands partially surrounding it. The island is the result of the large scale accumulation of sediments from the Brahmaputra River and its tributaries. Inhabited since the 15th Century, the nominated property has been subject to traditional and harmonious land and water use since then and most of the areas are under traditional use practices today, including agriculture, grassing and fishing. The property is subject to cycles of flooding (mainly during the Monsoon season) and dry periods in winter. These cycles not only dominate the natural processes occurring in the area but also condition the use of land and water resources each season.

The nomination dossier refers to the use of native flora and fauna for economic, social and religious reasons; and the importance of the area, particularly its wetlands and paddy fields, for local and migratory birds, and as a breeding place for the endangered river dolphin. However, it is lacking a detailed inventory of flora and fauna of the property, including existing threatened and endangered species, and an assessment of their state of conservation. Further information is required in relation to how the traditional practices (i) have contributed to develop and/or conserve a wide range of varieties of cultivated crops and domesticated livestock; and (ii) are contributing to support and enhance a variety of ecological niches that play a key role in protecting native and migratory species, particularly endangered and threatened species.

Management aspects and long-term protection

The proposed boundaries encompass the key areas associated to the property and ensure the protection of its immediate surrounding landscape as a way to maintain its visual quality and identity. However, the property is very vulnerable to any changes that may occur in the upper watershed and it would be beneficial to extend the buffer zone to the north to allow management of a greater part of this watershed. Establishing the legal status of the property as a protected area and identifying its management category are also of key importance. A proposed management plan for the property identifies overall management objectives but there is a need for detailed guidance on activities, operations and resources to ensure its effective implementation. IUCN suggests that the State Party should also explore mechanisms to streamline existing institutional coordination and project development. In addition, tourism development requires careful consideration in order to avoid impacts that could affect the fragile balance existing between people and nature in Majuli.

Overall, however, the survival of Majuli Island depends on ecological processes which cannot be totally controlled by management activities. In fact the island itself is depending on the river's cycles of sedimentation and erosion. IUCN is concerned that, in the light of predicted climate change impacts, the risk and impact of increased flooding events may jeopardize the existence of the property, causing people to resettle in other areas – a process that is already occurring. The proposed management plan recognises the need to prepare a Risk Management Plan for Majuli and IUCN considers that this should be of the highest priority for the State Party. Nonetheless, ensuring the long-term protection and existence of the property cannot be totally guaranteed.

EUROPE / NORTH AMERICA

THE CAUSSES AND CEVENNES

FRANCE

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE CAUSSES AND CÉVENNES (FRANCE) – ID N° 1153

1. DOCUMENTATION

i) **Date nomination received by IUCN:** April 2005

ii) **Consultations:** The mission met with national, regional and local authorities, community leaders, protected area staff, local NGOs and other experts.

iii) **Field visit:** Henry Cleere (ICOMOS) and Pierre Galland (IUCN), 18-22 September, 2005

iv) **Date of approval of report by IUCN:** April 2006

2. SUMMARY OF NATURAL VALUES

The nominated property of the Causses and Cévennes is an area of 476,400 ha in south-east France, with an additional buffer zone of 162,600 ha. The nominated property and buffer zone cover slightly over 1% of the total land area of France. The property includes the Cévennes National Park (321,380 ha), the Grands Causses Natural Regional Park (315,949 ha), and a number of other areas benefiting from coordinated management focussed on environmental values. The nominated area consists of three natural units of different geologic origin (karst, schist and granite) which combine to form a high diversity of landscapes and ecosystems. The landscape has been largely created by centuries of human activities which have also contributed to an increase in the biological diversity, especially notable in the large karstic plateaux of the Causses, and the terraced agriculture and the open highland grazing areas of the Cévennes.

Although the upper parts of the property receive the highest amount of precipitation of the country, water has always been a limiting factor for the vegetation and the agro-pastoral activities. Typical for areas under Mediterranean influence, most of the precipitation occurs in autumn or winter, and summers are very dry. A substantial network of channels and other small equipment have been set up in order to ensure a supply of water for domestic use, irrigation and energy production (water mills). Most of these networks are still in use today. Very few dams have been built, leaving most of the valleys intact, including the spectacular Gorges of Tarn and Jonte.

The nomination provides a good description of a range of geological, habitat, species and landscape values. Most of the noticeable species communities, ecosystems and landscapes have been significantly influenced by human activities and are currently maintained through these activities. It is therefore correct to describe the property as an organically evolving cultural landscape. In this respect and based on Annex 6 of the Operational Guidelines, IUCN considers that there are four kinds of natural values that are likely to be most evident in such landscapes: conservation of natural and semi-natural systems, and of wild species of fauna and flora; conservation of biodiversity within farming systems; sustainable land use; and enhancement of scenic beauty. IUCN comments on each of these aspects for the nominated property are as follows:

Conservation of natural and semi-natural systems, and of wild species of fauna and flora

The nominated property is a good example of how traditional land use patterns have:

- helped support and contribute to an increase of wild species of flora and fauna. Many orchid populations, for example, are very well developed as a consequence of the extensive grazing activities on the karst plateaux;
- contributed to the protection of natural ecosystems and human settlements by providing protection against erosion and flooding of the lower valleys, while ensuring water supply for animal flocks and crops during the dry season; and
- created numerous semi-natural habitats; different types for each of the three major geomorphologic units.

The Causses and Cévennes lie at a biogeographic crossroads between Mediterranean and Atlantic regions; the size of the property, its integrity and its elevation range contribute certainly to the maintenance of the genetic diversity for numerous plants and insects, offering a potential for migration in case of climate change or modification of human practices.

Conservation of biodiversity within farming systems

To some extent the traditional activities have lead to the selection of well adapted animal breeds (of sheep and cows) and cultivated crops (chestnut trees, etc.). However these breeds are not necessarily corresponding to the current market driving forces and might disappear or might be conserved as "relict" from the past. The same applies to traditional practices, like transhumance or extensive, low-input farming.

Sustainable land use

The land use practices established within the nominated property are a good example of how traditional agricultural methods respect land capability by adapting agro-pastoral practices to the landscape and its geomorphologic features; conserve the quality and quantity of soil by replanting forests on slopes prone to erosion; and manage rainwater, by increasing water retention through building of terraces and providing irrigation water during the dry season.

Enhancement of scenic beauty

In addition to a range of dramatic natural landscape features, such as the *Gorges du Tarn* and *de la Jonte,* the nominated property displays a range of scenic and aesthetic qualities, deriving from the integration of the traditional construction into the landscape (on cliffs, along streams or ridges, etc.) and from using local stones (limestone or schist stones and roof slabs). Traditional pastoral activities have kept open the transhumance roads (drailles), maintained semi open habitats and have contributed to the conservation of the cultural elements like dolmen or other spiritual witnesses. The preservation of in-situ semi-natural and cultural elements is enhanced by a number of museum displays, projects to rehabilitate building complexes, small exhibitions and visitor trails.

3. COMPARISON WITH OTHER AREAS

The nomination contains a clear comparative analysis that recognises that the features displayed by the Causses and Cévennes are found individually in many other places around the world, but identifies a number of points of differentiation in each case, and a claim for preeminence in Europe due to the richness, coherence and complementarity of the landscapes and its constituent values and features.

IUCN notes that the nominated property is considered to be a site characteristic of upland/mountain areas adjacent to the Mediterranean coast, with both evidence of the history of occupation and still active agro-pastoral practices which have disappeared or have been significantly modified in many areas. Other Mediterranean type areas outside of Europe do not display the same cultural and historical values nor a similar integration of the activities into the landscape.

IUCN agrees with the evaluation in the nomination that the factors identified are not unique to the Cévennes and Causses, and whilst they demonstrate a number of particular and specialised characteristics, the differentiation from other areas appears to rely on a rather complex and narrowly-based distinction. IUCN considers that it will be important for the ICOMOS evaluation to carefully consider the nature of this claim in relation to the many other upland areas in Europe that could be considered to display values of a similar nature that could also be used to argue for outstanding universal value.

4. INTEGRITY

4.1 Legal Status and ownership

A large number of protection measures are in force. The Cévennes National Park, including 117 *communes*, was established in September 1970 under the Law of 22 July 1960, and has been a UNESCO Biosphere Reserve since 1985, while the Grands Causses Natural Regional Park, covering 94 *communes,* was established in 1995 under the Law of 5 July 1972. The Centre permanent d'initiative pour l'Environnement (CPIE) des Causses méridionaux, set up in accordance with 1901 legislation, represents 28 *communes* and enables these collective groups to prepare and implement policies and activities of common interest. Private property covers some three-quarters of the nominated area. On September 15, 2005, a supervising / coordination body was created under the name of AVECC – Association de Valorisation des Espaces Causses et Cévennes (see section 4.3 below).

4.2 Boundaries

The property's boundaries are the result of a long process of negotiation with local and regional authorities, and appear to be quite logical. The boundaries have been determined mainly according to natural physical criteria, such as the border of the elevated plateaux (Causses) or valleys / mountain ranges in the Cévennes. The addition of the buffer zone appears to ensure the inclusion of the communities bordering the property. The main towns surrounding the property have been designated as 'Gateway Towns' in order to take advantage of the potential World Heritage designation.

It is for ICOMOS to judge the adequacy of the boundaries in relation to the claim for outstanding universal value. IUCN considers that they are more than adequate to encompass the natural values of the property and to ensure their conservation, but is concerned by the extent of the property and subsequent potential management difficulties as outlined below.

4.3 Management

The management of the property is mostly in the hands of three principal bodies: the Cévennes National Park, the Grands Causses Natural Regional Park and the Centre permanent d'initiative pour l'Environnement (CPIE) des Causses méridionaux. These three organisations maintain very good relations and have been very active in the nomination preparation. However, their real influence on the human activities is relatively limited, most of the land being private property. Even on the state land the potential for intervention or limitation

of specific activities is limited. The regional authorities, namely the Préfets (local representatives of the central government) and the Conseils Généraux (Departmental authorities) are very much supporting these institutions, as well as the "communautés de communes" (groups of community councils) created to handle local issues.

The management of the nominated property needs to be well coordinated to ensure coherent management across the three different physical units, integrating the authorities of the five French Departments and the three large management bodies. On September 15, 2005, a supervising / coordination body was created under the name of AVECC – Association de Valorisation des Espaces Causses et Cévennes and this is a noticeable step toward an integrated management. Good collaboration between the Préfets and the Conseils Généraux is also a positive factor for management.

Nevertheless IUCN notes that the management organisation of this large and diverse area is very complex, and only recently formed. There is likely to be a considerable ongoing challenge to maintain cohesion between the substantial and different management bodies responsible for the property. The multiplicity of labels for the area and other designations could be quite confusing for the visitors and a global reflection on the way the property will be presented in the future should take place in order to ensure a coherent approach.

In the immediate future it is clear that all the institutions involved in the property's management have the support of the political authorities, and the necessary budget to operate. It is not clear, however, if they will have access to the much larger financial means necessary to support the farmers and other local actors in the future for landscape conservation through traditional activities. The existence of Departmental funds for acquiring land, which is then leased to applicants for farming, eco-tourism and promotion of local products, is an example of a positive measure to partly address this concern.

4.4 Threats

The whole nominated area is maintained through the perpetuation of traditional activities and the support of management teams to address issues created by the decrease of traditional practices – such as the use of mechanical scrub clearance. Many small organizations have been created to support local initiatives and local farmers. However, the whole agricultural system appears to be quite fragile and very much depending upon current policy, in particular the European agriculture and food regulations. As an example, the enforcement of a regulation prohibiting cheese making from un-pasteurised milk could lead to a dramatic decline of practices of the 1'600 farmers depending upon the Roquefort factories. Cessation of subsidies to farmers for landscape maintenance is also an important threatening factor, along with the lack of training for young farmers specific to the property's characteristics.

Visitation numbers are quite high, supported by a dense network of visitor facilities and large amount of visitor information. The State Party expects that World Heritage designation would bring a significant increase in visitors but it appears that very little has been planned regarding the management of tourist flows and in particular, motor traffic. A coordinated effort is required in this regard and alternative transportation mechanisms considered, along with the development of low impact tourism like hiking, biking, sightseeing, and bird watching.

Water management has always been one of the major concerns for the area. The uneven distribution of the precipitation has forced the local people to develop sophisticated systems for water retention and run-off control. Pollution does not seem to be a major issue.

5. SUMMARY AND CONCLUSIONS

The nominated property of the Causses and Cévennes displays a variety of important natural values, resulting from both the natural landscape and geology, and the interaction of nature with human settlement and pastoral agriculture over a long period of time. These landscape and natural elements contribute significantly to a well-preserved and dynamic cultural landscape.

IUCN considers that the natural values of the property are of a national and regional (European) significance, rather than global significance. It is for ICOMOS to determine the validity of the claim for outstanding universal value as a cultural landscape in relation to the cultural criteria, and, in this regard, IUCN has suggested that ICOMOS may wish to consider :

a) the relationship of this cultural landscape nomination to potential claims that could be advanced by other European upland/mountain areas such as national parks, including those on existing tentative lists;

b) the justification for the size of the nominated property;

c) the issues created by the complexity of the current and proposed management arrangements; and

d) the relationship of the proposed property to the existing protected areas that lie within it.

IUCN notes the presence of a number of potential threats and management issues. In relation to the natural values of the property, particular attention should be placed on the maintenance of traditional activities likely to preserve the existing natural and semi-natural habitats and the species dependant on them. Effort should be made to rehabilitate sites that have been transformed or abandoned, returning them to semi-natural habitats through traditional practices and by reintroducing domestic species. The key threat appears to be uncertainty over the sustainability of the traditional agricultural use of the area in the face of changing European agricultural policy and funding.

IUCN finally notes the impressive community collaboration that is evident from this nomination, reflected in a consistent commitment to the nomination encountered at all levels throughout the evaluation

mission. IUCN congratulates all of the authorities and partners involved in achieving this level of consensus, and the creative approach that has been taken through the initiative to connect existing protected areas to the surrounding area and communities.

EUROPE / NORTH AMERICA

THE AGAVE LANDSCAPE AND THE ANCIENT INDUSTRIAL FACILITIES OF TEQUILA

MEXICO

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE AGAVE LANDSCAPE AND THE ANCIENT INDUSTRIAL FACILITIES OF TEQUILA (MEXICO) - ID N° 1209

IUCN carried out a desk review of this cultural landscape nomination, the full text of which was provided to ICOMOS as an input to their evaluation process. This is a brief summary for the information of the World Heritage Committee.

Natural Values

The nominated property is located in an area characterized by a hilly relief of volcanic origin, dissected by a number of rivers; mainly the Santiago River which forms a canyon at the northern part of the property. Another important natural feature is that associated to Mount Tequila, an inactive volcano reaching 2,900m. The region has a sub-tropical semi-arid climate with an annual rainfall of 1,100mm. The volcanic rocks and soils present in the area ensure good retention of water in important aquifers that are essential for social and economic activities. Most of the area used to be covered by natural tropical forest where different species of the genus Ficus were predominant (e.g. the name of Cerro Amatitán is originally from the amerindian language, náhuatl, and means "forest of amates" which is given to *ficus glabrata*). The nominated property is located in the region of Jalisco, one of the most biodiversity rich areas in Mexico, containing 25% of all the species of flora reported for the country.

Most of the original natural ecosystems have been modified by mankind for hundreds of years, in order to adapt it for agriculture and industry. In particular the domestication of the blue maguey plant, *Agave tequiliana*, leading to the production of mezcal and mezcal wine, has created a unique type of landscape. Culture influenced this trait to the extent that the blue agave is now known in cultivation only, with no wild relatives in the area. There are patches of natural forest and old regenerated secondary forest; such as those associated to "Hacienda La Primavera" where more than 1,000 species of plants have been reported (SEMARNAT, 2004) including a high diversity of orchid. The nomination, however, lacks detail on the flora and fauna of the region or how the Agave cultivation contributes to biodiversity conservation, particularly to the survival of a number of species of bats and hummingbirds.

Management aspects

IUCN notes a number of suggestions relating to the maintenance and restoration of the natural values of the nominated property. For instance, a descriptive biological inventory of the area would help to establish a baseline for their conservation and management. It is suggested that the conservation of the remaining isolated forest remnants, especially on Mount Tequila, figure as an important component of management of the natural values of the property. The impact of the extensive use of herbicides and insecticides within the property is not insignificant and it could affect the long-term quality of the water in existing aquifers. Poor soil conservation practices are common in the area and reductions in habitat for nectar-feeding bats and hummingbirds require management actions that would improve the environmental and aesthetic integrity of the area. The dependence on a very limited genetic stock of the blue agave species has resulted in an aggressive disease outbreak that has been the subject of a book, "Tequila – A Natural and Cultural History", by Ana Valenzuela-Zapata and Gary Paul Nabhan (2003).

IUCN suggests that all the above are important aspects of this cultural landscape nomination and should be recognized as part of the interplay between nature and culture. IUCN recommends that the State Party recognize and respond to the above concerns in future management and monitoring of the property.

EUROPE / NORTH AMERICA

CORNWALL AND WEST DEVON MINING LANDSCAPE

UNITED KINGDOM

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

CORNWALL AND WEST DEVON MINING LANDSCAPE (UNITED KINGDOM) - ID N° 1215

IUCN undertook a desk review of the Cultural Landscape nomination, the full text of which was provided to ICOMOS as an input to their evaluation process. Subsequently, the IUCN World Heritage Panel noted additional points and approved the following brief summary for the information of the World Heritage Committee:

Natural values

IUCN considers that the natural values of the property are evident, though concentrated in the 37% of the nominated property that lies within a Category V protected area (Area of Outstanding Natural Beauty). It also notes that several sites within the nominated property, including the highly unusual habitats and plant communities created by some of the former waste and spoil tips, have been nominated for inclusion as part of the European system of Special Areas of Conservation or designated as Sites of Special Scientific Interest. However, these habitats and plant communities are distinctive precisely because they have adapted to some of the most polluted land in the UK, which has had and continues to have considerable impact, not only on the natural communities of the waste and spoil tips, but on the downstream aquatic and estuarine environments as well. Indeed, the issue of toxicity is a clear manifestation of the interaction of humans and nature in this special environment, and might be given more prominent recognition as an important element of the cultural landscape.

Management aspects

IUCN is pleased to note that these natural qualities and the associated designations have been taken into account in the nomination. The case for listing of this property as a cultural landscape, “a combined work of man and nature”, was not, in the opinion of IUCN, adequately addressed in the nomination document. Thus, it is recommended that this central theme be given prominence in the management programme for the property. IUCN considers that nature conservation, landscape protection, contamination control, and the featuring of human/nature relationships are important elements to be recognized as critical to delivering the objectives of the nominated property, and should not be seen as in any way obstructive to them. In general, IUCN welcomes the aims of the Management Plan, and advises that policies for biodiversity, landscape protection, contamination control, and the recognition of human/nature relationships should be fully integrated into the future management of the property.

IUCN concurs with the ICOMOS recommendation to refer the nomination and suggests that the State Party give due consideration to the points outlined above.