

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  
May 2005



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# THE WORLD HERITAGE CONVENTION

## IUCN TECHNICAL EVALUATION REPORTS

May 2005

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

Members of the expert network of WCPA carry out the majority of technical evaluation missions. This allows for the involvement of regional natural heritage experts and broadens the capacity of IUCN with regard to its work under the World Heritage Convention. Reports from field missions and comments from a large number of international reviewers are comprehensively examined by the IUCN World Heritage Panel. PPA then prepares the final technical evaluation reports which are 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, the Protected Areas Programme has been able to call on experts from IUCN's other five Commissions (Species Survival, Environmental Law, Education and Communication, Ecosystem Management, and Environmental, Economic and Social Policy), from other specialist offices in the IUCN Secretariat, and from scientific contacts in universities and other international agencies. This highlights the considerable "added value" from investing in the use of the extensive networks of IUCN and partner institutions.

### 2. EVALUATION PROCESS

In carrying out the technical evaluation of nominations IUCN is guided by the Operational Guidelines of the Convention, which request IUCN "to be as strict as possible" in evaluating new nominations. 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 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 2004/2005);
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 missions 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 World Heritage properties, as well as other protected areas. 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 Convention, its primary role is to deliver objective 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 panel 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 2004 / 2005

22 nomination dossiers were examined by IUCN in the 2004/2005 period, involving 14 field inspections. These comprised:

- 13 natural property nominations (including 7 new nominations, 3 deferrals, 1 extension and 2 properties with minor modifications),
- 3 mixed property nominations, and
- 6 cultural landscapes.

In addition, one cultural landscape nomination (Issyk-Kul, Kyrgyzstan) was withdrawn following the field inspection, and one natural nomination (Tropical Rainforest Heritage of Borneo, Indonesia / Malaysia) was postponed. Joint missions were carried out with ICOMOS

for the mixed properties and 2 missions to cultural landscapes.

#### 6. GENERAL COMMENTS ON 2004 / 2005 EVALUATION CYCLE

In the 2004 / 2005 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 28<sup>th</sup> 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 7<sup>th</sup> Extraordinary session in December 2004 (7 EXT.COM 4B.1), the viability of the deadline of 31 March is to be evaluated at the 30<sup>th</sup> session of the Committee.

Based on this trial period, 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 by the middle or end of April so that they may be translated, 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 2005, 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;

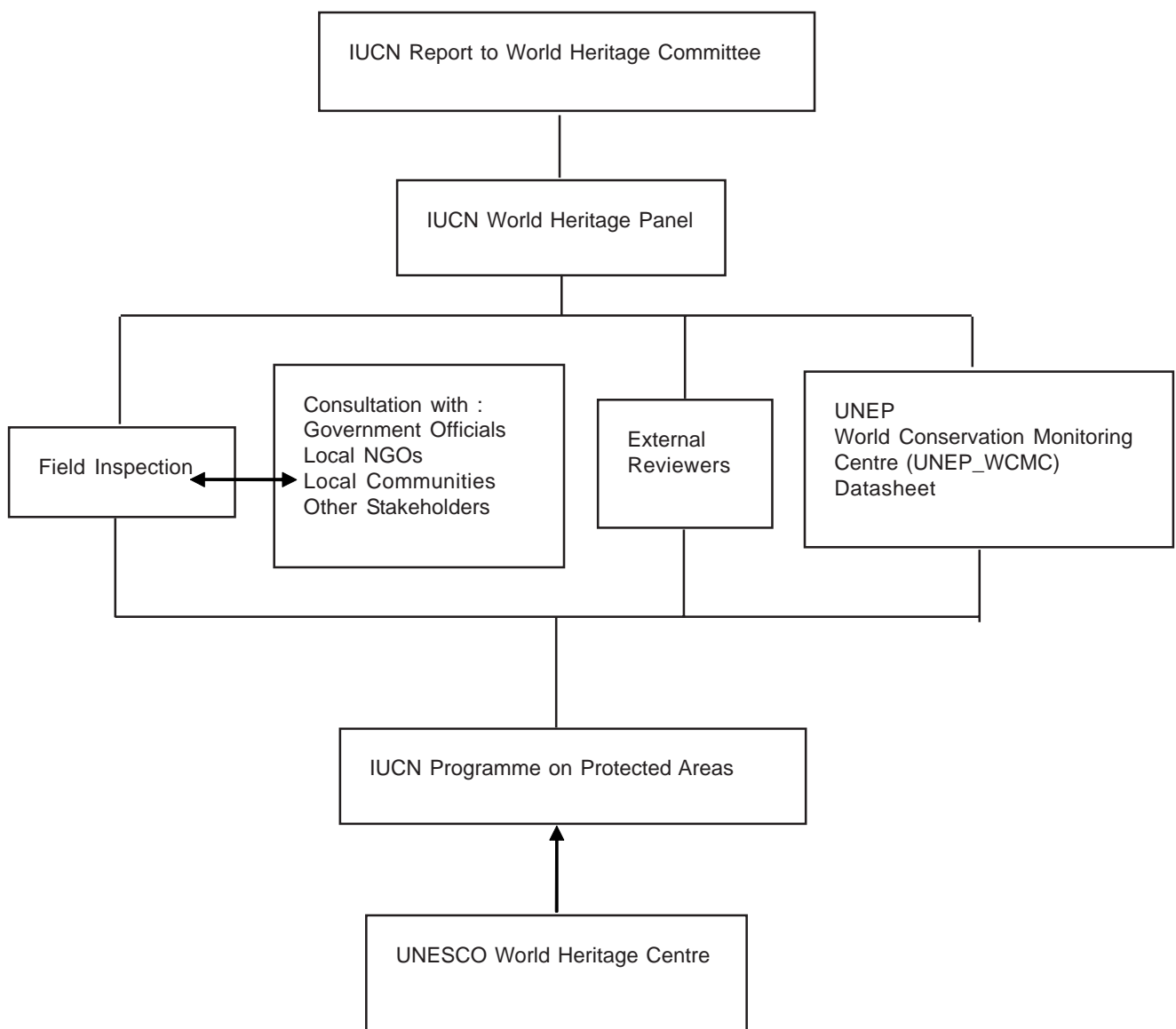
As a result of the above issues, IUCN was put under enormous pressure to complete its evaluations within the timeline provided. **Therefore, IUCN recommends that the deadline for the submission of supplementary information be brought forward to the 28 February of the year of examination of the nomination by the Committee.** 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 what is meant by supplementary information, so that States Parties cannot submit substantial new information and revised nominations at the last minute. IUCN considers supplementary information should be focused on responses to specific questions raised by the Advisory Bodies rather than providing substantial new material.

## 7. ACKNOWLEDGEMENT

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



AFRICA

VREDEFORT DOME

SOUTH AFRICA





## 1. DOCUMENTATION

- i) **Date nomination received by IUCN:** April 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** IUCN letters requesting supplementary information were sent on 26 October 2004, after the field visit, and 10 January 2005, following the IUCN WH Panel. State Party responses were received on 8 December 2004, and 29 March 2005.
- iii) **IUCN / WCMC Data sheet:** 2 references (one reference with 47 citations)
- iv) **Additional Documentation Consulted:** Brink, M., Waanders, F., Bisschoff, A.A. 2004. **IUCN Technical Evaluation: Vredefort Dome, 30<sup>th</sup> August 2004, Geological Aspects.** Paper prepared for the IUCN Mission, Vredefort Dome, South Africa, August 2004. Planetary and Space Science Centre 2004, Department of Tourism, Environmental and Economic Affairs, Free State. Brink, M.C., Bisschoff, A.A., Waanders, F.B., Schoch, A.E. 2005. **An addendum to the supplementary information document on the Vredefort Dome. Earth Impact Database, Impact Cratering on Earth** (including World Impact Structures sorted by location) University of New Brunswick. <http://www.unb.ca/passc/ImpactDatabase/essay.html>. Brink, M., Bisschoff, A.A., Waanders, F. 2004. **The Vredefort Impact Structure, Poteschefstroom, South Africa.** Brink, M.C., Waanders, F.B., Bisschoff, A.A., Gay, N.C. 2000. **The Foch Thrust-Poteschefstroom Fault structural system, Vredefort, South Africa: a model for impact-related tectonic movement over a pre-existing barrier.** Journal of African Earth Sciences, Vol 30, No 1, pp. 99-117. Elsevier Science Ltd Great Britain. Bisschoff, A.A. 1999, **The Geology of the Vredefort Dome (and Geological Sheets).** Council for Geoscience, Geological Survey of South Africa. Explanation of Sheets 2627CA, CB, CC, CD, DA, DC. 2727AA, AB, BA. Scale 1:50,000. Gibson, R.L., Reimold, W.U. 1999 **Field Excursion through the Vredefort Impact Structure.** Department of Geology, University of Witwatersrand, South Africa. French, B.M. 1998, **Traces of Catastrophe. A Handbook of Shock-Metamorphic Effects in Terrestrial Meteorite Impact Structures** Lunar and Planetary Institute, Houston USA. Glikson, A.Y. 1996. **Mega-impacts and mantle-melting episodes: tests of possible correlations.** AGSO Journal of Australian Geology and Geophysics, 16 (4) pp. 587-607. Grieve, R.A.F., Pilkington, M. 1996. **The signature of terrestrial impacts.** AGSO Journal of Australian Geology and Geophysics, 16 (4) pp. 399-420. Sutherland, F.L. **The Cretaceous/Tertiary-boundary impact and its global effects with reference to Australia.** AGSO Journal of Australian Geology and Geophysics, 16 (4) pp. 567-585. Shoemaker, E.M., Shoemaker, C.S. 1996. **The Proterozoic impact record of Australia.** AGSO Journal of Australian Geology and Geophysics, 16 (4) pp. 379-398.
- v) **Consultations:** 7 external reviewers, including ICOMOS. Officials from South Africa National, Provincial and District governments, representatives of community organisations and individuals.
- vi) **Field Visit:** Graeme Worboys, August 2004
- vii) **Date of IUCN approval of this report:** April 2005

## 2. SUMMARY OF NATURAL VALUES

The nominated serial property, Vredefort Dome, is located approximately 120 km to the south and west of Johannesburg, South Africa. Covering a total area of 30,111ha, the serial property includes a main core component of 30,108 ha, and three smaller (each 1 ha in size) component sites - two to the west, and one to the south east of the core area. The three satellite sites were added to the nomination, following discussions with IUCN, to include special outlier geological (outcrop) sites of significance to the overall geological story told at the nominated property.

The Vredefort Dome straddles the westerly flowing Vaal River, which also forms the administrative boundary of the Northwest Province and the Free State Province. It is

a representative part of a larger meteorite impact structure (or astrobleme) which has a radius of impact of 190 km. The eastern boundary of the distorted north easterly trending oval shaped core component of the serial property is found 5 km from the town of Parys, with its western boundary located some 19 km from the town. The southern boundary of the core component area lies about 6 km to the north of the town of Vredefort, and the northern boundary is about 26 km to the north of the town.

Meteorite impact has played a significant part in the geological history of the Earth. Geological activity on the Earth's surface means that the evidence of the majority of impacts has disappeared (in contrast to the prominent remains of such impact sites on the Moon). The largest meteorite impact craters are testament to catastrophic

changes in the record of the planet and life on Earth: these impacts would have caused devastating global changes, and some scientists believe some may be the cause of major evolutionary changes, including mass extinctions in the fossil record. This specialised and scarce group of geological sites therefore form a critical part of the evidence of Earth's geological history and the understanding of the evolution of the planet.

The Vredefort Dome meteorite impact structure is the oldest (2023 million years) and largest (radius 190 km) so far found on earth. It is one of only three meteorite

impact structures known with a diameter greater than 150 km, the other two being the structurally deformed Sudbury meteorite impact structure in Canada (1800 million years) and the buried Chicxulub meteorite impact structure in Mexico (60 million years). Chicxulub is also famous for its links to the demise of the dinosaurs at the end of Cretaceous (Table 1). The Vredefort Dome meteorite impact structure is one of about 200 meteorite impact structures currently known on the earth (Table 2). It is also the most deeply eroded impact structure known, with current levels of exhumation between 8 and 11 km.

**Table 1: Terrestrial meteorite impact structures larger than 10km crater diameter (After French, 1998)**

Crater diameter	Approx projectile diameter	Energy (TNT equivalent)	Mean impact frequency (Earth: No. per million yrs)	Mean impact interval (Earth)	Comparable terrestrial event
10km	500m	11,000 MT	10	100,000yr	Bosumtwi Meteorite Impact Crater, Ghana
20km	1km	87,000 MT	7.1	350,000yr	Ries Meteorite Impact Crater, Germany
50km	2.5km	1,300,000 MT	0.22	4.5m.y.	Charlevoix Meteorite Impact Structure, Canada
100km	5km	11,000,000 MT	0.04	26m.y.	Popigai Meteorite Impact Structure, Russia
200km	10km	87,000,000 MT	0.007	150m.y.	Largest known terrestrial impact structures, Sudbury Canada, Vredefort Dome, South Africa

**Table 2: Meteorite impact structures larger than 10km (Earth Impact Data base, 2002, Brink et al, 2004)**

Diameter	Meteorite impact structures
10-49 km	Ames, USA; Aorounga, Chad; Araguainha, Brazil; Avak, USA; Azuara, Spain; Boltys, Ukraine; Bosumtwi, Ghana; Carswell, Canada; Clearwater East, Canada; Clearwater West, Canada; Deep Bay, Canada; Dellen, Sweden; Eagle Butte, Canada; El'gygytgyn, Russia; Gosses Bluff, Australia; Gweni-Fada, Chad; Haughton, Canada; Janisjarvi, Russia; Kaluga, Russia; Kamensk, Russia; Karla, Russia; Kelly West, Australia; Kentland, USA; Lappajarvi, Finland; Lawn Hill, Australia; Logancha, Russia; Logoisk, Belarus; Manson, USA; Marquez, USA; Mistastin, Canada; Mjolnir, Norway; Montagnais, Canada; Nicholson, Canada; Oasis, Libya; Obolone, Ukraine; Ries, Germany; Rochechouart, France; Saint Martin, Canada; Serra da Cangalha, Brazil; Shoemaker, Australia; Sierra Madera, USA; Slate Islands, Canada; Spider, Australia; Steen River, Canada; Strangways, Australia; Suavjarvi, Russia; Upheaval Dome, USA; Ust-Kara, Russia; Vargeao Dome, Brazil; Wells Creek, USA; Zhamanshin, Kazakhstan.
50-99km	Acraman, Australia; Beaverhead, USA; Charlevoix, Canada; Chesapeake Bay, USA; Kara, Russia; Kara-Kul, Tajikistan; Morokweng, South Africa; Puchezh-Katunki, Russia; Siljan, Sweden; Tookoonooka, Australia; Woodleigh, Australia.
100-199km	Chicxulub, Mexico (170km); Manicouagan, Canada (100km); Popigai, Russia (100 km).
>200km	Sudbury, Canada (250 km); <b>Vredefort Dome, South Africa (380 km).</b>

There are two basic types of meteorite impact structures: simple structures of up to 4 km in diameter, with uplifted and overturned rim rocks surrounding a bowl shaped depression partially filled by breccia; and complex

structures, generally 4km or more in diameter, with a distinct central uplift in the form of a peak and/or ring, an annular trough, and a slumped rim. Most terrestrial meteorite impact structures that have formed on earth



have been obliterated by terrestrial geological processes over time, and many are buried.

## 2.1 Evolution of the Vredefort Dome meteorite impact structure

The impactor that formed the meteorite impact structure at the nominated property was either a large body such as an asteroid with a diameter of about 12 km traveling at a relative velocity of 20 km/sec, or a smaller one, such as the head of a comet, approaching at a much higher speed. The impact event created the greatest single energy release event known for the surface of the earth. The meteorite impact structure was estimated to have been created in about 4 hours. Major stages in the evolution of the structure are described below:

*Stage One: At impact.* A shockwave is generated at the moment of impact, followed by the excavation of a transient crater, the delamination of the earth's crust and its transport away from the impact point occurs.

*Stage Two: Transient excavation.* More material is accelerated away from the impact point, folding is starting to develop and a dent is starting to form. As the dent deepens, there is further outward acceleration of material away from the centre, and old Vredefort Dome fault surfaces are reactivated, and assume the role of a fortuitously placed ramp. A thrust system is formed by material moving over the ramp surface. Rock around the impact site is extremely highly compressed. As the crater reaches its final depth, gravitational sliding of material back into the crater takes place.

*Stage Three: Rebound.* The inner zone, situated within the newly formed final crater, rebounds. A much larger central cone is formed, underlain by a mantle dome. The dent is now modified to assume the shape of an annular syncline as the rebound accentuates. Along the sides of the uplifted central cone, beds are first overturned above a detachment surface and broken by faulting to form lingoidal nappes (thought to be unique to the Vredefort Dome). Inward-moving material starts falling back over the slopes of the uplifted cone. Equilibrium occurs and 1500 million years of erosion commences.

*Stage Four: The Present.* The eroded meteorite impact structure protrudes from below more recent sediments (The Karoo), with its granite basement rock core and the overturned collar forming major features of the central part of the nominated property. Despite the broadly circular and subvertical orientation of the strata around the collar of the dome, the structure is complicated on a smaller scale by both folding and concentric and vertical radial faults. Rocks and geological structures exhibit a mixture of compressional and extensional stress effects. The annular syncline, the basement rock dome and erosion resistant strata of the overturned collar help define the ring structure of the meteorite impact structure.

## 2.2 Vredefort Dome meteorite impact structure evidences

The rock exposures and geological evidences of the meteorite impact structure are very clearly displayed at a number of key locations.

1. *Shape:* The characteristic circular or ring shape of a meteorite impact structure is clearly demonstrated at Vredefort Dome. The annular syncline surrounds the inner mountainous ring. Part of this mountainous area is found in the nominated property.

2. *Evidence of great energy release:* The extreme physical conditions imposed by shock waves of impact intensity produce unique, recognizable, durable shock metamorphic effects including planar deformation features (microscopic features in quartz and feldspar); shatter cones; impact-related breccias or pseudotachylite; chocolate tablet brecciation (stress release in a very hard rock type); polymorphs of quartz (coesite and stishovite); and, possible impact melting. These are all found at the Vredefort Dome. The property is also the type locality for pseudotachylite for the world. No crater-fill breccias or ejecta deposits have so far been found at the Vredefort Dome. Had they existed, they would have been removed by the extensive period of erosion that lasted for about 1500 million years.

3. *Evidence from structural features:* The detachment surface or fault plane (above which the rock displacement occurred) is evident at the property in ramp faults that underlie nappes. There are multiple structural features associated with this meteorite impact structure.

4. *Evidence of deep crustal material exposed on the surface:* Thanks to the meteorite impact and rebound effects (and subsequent erosion), the core-portion of nominated property represents the equivalent of a borehole, drilled into the earth to a depth of 25 km. Deep crustal rock types, including granulite-hornfels facies grade metamorphics, are found.

## 2.3 Vredefort Dome meteorite impact structure: the scenic, landscape and natural and cultural heritage values of the nominated area

The nominated property includes part of the ring structure and a cross-section of the geological formations and structures that provide evidence for the impact. At a landscape scale, the magnitude of the ring structure diameter can be appreciated from vantage points within the nominated property. The magnitude of the forces which contributed to forming the overturned, steeply dipping and highly faulted hills of the Vredefort Dome can also be better appreciated at this landscape scale. The steepest gradient of the Vaal River is found where it courses through the Vredefort Dome hills giving rise to rapids, irregular stream patterns and islands, and a range of riverine habitats. Short, sharp streams have formed steep gullies and valleys that have cut into these hills. Flora mapping of the nominated property recognises 5 broad communities including the dolomite grasslands, andesite mountain bushveld, gold reef mountain bushveld, Vredefort Dome granite grassland and the riverine bushland. The area is very rich for some native species (butterflies), and includes many native birds, mammal species and other fauna. There are large areas of natural lands within the nominated property, and many areas are being rehabilitated to their natural habitat for game farming. The property contains evidence of past human use including agriculture, mining and conflict, and has a rich cultural heritage. There are many areas which are partly or intensively modified for

agriculture and ecotourism. The natural and cultural values of the property (other than the geological meteorite impact phenomena) complement the geological attributes.

### 3. COMPARISON WITH OTHER COMPLEX METEORITE IMPACT STRUCTURES

A detailed global comparative analysis was received in February 2005 as requested by IUCN. The multi-ring complex meteorite impact structure centred on the Vredefort Dome represents the oldest meteorite impact structure known for earth. The catastrophic, short duration impact that created this feature was the single greatest energy release event ever known to have affected earth (Table 3). Of the three largest meteorite impact structures, Vredefort Dome is not only the largest (380 km diameter) and oldest, but it has better exposures of impact evidences than either Sudbury (Canada) or Chicxulub (Mexico). Field inspections at Vredefort Dome clearly demonstrated the outstanding quality of the meteorite impact geological evidence. The property's structure provides the only structurally intact exposure of the basement, below the crater floor of a very large astrobleme. This is unique for the planet. It shows a geological section that reaches from the rocks which once covered the crater floor, through the floor, and down into the basement of the structure. The central cone of the crater rose (rebound) by approximately 38 km to provide a surface outcrop equivalent of mantle rocks obtained from the deepest borehole drilled on earth.

These mantle rocks also show a type of metamorphism found only in conditions of very high energy release. This characteristic may be unique to the nominated property. It is not found at Sudbury and Chicxulub. The energy released created chocolate tablet boudinage in cherts, and their association with distally situated ring thrusts is also thought to be unique. The impact forces overturned 17 km (true thickness) of strata to dip towards the centre of the structure. No other similar terrestrial phenomenon of this nature, of a comparable magnitude has (probably) been observed. Like other complex impact structures, Vredefort Dome includes examples of shatter cones, planar deformation features in minerals, high pressure mineral polymorphs. It does not include evidences of impact melts. In conclusion, the nominated property, has high quality exposures of a complex meteorite impact event that are readily accessible. It is a high quality representative example of a meteorite impact structure and has special significance given its status as evidence of the world's greatest single event release of energy. It is the world's only structurally intact exposure of the basement, below the crater floor, of a very large astrobleme. It provides the only mappable and restorable profile that illustrates the genesis and development of an astrobleme during the very short time after impact. A brief comparison relative to the world's 3 largest meteorite impact structures is provided in Table 3. The criteria cover aspects of significance in relation to all the relevant aspects of World Heritage natural criterion (i).

**Table 3: Comparison, Earth's 3 largest known meteorite impact structures**

Complex meteorite impact structure	Diameter (km)	Estimated energy released	Some surface exposure	Totally buried	Subsequent deformation	Link to major event in earth's history	Evidence of meteorite impact
Vredefort Dome, South Africa	380	87 million megatons (plus)	Yes	No	No	Impact at 2.2 billion yrs (the end of a large scale bombardment? Eukaryote / Prokaryote boundary?)	HD; E; LG: Circ; Mult Rings; Cent; PDF; Coes; Stish; Brecc; Shatt; Melt (rare); Det Fault; Faults, Folds
Sudbury Canada	250	87 million megatons	Yes	No	Yes	Impact at 1.8 billion yrs	DEF; HD (upper part); Brecc; Melt
Chicxulub, Mexico	170	87 million megatons	No	Yes	No	60 million yrs. End of the dinosaurs	This site is buried

**Key to Table 3: Meteorite impact structure evidence**

**A) State of preservation**

**HD:** High degree of preservation of meteorite impact evidence  
**LG:** Landscape geomorphic evidence  
**DEF:** Deformed meteorite impact evidence  
**W:** Weathered meteorite impact evidence  
**E:** Meteorite impact evidence eroded

**B) Meteorite impact evidence**

**Circ:** Circular ring structure and annular syncline  
**Mult Rings:** multiple rings  
**Cent:** Central structural uplift evidence  
**PDF:** Planar deformation features (characterised by microscopic effects in quartz or feldspar)  
**Stish:** Quartz polymorph mineral Stishovite

**Coes:** Quartz polymorph mineral Coesite  
**Brecc:** Impact related breccia (mylonite to pseudotachylite)  
**Choc Tab:** Chocolate tablet brecciation (characteristic of stress release in a very hard rock type)  
**Shatt:** Shatter cones  
**Melt:** Impact melting. Crystallisation of rock from a molten stage  
**Crat Fill:** Crater-fill breccias  
**Eject:** Ejecta deposits  
**Det Fault:** Detachment fault surface  
**Faults:** Multiple faulting evidences associated with the impact structure  
**Folds:** Folds and over folds associated with the impact structure

## 4. INTEGRITY

### 4.1 Land Ownership

The nominated serial property straddles the Vaal River and is located within the Free State and Northwest Provinces. It is comprised of 149 private properties, 91 of which are located within the Northwest Province (18,859 ha), and 58 the Free State Province (11,252 ha). There are 600 ha of state owned land within the nominated core component.

### 4.2 Management and planning framework

The land within the nominated property is predominantly agricultural, has freehold status, and is subject to national, provincial and district statutory regulations. The following national legislation is applicable: The World Heritage Convention Act 49 of 1999; the National Heritage Resources Act 25 of 1999; the National Environmental Management Act 107 of 1998 and the Physical Planning Act 88 of 1967. At the Provincial level, the Northwest and Free State Provinces have applicable nature conservation ordinances regulating environmental aspects of the area. At the local level, the nominated property falls within the District Municipalities of Northern Free State and Southern District North West, and the Local Municipal areas of Potschefstroom (Northwest Province) and Parys (Free State Province), and their environmental regulations.

In December 2002, the South African National Heritage Resources Agency decided, in principle, to declare the nominated property a National Heritage Site under the provisions of the National Heritage Resources Act 25 of 1999 subject to a Cultural Heritage Survey and Management Plan being completed. This document has been completed (February 2005) although no advice of the formal declaration of the National Heritage Site had been received as of March 2005.

In 2004, interim government management structures and actions were put in place in recognition of the potential World Heritage status of the nominated property. They include: *The Vredefort Dome Inter-provincial Task Team* which is coordinating the process of obtaining World Heritage status and providing interim technical and administrative management (until a Management Authority is appointed under the World Heritage Convention Act, 1999). The *Inter-provincial Task Team* is commissioned to develop an *Integrated Management Plan* for the serial property in accordance with the World Heritage Convention Act. Part of this process includes Northwest Province preparing a *Development Plan* (a spatial plan which includes a Strategic Environmental Assessment of the area) and a *Management (zoning plan) Plan*. This work aims to enhance the stature of the Vredefort Dome as a potential National Heritage site and a potential World Heritage site. A *Vredefort Dome Steering Committee* (involving District and Local Municipalities, Provincial, and National Government representatives) has been established to oversee the process of obtaining World Heritage status and the appointment of a Management Authority. A *Vredefort Dome Stakeholder Forum* has been established for public participation and awareness raising about

obtaining World Heritage status and the establishment of a Management Authority.

A *Vredefort Dome Bergland Conservancy* has been established by private landowners in the Northwest Province as a Section 21 Company. The main objectives of the Conservancy are to convert the private properties of the area into a voluntary nature reserve, and to conserve its unique aspects. The Conservancy has prepared a management plan to facilitate these objectives. It will be represented in the *Stakeholder Forum*, and it plays an important role in the facilitation of private landowner's involvement in the nominated property.

A *Vredefort Dome Conservancy* has also been established in the Free State Province by private landowners following the IUCN field mission.

### 4.3 Traditional protection mechanisms

Traditional intensive agriculture in the nominated property is reported to be diminishing, with rehabilitation of natural vegetation, game farms, and ecotourism based on the natural attributes, including the Vaal River riparian area becoming more important. The greatest protection currently afforded to many of the outstanding and sensitive geological (outcrop) sites is the general lack of publicity and awareness of their significance.

### 4.4 Public support

Consultations with national, provincial, and municipality officials, elected representatives and local school children demonstrated strong support for the nominated property. Support for and knowledge of the WH nomination by the 149 private property owners within the serial nomination was also evaluated. Assisted by the Dome Bergland Conservancy, it was found that not all landowners within the nominated property may be aware of the potential WH status for their land and the ramifications of this status. This has been recognised by the *Inter-provincial Task Team*, and the *Stakeholder Forum* has been designed to raise awareness of the proposal. In February 2005, this work was still being completed. Landowners of the 3 satellite sites separate from the core component area have been contacted, and are supportive of the nomination.

### 4.5 Site management

*The VD Inter-provincial Task Team* has assumed management of the nominated property for the interim period commencing 2004. Normal private property agricultural activities, ecotourism and game farming will continue to occur within the nominated property. Special planning provisions will be required to ensure the protection of the scenic landscape attributes of the meteorite impact structure. Active individual site management will be required to protect the three satellite component sites.

### 4.6 Boundaries

Roads have been used to define the boundary of core component of the nominated property. This is a clear

boundary. Each of the additional three component sites which make up the serial nomination are located in open, agricultural land and will be fenced to identify their boundaries. These 3 sites have been identified (February 2005) as being circular in shape around the geological outcrop and about 1 hectare in area. These circular boundaries are interpreted to be indicative and more definitive practical boundaries are needed. In addition, the eastern disjunct site (the pseudotachylite site) lies immediately adjacent to the core area, which could potentially be expanded to include this area.

#### 4.7 Threats

The major threats to the integrity and functioning of the nominated property are:

##### Site level: theft or vandalism to the geological evidence

The three satellite component sites, including the stromatolite site, the chocolate tablet brecciation site, and the shatter cone site are all vulnerable to theft and vandalism, and require management and supervision. At least two of the component sites (the stromatolite and chocolate tablet breccia sites) are so site-specific, valuable and vulnerable, that they may require special, small exhibition buildings and on-site supervision to permanently protect them.

##### Nominated area level: development

The essentially rural and natural scenic amenity of the nominated property and the “ring structure” landscape adds to the integrity of the nominated property. Appreciating the immensity of the meteorite impact ring structure requires a landscape scale vista. Urbanisation of parts or the entire nomination property would diminish the natural-rural scenic value and impact of the “ring structure” landscape. It would also impact on the important remaining natural values. Independent development actions of property owners within the nominated property could also have an impact. Mining is not considered to be a threat to the nominated property, though quarrying for granite could be. The polluted state of the Vaal River diminishes the natural values of the area.

##### Tourism and visitor access

Legal access will need to be achieved for visitors to the three small component sites and access will need to be negotiated with private property owners within the nominated property. Uncoordinated and unsupervised tourism access could threaten the integrity of the geological evidence as well as cause impacts to access and landscape scale scenery. Unplanned or ad hoc tourism developments could jeopardize the scenic amenity of the property. Therefore, active management of tourism will be needed.

#### 4.8 Concurrence with all relevant “Conditions of Integrity”

The World Heritage conditions of integrity for the Vredefort Dome nomination are:

*Section 44 b (i): Contain all or most of the key interrelated and interdependent elements*

The current nominated serial property includes key geological (outcrop) sites which demonstrate classic complex meteorite impact structure phenomena.

##### *Section 44 b (v): Should have a management plan*

The serial nominated property currently does not have a management plan. The *Inter-provincial Task Team* is currently in the process of investigating and preparing such a plan.

##### *Section 44 b (vi): Should have adequate long-term legislative, regulatory, institutional or traditional protection.*

The status of private property for the majority of the serial nominated property will require special land use planning requirements to ensure the aesthetic rural/natural landscape and the key satellite component sites are protected, that public access is available, and that active conservation management is possible. These provisions are critical. The *Inter-provincial Task Team* is currently investigating these requirements. Final practical boundaries for the 3 satellite component sites of the serial nomination need to be made clear and precise.

#### 5. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

Vredefort Dome is nominated for inscription under natural criterion (i)

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

Vredefort Dome is the oldest, largest, and most deeply eroded meteorite impact structure in the world. It is the site of the world’s greatest single, known energy release event. It contains high quality and accessible geological (outcrop) sites which demonstrate a range of geological evidences of a complex meteorite impact structure. The rural and natural landscapes of the serial property help portray the magnitude of the ring structures resulting from the impact. The serial nomination is considered to be a representative sample of this meteorite impact structure. A comprehensive comparative analysis with other complex meteorite impact structures demonstrated that it is the only example on earth providing a full geological profile of an astrobleme below the crater floor, thereby enabling research into the genesis and development of an astrobleme immediately post impact. IUCN considers that the nominated property meets this criterion.

#### 6. DRAFT DECISION

IUCN recommends that the World Heritage Committee adopt the following draft decision:

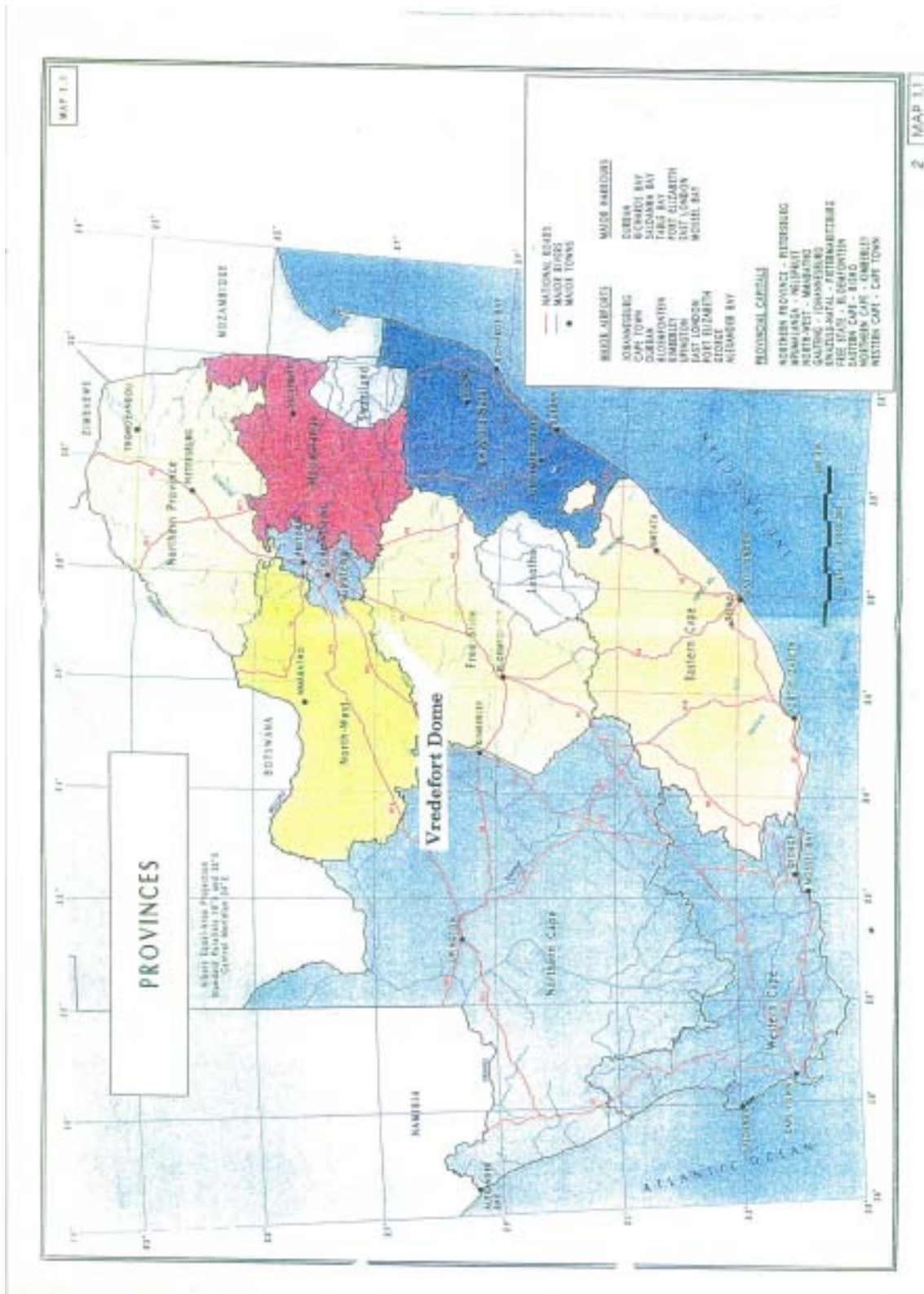
*The World heritage Committee,*

1. Having examined Document WHC-05/29.COM/8B
2. Inscribes the Vredefort Dome, South Africa, on the World Heritage List on the basis of natural criterion (i)

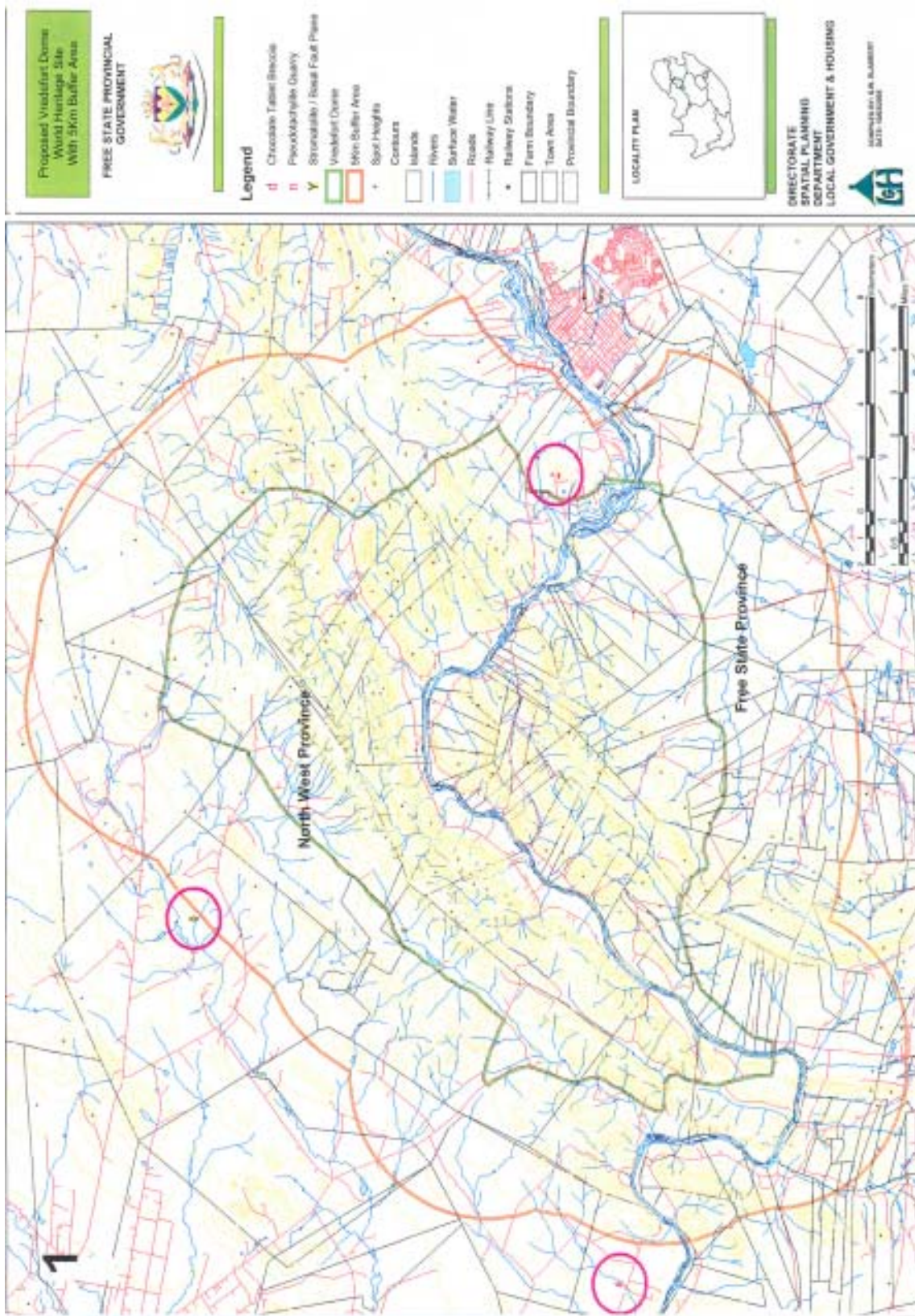
**Criterion (i):** *Vredefort Dome is the oldest, largest, and most deeply eroded complex meteorite impact structure in the world. It is the site of the world's greatest single, known energy release event. It contains high quality and accessible geological (outcrop) sites which demonstrate a range of geological evidences of a complex meteorite impact structure. The rural and natural landscapes of the serial property help portray the magnitude of the ring structures resulting from the impact. The serial nomination is considered to be a representative sample of a complex meteorite impact structure. A comprehensive comparative analysis with other complex meteorite impact structures demonstrated that it is the only example on earth providing a full geological profile of an astrobleme below the crater floor, thereby enabling research into the genesis and development of an astrobleme immediately post impact.*

3. Noting that the freehold status of the majority of the nominated property requires special management and collaboration with landowners to ensure the integrity of the property,
4. Requests the State Party to clearly define the legal boundaries for the three satellite component sites of the serial property,
5. Requests the State Party to complete and start to implement the management plan for the entire property within 2 years of inscription, and ensures that this plan has the support of key stakeholders;
6. Further requests the State Party to invite an IUCN mission within 2 years of inscription to evaluate progress with the above actions.

Map 1: General Location of nominated property



Map 2: Boundaries of nominated property







ARAB STATES

WADI AL-HITAN (WHALE VALLEY)

EGYPT





WADI AL-HITAN (WHALE VALLEY) (EGYPT) ID N° 1186

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1. DOCUMENTATION

- i) **Date nomination received by IUCN:** April 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** IUCN requested supplementary information on the 11 August 2004, prior to the field mission, 4 October 2004, after the field mission, and 10 January 2005, after the IUCN WH Panel. State Party responses were received on 1 December 2004 and 29 March 2005 respectively.
- iii) **IUCN/WCMC Data Sheet:** 1 (the nomination which contains 30 references)
- iv) **Additional Documentation Consulted:** Wells, R.T. 1996. Earth's Geological History – a contextual framework for World Heritage fossil site nominations in **Global Theme Study of World Heritage Natural Sites**, IUCN, Switzerland, 43pp. Uhen, M.D. (2004) **Form, Function and Anatomy of *Dorudon atrox* (Mammalia, Cetacea): An archaeocete from the Middle to Late Eocene of Egypt**, University of Michigan, USA, 222pp. Matravers-Messana, G.H. (2002) **Wadi el-Rayan: Gateway to the Western Desert**, Wadi el Rayan Protection Project, Egypt, 99pp. Dolson, J., El-Barkooky, A., Wehr, F., Gingerich, P.D., Prochazka, N., and Shann, M. (2002) **The Eocene and Oligocene Palaeo-Ecology and Palaeo-Geography of Whale Valley and Fayoum Basins**, AAPG/EPEX/SEG/EGS/EAGE Field Trip No. 7. Rising Star Energy Publication Ltd, Egypt, 79pp. Gingerich, P.D. (1992) **Marine Mammals (Cetacea and Sirenia) from the Eocene of Gebel Mokattam and Fayum, Egypt: Stratigraphy, age and Paleoenvironments**, University of Michigan, USA, 84pp. Zimmer, C. (1998) **At the water's edge: macroevolution and the transformation of life** The Free Press, New York, USA, 290pp. Kamel, H et al. (2002) **Wadi El-Rayan Protected Area Management Plan**, EEAA, Egypt, 54pp. Storemyr, P (2003) **Widan el-Faras Ancient Quarry Landscape, North Faiyum Desert, Egypt: Site Description, historical Significance and Current Destruction**, Expert Centre for Conservation of Monuments and Sites, Switzerland, 22pp. Redfern, R. (2002) **Origins: The evolution of continents, oceans and life**, Weidenfeld and Nicholson, 360pp.
- v) **Consultations:** 7 external reviewers. The mission met with the Governor of Faiyum Province, officials of the Egyptian National Commission for UNESCO, officials and site management staff of the Egyptian Environmental Affairs Agency, representatives of the Egyptian National Geological Museum, and geologists from Cairo and Mansoura Universities.
- vi) **Field Visit:** Tim Badman. September 2004
- vii) **Date of IUCN approval of this report:** April 2005

2. SUMMARY OF NATURAL VALUES

Wadi Al-Hitan (Whale Valley) lies within the Faiyum<sup>1</sup> province, and forms part of the Wadi El-Rayan Protected Area (WRPA). It is located within the Western Desert of Egypt, 150 km south-southwest of Cairo and 80 km west of Faiyum City. WRPA is centred around a series of natural springs, and two brackish lakes created in the 1970s from excess agricultural water channelled from nearby Lake Qarun. The totally dry Wadi Al-Hitan is a distinct area within the WRPA, and lies c.40 km west of the lakes among an attractive and distinctive desert landscape of wind-eroded pillars of rock, surrounded by sand dunes, hills, cliffs and escarpment-bounded plateaux. The nominated property comprises a rectangular core area of c.20,015ha, (c. 12km x 16km square) defined by latitude/longitude co-ordinates, with a 5,885ha buffer zone.

The property is nominated for its fossil values, which are centred on the fossils of ancient whales from the earliest, and now extinct, suborder of whales, the Archaeoceti (or archaeocetes). These are the ancestors of the two modern suborders of cetaceans (Mysticeti and Odontoceti). The whale fossils of Wadi Al-Hitan represent one of the iconic stories of evolution: the emergence of the whales as modern ocean-going mammals from a previous life as land-based animals. The whales of Wadi Al-Hitan, in evolutionary terms are amongst the youngest archaeocetes, and are in the last stages of losing their hind limbs and have taken on the typical streamlined body form of modern whales, whilst retaining certain primitive aspects of skull and tooth structure. This represents a transition from living only in shallow coastal waters to being ocean-going animals, able to spread worldwide.

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1. IUCN Adopts the recently announced official spelling of Faiyum, except where referring to alternative spelling used in older literature

The fossils are found within a horizontally-bedded rock succession of marine sandstones, shales, marls and limestones, often associated with evaporite minerals. The rocks are very extensively displayed in the field in natural exposures on the desert floor, and in a series of field exposures ranging from small cliffs to large escarpments. In addition to the fossil whales, the succession contains a range of other fossil values, and other geological evidence enabling a robust palaeogeographic and palaeoenvironmental reconstruction of the area through Eocene times to be made.

Over 40 million years ago the so-called Tethys Sea reached far south of the existing Mediterranean. This sea gradually retreated north depositing thick sediments of sandstone, limestone and shale, visible in three named rock formations which are visible in Wadi Al-Hitan. The oldest rocks are the Eocene Gehannam Formation, about 40-41 million years old, consisting of white marly limestone and gypseous clay and yielding many skeletons of whales, sirenians (sea-cows), shark teeth, turtles, and crocodilians. A middle layer, the Birket Qarun formation, of sandstone, clays and hard limestone, also yields whale skeletons. The youngest formation is the Qasr El-Sagha formation of late Eocene age, about 39 million years old. It is rich in marine invertebrate fauna, indicating a shallow marine environment. These formations were uplifted from the southwest, creating drainage systems, now buried beneath the sand, which emptied into the sea through mangrove-fringed estuaries and coastal lagoons when the coast was near what is now the Faiyum oasis, c. 37 million years ago.

The fossil beds of Wadi El-Hitan were first discovered during the winter of 1902-03. Large skulls and other remains of archaic fossil whales were first reported by H. J. L. Beadnell of the Geological Survey of Egypt. *Basilosaurus isis* and *Dorudon atrox* were named as new species by Charles Andrews of the Natural History Museum, London, UK in 1905. Other than two brief unpublished visits by the University of California, USA in 1947-48 and Yale University, USA in the late 1960s, the nominated property was not researched further until 1983 when it was visited by researchers from the University of Michigan, USA. Michigan carried out five further six-week expeditions in 1985, 1987, 1989, 1991 and 1993. Their research has been the main contribution to revealing the significance of Wadi Al-Hitan, and was responsible for the discovery in 1989 of the world's first evidence of an early whale displaying the remains of hind feet.

Three different species of Eocene whales have been identified with certainty at Wadi Al-Hitan. All are basilosaurids, the latest surviving group of archaeocete whales, and the group which are thought to have given rise to modern cetaceans. The largest was *Basilosaurus isis*, which was up to 21 meters long, with well developed five-fingered flippers on the forelimbs and with hind legs, feet, and toes, not known previously in any archaeocete. Their form was serpentine and they were carnivorous. Another species, *Dorudon atrox*, is also found with vestigial hind limb bones. It was a small whale with a more compact dolphin-like body, the presence of calving females of which may have attracted the larger predator whales. A third species, *Ancalocetus simonsi*, was

described in 1996. Besides whales, 19 other vertebrate species are known from the nominated property. They include three species of early sirenians (sea-cows), one partial skeleton of the primitive proboscidian *Moeritherium*, crocodiles, sharks, sawfish, rays, bony fishes, turtles (including a sea turtle), and sea snake. There is also a rich invertebrate fauna, including nummulites, molluscs including gastropods, bivalves and nautiloids, echinoids and crabs. Plant fossils include mangroves and sea-grasses. Given adequate protection, management and research, further discoveries of archaeocetes and other species, and of the biology and palaeoecology of early whales and the Eocene marine world are regarded as a certainty.

The whale fossils are present in an exceptional concentration, and are of a very high quality. Many whale and sirenian skeletons are very well-preserved: virtually complete, articulated specimens are found in-situ in their death positions, some with associated preservation of features such as stomach contents. In addition the many skeletons represent an ontogenetic series (i.e. a range of individuals from young to old) giving an added dimension to their study in terms of investigating life histories and development, and thus a deeper understanding of their evolution and ecology. The latest audited figures record a total of 379 whale fossils, of which 179 are catalogued, and a further 40 catalogued vertebrate fossils. 89 of the catalogued vertebrates are in the collection of the University of Michigan. 59 specimens, including the type specimens of the species first described from this site are in the collection of the Cairo Geological Museum, with the remainder of the catalogued species currently in the field. Earlier sirenian and cetacean material collected from the Faiyum is held in Cairo, London, Berlin and Stuttgart.

The nominated property adjoins an area with important fossil values; the rock succession exposed within Wadi Al-Hitan is overlain unconformably, outside the boundaries of the nominated property, by the Eocene – Oligocene Gebel Qatrani Formation. These rocks have been studied extensively at sites to the north of Lake Qarun, within the Qarun Protected Area, although they are also exposed over a wider area. Excavations in this formation have yielded internationally significant fossil remains of terrestrial mammals, including the fossil remains of eight primate lineages, including the earliest known hominoids (Redfern, 2002). The fauna also includes the unique twin-horned mammal *Arsinotherium*, as well as elephant ancestors. Gebel Qatrani is included on Egypt's current Tentative List as a potential mixed property. A request for international assistance from the World Heritage Fund to assist with the preparation of a management plan for Gebel Qatrani was submitted in early 2005. Furthermore Gebel Qatrani was identified by IUCN as a potential fossil World Heritage property in the IUCN contextual framework for fossil World Heritage (Wells, 1996), where it is described as: '*The most complete record of Palaeogene mammals for all Africa. The diverse fauna (40 genera, 75 species) which includes two hominoid genera is critical to understanding the evolution of many mammal groups on the continent, particularly hominids.*

### 3. COMPARISONS WITH OTHER AREAS

The original nomination document presents an incomplete comparative analysis. However, the State Party subsequently provided a comparative analysis prepared by a world expert on whale fossils, who has worked extensively on the nominated property and at other key sites world-wide. IUCN's comparative analysis has also benefited from the expert reviews of leading scientists with expertise in this area.

The primary claim of the nominated property for outstanding universal value is its demonstration of the early stages of whale evolution, and the evolution of the archaeocetes from land mammals to marine animals. Its claim to importance is based on it being the only known site in the world where large numbers of complete, high-quality archaeocete fossils can be seen in their original geological and geographical setting, and its 'iconic' status as the place where evidence of legs on whales was first discovered. These values are added to significantly by the additional geological context described above, and are drawn out in relation to IUCN's standard checklist for fossil site nominations in the Appendix to this report.

IUCN set out carefully in its contextual study (Wells, 1996) recommendations for the selection of fossil World Heritage properties. It stressed a number of key recommendations, including the central concept of the selection of properties that represent key events in the tree of life. It recommended the prioritisation of properties that represent community structures, but focussing on higher taxonomic levels, and vertebrates in particular, to maintain a manageable list of properties, and to focus on the most universally important properties. IUCN considers that the evolution of whales is a clearly defined aspect of the record of life that can be considered to fully meet these principles. It is an illustration of the process of evolution that is exceptionally vivid and accessible to the public, portraying a transition of land mammals returning to the sea, and gradually losing their legs in the process. Furthermore, it is a transition that is now well rooted in science and relates to an animal group that is both of modern conservation importance and widespread public appeal. IUCN considers it can justly be described as 'iconic'.

Other vivid illustrations of important fossil values that are represented on the World Heritage List include the diversity of the early explosion of life on Earth [the Burgess Shale within the Canadian Rocky Mountain Parks], the Age of the Fishes [Miguasha (Canada)], the Age of the Dinosaurs [Ischigualasto-Talampaya (Argentina), Monte San Giorgio (Switzerland), Dorset and East Devon Coast (UK), Dinosaur Provincial Park (Canada)], and the evolution of early man [Lake Turkana National Parks (Kenya)]. The rise of the mammals is a further example, and represents an important area of comparison in relation to the nominated property. In this case, terrestrial mammal evolution is represented on the World Heritage List by the exceptional fossil site of Messel Fossil Pit (Germany), which is considered the world's richest site for understanding the living environment of the Eocene, and the Australian Fossil Mammal Sites, whose values represent the evolution of the distinctive modern land mammal fauna of Australia

(from Miocene and younger sediments). Neither of these properties records marine values nor whale evolution. The World Heritage List also provides ample evidence of the outstanding universal value attached to cetacea and sirenia, as these species provide the basis for the selection of natural properties such as Peninsula Valdez (Argentina), Whale Sanctuary of El Vizcaino (Mexico) and Shark Bay (Australia). Relative to the values of other World Heritage properties, IUCN considers that the demonstration of whale evolution is justifiable as a sound claim to outstanding universal value in portraying the record of life.

There are thousands of fossil sites throughout the world that have yielded one or more whale specimens. A number of these are significant in relation to the illustration of the earliest stages of evolution of whales over 20 million years earlier than those at Wadi Al-Hitan. Important Eocene whale fossil sites are known in Egypt from Gebel Mokattam in Cairo, but are mostly lost to development. It is anticipated that much of the evidence from these sites could be replicated within the nominated property through further study. Older and more primitive archaeocete whales come primarily from India and Pakistan, from forested foothills of the Himalaya, from desert areas in Kutch, and from the desert in tribal parts of the Punjab, Balochistan and the North West Frontier Province. These sites illustrate earlier stages of the history of whale evolution, and demonstrate features that are different from and complementary to those of the nominated property. Many, however, are inaccessible, and none are even closely comparable to Wadi Al-Hitan in terms of the number and concentration of fossils.

A substantial number of partial skeletons of archaeocete whales, more or less contemporary with those of Wadi Al-Hitan, have been found on the Atlantic and Gulf coastal plain of eastern North America over the last 150 years. However, none of these skeletons is complete, and the sites where they are found are scattered and generally covered in vegetation with difficult access.

Fossil whales of the suborders Mysticeti and Odontoceti are known in abundance from Miocene and Pliocene sites such as 12-15 million year old Shark Tooth Hill, California, USA and the 5-6 million year old Cerro Blanco in the Pisco Formation, Peru. However, these whales are essentially modern and do not illustrate the evolutionary story in the same way as the values represented in the nominated property.

In discussing the comparative value of the nominated property, IUCN notes the important context for Wadi Al-Hitan provided by the adjacent interests of the Gebel Qatrani Formation within the Lake Qarun Protected Area. In the view of IUCN the values of the nominated property and the Gebel Qatrani Formation represent different aspects of an intimately related story. Although the comparative analysis for the nominated property must of necessity be based on its values alone, IUCN believes that there is significant evidence (including the IUCN contextual study) to suggest that Gebel Qatrani has important values which cannot be logically separated from the interests within Wadi Al-Hitan in relation to a claim for World Heritage status. The exposures in Lake Qarun have produced some whale fossils, but their values for demonstrating cetacean evolution are however greatly surpassed by the nominated property.

In summary the nominated property is the most significant site in the world to demonstrate the evolution of whales. This assessment is made in terms of the completeness, quality, concentration and accessibility of the fossils, and the abundant additional evidence enabling a robust construction of the palaeogeography and palaeoecology of the Eocene marine and coastal environment where they are found.

## 4. INTEGRITY

### 4.1 Boundaries

The boundaries of the nominated property are a rectangle defined by latitude and longitude coordinates, with a buffer zone based on a slightly larger and similarly defined rectangle. These boundaries have been selected to encompass the key features of interest, and a wider part of the WRPA. They are, therefore, sufficient to meet the conditions of integrity under the Convention, at least for administrative purposes. The boundaries are not optimal, however, for management purposes, in particular as they can only be traced in the field through use of a global positioning system. IUCN considers that topographic features visible in the landscape, specifically the tops of the escarpments within the protected area, would form a more operational boundary.

IUCN heard from scientists during the evaluation mission that the protected area within the property would be strengthened by the addition of a further area of outcrop to the west of the WRPA at Gebel Abiad. This area provides exposures of rock from the topmost Eocene rocks. IUCN considers that this area would add to the values of the nominated property in the future, but is not sufficiently critical to the core features of interest to be regarded as an essential addition to the nomination.

The buffer zone is also a rectangular area, running close to the proposed boundary of the nominated property, and like the nominated property lies entirely within the boundary of the WRPA. As proposed it appears to serve no functional purpose, and has no practical value in enhancing the protection of the nominated property over and above that provided by the property's boundary itself. During the evaluation mission the Egyptian parties identified that it was desirable that the buffer zone be extended westwards outside the existing protected area to the Bahariya Road, and southwards to provide a larger buffer area. As these areas are not currently within protected areas, such a proposal would require a ministerial declaration, which IUCN was advised was a relatively simple and quick process. IUCN considers that the extension of the buffer zone would be desirable, and in particular would strengthen the ability to manage access to the site from the Bahariya Road. However, in view of the extent of the defined boundary of the nominated property, the wider protection of the WRPA and the absence of substantial threats from the west and south of the property, IUCN does not consider that the absence of a formally declared buffer zone creates an immediate issue in relation to integrity.

### 4.2. Legal Status

The property has strong legal protection under Egyptian Law No. 102 of 1983 for Nature Protectorates. This provides strong and unequivocal legal protection for the property, forbidding actions that would lead to destruction or deterioration of the natural environment. The law commendably mentions geological features as specific elements receiving protection. WRPA was declared a protected area in 1989 according to Prime Ministerial Decree 943. Wadi Al-Hitan was added to WRPA in 1997 by Prime Minister's Decree 2954. The overall management goal of the protected area is the protection of natural resources, in accordance with the declaration decree.

### 4.3. Ownership

The nominated property is owned by the Egyptian State, and is managed by the Nature Conservation Sector of the Environmental Affairs Agency (EEAA).

### 4.4. Management

The nominated property and buffer zone are managed as part of a strict nature protection area within the WRPA. A management plan for the WRPA exists for the period 2002-2006, which was prepared through the EEAA, under the supervision of IUCN in 2002. Under the plan, the nominated property is identified as one of two Special Protection Zones, and the plan makes provision for strict protection of the fossil remains, and the development of well-controlled ecotourism. WRPA has also benefited from support under the Egyptian - Italian Environmental Co-operation Programme, providing for expenditure of c.6 million Egyptian pounds over the coming three years.

WRPA benefits from the services of a dedicated team of rangers, community guards, and other staff, with a total complement of 28 people. Some further enhancement of the staff team is envisaged. IUCN considers that support and training of what is still a relatively new staff team will be an essential part of the establishment of the management of the nominated property, and welcomes the attention to this aspect demonstrated by the EEAA, and the Egyptian-Italian Co-operation Programme.

The management and staffing arrangements are potentially sufficient to meet the needs of the nominated property. It is clear, however, that resources remain an issue, and that increased priority will need to be given in the short and medium term to the provision of adequate vehicles and equipment to the property's management team. The nominated property is also remote from the main staff base, and inhospitable, so the provision of on-site staffing requires careful consideration of logistical issues. The staff team is reliant to some extent on the provision of external assistance, and the development of adequate long-term funding to support the management of the property requires a strong central commitment by the State Party. IUCN is reassured that these matters are being accorded significant attention by the Egyptian authorities.

IUCN considers the operational aspects of a number of elements of the management plan still require further

consideration and detailed planning. Of particular importance will be the detail of how the plans for eco-tourism are developed, and how interpretation and educational opportunities are provided within the nominated property. The interests of the nominated property are currently presented and interpreted at the main visitor centre for the WRPA, situated adjacent to the lakes. In addition, knowledgeable ranger staff are available to assist visitors and there is an audio-visual theatre and video presentation. This provides a good introduction to the interests of the nominated property at the most accessible location for visitors, and there is scope to increase and develop this further. IUCN considers that the primary emphasis should be placed on experiencing the property with trained guides, as an alternative to the provision of signs and infrastructure, and notes the need for collaboration with private sector trekking companies who currently visit the property, and are expected to arrive in greater numbers in the future.

The monitoring arrangements for establishing and reporting on the condition of the fossil remains require further elaboration, in conjunction with a small scientific panel.

Beyond the nominated property, there is a range of challenging management issues within the WRPA. These do not impact on the nominated property, but are significant for its wider setting, and include the reclamation of desert land for agriculture, water management within the lakes, and the interaction with the village that lies within the protected area. Some activities appear to be carried out without adequate pre-planning and consultation in relation to the protected status and importance of the area. The management plan for the WRPA reports that there is weak collaboration between the different agencies, and IUCN considers that the integration of the activities of the different Egyptian ministries could be strengthened. Active involvement of the local community in the management of the WRPA could be strengthened, and there is an important opportunity to seek greater social and economic benefits for local communities through the presence and management of the protected area, and possible World Heritage status, particularly from sustainable tourism. It is important to note that a number of initiatives are underway to develop and implement sustainable tourism initiatives in the property.

#### **4.5. Human Impact**

The fossil remains at Wadi Al-Hitan are potentially vulnerable to visitor pressure through collecting and, in the longer term, to natural erosion by the wind if not conserved in museums or in the field. The whale fossils are large and relatively difficult to extract. Some of the obviously exposed skeletons, and features such as a worm bored tree-trunk, show the evidence of the removal of pieces as souvenirs. It is not feasible to completely prevent such removal without damaging the character of the property. Low level fencing and educational material appear to be effective in restricting damage to a low level, but require continued attention. Some natural erosion of the fossil remains is inevitable, but operates on a timescale that is not threatening to the integrity and value of the nominated property. Localised in-situ restoration and consolidation of some exposed

specimens through the application of polymers has been carried out under the supervision of the Egyptian Geological Museum. It is accepted however that there will be a gradual loss of some fossil material through natural exposure, but that such processes are both slow (so the impacts are gradual and can be mitigated by active management, research and responsible collection of fossils) and result in the maintenance of interest in the nominated property as new fossils are brought to light.

Palaeontological study is extractive in nature. The large size of the fossil skeletons and their remoteness means that the unauthorised removal of large specimens is unlikely, however regulated extraction, study and curation is an ongoing requirement. This issue is being tackled in an exemplary way in relation to the nominated property, through a tripartite memorandum of understanding between the University of Michigan, EEAA and the Egyptian Geological Survey and Mining Authority (EGSMA). This agreement is currently awaiting signature by EGSMA and sets out a well-developed research plan for the property over the period 2005-2008, which provides for regulated scientific exploration and specimen collection. It makes provision for curation of new discoveries within the Egyptian Geological Museum, research and study at Michigan, and the transfer of skills to Egyptian site staff through a training programme. There appears to be excellent and effective collaboration and support for site management from Egyptian geologists in both the national museum and universities. Such collaboration is leading to wider research on the geology of the area, helping to create a complete and robust picture of the palaeogeography and palaeoecology of the area.

The natural values of Wadi Al-Hitan as an unspoilt and beautiful desert landscape are fragile. The property is already heavily visited by visitors in 4-wheel drive vehicles, and there is noticeable evidence of vehicle tracks across the desert surface. Vehicular traffic is the greatest potential threat to both the physical character of Wadi Al-Hitan, and also the experience of visitors. Additional information provided by the State Party notes that design and implementation of a management programme for vehicular traffic, and provisions for visitor management and interpretation infrastructure is considered as part of the management plan being developed at present for the property. IUCN stresses the need to develop a holistic and sensitive approach to interpreting the property, which would ensure that its natural values are explained to visitors but would protect the remote and unspoilt character of the landscape and visitor experience.

#### **5. ADDITIONAL COMMENTS**

The relationship between Wadi Al-Hitan and the adjoining site of Gebel Qatrani is a key issue in relation to the consideration of this nomination by the World Heritage Committee. The Egyptian State Party currently conceives that the two properties of Wadi Al-Hitan and Gebel Qatrani are seen as self-contained. The reasons for this are firstly a view in relation to outstanding universal value, in that the distinctive elements of whale evolution that are only demonstrated at Wadi Al-Hitan,

and the fact that Gebel Qatrani is seen as potentially having mixed value – Eocene/Oligocene terrestrial fossil values that would be nominated under natural criterion (i), and the cultural values of the Widan Al-Faras basalt quarry landscape. Secondly in operational terms the State Party considers that Wadi Al-Hitan is administered separately, and benefits from a management capability that makes it 'ready' for nomination, whereas management measures for Gebel Qatrani are not sufficient at present to meet the conditions of integrity.

IUCN notes that:

- The fossils of Wadi Al-Hitan and Gebel Qatrani are found in rock formations that are geologically contiguous;
- The fossil values of both properties have the same core values – the evolution of mammals in the Eocene-Oligocene;
- The properties are essentially adjacent to each other, and the boundaries of the protected areas are almost contiguous;
- The two properties are managed by the same EEAA management team;
- The natural and cultural values of Gebel Qatrani are not intellectually related to each other, and the intention to nominate as a mixed property cannot provide a justification for viewing the interests separately; and
- The impact and benefits of World Heritage status for the Faiyum area would be enhanced by a wider area being nominated.

IUCN therefore considers that the fossil values of Gebel Qatrani cannot be separated from the values of Wadi Al-Hitan in two separate nominations. Whilst Wadi Al-Hitan provides a convincing demonstration of outstanding universal value in its own right, it is essential that a future nomination of the fossil values of Gebel Qatrani should be seen as an extension of the values of Wadi Al-Hitan, and not as a separate, stand-alone nomination.

IUCN recognises that an option for the Committee would be to defer the nomination of Wadi Al-Hitan pending a further integrated nomination of both properties. IUCN does not recommend this approach for the following reasons:

- Wadi Al-Hitan, on its own, demonstrates outstanding universal value and is able to meet the conditions of integrity. If Gebel Qatrani did not exist, the nominated property would be an acceptable nomination;
- Wadi Al-Hitan is a fragile property under current pressure, and World Heritage status provides impetus to ensure its protection; and
- With appropriate monitoring, the nomination of Wadi Al-Hitan provides the most effective starting point for developing a cohesive nomination for the wider fossil interests, in relation to the capacity of the State Party. The nomination recognises the extensive investment which the Egyptian State Party has made in the management of the WRPA, and its plans to develop similar capacity for the Lake Qarun PA.

On another issue, IUCN notes that sites elsewhere in the world, and in particular in Pakistan and India, display

different aspects of the earlier evolution of whales, and encourages the relevant States Parties to seek to link, as far as possible, research and promotion programmes in relation to these sites.

## 6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

Wadi al-Hitan is nominated for inscription under natural criterion (i)

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

Wadi Al-Hitan is the most important site in the world to demonstrate one of the iconic changes that make up the record of life on Earth: the evolution of the whales. It portrays vividly their form and mode of life during their transition from land animals to a marine existence. It exceeds the values of other comparable sites in terms of the number, concentration and quality of its fossils, and their accessibility and setting in an attractive and protected landscape. It accords with key principles of the IUCN study on fossil World Heritage Sites, and represents significant values that are currently absent from the World Heritage List. IUCN considers that the nominated property meets this criterion.

## 7. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

*The World Heritage Committee,*

1. Having examined Document WHC-05/29.COM/8B
2. Inscribes Wadi Al-Hitan, Egypt, on the World Heritage List on the basis of natural criterion (i):

**Criterion (i):** *Wadi Al-Hitan is the most important site in the world to demonstrate one of the iconic changes that make up the record of life on Earth: the evolution of the whales. It portrays vividly their form and mode of life during their transition from land animals to a marine existence. It exceeds the values of other comparable sites in terms of the number, concentration and quality of its fossils, and their accessibility and setting in an attractive and protected landscape. It accords with key principles of the IUCN study on fossil World Heritage Sites, and represents significant values that are currently absent from the World Heritage List.*

3. Recommends the State Party to further develop the management plan for the property, which should consider:

(i) *Revising the boundary to use topographic features visible in the landscape, primarily the tops of the escarpments within the protected area, to ensure that they are clearly identifiable on the ground, and more useful for site management;*

(ii) *further explore the feasibility of extending the buffer zone of the property to the Bahariya Road,*



*and across the desert to the south, in order to ensure effective management and control of vehicular traffic;*

- (iii) carefully designing and implementing a management programme for vehicular traffic;*
  - (iv) provision of essential management infrastructure within the nominated property that minimises intrusion and damage to its natural values; and*
  - (v) make full use of the results and recommendations from programmes and studies that are underway in relation to the development of sustainable tourism, including visitors management and interpretation.*
4. Welcomes the support provided by the State Party of Italy for the management of this property and recommends the State Party of Egypt, in conjunction with Italy, identify measures to maintain and enhance this support in future to ensure the effective implementation of the management plan and protection of the values of the property in the long term.
5. Urges the State Party to consider any future nomination of the Gebel Qatrani Formation for natural fossil values as an extension of Wadi Al-Hitan.

## APPENDIX 1: IUCN FOSSIL SITE EVALUATION CHECKLIST

### Coverage of an extended time period

The rocks within the nominated property were deposited over a period of 3-4 million years covering the time period of the Middle to Late Eocene transition (40 – 37 Ma). The rocks containing the main whale remains are aged between 37-38 million years, and record gradual changes in conditions with a series of different stratigraphic levels preserving fossil remains. The feature of prime interest, the evolution of whales, took place through the Eocene period as a whole, with the earliest evidence from the early Eocene at c. 55 million years, and the presence of essentially modern forms at 33 million years ago. The fossils from the nominated property vividly illustrate the critical morphological changes that took place over this longer period, and particularly the gradual loss of hind legs as a fully marine mode of life was adopted. Beyond the nominated property, the stratigraphic section is exceptionally exposed and continuously extends northwards in the surrounding escarpments over a wider geological window including also the Oligocene and Lower Miocene Deposits as young as 15 Ma.

### Richness of species diversity

The nominated property contains a diverse marine fauna, including 25 genera of more than 14 families, 10 orders and 4 classes of vertebrates. The fauna includes cartilaginous and bony fish, reptiles (including crocodiles, turtles and sea snake, and mammals (whales and sirenians). In addition there is a well developed invertebrate fauna and plant remains in the form of fossilised mangroves and sea-grass. The diversity is high in relation to the known diversity of Eocene whales, and is expected to be increased through further study, although in absolute numbers the vertebrate diversity is at the low end of the scale in relation to existing fossil WH properties. Taken with the adjacent area within the Gebel Qatrani Formation, the total number of vertebrates is greatly increased to over 90 species.

### Uniquely representative of a geological time period

There are countless Eocene fossil sites world-wide, and thousands of sites that have produced whale fossils of some kind. The property is not uniquely representative of the Eocene marine environment, or of the iconic story of whale evolution during the Eocene. It is however considered to be the best site for illustrating whale evolution. Messel Fossil Pit World Heritage property is also of Eocene Age and preserves a fossil fauna that is, relatively speaking, much richer than the nominated property. It is however a terrestrial record, and provides no record of Eocene whales or other marine species.

### Existence of other comparable sites

Amongst the many sites where remains of Eocene archaeocete whale fossils have been discovered, a number are also of international significance. These include sites that represent the earliest stages of evolution of whales over 20 million years earlier than Wadi Al-Hitan. Older and more primitive archaeocete

whales come primarily from India and Pakistan, from forested foothills of the Himalaya, from desert areas in Kutch, and from desert in tribal parts of the Punjab, Balochistan and the North West Frontier Province. A substantial number of partial skeletons of archaeocete whales more or less contemporary with those of Wadi Al-Hitan have been found on the Atlantic and Gulf coastal plain of eastern North America. None of these are even closely comparable to Wadi Al-Hitan in terms of the number and concentration of fossils, and in most cases access is very difficult. Other world fossil whales sites record essentially modern species.

### Contribution to the understanding of life on earth

Whale evolution is an iconic story of the record of life on Earth. Whales evolved from land mammals, so in terms of a tree of life the property represents a vivid picture of mammals 'returning to the sea' from the land-based mode of life they had evolved. Wadi Al-Hitan has the best and most vivid fossil record that illustrates this change through the extinct group of archaeocete whales, and its value is added to greatly by its accessibility. Although not the earliest known whales, they represent a very important state in the evolution of this group of mammals. In evolutionary terms, they are in the last stages of losing their hind limbs and have taken on the typical streamlined body form of modern whales. This marks their transition from living only in shallow coastal waters, to being ocean-going mammals, with a world-wide distribution. The many skeletons provide an ontogenetic series with young and old individuals, giving additional dimensions to the study of their life history and a deeper understanding of their evolution. The extent of other fossil material mean it is possible to reconstruct the surrounding environmental and ecological conditions.

### Prospects for ongoing discoveries

The nominated property has already produced the exceptional first discovery of direct evidence of vestigial feet on a fossil whale. However it still offers considerable scope for further study. Arrangements for a further phase of study are currently being put in place, and further discoveries are regarded as a virtual certainty. Beyond the vertebrate fossil remains, the property is particularly valuable in allowing study of an associated fossil fauna of invertebrates and plants, allowing a robust interpretation of Eocene marine environments, and the reconstruction of ecological interactions and past geography. Further study of the extensively exposed geology is likely to lead to further refinements and reinterpretations.

### International level of interest

The nominated property is of established international interest, as the best and most complete record of Eocene whale evolution. This is evidenced by the level of international interest in the property over the last 20 years, and its recognition in the international media, including widely syndicated television programmes, and articles in popular magazines and books, as well as the scientific literature.

The nominated property is intimately linked, in a geological sense, with the adjacent exposures of the Gebel Qatrani Formation. These sites have produced an exceptionally rich, mainly terrestrial, fossil record including the earliest hominoids, and is of critical international importance in the development of knowledge of hominid evolution in Africa.

#### **Associated features of natural value**

The nominated property is a very attractive and distinctive desert landscape of conical hills, and various sculpted landforms, created in substantial part from wind erosion by sand, and demonstrating a range of interesting and attractive features. The cliffs of Gebel Gohannam provide a dramatic entrance to the property, and a landscape feature visible from far around. The nominated property is a key feature of the wider WRPA, which is centred on two artificially created lakes forming an important habitat, and a dramatic and attractive contrast to the surrounding desert landscape. The WRPA also includes an unusual area of natural springs, supporting indigenous vegetation and a range of species, including rarities such as the Dorcas Gazelle.

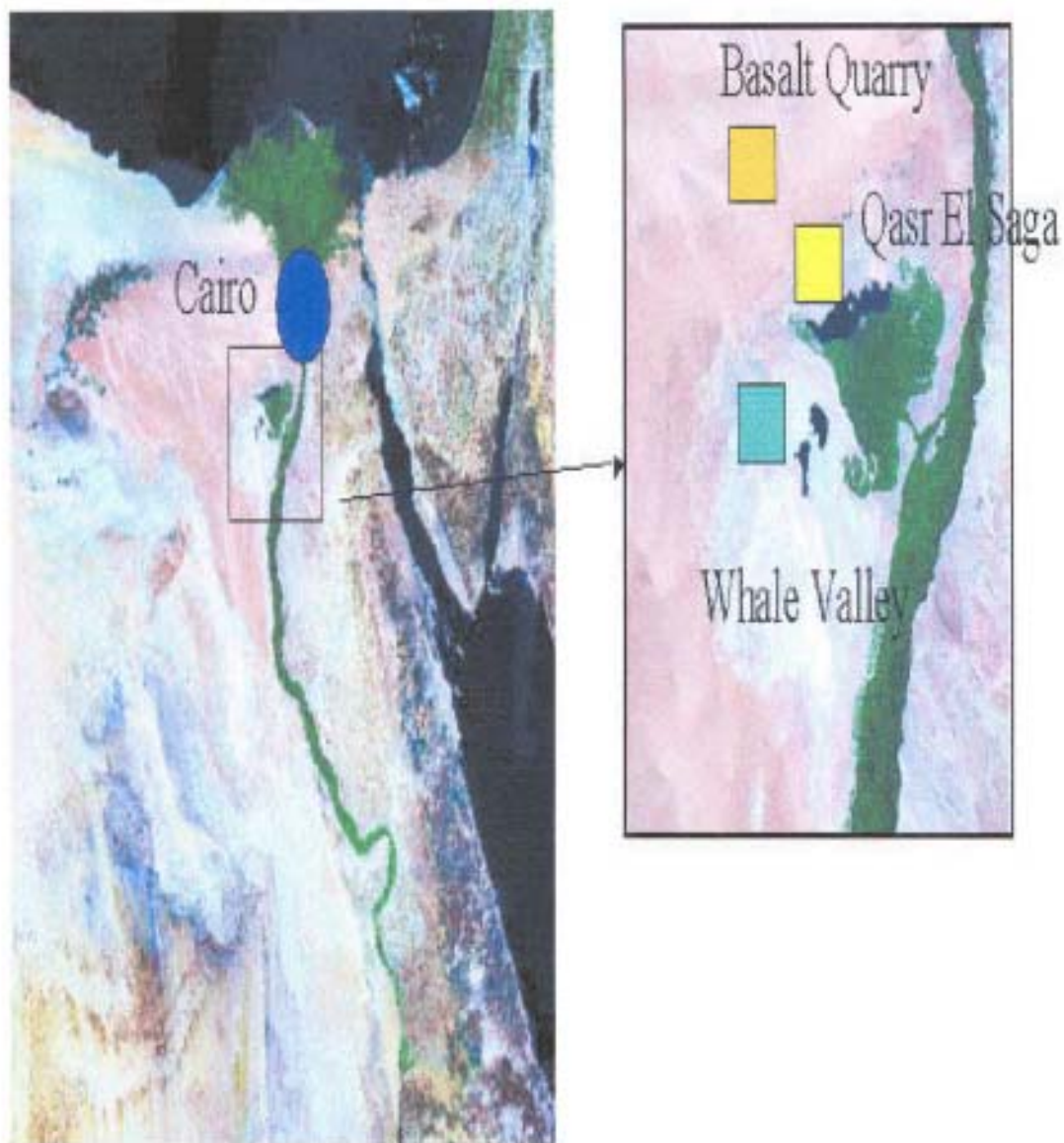
#### **State of preservation of specimens**

The state of preservation of the fossil specimens is excellent. The fossils are found in an exceptional concentration, with c.400 identified to date. Many specimens are near-complete specimens preserved in-situ in their death position, with a few to date having preserved features such as stomach contents.

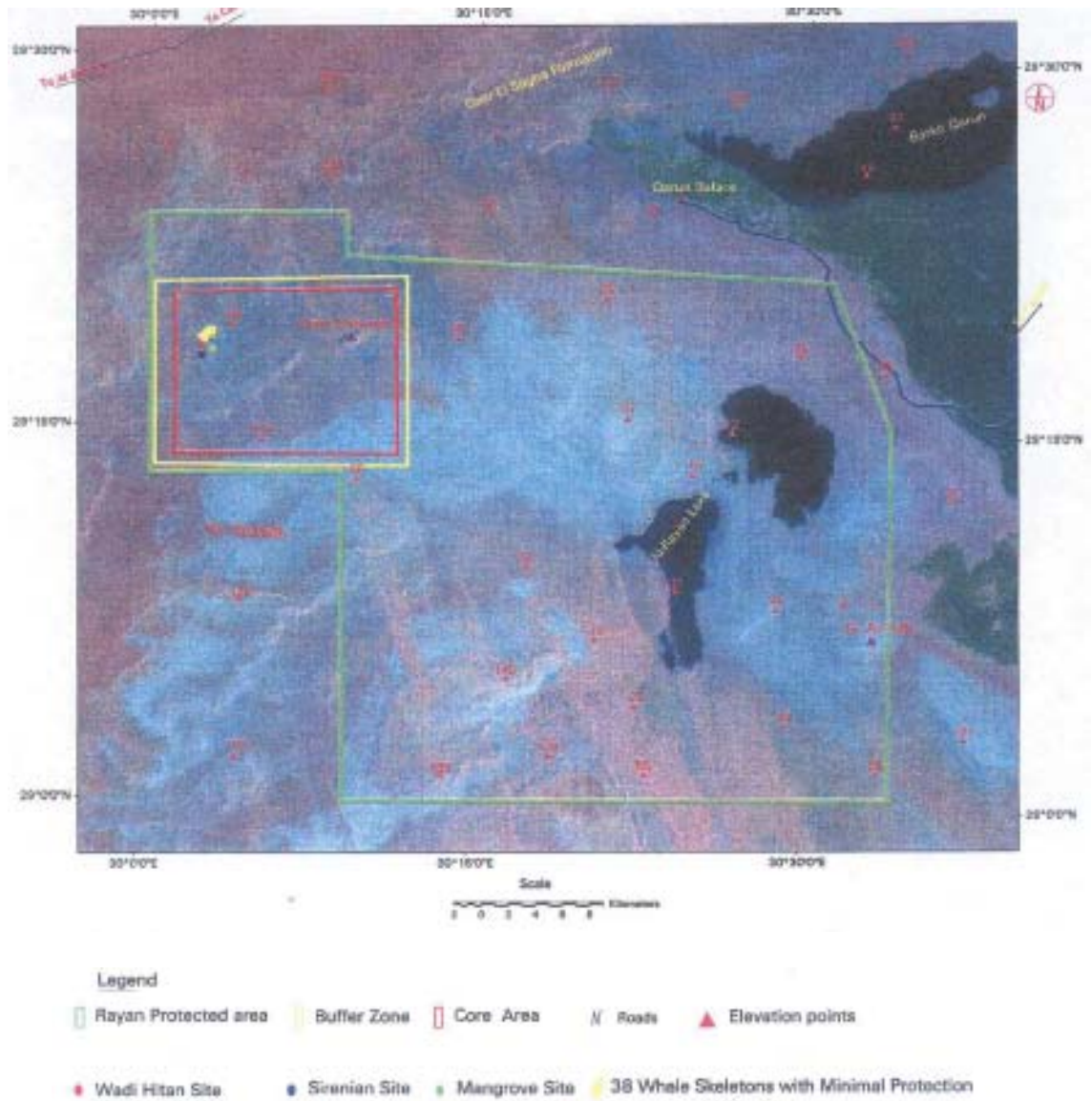
#### **Curation, study and display of fossils**

There are well-developed arrangements developed over the last 20 years through the collaboration between the Egyptian authorities and the University of Michigan. Fossils are curated in both Cairo and Michigan, and displayed in museum collections in both places. Fossils are also displayed in-situ within the nominated property, and one skeleton and representative fossil material are also on display at the main visitor centre of the WRPA.

Map 1: General Location of nominated property



Map 2: Boundaries of nominated property





ASIA/PACIFIC

SHIRETOKO

JAPAN







## 1. DOCUMENTATION

- i) **Date nomination received by IUCN:** April 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** IUCN requested supplementary information on the 20 August 2004, after the field mission, and 2 February 2005, after the IUCN WH Panel. State Party responses were received on 5 November 2004 and 30 March 2005 respectively.
- iii) **IUCN/WCMC Data Sheet:** 1 [the nomination which contains 136 references]
- iv) **Additional Literature Consulted:** : Hattori H., 2004. **Plankton and seasonal sea ice.** Unpublished report provided to evaluation mission; Nature Conservation Bureau, 1985. **Conservation Reports of the Onnebetsu-Dake Wilderness Area, Hokkaido, Japan.** Environment Agency, Japan; Ohtaishi N., and Nakagawa, H. (1988) **Animals of Shiretoko. Hokkaido University Press, Sapporo English Summary.** Sakurai Y., 2004. **The rich marine environment and ecosystem around Shiretoko – towards coexistence with the fisheries.** Unpublished report provided to evaluation mission. Sato K., 2004. An Introduction to Vegetation of the Daisetsuzan Mountains. **Journal of Development Policy Studies,** Hokkai-Gakuen Univ, No 73:23-38; Tatewaki M., 1963. **Phytogeography of the Islands of the North Pacific Ocean. Proceedings of the Tenth Pacific Science Congress,** University of Hawaii, pp 23-28; Tatewaki M., (1958) **Forest Ecology of the Islands of the North Pacific Ocean** University of Sapporo, Japan.
- v) **Consultations:** 12 external reviewers provided input to this evaluation report. Extensive consultation was carried out in Japan with representatives of relevant government agencies, local communities and other stakeholders.
- vi) **Field Visit:** David Sheppard, July, 2004
- vii) **Date of IUCN approval of this report:** April 2005

## 2. SUMMARY OF NATURAL VALUES

Shiretoko is located in the northeast of Hokkaido, the northernmost island of Japan. The Shiretoko Peninsula is approximately 25 km wide at its base and protrudes 70 km into the southern boundary of the Sea of Okhotsk. The nominated property includes the terrestrial area from the central part of the Peninsula to the tip of the peninsula (Shiretoko Cape) and the surrounding marine area. The total area of the nominated property is 56,100ha comprising a core area of 34,000 ha and a buffer area of 22,100 ha.

The Shiretoko peninsula was formed by volcanic activities and uplift from the Pacific Plate subducting under the North American Plate. The Peninsula comprises a number of volcanoes running along the centre of the peninsula and including the highest peak within the nominated property, Mount Rausu (1,661m). The coastlines on the east and west sides of the peninsula were formed by a combination of volcanic activities, tectonic movement and marine erosion. For example, sea cliffs around Utoro range from 60m to 120m in height and were formed from andesitic lava from the eruption of Mt Rausu 80,000 years ago and subsequent marine erosion.

The key feature of the property is the productivity of the marine and terrestrial ecosystem, reflecting the formation of seasonal sea ice at the lowest latitude among the world's seasonal sea ice in the northern hemisphere. The formation of the sea ice plays an integral role in the formation of the phytoplankton which develops on the nutrients supplied by the sea ice. Blooms of ice algae and other phytoplankton occur earlier in spring as ice melts faster than other sea ice areas. The phytoplankton is the primary producer in the marine ecosystem and provides the source of food for krill and zooplankton such as small shrimp, which in turn become food for small fish, crustacean and shellfish. These in turn become food sources for fish, marine mammals, such as seals and sea lions, as well as birds including the Steller's sea eagle and the White-tailed eagle. In addition, salmon and trout swim upstream to spawn and become an important food source for terrestrial species, including the brown bear and the Blakiston's fish-owl.

The significance of the sea ice in contributing to the high productivity of the ecosystem within the nominated property reflects three distinct conditions affecting the Sea of Okhotsk in general and this property specifically. The first condition is the double-layered water structure of the Sea of Okhotsk, with the surface and lower layers of the water having a large difference in salinity. The second condition is that the Sea of Okhotsk is

surrounded by lands with limited exchange of seawater with the open sea. This low level of exchange contributes to maintaining the double-layered water structure with different salinity levels. The third condition is the distribution of atmospheric pressure in the area, causing cold air from Siberia to blow into the area and providing a chilling effect on the seawater. As noted, the seasonal sea ice contributes to the productivity of both the marine and terrestrial ecosystems.

In relation to the marine ecosystem, two hundred and twenty three (223) species of fish have been collected from the coastal waters of the Shiretoko Peninsula, with the composition of species reflecting the effects of the seasonal sea ice in winter, as well as the differential in water temperature throughout the year, with cold water temperatures in winter and the warmer surface temperatures of the property from August to September, due to the warm Soya current. Ten species of salmonid species have been found in the coastal waters of the Shiretoko Peninsula and thus a majority of the 13 species in the Pacific Ocean and 12 in the Sea of Okhotsk are represented in the group. The coastal waters of the Shiretoko Peninsula are recognized for their global importance for salmonid species and also as a key migration route for salmonids.

The nominated property also has important populations of marine mammals and cetaceans. The sea ice around Shiretoko is particularly important for the feeding, resting and breeding of marine mammals, since the coastal waters of Shiretoko are rich in food and the ice that covers the sea in winter provides protection from predators and waves. Twenty eight (28) species of marine mammals have been identified in the coastal area of Shiretoko. These include the Steller Sea Lion, which is listed as Endangered in the IUCN Red List of Threatened Species, as well as a number of other important marine mammal species. The Steller Sea Lion is one of the flagship species within the nominated property and the coastal waters of the Shiretoko Peninsula are essential for over-wintering and feeding for this species. The Walleye Pollack is a particularly important fish species for the diet of the Steller Sea Lion. The Sea Lions rest along the near shore waters about one km from the coast and feed along the edge of the continental shelf near the isobathymetric line of 200 metres.

There are seven cetacean species commonly distributed in the coastal waters adjacent to the Shiretoko Peninsula, including within the waters of the nominated property. The coastal waters of the Shiretoko Peninsula are important as a cetacean feeding and breeding site and also as a route for their seasonal migration. Species include the Minke Whale, the sperm whale and the Dall's porpoise, with the nominated property providing the only confirmed breeding site in the West Pacific Ocean for the latter species. In addition, some species are infrequently found within the waters of the Shiretoko Peninsula, including the Sei Whale (Listed as Endangered on the IUCN Red List of Threatened Species) and also two rare and little known beaked whales.

In relation to the terrestrial ecosystem the majority of the vegetation is in a natural or semi natural condition. Various types of virgin vegetation are present from the

coastline to the mountain peaks, 1,600m high. Further, the complex and undulating topography and the differences in weather conditions between the east and the western sides of the Shiretoko Peninsula create a variety of habitats and as a result, Shiretoko contains a diverse range of terrestrial fauna and flora. A number of endemic plant species are found within the property, including *Viola kitamiensis* which is endemic to the Shiretoko Mountain Range and a number of plant species found within the nominated property are listed in the IUCN Red List of Threatened Species. While the altitude variation within the property is only 1,600 m from the coast to the highest peak (Mount Rausu), alpine plants such as the Japanese stone pine and other alpine plant communities are developed at relatively low altitudes, due to an upper forest line at about 800 m. The forest within the nominated property is a Pan Mixed Forest Zone and consists of a mosaic of three types of forests: (a) cool temperate deciduous broad-leaved forest with species such as Japanese Oak, Painted Maple and Japanese Linden; (b) sub-arctic evergreen coniferous forest with species such as Sakhalin fir, Yeso Spruce and Sakhalin Spruce; and (c) mixed forest combining the above cool temperate deciduous broad leaved forest and sub-arctic evergreen coniferous forest.

The nominated property supports a range of animal species, combining northern species from Sakhalin and southern species from Honshu. There are thirty five (35) species of terrestrial mammals within the nominated property, including three species of one family of Chiroptera which are listed as Endangered or Lower Risk (LR) in the IUCN Red List of Threatened Species. The property has one of the highest recorded densities of brown bear populations in the world, with estimates up to 35 bears per 100 km<sup>2</sup>. This, in turn, reflects the very small home range of brown bears in the Shiretoko Peninsula, at 15 km<sup>2</sup> on average, among the smallest home ranges for brown bears in the world.

A rich diversity of avifauna is found within the nominated property, with two hundred and sixty four (264) species of birds recorded in the Peninsula, including 9 species listed on the IUCN Red List of Threatened Species. Shiretoko is recognized as one of the world's Important Bird Areas (IBA) by Birdlife International. The nominated property provides particularly important habitat for the Blakiston's fish owl (Endangered on the IUCN Red List of Threatened Species) and the previously mentioned Stellar sea eagle. It has been estimated that there are less than 1,000 Blakiston's fish owls left in the world, with a significant number of these found in the Shiretoko Peninsula. It has been estimated that the global number of Stellar sea eagles is around 5,000 (Birdlife International) and more than 2,000 have been recorded as over-wintering within the Shiretoko Peninsula. The nominated property is also an important wintering site for the White-tailed eagle, with up to 600 individuals recorded at the property in winter. These three species, along with the black woodpecker, are designated as Natural Monuments in Japan, due to their rarity and high scientific value. The coastal areas of Shiretoko are also important for migratory seabirds. Specifically the sea cliffs along the coast from Utoro on the western side of the Peninsula to Shiretoko Cape are important breeding grounds for a range of species, with particular

importance as a breeding site for the Japanese Cormorant.

In autumn, both Steller's sea eagle and White-tailed eagle feed upon the salmon which swim upstream and in winter they hunt the Walleye Pollack. Two hundred and fifty five (255) species of fish have been recorded in the rivers of the Shiretoko Peninsula. The nominated property is noted as a key breeding area for the nine salmonid species found in the rivers of the Shiretoko Peninsula. Rivers specifically play an important role as a spawning and wintering area for these species. In particular the Shiretoko Peninsula is the southernmost habitat in the world for the sea run of the Dolly Varden.

### 3. COMPARISON WITH OTHER AREAS

The nominated property lies within Udvardy's "Manchu-Japanese Mixed Forest" Biogeographic Province. The Central Sikhote-Alin in Russia is the only World Heritage (WH) property within the same Udvardy Biogeographic Province. This property, at 406,200 ha is much larger than the nominated property and is one of the world's largest temperate wilderness areas. On a comparative basis it is clear that the forest within Shiretoko (total area 56,100 ha) cannot compare with the Shitote Alin property in terms of forest biodiversity nor in general terms of species diversity or coverage of this province. However the range of other attributes of the nominated property is important and particularly the higher level of marine biodiversity exhibited at the property. Shiretoko also exhibits clearer and exceptional evidence of the interaction between the marine and the terrestrial environments.

From the global perspective there are 11 other natural WH properties within the same "Temperate broad-leaved forests or woodlands, and sub polar deciduous thickets" biome of Udvardy. Among the existing WH properties there are only two which feature the interaction of the terrestrial and marine environment, Sikhote-Alin, mentioned above, and Volcanoes of Kamchatka, also in Russia. The Volcanoes of Kamchatka property was inscribed on the WH List for its wide range of volcanic attributes as well as its biodiversity. This property has a higher diversity of salmonid fish species but the level of diversity of terrestrial mammals and birds is higher in the nominated property, also due to its more southward location, with Shiretoko having 35 species of terrestrial mammals and 264 species of birds compared to the 33 species of terrestrial mammals and 145 species of birds found in the Volcanoes of Kamchatka. It is further noted that the seasonal sea ice within the nominated property is formed by the specific conditions of the Sea of Okhotsk while the east coast of the Kamchatka Peninsula (where the WH property faces) usually does not have sea ice.

There are three comparable large continental/maritime natural WH properties at broadly similar latitudes in North America – (a) Olympic National Park bordering the Pacific Ocean in Washington State; (b) Gros Morne National Park on the western Atlantic seaboard in Newfoundland and Labrador province in Canada; and (c) the Redwood National Park situated along the Pacific Coast in California. The Olympic National Park (Oregonian biogeographic province) is an outstanding temperate

rainforest but its climate is very different (much wetter and warmer) than Shiretoko and its forest is more coniferous. Olympic is also not listed for its biodiversity value or endangered species. Gros Morne National Park, likewise, is not listed under criterion (iv); it is wetter and cooler (in summer) than Shiretoko and it lacks the forest community diversity of the latter. The Redwood National Park is characterised by virgin temperate rainforests, mainly consisting of giant conifers and exhibits a different range of species from the nominated property and it does not exhibit the same interaction of terrestrial and marine features of the nominated property, neither is it influenced by the seasonal sea ice.

The Udvardy's "Manchu-Japanese Mixed Forest" Biogeographic Province also extends across provinces of north-east China (Heilongjiang and Jilin) to the North Korean border. The most significant site in this area is Changbai Mountain Nature Reserve (190,582 ha). This site is a Biosphere Reserve but lacks any lowland forest (below 300m) or any coastal landforms and biota. It is noted that similar ecosystems, and especially the same type of forest vegetation as well as comparable interactions between terrestrial and marine ecosystems also occur on the two southernmost islands of the Kuril island chain, adjacent to Shiretoko.

In addition to the comparison with other properties within the same Udvardy Biogeographic Province and Biome, it is noted that there are a number of distinctive features which strengthen the case for the nominated property being of Outstanding Universal Value. These include:

- The productivity of the marine and terrestrial ecosystem, reflecting the formation of seasonal sea ice at the lowest latitude among the world's seasonal sea ice;
- The interaction between the marine and terrestrial environment within the nominated property;
- The high number of flora and fauna species within the nominated property that are endemic and/or listed as Threatened on the IUCN Red List of Threatened Species (refer above section);
- The nominated property also has particular importance as a site for the protection of a number of globally threatened bird species, including the Steller's sea eagle, the Blakiston's Fish - owl and the White-tailed eagle, as well as being a significant site for migratory birds, such as Short tailed shearwater. Birdlife International suggests the ornithological importance of the site relates to the "site's significant numbers of globally threatened bird species, to its significant assemblage of species whose breeding distributions are largely or wholly confined to one biome, and to the fact that it holds, on a regular basis, more than 1% of a biogeographic population of a waterbird species"
- The fact that this property has one of the highest densities of brown bear populations in the world is also an important, although secondary, attribute. It is noted that densities in Shiretoko compare with brown bear population densities observed in coastal areas of Alaska and Kamchatka, with bears in these areas

also having access to salmon. However, it is noted that the high figure estimated for the Shiretoko nomination is exceeded by at least two Alaskan island populations (40 bears per 100 km<sup>2</sup>) (pers. comm. IUCN/SSC Bear Specialist Group). Thus the high density of the brown bear at the nominated property is a key feature but by itself probably not sufficient to justify "Outstanding Universal Value".

- The property has particular significance for salmonid species. The IUCN/SSC Salmon Specialist Group notes there are nine Natural World Heritage properties established within the natural range of Pacific salmon (Shirakami Sanchi in Japan, Central Sikhote-Alin in Russia, Volcanoes of Kamchatka in Russia, Wrangel Island Reserve in Russia, Kluane/Wrangell-St. Elias/Glacier Bay/Tatshenshini-Alsek in Canada and the USA, Olympic National Park in USA, Redwood National Park in USA, Yosemite National Park in USA, and Nahanni National Park in Canada). Most of these properties, however, include higher elevation areas that do not necessarily encompass critical habitat for salmon, or only provide partial protection of watersheds that support salmonids. Exceptions to this include the Olympic National Park in the USA and the Volcanoes of Kamchatka in Russia. The 3.7 million km<sup>2</sup>. The Kamchatka property includes the world's greatest diversity of salmonid fish as well as important populations of seabirds and marine mammals. The IUCN/SSC Salmon Specialist Group notes the particular significance of the Shiretoko property is that it encompasses habitat in more than a dozen small watersheds and supports several species of Pacific salmonids, including White spotted charr, Japanese huchen or Sakhalin taimen, masu salmon, chum salmon and pink salmon. The nominated property has specific importance as it is the southernmost habitat in the world for the sea run of the Dolly varden. The importance of the property is underlined by the fact that many of the salmon river ecosystems in the region have been significantly altered through land use practices and various forms of channel modification and impoundment.
- The nominated property represents the lowest latitude of the world's seasonal sea ice. This is a particularly interesting feature but is not by itself sufficient as a feature to represent Outstanding Universal Value. However the enormous productivity of the marine and terrestrial ecosystem within the nominated property is, as noted above, a direct consequence of the seasonal sea ice and thus the sea ice is a major contributing factor to the conservation value of the nominated property.

## 4. INTEGRITY

### 4.1 Legislation and Management Plan

The nominated property is protected through a number of national laws and regulations. These include The Nature Conservation Law (1972), the National Parks Law (1957), the Law on Administration and Management of National Forests (1951) and the Law for Conservation of Endangered Species of Wild Fauna and Flora (1992). A comprehensive administrative scheme is proposed

for the nominated property to ensure effective integration of the various management objectives for the property and to ensure cohesive management for the core and buffer zones. Several management plans exist for the nominated property and this includes both a Park Plan for the Shiretoko National Park and the Regional Administration and Management Plan for the National Forest. These plans have been developed through a consultative process, involving relevant stakeholders, and set out clear management objectives and strategies for the nominated property.

In general, these and other laws provide an effective matrix of legal protection for the nominated property, within its current borders. IUCN finds the legal and management planning basis satisfactory (while noting the points below in section 4.4) but notes that the management plan may need to be revised in future, particularly in relation to the need to address anticipated tourism pressures and to ensure the effective protection and management of marine resources within the nominated property.

### 4.2 Boundaries

The boundaries of the nominated property consist of those of existing legally designated protected areas. The nominated property is classified into a core area and a buffer area for management purposes. As previously noted, the total area of the nominated property is 56,100 ha comprising a core area of 34,000 ha and a buffer area of 22,100 ha. The core zone consists of a number of specially protected areas, including the Onnebetsudake Wilderness Area and the Special Protection Zone of the Shiretoko National Park. The buffer area includes land surrounding the core area and also the sea area within the coastline of the nominated property. IUCN notes that the terrestrial boundaries are logical and protect the key terrestrial features of the property, although there are some construction and recreation-related developments in the settlements which need more consideration in future.

In relation to the marine boundaries IUCN notes that the boundaries were originally proposed as being one kilometre from the shoreline. In discussions with the State Party following the Evaluation Mission, the Japan Government, including relevant Ministries, Local Government Authorities and key stakeholders, agreed to extend the marine boundaries to a distance of three kilometres from the shoreline. This corresponds to the depth of 200 metres which encompasses the key marine ecological area for marine biodiversity. The IUCN Evaluation Mission also noted the need to ensure effective protection of marine resources within the nominated property and for adequate protection of flagship species, such as the Steller sea lions. This is further elaborated in section 4.4 below.

### 4.3 Management of the terrestrial environment

The level of management of the terrestrial component of the nominated property is high and the area's physical features retain a high degree of natural integrity. As noted, effective management plans cover the nominated property, and these set out clear management objectives and strategies. There are adequate resources to ensure

the implementation of the provisions of the management plans and these are available from a range of sources, including the Ministry of the Environment, Forestry Agency, Hokkaido Prefectural government and the local towns adjacent to the nominated property (Shari Town and Rausu Town). The National Parks Foundation, Shiretoko Branch, also contributes to the management of the property, particularly through clean-up activities and the management of facilities within the park. In total there is an amount of approximately US\$11.6 million per annum available from the various sources for the management of the nominated property (and also areas surrounding the property, in the case of the Forestry Agency). The IUCN evaluation mission was particularly impressed by the close cooperation between the Ministry of Environment and the Forestry Department, as well as the excellent collaboration between the different levels of government (national, prefectural and the local towns). The involvement of external partners and stakeholder groups, such as the National Parks Foundation and the Shiretoko 100 Sq Metre Trust also makes a major contribution to the effective management of the nominated property.

Tourism and wildlife management are important issues within the terrestrial component of the nominated property. In relation to tourism, it is estimated there are approximately 2.34 million visitors per annum to the Shiretoko Peninsula. Summer is the high season but some 300,000 people also come to see the sea ice (January to March). Popular tourism activities include the nature walks to Shiretoko-goko lakes and Kamuiwakka, trekking around Lake Rauso, sightseeing from Shiretoko Pass and climbing in the Shiretoko mountain range. Nature sightseeing from the sea on tour boats is another popular attraction.

The IUCN Evaluation Mission (June 2004) noted some signs of soil erosion around the high mountain trails, underlining the need for clear management strategies and actions. The high density of bear populations in proximity to an increasing number of visitors also underlines the need for effective management of bear - human interactions, particularly in and around main tourist destinations. The State Party, working with NGOs and local communities, is addressing these problems, particularly through a range of non-lethal ways, including through increased public awareness, and the short term closure of key visitor use areas, as required. Ecotourism is clearly promoted by the authorities. In July 2004 a "Shiretoko Ecotourism Promotion Council" was established. This council will formulate an ecotourism strategy for Shiretoko by the end of 2005. Ecotourism has clear potential for positive and also negative impact, in relation to the nominated property. It is important to develop the ecotourism strategy, building on experience from within the property and from elsewhere. Elements for possible consideration in this strategy include: (i) a Trail Management Strategy, based in part on existing scientific research relating to trail use and impacts; (ii) considering developing Limits of Acceptable Change indicators for different zones within the park, in relation to visitor use; (iii) promotion of visitor use strategies within a regional context should use levels become too high; and (iv) management of bear - human interactions.

Wildlife management is also an important issue within the property. Specifically, the Sika deer is another abundant and high profile species at Shiretoko and the deer population has been subject to major fluctuations. It is noted that Sika Deer populations are rapidly increasing all over Japan and that effective deer control is a broader wildlife management issue within Japan. As for regulated ungulate populations elsewhere, such as in the Yellowstone National Park, there is debate as to whether and how to prevent such dramatic oscillations. High deer densities greatly alter the natural vegetation, so the debate centres on whether the effects of the deer are natural, or due to long term human imposed changes in the ecosystem. (IUCN/SSC Bear Specialist Group, pers. comm.). The management plan for the property notes that a study will be undertaken to monitor the relation between population density and the impact on the forest ecosystem. Results from this study will be used to identify effective measures for the future management of deer populations. IUCN notes that there might be potential conflicts between the management of Sika deer and the desire of visitors to see wildlife, and that effective management will be required.

#### **4.4 Management of the marine environment/fisheries management**

The IUCN Evaluation Mission noted that there is currently a broad range of fishing activities within and adjacent to the nominated property. The Nomination document notes that the: "fishing industry uses set nets, gill nets and aquaculture in the coastal waters of the Shiretoko Peninsula. The major marine resources harvested are salmon and trout, Sagittated calamari, Walleye Pollack and kelp. There have been almost no changes in production volume in the last 10 years for most of the fisheries resources. The level of catches in the fisheries operating in the coastal waters of the Shiretoko Peninsula is supported by the high production level of the sea. Fisheries activities are controlled by the Fisheries Law and other regulations issued by the Hokkaido Prefectural government, voluntary restrictions by the fisheries industry, as well as artificial production and fry release programme for salmon and trout".

IUCN notes that fishing has been undertaken in the area for a considerable period of time and it is a vitally important industry in the region. Considerable consultation has taken place with fisheries interests and there has been a high level of cooperation in relation to the prescriptions in the management plan regarding fisheries, such as those relating to restrictions and prohibitions on capture of Sakhalin surf clams and sea urchins, and prohibitions on certain fishing methods. However, IUCN notes that there appear to be declining levels of catch of key fish species within and adjacent to the nominated property.

As noted above, the potential significance of the nominated property as being of Outstanding Universal Value derives from the inter-relationship between the terrestrial and the marine ecosystems. Further, the protection of any property as World Heritage implies the highest possible level of legal protection for the property as a whole, both for terrestrial and marine components. Accordingly the protection and management of the marine component of the nominated property is of high

importance. The IUCN mission communicated with the State Party after the evaluation mission and raised a number of issues relating to the management of the marine component of the property, including concerns regarding:

- the level of protection of the marine component of the nominated property;
- the level of fishing currently occurring within the nominated property. Concerns were also raised in relation to what appeared to be declining levels of catch of the Walleye Pollock within and adjacent to the nominated property, as this species is one of the main food sources of the Stellar Sea Lion, the Steller's sea eagle and the White tailed eagle, which are flagship species of the nominated property;
- potential impacts of aquaculture, including the release of trout; and
- the need for consideration of stricter controls of fishing within key breeding, spawning and nursery sites for key fish species within the nominated property and in the adjacent areas, as far as they are functionally related ecologically to the nominated property. Potentially this could be achieved by the establishment of a number of Fisheries Resource Protection Areas (FRPA) and this should be undertaken through consultation with appropriate scientific bodies and fisheries experts.

The State Party response to these matters noted, inter alia:

- that resource levels of the Walleye Pollack have, in fact, been stable within the nominated property but have been generally declining throughout the Sea of Okhotsk. The Government manages the resources by setting the Total Allowable Catch (TAC) based on surveys from relevant fisheries organisations. There have also been self imposed controls on fishing of Walleye Pollack, for example, by reducing the number of fishing boats operating gill nets (from 324 to 181 during the period 1990 to 2003);
- their intent to develop within the next 5 to 10 years a "Multiple Use Integrated Marine Management Plan": "in order to conserve the marine area within the nominated property as a World Heritage Area". This plan would include mechanisms for ensuring the conservation of the marine life, based on a detailed assessment of the state of marine life, fisheries operations and leisure fishing within the nominated property and the surrounding areas; and
- that governments and relevant stakeholders will review new measures to control fisheries activities within the nominated property. These new measures would be modelled after the existing fishing ban in certain areas and periods, which are voluntarily adopted by local fishermen and fisheries organisations, to conserve and manage the Walleye Pollack stock. The new measures will be presented to the Shiretoko Nominated property Regional liaison Committee by 2008.

IUCN notes the increasing evidence from around the world to support the link between the establishment of well managed marine protected areas (MPAs) and the conservation of fisheries stocks. It is further noted that there are currently many global efforts underway to develop representative marine protected areas, including within the Great Barrier Reef Marine Protected Area, which provides one example of a representative marine protected areas system. These examples have shown the need for management policies to be based on the best available science and the critical importance of working closely with the fisheries sector and relevant interests. A further important lesson is that effective consultation takes time and effort.

IUCN supports the development, within the next three years, of the Multiple Use Integrated Marine Management Plan and the study as proposed by Japan. It is important that such an integrated management plan draw on appropriate scientific expertise and that it clearly identify measures for strengthening marine protection within the nominated property. This may include restrictions on fishing within key breeding, spawning and nursery sites for key fish species within the nominated area, as well as reviewing strategies for expanding the boundaries of the marine component of the nominated property. Any future boundaries should consider the need to adequately protect key locations and migration routes for the Steller sea lions and cetacean species. The Plan should include clear and time bound objectives and strategies and the effectiveness of the measures within the plan on marine resources should be assessed after a five year period.

Following consultation between the State Party and IUCN, the State Party has recently agreed to shorten the period for the development of the Marine Management Plan and also to extend the marine boundary from 1km to 3km off the shoreline. IUCN considers these to be positive developments and recommends a mission after two years, if this property is inscribed, to assess the impact of the Plan and the marine extension on the ecological functionality and the fisheries resources of the property.

#### 4.5 Dam Construction on Rivers

The nominated property has important values for salmonid species (IUCN/SSC Salmon Specialist Group, pers. comm.) and salmon species are an important food source for a number of important species within the nominated property, including the Steller's sea eagle and White tailed eagle which feed upon the salmon swimming upstream in summer. Providing for the free movement of fish species within the nominated property should be an important element of the overall management in relation to the restoration and maintenance of natural river flows and processes. An important element of this is the need to consider installation of ecologically efficient fish ladders to allow for the free movement of salmon on all structures maintained on the rivers in the nominated property and strict regulations of leisure fishing in the lower courses of the streams (buffer zones or outside the nominated property).

Currently nine out of the forty-four rivers within the nominated property have artificial modification, mainly in the form of dam construction. These have been installed to protect human life and properties from the impacts of severe weather events and associated disasters, such as landslides. The nomination document notes that: "The impact of these constructions on salmon is not clear yet, and is going to be investigated" (pg 21). Subsequent to the Evaluation Mission, IUCN raised this issue with the State Party and noted the importance of further research and possibly remedial action, which could potentially involve the removal of some of these structures in the future and/or the installation of fish ladders.

IUCN considers that it is important that more research, providing substantial results within a definite span of time, be undertaken in relation to the impact of dam construction on populations of salmonid species. Such research could include aspects such as the:

- extent to which specific streams are used for spawning by each of the salmonid species;
- specific impact of dams in relation to impeding salmon migration; and
- establishment of a monitoring program to regularly assess status and trends of the populations of salmonid fishes.

IUCN considers that a Salmonid Management Plan, as one component of the overall management plan for the property is necessary. It should include an assessment of the current practice of salmonid management by releasing artificially reared fry. Such a Management Plan should be developed to ensure the above issues are adequately addressed. It is important that this draw on appropriate scientific expertise and the IUCN/SSC Salmonid Specialist Group may be able to assist this process. The Plan should include clear and time-bound objectives and strategies and the effectiveness of the measures within the plan on marine resources should be assessed after a five year period

## 5. ADDITIONAL INFORMATION

### 5.1 Public support and involvement

The nominated property features a very high level of involvement of local communities and stakeholder groups. It is particularly noteworthy as the setting for the innovative Shiretoko 100 square metres movement, an innovative mechanism for individuals and organisations to support conservation through specific donations and support. This model has become a pioneering model, inspiring similar efforts throughout East Asia and other parts of the world. Similarly, the involvement of stakeholders involved in fisheries has been noteworthy and very effective.

### 5.2 Scientific Research

There are a number of innovative scientific research programmes throughout the nominated property and

these are, to the fullest extent possible, linked to the development of management strategies within the nominated property. It is important that these research programmes be expanded in the future, particularly to address key issues for management, including the management of bear and Sika deer populations and to contribute to the development of management plans for marine resources, salmonid species and ecotourism.

### 5.3 Kuril Islands

There are clear and apparent similarities between the environment and ecology in Shiretoko and the neighbouring Kuril Islands of Russia. It is noted that there has been informal contact between researchers from Japan and Russia in relation to the ecology of these areas. Should it be possible for the States Parties to agree to promote the conservation of these properties in the future, there may be potential for development of these properties as a transboundary "World Heritage Peace Park".

### 5.4 Involvement of Indigenous Peoples

Shiretoko was reverently called by the Ainu People as "sir.etok" (the end of mother earth) indicating the importance of this area for traditional inhabitants. It is important, as reinforced in the management plan (page 214 of the nomination document) to "study the culture of the Ainu people and the traditional wisdom and skills of the local residents in order to determine the methods to preserve, manage and realize sustainable use of the natural environment". Accordingly it is considered important that representatives of the Ainu people, such as through the Hokkaido Utari (Ainu) Association, have the opportunity to be involved in the future management of the property, including in relation to the development of appropriate ecotourism activities which celebrate the traditional customs and uses of the nominated property

## 6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

Shiretoko has been nominated under natural criteria (ii), (iii) and (iv)

### Criterion (ii) Ecological Processes

Shiretoko provides an outstanding example of the interaction of marine and terrestrial ecosystems as well as extraordinary ecosystem productivity, largely influenced by the formation of seasonal sea ice at the lowest latitude in the northern hemisphere. This process supports the formation of phytoplankton which develops on the nutrients supplied by sea ice. Blooms of ice algae and other phytoplankton occur earlier in spring as ice melts faster than other sea ice areas. The phytoplankton is the primary producer in the marine ecosystem and provides the source of food for krill and zooplankton such as small shrimp, which in turn become food for small fish, crustacean and shellfish. These in turn become food sources for marine and terrestrial species which provide the basis for the outstanding ecological processes exhibited at the property. IUCN considers the nominated property, including the proposed extension to 3 kilometres off the shoreline, is an outstanding

example of the linkage between marine and terrestrial ecological processes and ecosystems. IUCN considers that the nominated property meets this criterion

### **Criterion (iii) Superlative natural phenomena, scenic beauty**

The nominated property derives its primary visual impact from a range of natural landscapes that vary with the season. These features include the scenic coastline, with sea cliffs more than 100 metres high and mountain scenery. IUCN considers that this property is very beautiful but considers that these values are of significance at the regional level and cannot compare to other coastal and mountain sites already inscribed on the WH List, under this criteria, such as Lord Howe Island (Australia) and the Volcanoes of Kamchatka (Russia). IUCN considers that the nominated property does not meet this criterion

### **Criterion (iv) Biodiversity and threatened species**

Shiretoko has particular importance for a number of marine and terrestrial species. These include a number of endangered and endemic species, such as the Blackiston's Fish owl and the plant species *Viola kitamiana*. The property is globally important for a number of salmonid species and for a number of marine mammals, including the Steller's sea Lion and a number of cetacean species. The property has significance as a habitat for globally threatened sea birds and is a globally important area for migratory birds. The nominated property also exhibits excellent examples of forest ecosystems with a very limited area of distribution. IUCN considers that the nominated property meets this criterion

## **7. DRAFT DECISION**

IUCN recommends that the Committee adopt the following draft decision:

*The World Heritage Committee,*

1. Having examined Document **WHC-05/29.COM/8B**
2. Inscribes Shiretoko, Japan, on the World Heritage List on the basis of natural criteria (ii) and (iv).

**Criterion (ii):** *Shiretoko provides an outstanding example of the interaction of marine and terrestrial ecosystems as well as extraordinary ecosystem productivity, largely influenced by the formation of seasonal sea ice at the lowest latitude in the northern hemisphere.*

**Criterion (iv):** *Shiretoko has particular importance for a number of marine and terrestrial species. These include a number of endangered and endemic species, such as the Blackiston's Fish owl and the plant species *Viola kitamiana*. The site is globally important for a number of salmonid species and for a number of marine mammals, including the Steller's sea Lion and a number of cetacean species. The site has significance as a habitat for*

*globally threatened sea birds and is a globally important area for migratory birds.*

3. Notes that the State Party has agreed to extend the Marine Boundary of the property from 1km to 3 km off the coastline, and that such extension is "de facto" in place awaiting legal designation by the end of 2005.
4. Requests the State Party to:
  - (i) Expedite development of a Marine Management Plan, to be completed by 2008, to clearly identify measures for strengthening marine protection and the possibilities of extending the boundaries of the marine component of the property;
  - (ii) Send a map and details of the final boundaries of the property, as well as a copy of the law supporting them, to the World Heritage Centre once they have been confirmed in law;
  - (iii) Develop a Salmonid Management Plan to identify impacts of dams and strategies to address this impact; and
  - (iv) Address other management issues included in the evaluation report, including in relation to tourism management and scientific research.
5. Encourages the State Party to invite a mission to the property in 2 years from its inscription to assess progress with the implementation of the marine Management Plan and its effectiveness in protecting the marine resources of the property.
6. Commends the State Party for the commendable process for public consultation involved in the preparation of this nomination document; the preparation of an excellent nomination dossier; and for effectively addressing IUCN recommendations to enhance the conservation and management of this property.



Map 1: General Location of nominated property

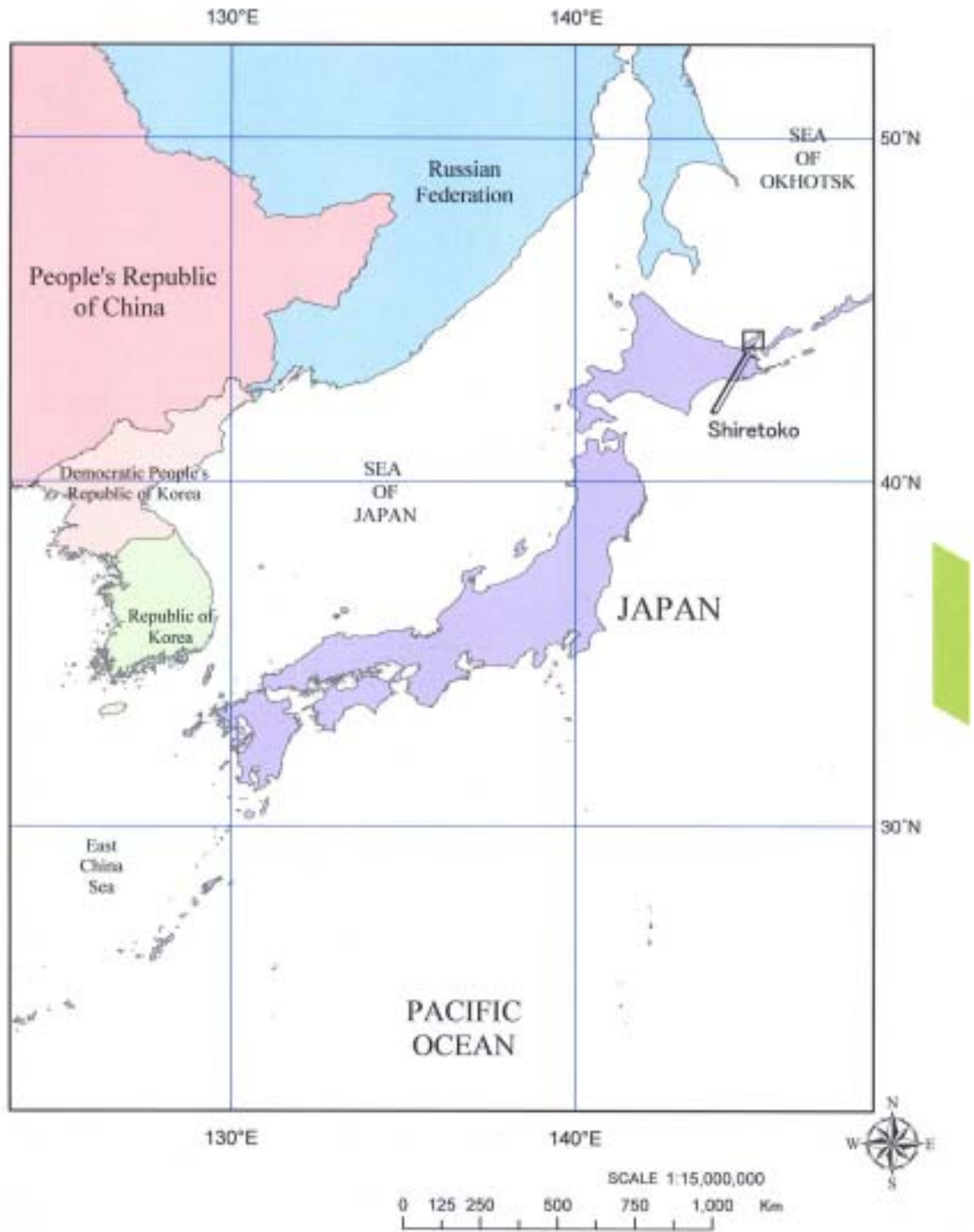


Figure 1-1 Location of Shiretoko Peninsula in Japan

Map 2: Boundaries of nominated property

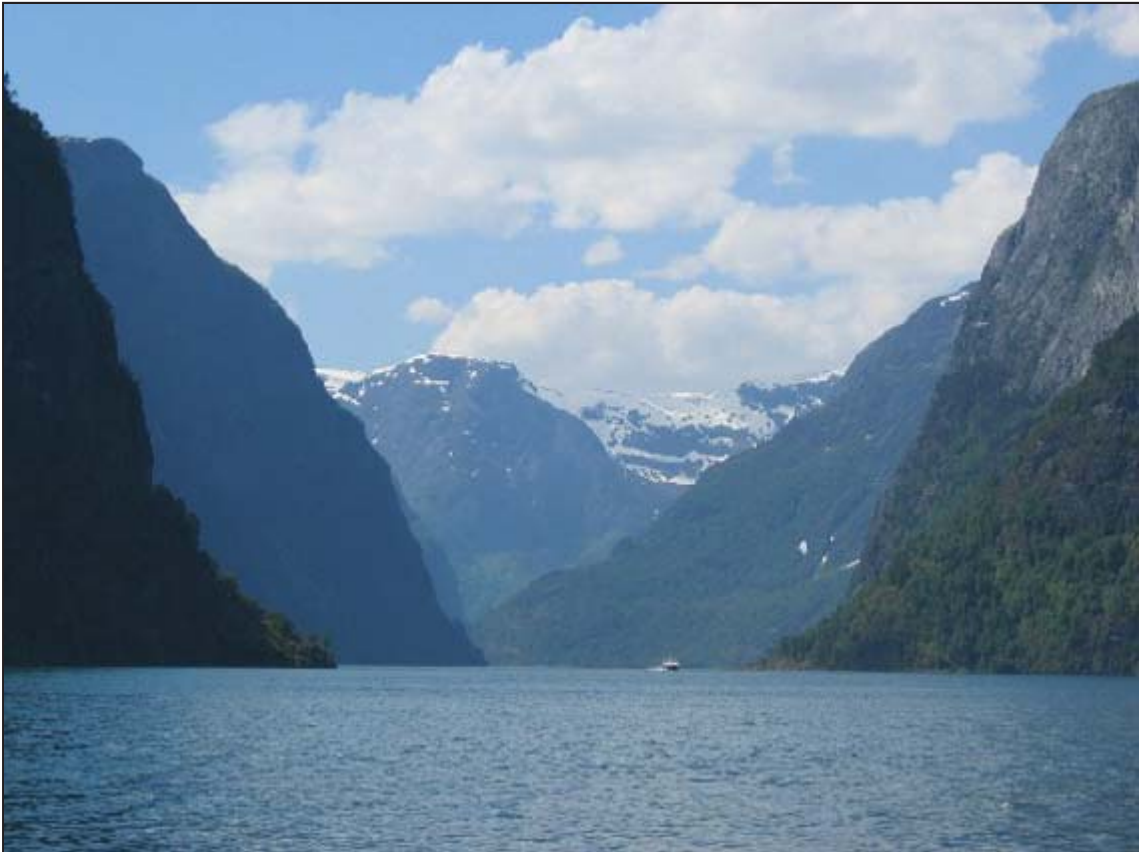


EUROPE / NORTH AMERICA

WEST NORWEGIAN FJORDS

GEIRANGERFJORD & NÆRØYFJORD

NORWAY





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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### GEIRANGERFJORD & NÆRØYFJORD (NORWAY) ID N° 1195

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#### 1. DOCUMENTATION

- i) **Date nomination received by IUCN:** April 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** State Party provided supplementary information requested during the IUCN field visit – received by IUCN on 22 November 2004.
- iii) **IUCN / WCMC Data Sheet :** 2 references (nomination document also contains a bibliography of 250 technical references)
- iv) **Additional Literature Consulted:** IUCN. 2004. **Global Strategy for Geological World Heritage Sites.** Draft; Nordic Council of Ministers. 2003. **Nordic Scenery: Protecting the Nordic Countryside in the 20<sup>th</sup> Century.** 258p.; Eide, Per and Olav Grinde. 2001. **The Magic of Fjord Norway.** 192p.; Aasheim A. and Oddgeir Bruaset. 2001. **Geiranger – Jewel of Fjord Country.** 159p.; Aarseth I. 1997. Western Norwegian fjord sediments: age, volume, stratigraphy, and role as temporary depository during glacial cycles. **Marine Geology** 143 39-53; Nordgulen O. Fjords-a comparative analysis. Supplementary information to the nomination provided by Norway. Oct. 2004.
- v) **Consultations:** 11 external reviewers. Representatives from the Ministry of Environment, Directorate of Nature Management, County Administrations, Geological Survey of Norway, and local tourism officials.
- vi) **Field Visit:** James W. Thorsell. June 2004
- vii) **Date of IUCN approval of this report:** April 2005

#### 2. SUMMARY OF NATURAL VALUES

The West Norwegian Fjords (WNF) are located in southwestern Norway northeast of Bergen. The property is a part of the west Norwegian fjord landscape which stretches from Stavanger in the south to Andalsnes, 500km to the north east. The nomination is a serial one consisting of two tributary fjords occurring 120 km apart. The more northerly Geirangerfjord area (49,887ha) lies 60 km inland on the upper end of Storfjord while the Nærøyfjord (68,346 ha) is 100km inland at the upper end of the Sognefjord. Total area of the property is 122,712 ha, of which 111,966 ha is land and 10,746 is sea. Elevations vary from sea level to 1850m (Torvløysa mountain above Geirangerfjord) and 1761m (Stiganosi mountain above Nærøyfjord).

The two nominated sites are distinctive landscapes in a country of spectacular fjords. *Fjord* is a word of Norwegian origin, meaning a glacially over-deepened valley, usually narrow and steep-sided and extending below sea level. The fjords of Norway are among the most extensive on earth and are considered the type locality for study of fjord landscapes.

Each of the two components of the nomination are at the end of two major fjord systems that developed along faults and fracture zones at right angles, giving them a characteristic zigzag form. Both fjords are submarine hanging valleys, which have floors between 300-500m deep in ice-scoured basins. The fjords are 1-2 km wide and their sides reach a height of 1300m in places. They are surrounded by mountains with old transhumance

farms in the hanging valleys, and high glacier lakes. The rivers which enter each of the fjords have not been developed for hydroelectric power as have most others in the region.

Though their differences are not dramatic, the two areas that comprise the property complement each other. Nærøyfjord is located 100km inland near the end of Sognefjord. Its fjords are 250m-2.5km wide with adjacent cliff faces 900-1400m high. The surrounding mountains are smooth-topped with high glacial lakes and a plateau glacier. The uplands of Nærøyfjord preserve much of the rounded landforms of the pre-glacial fluvial-dominated landscape. The Geirangerfjord mountains are more alpine in character; block fields are more prevalent and there is still permafrost and several small glaciers on the highest summits.

The Management Plan's summary for the property notes five main landscape types: (1) The fjord system with shore areas and undisturbed hillsides where the physical relief is more prominent than any other feature; (2) Farms of three distinct types with their surrounding cultural landscapes: fjord-side, valley and mountain-ledge; (3) Valleys of which a large number extend into the mountains and have been used for centuries for transhumant summer grazing; (4) Woods which are deciduous in the valleys and on mountainsides, coniferous at higher elevations; and (5) Mountains, where alpine vegetation extends from treeline to 1400M, above which the landscape becomes one of scree, block fields, snow fields and glaciers.

Geologically, the WNF are well-developed examples of fjord landscape and excellent examples of young active glaciation and have a long record of scientific study. They are located along the raised rifted margin of the North Atlantic where Tertiary uplift and tilting led to formation of extensive westward-flowing drainage systems that were subjected to deep glacial erosion during the Pleistocene ice age. Relatively recently in geologic terms, the products of glacial weathering were removed, leaving ice- and wave-polished surfaces on the steep fjord sides which provide superbly exposed and continuous three-dimensional sections through the bedrock. In Geirangerfjord these are Precambrian gneisses of the West Gneiss Region, an outstanding example of deeply subducted continental crust and of well preserved high-pressure rocks. In Geirangerfjord there are outcrops of peridotite and serpentinite in the predominant gneiss bedrock. In Nærøyfjord the underlying rocks are anorthosite and gabbro, and softer phyllite. The high mountain surface is a slightly undulating peneplain dissected by rivers, the courses of which were deepened, widened and scoured 20,000 years ago by the glaciers of the last Ice Age. Later, melting of the heavy ice cap allowed the land to rebound by some 110m, deepening the fjords. Over the past 5000 years most of the glaciers have disappeared, leaving thick till in places and many moraines. Where fractured, the crystalline rocks are unstable and due to weathering have created a wide variety of rock-slide scars and slumps, active scree and snow avalanche paths. Unpredictable rockfalls are still frequent hazards and, in extreme cases, have created local tsunamis in the enclosed waters of some fjords (62m high in Tafjord in 1934).

Climate is transitional between oceanic and continental and varies markedly with aspect and altitude. Snow persists from October to late May on the mountains and from late November to March in the valleys. Winter ice occurs in the fjord heads for 1-3 weeks. The vegetation is typical of this part of West Norway, being moderately diverse despite the nutrient-poor soils. This diversity is due to the range of gradients from coast to inland, from north to south, from sea level to 1800m and to the consequent variety of terrain and microclimates. Wildlife is also representative of the region and includes four species of deer, arctic fox, otter, and many marine species such as Atlantic salmon, seals, porpoise, dolphins and whales. Over 100 bird species have been recorded. Parts of the area have, in the past, been used for transhumance agriculture and its remnants are now seen as adding a harmonious human element to the natural landscape.

### 3. COMPARISON WITH OTHER AREAS

#### 3.1 Comparison with other regional natural World Heritage properties

The WNF does not compare in any meaningful way with the six existing WH natural properties in the two biogeographic provinces where the nominated property is found:

- (i) West Eurasian Taiga:
  - Virgin Komi Forests, Russian Federation

- High Coast, Sweden
- (ii) Middle European Forest / Boreonemoral:
  - Belovezhskaya Pushcha / Bialowieza Forest, Belarus/Poland
  - Srebarna Nature Reserve, Bulgaria
  - Messel Pit Fossil Site, Germany
  - Caves of the Aggtelek Karst and Slovak Karst, Hungary/Slovakia

None of the above is a fjord landscape and the geological history and coastal scenery of the WNF are quite distinct from existing WH properties in the region. WNF does, however, share the phenomenon of dramatic isostatic rebound of the High Coast of Sweden.

#### 3.2 Comparison with other global fjords and existing WH fjord properties

The State Party provided supplementary information on this topic at the request of IUCN which further underlined the distinctiveness of the WNF and their contribution to the study of fjord landscapes at an international level.

Fjord landscapes are found in high latitudes in both the northern and southern hemispheres. Four existing WH **properties** contain fjords: Gros Morne in Canada, the St. Elias Parks complex between the USA and Canada, Te Wahipounamu in New Zealand, and the Ilulissat Icefjord in Greenland. Comparative statistical data on selected global fjords are shown in the table 1 below.

Table 1 demonstrates the many detailed distinguishing features of the WNF from existing natural WH **properties**. The fjords in Gros Morne are much shorter in length and have a maximum hinterland relief of 800m with no permanent snow or icefields. Compared to fjords in western Norway, the Glacier Bay fjord portion of the St Elias Parks complex differs in numerous ways; e.g. the tectonic setting, high rates of uplift and glacial sedimentation, a highly diverse fjord system with multiple tidewater glaciers that calve into the bay, and recent glaciation followed by fast glacial retreat recorded in historical times. The glacial history and evolution of fjords in the geologically young landscape of Te Wahipounamu - SW New Zealand result from its location above a destructive plate margin, a setting completely different from that of Scandinavia where the history of landscape evolution can be traced back to the pre-Cambrian. There is also a substantial difference in the scale: compared to the major Scandinavian fjords, the examples from New Zealand are quite short. The impressive active glacial processes found in the recently-inscribed Ilulissat Icefjord in Greenland are related to the existing icesheet and not observed in the WNF. Ilulissat is also, however, a relatively short fjord with a much lower hinterland relief.

Other fjord areas exist that may be of international significance. These include the Bernardo O'Higgins National Park in Chile, the Svalbaard National Park in Norway and the Hornstrandir Nature Reserve in Iceland. However, the WNF are more extensive than these areas and, indeed, are considered the type locality for fjords in the world.

Apart from these physiographical differences it should also be noted that, although the nominated WNF site is assessed as the most undisturbed of the more than

**Table 1:** Typical physiographic features from selected fjords

No	Name	Length	Depth	Altitude	Location
1	Storfjorden/Geirangerfjorden	150 km	679 m	1600 m	62,5N- 7E
2	Sognefjorden/Nærøyfjorden	200 km	1306 m	1700 m	61N- 6E
3	Hardangerfjord, Norway	140 km	900 m	1600 m	60N- 6E
<b>4</b>	<b>Ilulissat Icefjord, Greenland</b>	40 km	No data	Ice cap	69N- 51W
5	Kangerlussuaq, Greenland	220 km	<1000 m	980 m	63N- 53W
6	Igaliku fjord, Greenland	40 km	360 m	Ice cap	61N- 45,5W
<b>7</b>	<b>Glacier Bay, Alaska</b>	85 km	450 m	4663 m	59,5N- 137W
8	Lynn Canal, British Columbia	129 km	No data	2323 m	59N - 135W
9	Howe Sound, British Columbia	50 km	325 m		49,5N- 123W
10	Prince William Sound, Alaska	Wide fjord complex	800 m	1689 m	60,5N- 147W
11	Port Valdez, Alaska	45 km	280 m	1689 m	61N- 147W
<b>12</b>	<b>Gros Morne National Park Newfoundland</b>	40 km	No data	800 m	49,5N- 7,5W
13	Saguenay Fjord, Quebec, Canada	90 km	275 m	937 m	48N - 70W
14	Hamilton Inlet/Lake Melville, Labrador	180 km	400 m	1150 m	54N - 58W
15	Greely Fjord (Ellesmere Island)	250 km	<1050 m	2012 m	80,5N - 85W
16	Canal Messier, Chile	200 km	1270 m	3600 m	49S - 75W
<b>17</b>	<b>Te Wahipounamu, NewZealand</b>	40 km	No data	< 3000 m	44S - 168E

Notes on Table 1: Names in bold denote WH **properties** that include fjord landscapes. Note that bathymetric data does not take sediment infill within the fjords into account. In many cases, the thickness of the sediments exceeds that of the present basin depth. Altitudes from the fjords in Norway are from mountains adjacent to the fjords. Otherwise, altitudes refer to the highest mountain in the region where the fjord is situated; hence this has no direct bearing on the steepness along the fjord. (Source: Nordgulen, 2004)

200 fjords in western Norway, it is in a less natural condition than the other four existing natural sites due to more than 5000 years of human occupation. In terms of size, the WNF site is larger than Gros Morne but smaller than the other three sites. Another distinction of the WNF is that it is the upper segments of a fjord rather than an entire fjord system as occurs in the existing WH fjord sites. This is understandable in light of the length of the Norwegian fjords and the impact of human history upon the landscape. The upper segments still contain the key elements of a fjord and are of substantial size; this is not therefore considered a boundary flaw.

In summary, a combination of features sets the WNF apart from fjords elsewhere in several ways:

- Impressive physiography – their exceptional length and depth and the dramatic expression as expressed in the scenery. While fjords of similar magnitude are present, mainly in Greenland and arctic regions of Canada, most of these are in regions with seasonal or permanent sea-ice cover, are commonly backed by permanent ice fields and are directly or indirectly fed by glacial runoff;
- Geological setting – the WNF are classical examples showing a long history of geomorphological development, since the former westward-flowing drainage systems of ancient fold mountains of the Caledonia period were subjected to deep glacial

erosion during the Pleistocene glaciation. Another distinctive feature of the WNF is their record of post-glacial isostatic rebound of the crust and its geomorphic expression in the fjord landscape; and

- Outstanding on-going geological processes including their global contribution to the scientific study of slope instability and consequent geohazards.

The WNF are also nominated under criterion (iii). It is always difficult to make objective comparisons of natural beauty and aesthetic importance of **properties**. Certainly the other four existing fjord **properties** are scenically impressive natural landscapes and all have been inscribed under this criterion. In terms of the iconic identification and the role of Norway's fjords in the cultural milieu of the country and the attraction they provide to international tourists, they are highly significant. Interestingly, the long record of human use of the property adds interest and value to the landscape that is not found in other fjord **properties**. In conclusion, the WNF is at least the equivalent in terms of "scenic natural beauty" to other fjord **properties** and this in turn is supplemented (though not dominated) by remnants of its human historical past.

## 4. INTEGRITY

### 4.1 Legislation and management plans

The majority of the nominated area is considered as an IUCN Category V “Protected Landscape” with several small areas within it that would be Category I “Strict Nature Reserve”. All of the 8 separate protected sites within the two areas have legislative protection, the most recent designations occurring through the National Nature Conservation Act in October, 2004. Private lands make up 85% of the nominated area. Inhabited portions of the area are carefully controlled under the Planning and Building Act as well as other mechanisms such as County, Municipal and Local Development Plans. In addition, the Ministry of the Environment coordinated the signing of a “Declaration of Intent” signed by the relevant national agencies as well as all the affected six Borough Councils and County Governors. This outlines the cooperative measures to be taken as well as “...guarantees that the values in the area will endure.” IUCN considers that the legislation, staffing, budget and institutional structures in place are adequate to meet the Conditions of Integrity outlined in the Operational Guidelines (July 2002). Moreover, all of the above are to be augmented if WH status is achieved.

### 4.2 Impacts and threats

As with all protected areas, the nominated property has its own array of management challenges which are clearly spelled out in the nomination and which were the subject of review during the field inspection. Compared to other fjord regions in the country, the nominated site is very lightly populated. No aquaculture operations, commercial fisheries or forestry plantations exist and no hydro development (apart from some possible mini-stations) is planned. A military training area near the property had been planned but has now been cancelled in light of the WH nomination. Tourism pressures are intense in both fjords but impacts are limited as most visitors are confined to cruise ships and there are adequate planning and zoning measures as well as a short visitor season which limits impacts to three months per year.

The one activity that is considered to be of more concern is mining and quarrying. At present a peridotite rock quarry is active outside but close to the boundary of the Geirangerfjord and plans exist for another nearby. The impacts here are very localized, primarily visual and rehabilitation measures will occur on completion. Within the Nærøyfjord nominated area an underground excavation of anorthositic rock takes place which may also expand in future. Though not directly adjacent to the fjord itself, the quarry has a visual impact when seen from the road to Gudvangen. On the positive side, and adjacent to the existing quarry, are the restored remains of a previous quarry which has recovered to the extent that only the small entrance cavities and a parking lot can be seen. Any expansion of underground quarrying would require an environmental impact assessment. This would need to address concerns over the direct impact of any such operation and about the arrangements for the export of the mined material and the need for related infrastructure.

### 4.3 Serial property questions

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

- **What is the justification for the serial approach?**  
Almost all of the more than 200 fjords along the west coast of Norway have been impacted in some way by urban settlement, agriculture or hydro dams. The nominated property was selected as the best remaining two fjords that were not only the least affected by previous human activity but are also considered the most spectacular and most studied for their geological interest. Each fjord has a different morphology and geology and displays a different range of geomorphological features. The two parts of the nomination are thus complementary and each adds a special strength to the overall nomination, although the natural features found in each component site are not radically different to the casual visitor.
- **Are the separate elements of the property functionally linked?**  
Other than being tributary parts of the west Norwegian fjord region the two component sites are some 120km apart and there are no direct linkages. Rather, the two components are the two outstanding “natural” fjord areas in the entire coastal region and, taken together, provide most of the features that could be expected of a fjord landscape and its geological evolution.
- **Is there an overall management framework for all the components?**  
All of the 8 protected areas found in the two fjords have management plans and each area has a Consultative Group made up of the various agencies and groups involved in each area. The Consultative Group for both Nærøyfjord and Geirangerfjord will meet once per year. Though there is not therefore a single management agency, this group will facilitate the necessary co-ordination.

## 5. ADDITIONAL COMMENTS

### 5.1 Cultural and historical values

Many external reviewers of the WNF nomination have commented on the strong cultural and historical values of the property and how previous human impact does not detract from, but enhances, the aesthetic value of the two fjords. The nomination document also provides substantial information on the transhumance phenomena of the early inhabitants and the existence of over 350 registered old buildings, such as stave churches. Another indicator of the cultural values is reflected in the fact that both components of the nomination were included in the National Register of Valuable Cultural Landscapes”. ICOMOS has also suggested in its comments to IUCN that the property be also considered under criteria related to cultural landscapes while also noting that “...human intervention is dwarfed by the scale and grandeur of the scenery”.



This issue was discussed during the field evaluation with the conclusion that, although the human values are significant, they are less so than those found in other Norwegian fjords, including several other fjord areas on their Tentative List, such as the Tysfjord adjacent to the Lapponian Area WH property in Sweden, the Lofoten Islands and the Vega Archipelago WH property in Norway. Cultural values are well-recognized in the management of the property and are well-protected under Norway's Cultural Heritage Act and various local legal instruments.

## 5.2 Process of property selection

The 10 year process of property selection undertaken by the Norwegian authorities in close cooperation with other Scandinavian countries through the Nordic Council is exemplary. This approach has allowed a collective overview of the WH potential and most outstanding landscapes of the wider region. Beyond this regional view, a local consultative process with stakeholders and county officials led to broad support of the nomination as reflected in the "Declaration of Intent" referred to in 4.1 above.

## 6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The WNF have been nominated as a serial property under natural criteria (i) and (iii).

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

The WNF are classic, superbly developed fjords, considered as the type locality for fjord landscapes in the world. They are comparable in scale and quality to other existing fjords on the WH List and are distinguished by the climate and geological setting. The nominated property displays a full range of the inner segments of two of the world's longest and deepest fjords. IUCN considers that the nominated property meets this criterion.

### Criterion (iii) Superlative natural phenomena, scenic beauty

The Nærøyfjord and Geirangerfjord areas are considered to be among the most scenically outstanding fjord areas on the planet. Their outstanding natural beauty is derived from their narrow and steep-sided crystalline rock walls that rise up to 1400m direct from the Norwegian Sea and extend 500m below sea level. Along the sheer walls of the fjords are numerous waterfalls while free-flowing rivers rise up through deciduous and coniferous forest to glacial lakes, glaciers and rugged mountains. There is a great range of supporting natural phenomena, both terrestrial and marine such as submarine moraines and marine mammals. Remnants of old and now mostly abandoned transhumant farms add a cultural aspect to the dramatic natural landscape that complements and adds human interest to the area. IUCN considers that the nominated serial property meets this criterion.

IUCN also notes that the property has other important and complementary natural values under criterion (ii) and (iv) but these are of secondary significance to the

criteria chosen for nomination. They should, however, be considered in the integrated management of the range of natural values found in the WNF.

## 7. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

*The World Heritage Committee,*

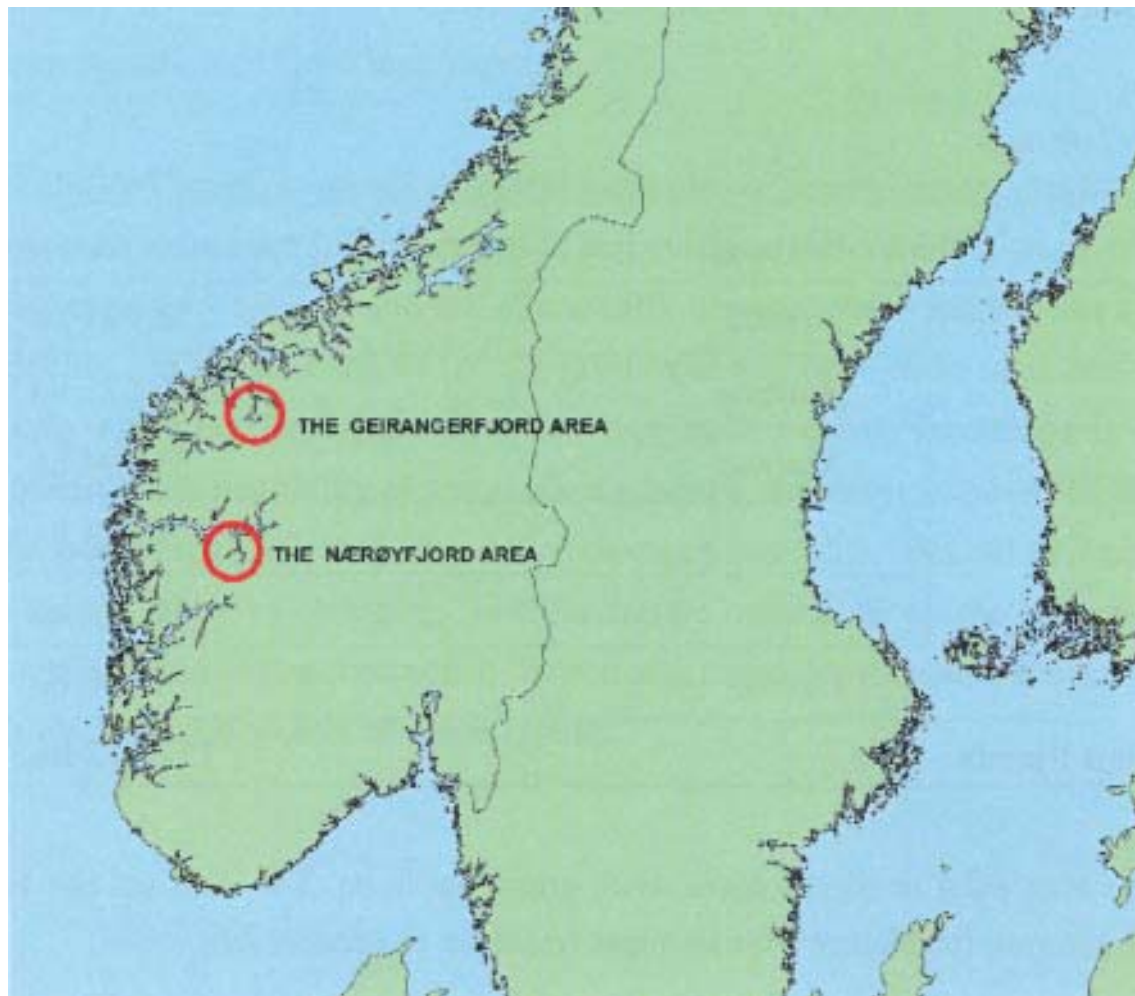
1. Having examined Document **WHC-05/29.COM/8B**
2. Inscribes the West Norwegian Fjords on the World Heritage List on the basis of natural criteria (i) and (iii):

**Criterion (i):** *The West Norwegian Fjords are classic, superbly developed fjords, considered as the type locality for fjord landscapes in the world. They are comparable in scale and quality to other existing fjords on the WH List and are distinguished by the climate and geological setting. The property displays a full range of the inner segments of two of the world's longest and deepest fjords.*

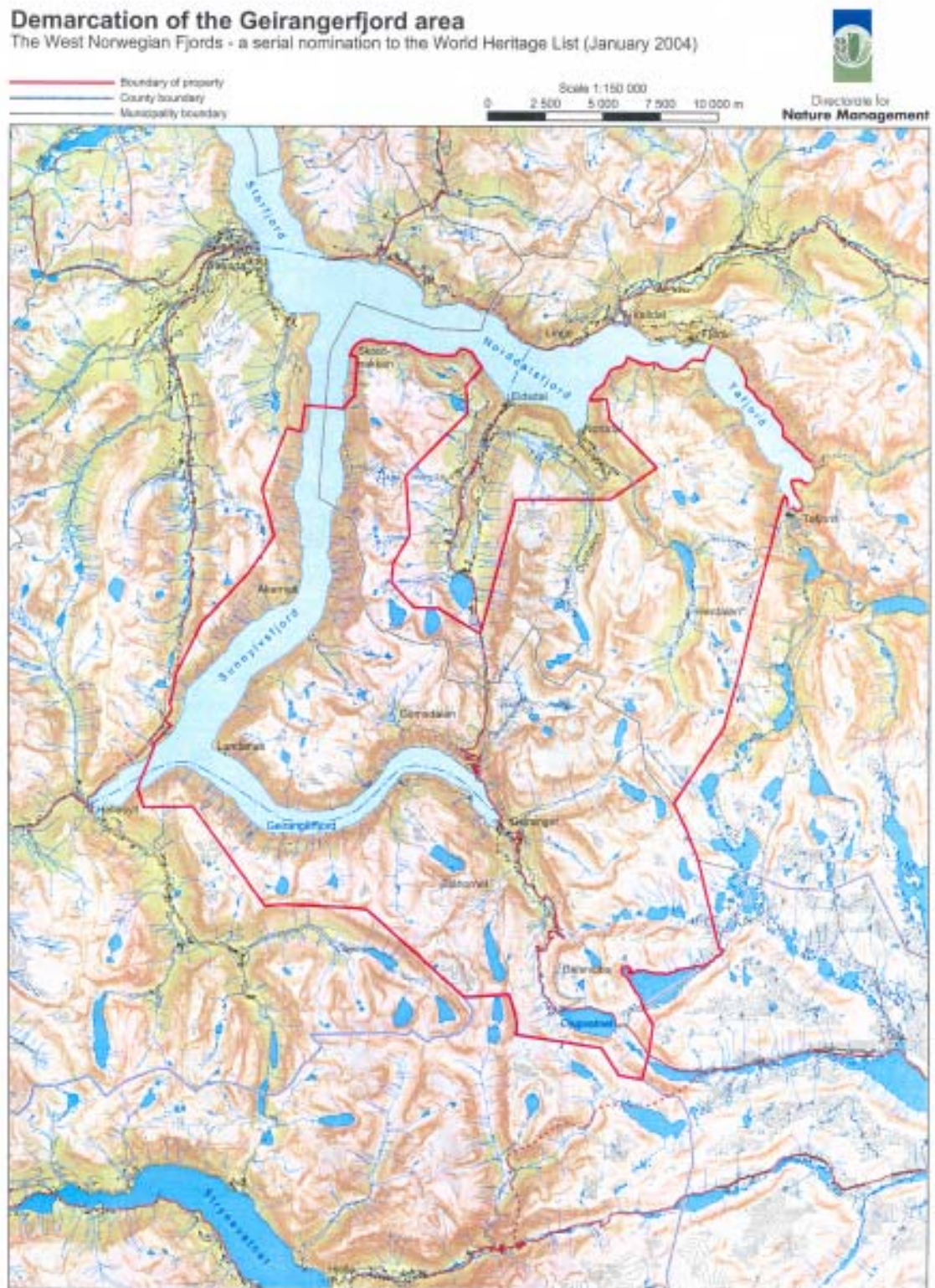
**Criterion (iii):** *The Nærøyfjord and Geirangerfjord areas are considered to be among the most scenically outstanding fjord areas on the planet. Their outstanding natural beauty is derived from their narrow and steep-sided crystalline rock walls that rise up to 1400m direct from the Norwegian Sea and extend 500m below sea level. Along the sheer walls of the fjords are numerous waterfalls while free-flowing rivers rise up through deciduous and coniferous forest to glacial lakes, glaciers and rugged mountains. There is a great range of supporting natural phenomena, both terrestrial and marine such as submarine moraines and marine mammals. Remnants of old and now mostly abandoned transhumant farms add a cultural aspect to the dramatic natural landscape that complements and adds human interest to the area.*

3. Requests to be kept informed by the State Party of any proposals for expansion of quarrying activities within the property and of measures taken to limit impacts of existing quarries. Close monitoring will be required, as such activities, if not carefully considered, could have significant impacts on the visual quality of the property (criterion iii).
4. Commends the State Party on the thorough nomination process involving a well-designed selection process and consultation with all Nordic countries as well as local stakeholders, which led to support for the nomination.

Map1: General Location of serial property



Map 2:



Map 3:



EUROPE / NORTH AMERICA

GLARUS OVERTHRUST

SWITZERLAND





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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### GLARUS OVERTHRUST (SWITZERLAND) ID N° 1179

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#### 1. DOCUMENTATION

- i) **Date nomination received by IUCN:** April 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** No supplementary information was requested from the State Party.
- iii) **IUCN / WCMC Data Sheet :** (1 reference – the nomination dossier)
- iv) **Additional Documentation Consulted:** BUWAL/SAEFL. 2001. **Legislation on the Protection of Nature and Cultural Heritage in Switzerland**; Pfiffner, A. 1992. **Alpine Orogeny**. Ch.6 in Blundell D J et al. (Eds) *A Continent Revealed: The European Geotraverse, Structure and Dynamic Evolution*. Cambridge University Press for European Science Foundation; Furrer, H. 2003. **Die Glarner Fossilien vom Landesplattenberg Engi**. Chapter 4 in (Eds) *Sonderdruck aus Weidert, W.K., Klassische Fundstellen der Paläontologie*. Goldschneck-Verlag, Korb. pp.178-193.; Imper, D. 2004. **Der Geopark Sarganserland-Walensee-Glarnerland**, pp.101-136, Separatum aus: *Berichte des St. Gallischen Naturwissenschaftlichen Gesellschaft*; Imper, D. 2004. **Die Glarner Hauptüberschiebung - Kandidatur als UNESCO-Weltnaturerbe**, pp.137-152, Separatum aus: *Berichte des St. Gallischen Naturwissenschaftlichen Gesellschaft*; Imper D. & Feldmann, M. 2004. **GeoPark Information 2004**. GeoPark Geschäftsstelle, 48p; Moores, E M & Twiss R J 1995. **Tectonics**. W H Freeman & Co.; Schwitter, R. et al. 2004 **Graue Hörner: Entstehung Natur Nutzung**. Alpenland Verlag AG., Schaan, 215p.; Van der Pluijm, B & Marshak, S. 1996. **Earth Structure: An Introduction to Structural Geology and Tectonics**. 495p. WCB/McGraw-Hill; Weighell, T. 2004. **A Global Strategy for Geological World Heritage: Consultation Document**, Joint Nature Conservation Committee UK for IUCN, 55p, 2004.
- v) **Consultations:** 13 external reviewers were consulted. The mission met with Head of the Swiss Agency for the Environment, Forests and Landscape (SAEFL), cantonal environmental planners, cantonal political and community representatives, geological scientists, GeoPark representatives, representatives from the Universities of Bern and Neuchatel, as well as representatives from the military and tourist industry.
- vi) **Field Visit:** Chris Wood and Maurice Nyaligu, September 2004.
- vii) **Date of IUCN approval of this report:** April 2005

#### 2. SUMMARY OF NATURAL VALUES

The nominated property is located in the Glarus Alps, north-east Switzerland, and is bounded by the valleys of the rivers Rhine (to the south and east), Sernf/Linth (to the west) and Walensee/Seez (to the north). The area of the property is 329.34km<sup>2</sup>. The property straddles the watersheds that form the borders of the cantons of St Gallen, Glarus and Graubünden, embracing a number of mountain groups, including seven peaks that rise above 3000m.

The nominated property displays excellent geological sections through a tectonic thrust, and it is this feature that is the basis of its nomination for WH status. Thrusting is the process whereby older, deeper rocks are carried onto younger, shallower rocks and is widely recognised as being a main component of mountain building. It is generally accompanied by the formation of nappes, which are geological folds with near-horizontal axes.

The Glarus Overthrust displays very clear evidence of the major tectonic processes and structures that created the whole of the Alps, and typify fold-mountain belts

around the world. Vast sheets of sedimentary rocks were thrust northward for a considerable distance along a gently undulating, sub-horizontal fault plane (the Glarus thrust). The rock succession ranges in ages from the Verrucano Group of Permian age (300-250 million years old) to Tertiary (ranging from 50-35 million years old). However thrusting has resulted in the older Permian rocks being transported over the younger rocks along a gently undulating, sub-horizontal fault plane, so that they now cap the highest mountains in the nominated property and in different parts of the property may overlie younger Upper Jurassic, Cretaceous or Tertiary strata. The displacement took place between 20 and 30 million years ago.

The stratigraphical sequence and structure of the Overthrust are very clearly visible throughout the region because the rock sequence is deeply cut by glacial valleys. The thrust may be observed within an area approximately 30km east-west and 20km north-south. As a result it is possible to trace the thrust block of the Helvetic Nappes over a distance of approximately 50km, from its origin in the Surselva in the south to its front on the Säntis in the north. These exposures have enabled

geologists to reconstruct with high accuracy the architectural detail of this part of the Alpine mountain range, informing concepts of mountain building world-wide. The detailed mapping has shown that the overthrust rocks may have been up to 3km thick, 50km long and 100km wide, and were displaced northward by at least 35km.

In the nominated property the Glarus Overthrust is easily recognised as a continuous, near horizontal fracture that separates the darker green/purple Verrucano Formation above from the lighter limestone and flysch deposits below. In detail the fault plane has a hidden relief and is at first arched in shape, rising from 600m at the Vorderrheintal in the south to 3000m in the Piz Segnes, before it dips in a north-north-westerly direction to an altitude of 570m at Lochsite, near Sool. Beyond the northern end of the property, the fault is thought to plunge under the Walensee at an altitude of about sea-level. Although the Overthrust is best known by geologists at the sites of Martin's Loch and Lochsite, it is in fact exposed extensively throughout the property.

The geological value of Glarus is further distinguished by its status as one of the most important sites for the history of geological ideas. This value stems from it being one of the first (and certainly the best known) of places where the phenomenon of thrusting was recognised. It was on the basis of evidence from the Glarus Alps that the idea was first conceived that fold mountain ranges consist of sheets of rock piled one on top of the other. The earliest observations at Glarus are attributed to Hans Conrad Escher (1767-1823) who was thought to be the first to draw attention to the unusual rock succession in the Glarus Alps, although it was his son, Arnold Escher, who as early as 1845 first alluded to the concept of an overthrust. Arnold Escher's ideas were supported by Roderick Impey Murchison after a visit to the site in 1848, and developed by M Bertrand in 1884, although it was not until the turn of the century that the theory of overthrusting was generally accepted by the leading scientists of the day. These observations informed research in other thrust zones, but while the second half of the nineteenth century saw new ideas about thrusts being developed in the Appalachians and NW Scotland, the classical example of an overthrust structure remained that of the Glarus Overthrust. By the end of the nineteenth century the Glarus Overthrust had become a celebrated international geological site and it has continued to stimulate studies in tectonics up to the present day. Research on the Glarus site has continued to provide new scientific revelations, with the most recent contributions providing insights into the role of mylonites (in particular through study of the Lochseiten limestone) in facilitating thrust movement.

In addition to the core values that are the basis of its nomination, the property has strong associated natural values. In physical form the Glarus Alps are high, glaciated mountains, rising dramatically above the enclosing narrow river valleys of the upper Rhine, Linth and Walensee. Previous glaciations have left an impressive landscape, while the ongoing geomorphic processes demonstrate the role of denudation and sedimentation in the creation of new rocks. Sedimentation in corries and glaciated valleys above rock steps has created some significant alluvial plains,

which hold important areas of raised bogs and mires. The landscape has also been fashioned by landslides and as a result exhibits scars, debris fields and fallen rock masses. Indeed, the source of the largest ever-late post-glacial landslide in the Central Alpine region lies within the nominated property above Flims. The property also has some karst landforms.

The property contains an interesting fauna and flora. With decreasing elevation the high, un-vegetated zone gives way to mountain pasture, transforming into scrub and eventually forest. The natural tree line lies at between 1700m and 2000m a.s.l.; but where livestock has been pastured this has been lowered by 100-200m through forest clearance. Above the tree line mountain pastures and dwarf birch heath predominate up to an altitude of approx. 2200m. Overall the property contains approximately 800 plant species, of which less than 50 species are protected at the national level.

In addition the property contains locally significant populations of mammals, including several colonies of alpine ibex (reintroduced to the area in 1911), chamois, mountain hare and alpine marmot, while red and roe deer are found mainly in the forested area. In addition to 80-90 species of breeding birds, including capercaillie, black grouse, ptarmigan, snow finch, wall creeper and golden eagle, the site has important reptile populations and approx. 90 species of butterflies. Due to the diversity of habitats, the site is also of regional significance for sub-alpine and alpine insect species.

### 3. COMPARISON WITH OTHER AREAS

Nappes and overthrusts are common features of all fold mountain ranges: indeed it is because of the intense, large scale folding and faulting of sediments, during mountain building episodes, that fold mountain systems originate. These areas of compressional tectonics are known as fold belts, or fold-thrust belts, in recognition of the role that the folding and thrusting of strata plays in shortening the Earth's crust. The ubiquity of the process therefore means that structures similar to the Glarus Overthrust may be recognised in all other fold mountain ranges. Given the large number of similar structures worldwide it is therefore difficult, in principle, to make an immediate case that any one example of a thrust should be recognised individually as being of outstanding universal value.

There are many thrust structures in the world that compare with the Glarus Overthrust. The nomination document describes overthrusts from other parts of the Alps, the Pyrenees, Scandinavia, Scotland, the Appalachians (USA), the Rocky Mountains (Canada), the Peruvian Andes, the Himalayas, the Moroccan Rif and Namibia. Particularly impressive and with a long history of study are the so-called Caledonide structures of Scandinavia and Scotland (UK), such as the Moine Thrust Belt in NW Scotland. The thrust structures of the Caledonides are larger and more complex, but in general are less readily discernible than the Glarus Overthrust. The Appalachians and the Rocky Mountains in Alberta, Montana and near Las Vegas also have some well-exposed structures. Particularly visible are the McConnell thrust on Mt Yamnuska, Alberta and the Lewis



thrust on the Alberta-Montana border in the Waterton/Glacier International Peace Park. There are large thrusts in the Andes and Himalayas, such as the Main Central Thrust in Nepal, but often cannot be directly observed. Most are covered in recent sediments or forest and they have been little studied because of their great size and remoteness. Thrusts have also been mapped in the Rif and Namibia. Clearly, as more overthrusts are being mapped and interpreted they are revealing varying structures, with some sites now proving to be more instructive than the Glarus Overthrust on the structural processes operative in mountain belts.

In total, over 30 properties on the WH List are located in fold mountain ranges and as such would be expected to contain fold-thrust structures, although none to date have been inscribed primarily for their tectonic values. At least three of these properties are regarded as especially notable for their scientifically important overthrusts:

- Waterton Glacier International Peace Park, Canada/USA, which displays good exposures of the Lewis Thrust;
- Pyrénées-Mont Perdu, France/Spain, which encloses the area of the Gavarnie Thrust; and
- Te Wahipounamu – South-West New Zealand, which contains the Alpine Fault.

In terms of the wide variety of thrust structures worldwide that are of comparable scientific importance to Glarus, IUCN concludes that there is no compelling case for the Glarus Overthrust to be recognised as being of Outstanding Universal Value as defined in the natural criteria.

Several sites are relevant in relation to comparisons within the Alps. It is particularly relevant to mention the case of Hohe Tauern (Austria). This property was nominated for WH status in 2003, although was withdrawn prior to consideration by the WH Committee. A central element of the WH nomination was the “Tauern Window” (Tauernfenster), a tectonic feature demonstrating Alpine thrusting with similar values to those in the nominated property, and similarly claimed to be superbly exposed and accessible. The Austrian nomination included a specific comparison with the Glarus Overthrust, suggesting that it was distinguished by its larger size, and having four or five major thrust units, as opposed to the single unit displayed at Glarus. The Jungfrau-Aletsch-Bietschhorn WH property in Switzerland was inscribed on the WH List in 2001: although the principal feature of this property is its glacial geomorphology, it also displays exposures of Alpine folding and thrusting. A further Swiss geological property, Monte San Giorgio, was inscribed in 2003, on the basis of its exceptional fossil values. IUCN considers that the interests of the nominated property clearly form an important facet of the story of the Alps. However at the present time, there appear to be wider issues of the relationship of different sites within the Alps to consider, and further work is needed on a joint basis between the relevant States Parties to identify discrete features of potential outstanding universal value within the Alps. IUCN considers a strategic approach to further nominations, that has the support of relevant States Parties, is required.

A key claim of the nomination is that the Glarus Overthrust has played a seminal role in the development of ideas about tectonics and mountain building. This is generally recognised to be true, but it must also be acknowledged that there have been important discoveries at other thrust sites both in the nineteenth century and in more recent times. One of the first nappes ever described was the Sparagmite nappe, central Scandinavia, by Törnebohm in 1896. Of special importance is the study of the Moine Thrust Belt which occurred virtually in parallel with that of the Glarus Overthrust. Here early research progressed in step with advances made in Switzerland and the Appalachians, so that by the late 1880s Cadell, Peach and Horne and others had effectively mapped the Scottish thrust system and analysed the mechanics of thrusting. A further important development was in 1959 when Hubbert and Rubey, who were mapping the Heart Mountain Detachment in Wyoming, determined how the action of high pressure fluids could enable vast sheets of rock to slide on top of other rocks without much frictional resistance.

On the basis of scientific reviews, there is no doubt that there is a strong, although not universal, consensus amongst the earth science community, that the Glarus Overthrust has a special place amongst geological sites due to its role in founding ideas that led to one of the most significant developments in the history of geological ideas. IUCN recognises this interest but considers that this does not translate to Outstanding Universal Value for a natural property.

#### 4. INTEGRITY

##### 4.1. Legal status

The nominated property is considered to have adequate legal protection. It lies within the territory of three cantons and 19 communes. The percentages of land covered by each canton are: St Gallen 47.46%, Glarus 38.71%, Graubünden 13.84%. Most of the land in St Gallen is owned by alpine corporations, in Glarus by the communes, and in Graubünden by citizens associations. The boundary of the property was confirmed as a part of the agreement between all of the stakeholders to establish and manage the area for conservation, and is marked on the commonly agreed Development Plan. It generally follows topographic features and often coincides with the boundaries of existing protected areas.

The property does not have a single legal status, but is protected by a mixture of federal, cantonal and communal measures. Under Swiss law, sites of national importance are entered onto the Federal Inventory of Landscape and Natural Monuments, although responsibility for the management of these sites lies with the cantonal authorities, which are free to choose the appropriate method of management. In effect, the cantons are responsible for protection, upkeep and enhancement measures of such protected areas, while technical support is provided by the federal authority, which also bears a large part of the costs.

Important geological sites are protected as geotopes. Although a Federal Inventory of Geotopes of National

Importance has yet to gain legal status, at the cantonal level a geotope inventory was adopted in St Gallen in 2002, while a similar inventory was in the process of adoption at the time of the mission in Glarus. In Graubünden, geotopes have been included in the cantonal nature and cultural heritage protection inventory, and a special inventory of geological sites within the nominated property has been compiled. At the communal level, these geotope protection provisions are included in inventories or ordinances or in land use plans, when they are binding on landowners.

The most important national and international geological sites are therefore listed at the federal level in the Inventory of Geotopes of National Importance. In the nominated property, these sites include a geotope complex exposing the Glarus Overthrust comprising 7 individual landscape areas or rock outcrops, as well as four other geotopes, including the exposure of the unconformity at the Vättis window. In addition there are 26 geotopes of cantonal importance.

#### 4.2. Management

There are two levels of management at the nominated property.

In each of the three cantons, a master plan provides the basis for protection of the property in terms of spatial planning. The master plan, issued by the cantonal government and approved by the Federal Council, is binding on all authorities. It lists nature and landscape priority areas, many of these also having been designated as sites of national importance by the federal authorities. The dates that master plans were adopted in each canton are as follows: St Gallen - issued April 2002, approved by the Federal Council in January, 2003; Glarus - adopted at cantonal level October 2004, awaits approval by the Federal Council; Graubünden - issued November 2002, approved by the Federal Council September 2003.

However, because the nominated property lies across the territories of 19 communes and three cantons, no single agency bears responsibility for its overall management. As a means of overcoming this problem the various parties (federal, cantonal, communes and other) agreed to the formation of a co-ordinating assembly. The *Agreement on joint action to protect the UNESCO World Natural Heritage Site "Glarus Overthrust"*, came into existence in 2003, and includes a Development Plan and a schedule of acceptable and unacceptable uses of the site. The Development Plan is binding on the contracting parties. The Agreement defines the purpose and nature of co-operation between the parties, and covers organisational, financial and legal aspects, forming the essential basis of the Regional Management Plan. The Regional Management Plan, in turn, outlines the measures by which the nominated property will be conserved and specifies how the provisions and goals of the Development Plan are to be implemented.

The Agreement for Joint Action between the contracting parties allows for the provision of a delegates assembly, a committee with Chair, an auditing body, a regional management/Secretariat, with subsidiary centres and a Scientific Advisory Committee. The responsibilities and

powers of the various bodies are defined in the agreement. The body responsible for servicing and reporting day-to-day management developments to the Committee is the Secretariat, headed by an Executive Regional Manager. The Committee will employ no other staff: rather, field staff, such as rangers, foresters and gamekeepers that already work in the area will receive additional instruction to extend their management duties with respect to any new needs arising from potential WH status. Path and road maintenance will be managed as previously by tourist operators, road owners and the communal and cantonal authorities.

The nominated property has been the subject of research since the nineteenth century and the tradition continues today, not only in geology, but also in ecology, biology and tourism studies. However, collections of scientific documents and specimens are dispersed throughout many Swiss organisations; there is no single centre co-ordinating the research of the area, and currently no documentation centre exists. However, it is planned that the future regional management authority (Secretariat) for the WH property, under the guidance of the Scientific Advisory Committee, will undertake to establish a central documentation centre with modern web-based search facilities so as to make it more accessible. Some work in making important collections of documents and specimens locally accessible has already begun. While the Regional Management Plan outlines initiatives to further develop interpretive media and educational programmes, both to visitors and local people, a substantial amount of public education about the Glarus Overthrust and its associated geology already takes place through the GeoPark programme. Future plans also include training programmes for existing local tourism professionals, mountain guides and field management personnel, as well as for voluntary interpreters, or 'GeoGuides'.

If the property were inscribed on the WH List, an annual budget of CHF 100,000 (approximately US\$ 84,000) would be available, with the federal authorities contributing 50% and the cantonal and communal authorities each contributing 25%. Some external funds are likely to be raised in later years. Although complemented by the devotion of significant management resources to the property, this proposed budget appears to be somewhat small to effectively implement the additional management requirements of WH status.

#### 4.3. Threats and impacts

There are very few impacts from human use in the nominated property, and its core values are essentially robust and immune to threat. The two exceptions are the well-known and accessible exposures of the Overthrust at Lochsite and Martin's Loch, where careful management of hammering of the exposures is required. It is also noted that the values of the property rely substantially on the retention of public access to be able to view the significant views of the Overthrust.

In terms of the wider management of the area, the landscape is impacted by cattle grazing of the high mountain pastures. Trampling by cattle has led to the formation on steep slopes of extensive staircases or terraces. Not only do these scars have high visual

impact, but they reduce the area of vegetation cover and sward diversity, promote soil erosion and destabilise the structural integrity of the slopes. In some areas, such as the head of the valley of the Aua da Mulins, relatively large areas of soil have been lost through land-slipping. While this is a common problem associated with cattle grazing in many European mountains, it is a problem that requires some future research in order to find a more appropriate balance between the economic use and the protection of the sensitive ecology of the nominated property.

Other human impacts on the property are minimal, although there is use by climbers, walkers, skiers and hunters. The area is crossed by way-marked footpaths and there are overnight cabins. While skiers do not penetrate deeply into the property, there is some overlap of ski runs with the boundary of the property near Flims and Weisstannen. The hunting on this property has a long tradition and is well regulated. It is practiced in a way to ensure sustainable populations of game, and is undertaken only by those that have a hunting certificate awarded after passing a hunting examination.

Some areas within the property are reserved for military training, including live firing practice. While the nomination document states that there is no evidence that this has adverse impact on the geological interest and its protection, there is no doubt that the visitor experience would be enhanced if such use ceased.

#### 4.4. Boundary

The boundary of the nominated property encloses the high mountains on the meeting place of the three cantons, centred on the Piz Sardona. It generally lies above 1500m, but descends to below 600m in two places to enclose the important geological sites at Vättis (basal unconformity) and Lochsite (overthrust exposure). The property is therefore mainly open-mountain landscape, with high mountain habitat and alpine pasture. The particular geography of the property and the topographically restricted access to it mean that there is no requirement for a buffer zone.

#### 4.5. Sarganserland-Walensee-Glarnerland Geopark

The Sarganserland-Walensee-Glarnerland GeoPark was launched in 1999 and its area embraces the most southerly part of the St Gallen canton (Sarganserland-Walensee) and the canton of Glarus. As such the geopark covers all of the nominated property except that in the Graubünden canton. The stated aim of the geopark project is to '*exploit the potential for innovation [in sustainable development] in geology and mining*', although the current emphasis of the programme is placed on tourism, education and research. The geopark project has been responsible for developing a programme of interpretation of the local geology within and outside of the nominated property, including guided walks, mine visits, self-guided geo-trails, visitor centre and museum exhibits, as well as holding conferences, publishing educational and research material and managing a web-site.

## 5. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Glarus Overthrust has been nominated as a geological WH property on the basis of natural criterion (i).

### Criterion (i) Earth history and geological features

The Glarus Overthrust is a very well exposed example of a geological thrust. Such features are, however, ubiquitous in fold mountain belts, and in principle the selection of a site based on the presence of a geological thrust is too narrow a basis for identification of outstanding universal value as a natural WH property. Furthermore, the nominated property is neither the largest nor the most scientifically important in terms of its modern research value. There are also a number of well-developed and accessible thrusts within mountainous properties already inscribed on the WH List.

The nominated property has acknowledged significance as a seminal site for the history of geological thought, as the best known and probable key site where early advances in thinking about the structure of the Earth were made leading to fundamental shifts in the way the world is viewed. However, IUCN considers that these historical values alone do not provide justification for inscription on the WH List. IUCN therefore considers that the nominated property does not meet this criterion.

IUCN recognises the natural heritage importance of the Alps and the interests of the relevant States Parties in seeking WH recognition, and has recently recommended inscription of two exceptional properties in Switzerland on the WH List (Jungfrau-Aletsch-Bietschhorn and Monte San Giorgio). IUCN notes the recent withdrawn nomination of Hohe Tauern (Austria), which encompassed many similar values to the nominated property. IUCN considers that further work is required by relevant States Parties to develop thinking on transnational approaches for protecting and recognising natural heritage in the Alps, through WH and other international designations.

IUCN notes the distinctive claim for the modern importance for the property to be recognised as an educational locality, based on the very well exposed Overthrust, and its associated historical and landscape values. The nominated property is already substantially recognised as a UNESCO Geopark, and IUCN considers that this is an appropriate mechanism to continue to protect and promote the important, and specialised nature of these values.

## 6. DRAFT DECISION

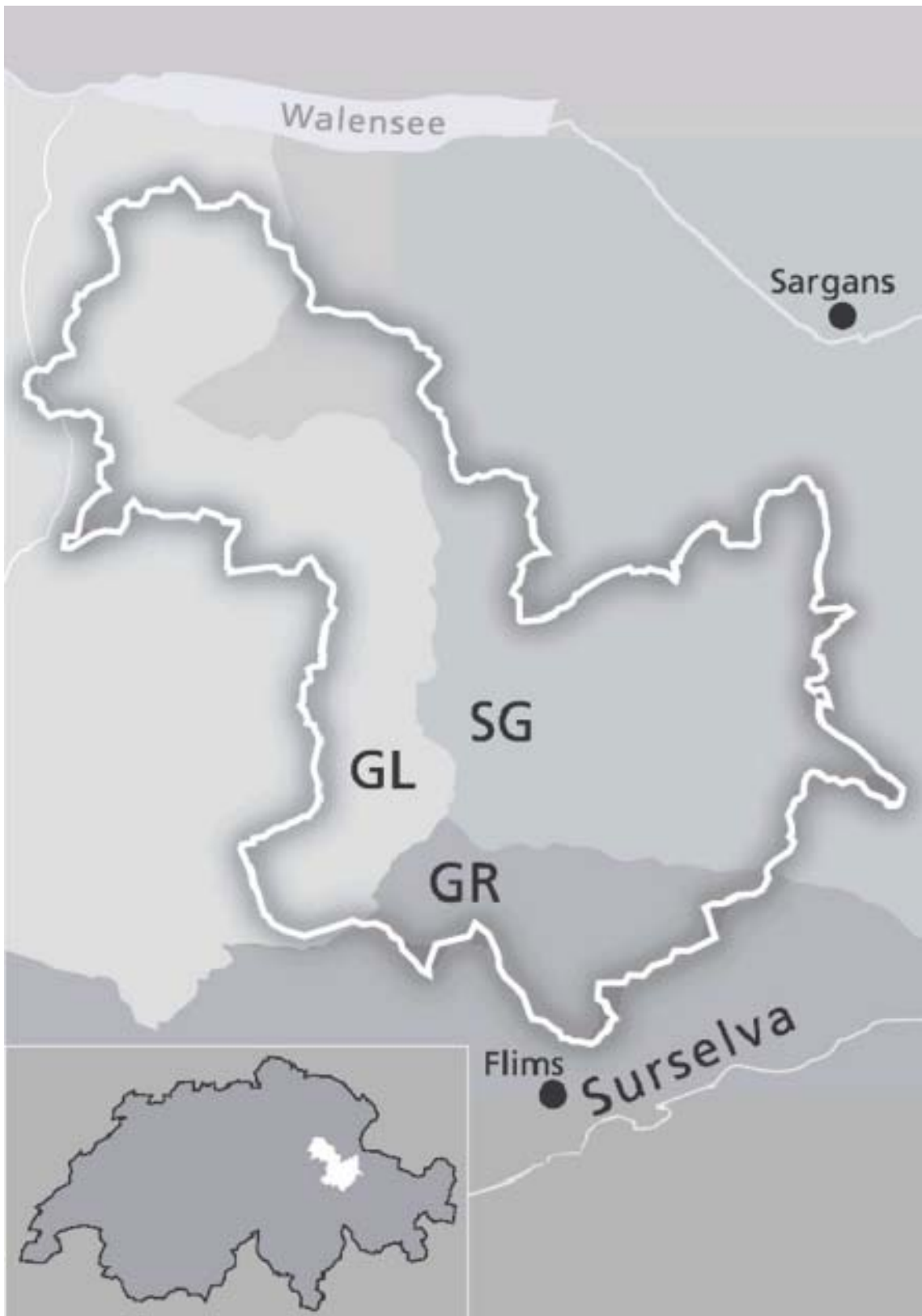
IUCN recommends that the Committee adopt the following draft decision:

*The World Heritage Committee,*

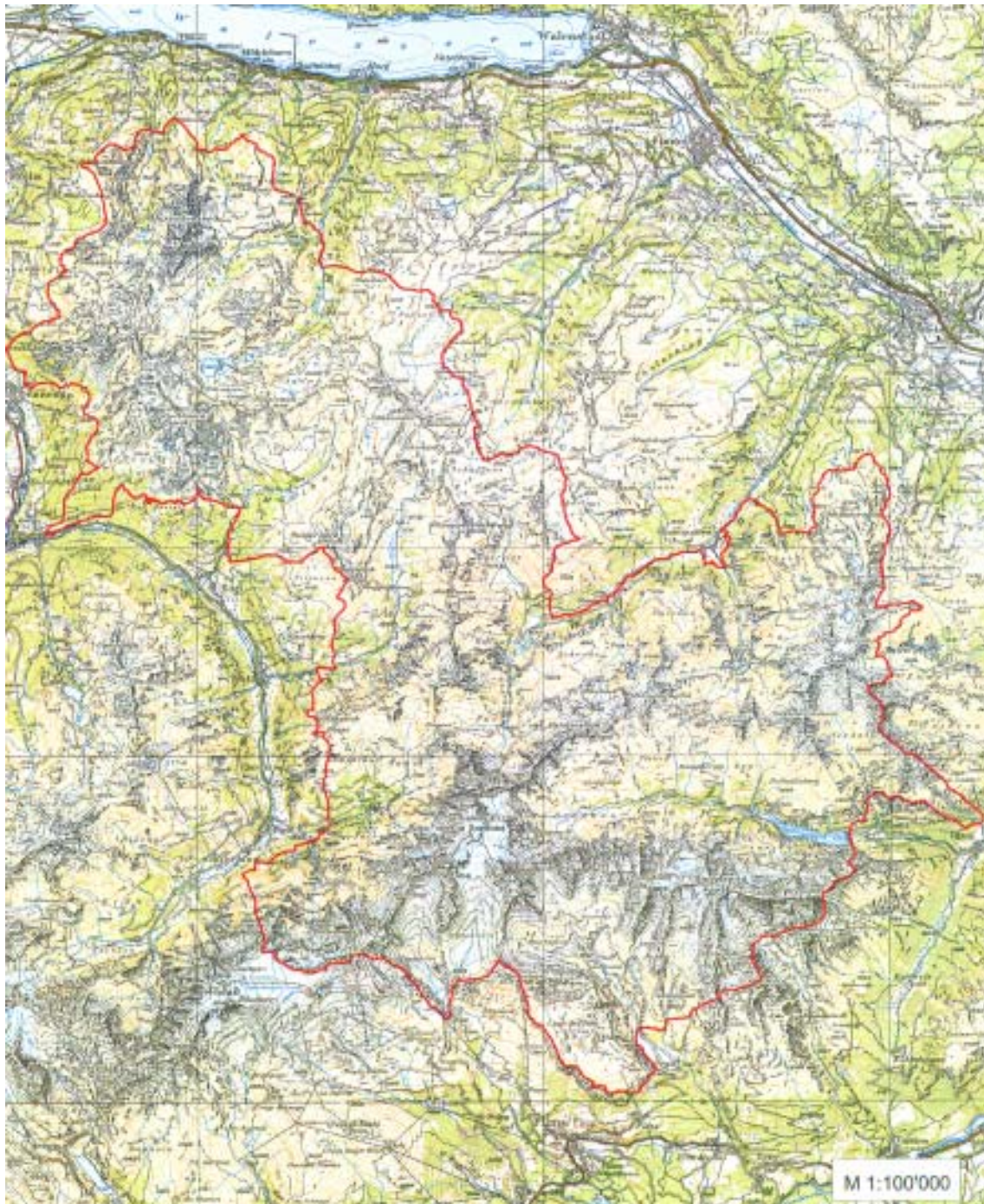
1. Having examined Document WHC-05/29.COM/8B,

2. *Decides not to inscribe the Glarus Overthrust on the World Heritage List under natural criterion (i).*
3. *Recommends the State Party to continue to promote the value of the property as an internationally important research, teaching and historical site through the Sarganserland-Walensee-Glarnerland GeoPark.*
4. *Recommends that relevant States Parties in Europe continue their co-operation in relation to transnational approaches for protecting and recognising natural heritage in the Alps, through World Heritage and other international designations.*

Map 1: General Location of nominated property



Map 2: Boundaries of nominated property



LATIN AMERICA / CARIBBEAN

ISLANDS & PROTECTED AREAS  
OF THE GULF OF CALIFORNIA

MEXICO







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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### ISLANDS AND PROTECTED AREAS OF THE GULF OF CALIFORNIA (MEXICO) - ID N° 1182

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#### 1. DOCUMENTATION

- i) **Date nomination received by IUCN:** April 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** IUCN letter requesting supplementary information sent 26 October 2004. State Party response received on 7 December 2004.
- iii) **IUCN/WCMC Data Sheet:** 10 references.
- iv) **Additional Documentation Consulted:** UNESCO, 2002, **Proceedings of the World Heritage Marine Biodiversity Workshop, Hanoi, Vietnam**, World Heritage Papers 4; UNEP-WCMC, 2002, **Coral Reefs Atlas of the World**; UNEP-WCMC, 2003, **Seagrass Atlas of the World**; GBRMPA, WB, IUCN, 1995, **A Global Representative System of Marine Protected Areas**. Vol. III; Bezaury-Creel, J.E. (in print), **Las Áreas Protegidas Costeras y Marinas de México**; Walter, B.W, 1960. **The distribution and affinities of the marine fish fauna of the Gulf of California**, in Systematic Zoology, Vol. 9, No.3; Sala, E.O, Aburto.G, et al, 2002, **Marine Conservation at a regional scale: developing a science-based network of marine reserves in the Gulf of California**, in Science, Vol. 298; WWF-Mexico. **Base de datos de biodiversidad, procesos ecológicos, físicos y socio-económicos para la definición de prioridades de conservación de biodiversidad en el Golfo de California**; Case. T.J, Cody.M, Ezcurra. E, 2002; **A New Island Biogeography of the Sea of Cortés**.
- v) **Consultations:** 10 external reviewers consulted. Staff from the National Commission for Protected Areas of Mexico (CONANP); Staff from Regional Divisions of CONANP; Staff from the Regional Division of the Navy; experts from WWF, TNC working in the nominated area; local communities and representatives of the Seri Indigenous Peoples; and other national and local institutions involved in the management of the property.
- vi) **Field Visit:** Pedro Rosabal, September / October, 2004.
- vii) **Date of approval of report by IUCN:** April 2005

#### 2. SUMMARY OF NATURAL VALUES

The nominated serial property comprises 244 islands, islets and coastal areas that are located in the Gulf of California in North-eastern Mexico, extending from the Colorado River Delta in the north to 270 km southeast of the tip of the Baja California Peninsula. All the component sites included in this serial nomination lie within nine protected areas declared by law. The total area of the nominated property is 1,838,012ha, of which 460,788ha are terrestrial and 1,377,224ha are marine areas, which represents 5% of the total area of the Gulf of California. The property's marine extension is smaller than that of the Great Barrier Reef in Australia and the Galapagos Marine Reserve in Ecuador, but it is the largest of all the others marine properties on the WH List. The nine protected areas clusters included in the nomination are outlined in Table 1 below.

The Gulf of California extends 1,557km from the Colorado River delta to a line between Cabo San Lucas and Cabo Corrientes on the mainland, well to the south. It averages about 175km wide overall, widening towards the south. The Baja California Peninsula parallels the mainland for about 1,130km. The Gulf and its islands are a result of the crustal movement which began to detach the peninsula from the continent 17 to 25 million years ago. As a sea it is only about 4.5 million years old. The separation is continuing, and faulting in the

northernmost part of the Gulf related to tectonic movements has thrown up many plant, coral and animal fossils dating from a warmer past. It also represents a unique example in which, in a very short distance, there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air).

The geological and oceanographic processes occurring in the Gulf trapped a portion of the Temperate Eastern Pacific marine waters in its upper part, isolating it from the rest of the region's water mass. This process resulted in the formation of a gradient of habitats that go from temperate, in the Upper Gulf and Colorado River Delta in the north, to tropical, in the south, where the gulf opens up to the influence of the Eastern Pacific marine waters. This unique marine ecoregion, named the Sea of Cortez Ecoregion (Case et al, 2002), contains a variety of benthic (both deep and shallow) and pelagic environments that range from coral reefs to wetland to upwelling areas. The ecoregion sustains a wealth of ecosystems and populations of numerous species of macro algae, bony and cartilaginous fish, marine mammals, and sea birds, among other taxonomic groups.

There are some 900 islands and islets in the Gulf, 244 of which are included in this serial nomination. Most are barren, volcanic and mountainous with mainly rocky

**Table 1: The nine protected areas clusters included in the nomination**

Protected Area	Location	Terrestrial Area (ha)	Marine Area (ha)
Upper Gulf of & Colorado River Delta Biosphere Reserve (Cat. VI, IUCN)	Baja California, Sonora, San Luis.	86,638	454,591
Islands of the Gulf of California. Flora and Fauna Reserve (Cat. VI, IUCN)	Baja California, Baja California Sur, Sinaloa	358,000	-
Isla San Pedro Mártir Biosphere Reserve (Cat. VI, IUCN)	Sonora	1,111	29,054
El Vizcaíno Reserve. Biosphere Reserve (Cat. VI, IUCN)	Baja California Sur	-	49,451
Bahía de Loreto. National Park (Cat. II, IUCN)	Baja California Sur	-	206,581
Cabo Pulmo. National Marine Park (Cat. II, IUCN)	B. California Sur, Los Cabos	-	7,111
Cabo San Lucas. Flora & Fauna Reserve (Cat. VI, IUCN)	B. California Sur, Los Cabos.	-	3,996
Islas Mariás. Biosphere Reserve (Cat. VI, IUCN)	Nayarit	14,845	626,440
Isla Isabel. National Park (Cat. II, IUCN)	Nayarit	194	-
<b>TOTAL</b>		<b>460,788</b>	<b>1,377,224</b>

shores, and, except for a few that were in the past mined for guano, undisturbed. Many have yet to be accurately described as research in the islands is difficult due to their isolation, lack of water, and extreme climatic conditions. The islands and coastal areas included in the nomination are representative of the Sonoran desert, biologically one of the outstanding desert regions of the world. Tiburón Island, the largest in the Gulf, is almost in pristine condition as it is considered a sacred site for the Seri Indigenous Peoples.

The dominant flora in the nominated serial property is that of the Sonoran desert with its many varieties of succulents and cactus, including some of the tallest cacti in the world; over 25m high. There are 695 species of vascular plants recorded in the nominated area, 28 species or subspecies being endemic. Variations in the diversity of habitats and plants on the islands are due mainly to proximity to the coast, island size and elevation: the islands of Tiburón and Espiritu Santo have 298 and 235 species respectively, while Isla San Pedro Mártir has only 27. The harsh conditions, the isolation and variations from north to south have resulted in high speciation and endemism. These have also limited settlement by man. The Islas Marias, located in the lower Gulf coasts, which fall within the Udvardy's Sinaloan Biogeographic region, have a relict biota of continental dry tropical habitat species. The marine environment is fragile but diverse, being situated between the Pacific tropical and temperate ecoregions. The marine flora presents 626 species of macroalgae that form submarine forests that protect and feed large concentrations of invertebrate life.

The diversity of land forms, vegetation types, the isolation and difficult access to the islands and the abundance of marine life influence the importance for

birds. There are 181 species of birds in 19 orders and the property hosts nesting sites for more than 90% of the world's population of Heermanns Gulls, the world's fourth largest population of blue-footed booby and 70% of the world's population of Black Storm Petrel.

The Gulf can be divided into four oceanographic zones: The Upper Gulf, the Great Islands, the Central Gulf, and the Southern Gulf. The wide mouth of the Gulf is open to the Pacific Ocean and the Islas Mariás and Isla Isabel lie near its southern end. The serial nomination includes representative component sites of each of these zones, thus showing the whole spectrum of natural values and ecological processes occurring in the Gulf of California. Moreover in the relatively limited area covered by the Gulf, almost all key oceanographic processes that can be seen in the world's oceans occur, including different types of upwelling systems, including wind-driven and current driving, tidal mixing associated to tides that can reach over 10m high, and hydrothermal vents. These oceanographic processes contribute to the Gulf's immense marine productivity, considered one of the highest in the planet's oceans, and have prompted the property to be called "an ocean oasis". There are 31 species of marine mammals (75% of Mexico's and 39% of the world's total number of species), 34 species of marine cetaceans (a third of the world's total), 891 species of fish in 441 genera including 90 endemic species and over 150 rocky and sandy coastal species; 73% of the fish are tropical. Five of the 8 world's sea turtles species are present in the area. There are also 4,848 recorded macro-invertebrates.

The waters of the **Upper Gulf and Colorado River Delta** are shallow (50-200m) and becoming more saline (to 35.5ppm) as a result of the upstream diversions of the Colorado River, which started in 1909. But they have a

variety of intertidal wetlands and sandy and rocky coasts of coquina (cemented molluscs). The sea floor is mud and silts near the delta, sandy and rocky further south. In this area there are 18 species of marine mammal. One of most important for conservation is the so-called "vaquita", or Gulf porpoise, which is one of the world's four rarest marine mammals. There are also sea lion, 5 species of dolphin, 11 species of whales and 161 species of fish, 42 of them endemic. Marine invertebrate include 35 species of mollusc and 190 decapods.

The Flora and Fauna Reserve of the **Islands of the Gulf** provide nursery and breeding grounds for some 30,000 California sea lions (25% of the Mexican total population). There are grazing and wintering grounds for five out of the world's eight marine turtles: leatherback, hawksbill, loggerhead, black or Pacific green and olive ridley. The poisonous yellow-bellied sea snake is common. The terrestrial fauna is not abundant except for birds for which 154 species of terrestrial birds are recorded, 45 being migratory. Mammals are not diverse though 30 species are listed as nationally threatened, mainly small rodents. The antelope jack rabbit, coyote, ring-tailed cat, and mule deer are to be found on the larger islands. There are 115 species of reptiles, 48 of them (42%) being endemic and 25 being nationally endangered or in need of protection.

The small isolated **Isla San Pedro Mártir** Biosphere Reserve is one of the best preserved islands in the Gulf. The vegetation of Isla San Pedro Mártir is representative of the Sonoran desert with only 27 species, dominated by an open forest of cardon (*Pachycerus pringlei*), a columnar cactus that can reach up to 25m high. The surrounding waters, influenced by temperate currents in winter and spring and tropical currents in summer and autumn, are biologically very rich. There are two endemic reptiles: San Pedro Mártir lizard and the side-blotched lizard. The only native mammal is also a Gulf endemic, the fish-eating bat. All five of the Gulf's turtles swim around the island: leatherback, hawksbill, loggerhead, Pacific green and olive ridley. Ten land birds and 17 seabirds are recorded. These include the world's fourth largest population of blue-footed booby, Mexico's largest population of brown booby, and large colonies of brown pelican and red-billed tropicbird. There is a very large sea lion colony of 2,500 individuals, while aggregations of bottlenose dolphins and fin whales are frequently seen offshore.

The **El Vizcaíno Reserve** is a narrow coastal strip with a marine buffer zone. The coast is arid but offshore currents and surges entrain high waves and nutrient enriched waters. The dense algae and seagrass growing on the sandy and rocky seabed nurse rich invertebrate and vertebrate marine life. Over 300 species of fish are recorded, most of them common to the Central Gulf. Sea lions are abundant. Other marine mammals occurring are the elephant seal, common and long-beaked dolphins, grey, humpback and blue whales, and Baird's beaked whale.

**Bahía de Loreto National Park** comprises twelve barren islands set in very productive, warm and shallow seas. On the islands of Bahía de Loreto National Park 262 species of vascular plants are recorded, 120 of them in the coastal zone. The Bay has 161 species of

macroalgae, red (73% cover), green and brown, sheltering plentiful phytoplankton. Carmen Island has a large mangrove forest of red, black and white mangroves and a mantle of dense macroalgal growth. There are 25 species of land mammals; 13 of them bats, and 51 terrestrial reptile species. The Bay's marine life is particularly rich. The existent dense macroalgae shelters, rich in phytoplankton and zooplankton, provide nursery conditions for larval reef fish. Here 299 species of macroinvertebrates have been recorded to date, 120 being species of the rocky reef, the most diverse environment. Six out of the seven invertebrates protected in Mexico are found in the Bay, including the giant sea cucumber, mother-of-pearl and winged oyster. The giant squid uses the area as a spawning site in summer. The Bay is characterized by a large concentration of marine mammals: 30 occur, among them the blue, fin, humpback, sperm, killer, gray, Cuvier's beaked and Bryde's whales. There are also the California sea lion, elephant seal, Risso's dolphin, spinner dolphin and striped dolphin. There are 53 species of reef fish recorded, including dorado, roosterfish, blue marlin, striped marlin, sailfish, swordfish and yellowtail kingfish. Sharks occur in large populations, among them the pelagic thresher, the bigeye thresher, silky shark and bull shark. Attracted by the variety of habitats and food, all five of the Gulf's marine turtles are found here and normally migratory species, such as the hawksbill, are often resident.

**Cabo Pulmo National Marine Park** has the only coral reef in the Gulf. This reef, about 20,000 years old, is one of the oldest and most important in the eastern Pacific. On shore, 5m sand dunes and alluvial sands and gravels overlies relatively recent sedimentary, Tertiary clastic and Pre-Cambrian crystalline rocks. Marine terraces and offshore basalt bars at depths between 2m and 20m form the substrate for coral communities. The Southern Gulf here is over 2,000m deep and is open for 200km to strong tidal currents and summer storms from the Pacific, which bring high waves. There are many endemic and, as yet undescribed, invertebrate species, especially in the intertidal zones. The terrestrial wildlife is typical of the Baja California desert with 2 species of mammal, the jackrabbit, mule deer; 4 species of bird and 22 species of reptiles. The marine flora and fauna is little studied except for the coral reef. Dense macroalgae provide a protective mantle for the organisms of the reef. These include 226 of the Gulf's 891 species of fish, 154 species of marine invertebrates and 25 species of corals. There is a non-breeding colony of sea lions offshore. All five of the Gulf's sea turtles occur, as do bottlenose, spinner and rough-toothed dolphins and, in winter, humpback, fin and Bryde's whales.

Nearby **Cabo San Lucas Reserve** protects a deep submarine canyon with spectacular submarine sand cascades, extending from 15m below sea level to 2000m below sea level at the bottom of the canyon. The ocean environment is still very intact with water transparency down to 35-40m. The subtropical North Equatorial current passes west through the area, under the tropically warm surface and above cold north Pacific water at depth. This creates an exceptional flow of plankton that conditions the presence of abundant marine life, which complements the exceptional underwater scenery.

The volcanic **Islas Mariás Biosphere Reserve** has very varied sea currents and sea-bed conditions and the islands, having been separated from the mainland for some eight million years, preserve a relict dry tropical forest fauna. The main types of vegetation are deciduous and sub-deciduous tropical forest, subtropical matorral with low spiny forest, and mangroves. There is also coastal dune, cliff and secondary vegetation. In relation to the flora, 387 vascular plant species are recorded, including 11 endemic or restricted-range species with high priority for conservation. The fauna, distributed over four islands, includes 19 species of mammals, 24 reptiles and three amphibians. The Tres Mariás raccoon and Tres Mariás cottontail rabbit are endemic. Reptiles include river crocodile, green iguana, Boa constrictor and Mexican spiny-tailed iguana. There are 158 bird species, 23 of which are endemic. Marine life is highly diverse, with 21 sharks, 10 rays, and 302 species of fish reported in the area around the islands. Sea lion, humpback, Bryde's, grey and killer whales, bottlenose dolphins and spotted dolphins are also present.

The small **Isla Isabel National Park** is notable for its birds. It hosts 90% of the world's population of Heermanns Gulls. The dominant garlic-pear tree is a favoured roost of the magnificent frigate bird, with populations of over 11,000 individuals. The flat sedge of the grassland provides essential cover for nesting sooty terns. Other notable species are brown pelicans, the brown booby, blue-footed booby, white-tailed tropicbird, brown noddy and red-footed boobies. There are few terrestrial animals, including six reptiles, one amphibian, and one bat. The marine fauna around the islands includes 79 reef fishes, 22 shark and 10 ray species. The surrounding seas are visited by whale sharks, olive ridley, black and hawksbill turtles, humpback and killer whales, dolphins and California sea lions.

### 3. COMPARISON WITH OTHER AREAS

As of 2003, 15 properties inscribed on the WH List primarily for their marine values; 7 of them include island ecosystems. There are another 26 properties inscribed on the WH List which also include marine areas, 18 of which include islands. The components that form this serial nomination are within the Sonoran and Sinaloa Udvardy's Biogeographic Provinces, where no property has been inscribed in the WH List. In addition, the Gulf of California is identified in IUCN's Analysis of the WH List (*The World Heritage List: Future priorities for a credible and complete list of natural and mixed sites*, April 2004) as an area that should receive priority.

The nominated serial property represents a combination of desert islands of different origin in an enclosed and highly productive sea described by Jacques Cousteau as 'the world's aquarium'. It is one of the less disturbed ecosystems in the world, highly valuable both for conservation and to science. It has great diversity of fishes, marine mammals, birds and macro-invertebrates, and endemic flora and fauna.

The nominated serial property can be compared with the Galapagos Islands of Ecuador and Banc d'Arguin of Mauritania. The Galapagos are an isolated group of volcanic islands with high biodiversity and endemism.

However, the nominated property includes a sample of much more complex marine systems, since, in this limited area, almost all oceanographic processes occurring in the world's oceans occur. The Banc d'Arguin is a desert coast with island mangroves, but few rocky islands, located in an open marine system associated to the Atlantic Ocean. On the contrary, the nominated property is located in a closed marine basin between two arid land masses which condition the formation of a gradient of habitats that go from temperate, in the north of the Gulf, to tropical in the south, where the Gulf opens up to the Eastern Pacific marine waters.

Similar enclosed seas are the Red Sea and the Arabian Gulf, where the Hawar Islands of Bahrain have been nominated. Both are enclosed between subtropical deserts and contain a variety of coasts and islands. They are, however, much less complex from the oceanographic and ecological point of view than the nominated property. The coral-based Tiran Islands of the northern Red Sea and the Dahlakh and Farasan Islands of the south are all isolated, inhabited islands yet less biologically diverse when compared to the nominated serial property.

This serial property has been nominated for inscription under the four natural criteria of the Convention. Annex 1 to this report summarises a comparative assessment of the nominated serial property with other marine and insular properties and in relation to each of the four criteria. The assessment shown in this annex indicates that:

- (a) The nominated serial property has very important values in relation to criterion (i) when compared to other WH natural marine and insular properties. However, there are a number of properties already inscribed in the WH List under this criterion that offer greater coverage of the key stages of Earth evolution, such as the Australian Fossil Mammals site that is considered among the world's 10 greatest fossil sites; Ischigualasto – Talampaya Natural Parks (Argentina) that contain the most complete continental fossil record known for the Triassic Period; Miguasha Park (Canada) which is considered to be the world's most outstanding illustration of the Devonian Period known as the "Age of Fishes" and Monte San Giorgio (Switzerland) which is regarded as the best fossil record of marine life for the Triassic Period; just to mention a few. In addition, while the nominated serial property is located in an area that represents one of the most recent (4.5 Million years) and active phenomenon of land separation in the world; there are other locations that can better show this geological process, such as the Rift Valley in Africa.
- (b) In relation to criterion (ii) the property also ranks high when compared to other marine and insular WH properties, being almost or at least of equal significance to the Galapagos. It represents an exceptional example in which, in a very short distance, there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air). As noted by Georges E. Lindsay "The Sea of Cortez and its Islands have been called a natural

laboratory for the investigation of speciation". Moreover, almost all major oceanographic processes occurring in the planet's oceans are present in the nominated property, giving it extraordinary importance for the study of marine and coastal processes.

- (c) The nominated serial property is of striking natural beauty and provides a dramatic setting due to the rugged forms, with high cliffs and sandy beaches contrasting with the brilliant reflection from the desert and the surrounding turquoise waters. Some of the islands have red and dark orange geological formations giving the impression of having parts of the Grand Canyon transferred to the sea. All this diversity of forms and colours is complemented with a wealth of birds and marine life. One can encounter whales, sea turtles and different species of dolphins around the islands on a daily basis, making a trip to these islands a vivid experience of the nature's grandeur. The diversity and abundance of marine life associated to spectacular submarine forms and high water transparency makes the property a diver's paradise. Encounters with rays, sea lions, shark whales and large sharks are common. While Cocos Island is famous for encounters with hammerhead sharks, it is common to encounter several species of large sharks in the nominated property.
- (d) The diversity of terrestrial and marine life is extraordinary and constitutes a unique ecoregion of high priority for biodiversity conservation. The number of species of vascular plants (695) present in this serial property is higher than that reported in other marine and insular properties included in the WH List. The number of species of fish (891) is also highest when compared to a number of marine and insular properties; in addition the marine endemism is also important, with 90 endemic fishes. The serial property contains 39% of the world's total number of marine mammal species and a third of the world's total number of marine cetacean species, including the "vaquita", or Gulf porpoise, which is one of the world's four rarest marine mammals. It also includes 181 species of birds with 90% of the world's population of Heermanns Gulls. In addition this serial property includes a good sample of the Sonora desert ecosystems, considered one of the richest in the world in terms of deserts biodiversity.

## 4. INTEGRITY

### 4.1. Ownership and Legal Status

From the 244 islands proposed in this serial nomination the majority are property of the Federal government and only 10 are of private ownership. One of these private islands, Isla Tiburón, belongs to the Seri indigenous Peoples, who consider it a sacred site, thus there is no habitation on the island and it is only used on a few occasions throughout the year for ceremonial activities. Most private owners do not live on the islands but on the mainland, mostly in rural settlements that have been excluded from the nomination.

All of the islands nominated are protected areas under the General Law for Ecological Balance and Environmental Protection of Mexico (1994). In accordance to article 44 of this law private owners have to comply with the conservation and management provisions declared for each protected area at the time of its declaration, as well as with the regulations included in their management plan. Thus, in practical terms all the islands under this nomination are protected and managed by the National Commission for Protected Areas (CONANP) often under co-management arrangements with local communities. All of the marine areas included in the nomination are federal property.

### 4.2. Boundaries

The boundaries of the islands correspond to their physical limits down to the level marked by low tides. However, not all of the islands have a marine protected area around them, which has been noted by a number of independent reviewers of the nomination as a limitation for biodiversity conservation that should be urgently addressed. In June 2001, Mexican President, Vicente Fox, launched an initiative to create marine protected areas around all the islands of the Gulf of California. The National Commission for Protected Areas has been mandated to implement this initiative and it is currently implementing a consultative process with the Ministry of Fisheries, local governments and fishermen groups. As a result it is expected that in 2005 the protected areas of Isla San Lorenzo, and Isla Marietas will be complemented by a marine protected area surrounding them. It is also expected that the marine component of the Upper Gulf of & Colorado River Delta Biosphere Reserve will be extended substantially during 2005 in order to enhance the protection of the "vaquita", or Gulf porpoise.

### 4.3. Management

Management of the protected areas included in this nomination is exercised by the National Commission for Protected Areas (CONANP), which is a specialized agency of the Mexican Ministry of the Environment and Natural Resources (SEMARNAT). CONANP is a decentralized agency thus direct management activities are implemented by CONANP's Division for the Northwest Region that has 11 operational units with 50 permanent staff working on the protection of these areas. During the field mission it was possible to interact with almost all staff working in the nominated property; all of them are highly professional and fully committed to implementing their duties in a very difficult region.

The annual budget dedicated to the management of the protected areas is US\$ 1,092,195 from CONANP, US\$ 710,400 from a number of projects funded by different donors and US\$ 412,776 from a GEF project aiming to enhance the Mexican Protected Areas System. All of the operational units have at least one speed boat for patrolling the areas and other management activities. Conservation, management and ecological research is also supported by a number of NGOs working in the Gulf of California, mainly WWF, CI, TNC and PRONATURA. The in-kind contribution associated to this support is around US\$ 450,000 per year. Since 1999, financial support of US\$ 13,320,000 has been

obtained from the private sector, mainly through outstanding contributions from Pemex (Mexican Oil/Gas Company), Ford, Nestlé, Bimbo, and Coca-Cola. This funding is mainly supporting management operations and patrolling activities. This support is extremely valuable as the management of the islands is very expensive due to their isolation and extreme living conditions. Patrolling and management is implemented through campaigns of 2-3 weeks in each of the protected areas where staff rotate while staying in temporary field camps.

There is an Integrated Management Programme for the entire serial property (Programa de Manejo del Área de Protección de las Islas del Golfo de California) that was approved by the government of Mexico in the year 2000 which guides conservation and management activities in all of the protected areas of the Gulf. As noted above its implementation is coordinated by CONANP Division for the Northwest Region. Specific management plans have been prepared for the Upper Gulf of & Colorado River Delta Biosphere Reserve (1995), El Vizcaíno Biosphere Reserve (2000), Bahía de Loreto National Park (2000) and Isla Espíritu Santo (2000). The management plan for Isla Isabel National Park has been concluded and it is expected to be approved by the government in early 2005. The management of other islands, that still don't have specific management plans, is done through the implementation of yearly Operational Plans that are guided by the Integrated Management Programme prepared for the Gulf's protected areas. Surveillance operations and enforcement in the islands and marine areas, including control of illegal fishing and non-authorized tourism and sport fishing operations, is actively supported by the Navy that has a large number of armed speed boats throughout the Gulf.

#### **4.4. Human use of the area**

##### **4.4.1. Human Occupation**

Most of the islands are free of human presence due to their difficult access and extreme climatic conditions. Only 6 islands are inhabited, with populations of usually 35 to 50 people, mostly local fishermen. One exception is Maria Grande Island, which forms part of the Islas Marías, where a penal colony has been located since 1905, and it maintains a population of 1801 people. The government of Mexico is considering a plan to relocate this penal colony in the next 2-3 years in order to fully dedicate the site for nature conservation.

##### **4.4.2. Fisheries**

The main economic activity in the Gulf of California is fishing, both commercial and traditional, that takes place in coastal areas, as well and in the deepest parts of the Gulf. This activity is of importance both for the national economy, as well as to local people. Around 70 commercial species are exploited, mainly shrimp, gulf grouper, anchovies, sardines, dorado, squid and different species of marlin. Exploitation of fisheries resources is authorized by means of fishing permits granted by the Ministry of Agriculture, Cattle Raising and Fisheries. Those permits are controlled by local inspectors of this Ministry and by the Navy.

For the objectives of assessing this nomination two issues need to be considered: fishing associated to the protected areas and that occurring in the rest of the Gulf.

In the protected areas that include marine protected zones, fishing is not allowed. In protected areas that do not yet include marine protected zones, only traditional fishing (hook-and-line), granted by the necessary permits, is allowed. Enforcement of fishing regulations around protected areas by the Navy is quite effective, particularly after the recent strengthening of the Navy forces in the Gulf with a higher number of fast speed boats acquired by the government for anti-drugs operations. While, as noted in point 4.2 above on boundaries, it would be highly desirable to have marine protected zones around all existing protected areas to enhance conservation of marine biodiversity, at this point the existing enforcement of fisheries regulations around protected areas can be considered satisfactory.

The situation is quite different in relation to the rest of the Gulf. Current fishing levels have exceeded maximum sustainable levels in most commercial fisheries and there is evidence of considerable reduction in the stocks of shrimps, marlin, sailfish and tunas. This is mainly due to overfishing, illegal fishing, and lack of compliance with regulations on sport fishing. While all experts interviewed during the mission noted the strong capacity for resilience of the Gulf of California due to its high productivity associated to the upwelling of nutrients, they also noted with concern that if overfishing continues this can negatively impact on the terrestrial and marine biodiversity of the nominated property, as most species are highly dependant on a healthy marine environment throughout the entire Gulf. This concern is well known by the government of Mexico that, in order to address this issue, is launching a programme for the Marine Ecological Planning of the Sea of Cortez. This will be coordinated by the National Institute of Ecology with the participation of the Ministry of the Environment, CONANP, the Ministry of Agriculture, Cattle Raising and Fisheries, and a number of other agencies, research centres and local and international NGOs. This plan, which should be concluded in the biennium 2005-2006, should guide further conservation efforts in the Gulf including revision of the existing fishing regulations.

##### **4.4.3. Tourism Development**

The islands and the marine environment associated to them are particularly appealing to visitors, thus tourism is becoming a particular source of revenue for the regional economy and particularly for local communities. However this is creating problems as not all of the tourist companies operating on the islands are conducting their activities in an orderly fashion. It is also difficult to control the number of visitors as many are coming with their own boats from the USA. The number of visitors is still relatively small, estimated between 1,000-3,000 visitors/year for the overall serial property. Much higher numbers exist in the area of the city of La Paz where a number of tourist resorts exist. There is little doubt that the number of visitors is steadily increasing. In order to address this issue CONANP has recently adopted (2004) Guidelines for Tourism and Ecotourism activities in the Gulf of California that are going to be reinforced through the Regional Division of CONANP, the Navy, local governments. The guidelines are also going to be promoted to local communities operating small tourist businesses, through environmental education and capacity development activities.

#### 4.4.4 Research

Research activities need to be implemented on the basis on legal permits granted by CONANP. While research is allowed in protected areas and its implementation essential to guide conservation and management interventions, it has produced a number of impacts in some of the islands and the species they contain. The Regional Division of CONANP is therefore taking measures to control the development of research activities in the islands by enhancing patrolling during research activities and developing the capacity of visiting scientists on how to interact with the fragile environment existing on the islands.

#### 4.5 Other threats

A number of reviewers and people interviewed during the field mission noted that the main threat to the future integrity of the property is associated to the development of the so-called "Nautical Stairway for the Sea of Cortez". This project has been promoted by the Federal Government, through the National Fund for the Promotion of Tourism. Its aim is to take advantage of the potential nautical tourism and its enormous potential market in western U.S.A. The objectives of this project are to promote the conservation of the Gulf's ecosystems while creating new opportunities to improve the quality of life of local communities. However the project foresees the development of a number of sport ports and marinas along the coast of the Gulf.

During the field mission all the experts and representatives of local communities interviewed were against this project and noted concern over its potential impact to the long-term integrity of the property. IUCN was informed that the original project was subject to a full revision as the costs-benefits analysis prepared did not properly consider the huge investments required to operate in a region of extreme climatic conditions. As a result, IUCN was informed, the project has been re-dimensioned in order to reduce its impacts. Additional information on this has been requested from the State Party but has not yet been provided. So far no investment has been made in the nominated property towards the development of this project.

Considering all of the information above in Section 4, IUCN considers that the nominated serial property meets the conditions of integrity as required under the Operational Guidelines of the Convention.

### 5. ADDITIONAL COMMENTS

#### 5.1. Justification for Serial Approach

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

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

The Gulf of California represents a unique ecoregion where the huge biodiversity and marine productivity is the result of complex ocean-land-islands interactions supported by complex ecological and oceanographic processes. As noted in Sections 2 and 3 all of the islands are different representing a complex natural puzzle, in

which each of them plays a particular ecological role. Individually each island and marine area displays different geological, geomorphological and ecological features that fit within the overall framework of the Gulf of California. It is therefore very difficult, if not impossible, to try to identify a single area that could be representative of this complex region.

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

There is a strong functional linkage between all components proposed in this serial nomination associated to the influence of the climatic, geomorphological and complex oceanographic processes occurring in the Gulf. There are also strong biological connections among them, for example frigate birds that have been marked in Isla Isabel, at the south of the Gulf, have then been observed in other islands at the central and northern parts of the Gulf. Marine mammals that have been marked by photographic techniques are also changing locations between the islands throughout the year as the marine productivity patterns change, particularly during the autumn and winter.

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

As noted in Section 4.3, there is an Integrated Management Programme for the entire serial property (Programa de Manejo del Área de Protección de las Islas del Golfo de California) that was approved by the government of Mexico in the year 2000 which guides conservation and management activities in all of the protected areas of the Gulf.

### 6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

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

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

As noted in Section 3, while the nominated serial property includes islands of different origins and it is of importance for geological research, it does not rank highly when compared to other properties already inscribed in the WH List under this criterion. IUCN considers that the nominated serial property does not meet this criterion.

#### Criterion (ii): Ecological processes

The property ranks higher than other marine and insular WH properties as it represents a unique example in which, in a very short distance, there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air). As noted by Georges E. Lindsay "The Sea of Cortez and its Islands have been called a natural laboratory for the investigation of speciation". Moreover, almost all major oceanographic processes occurring in the planet's oceans are present in the nominated property, giving it extraordinary importance for the study

of marine and coastal processes. These processes are indeed supporting the high marine productivity and biodiversity richness that characterize the Gulf of California. IUCN considers that the nominated serial property meets this criterion.

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

The nominated serial property is of striking natural beauty and provides a dramatic setting due to the rugged forms of the islands, with high cliffs and sandy beaches contrasting with the brilliant reflection from the desert and the surrounding turquoise waters. The diversity of forms and colours is complemented by a wealth of birds and marine life. The diversity and abundance of marine life associated to spectacular submarine forms and high water transparency makes the property a diver's paradise. IUCN considers that the nominated serial property meets this criterion.

**Criterion (iv): Biodiversity and threatened species**

The diversity of terrestrial and marine life in the nominated serial property is extraordinary and constitutes a unique ecoregion of high priority for biodiversity conservation. The number of species of vascular plants (695) present in this serial property is higher than that reported in other marine and insular properties included in the WH List. The number of species of fish (891) is also highest when compared to a number of marine and insular properties. In addition the marine endemism is important, with 90 endemic fishes. The serial property contains 39% of the world's total number of marine mammal's species and a third of the world's total number of marine cetacean's species. In addition the serial property includes a good sample of the Sonora desert ecosystems, considered one of the richest deserts in the world from the biodiversity point of view. IUCN considers that the nominated serial property meets this criterion.

The nominated serial property, as discussed in Section 4, meets the conditions of integrity as required under the Operational Guidelines of the Convention.

**7. DRAFT DECISION**

IUCN recommends that the World Heritage Committee adopt the following draft decision:

*The World Heritage Committee,*

1. Having examined Document **WHC-05/29.COM/8B**,
2. Inscribes the Islands and Protected Areas of the Gulf of California on the World Heritage List on the basis of natural criteria (ii), (iii) and (iv).

**Criterion (ii):** *The property ranks higher than other marine and insular WH properties as it represents a unique example in which, in a very short distance, there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air). As noted by Georges E. Lindsay "The Sea of Cortez*

*and its Islands have been called a natural laboratory for the investigation of speciation". Moreover, almost all major oceanographic processes occurring in the planet's oceans are present in the property, giving it extraordinary importance for the study of marine and coastal processes. These processes are indeed supporting the high marine productivity and biodiversity richness that characterize the Gulf of California.*

**Criterion (iii):** *The serial property is of striking natural beauty and provides a dramatic setting due to the rugged forms of the islands, with high cliffs and sandy beaches contrasting with the brilliant reflection from the desert and the surrounding turquoise waters. The diversity of forms and colours is complemented by a wealth of birds and marine life. The diversity and abundance of marine life associated to spectacular submarine forms and high water transparency makes the property a diver's paradise.*

**Criterion (iv):** *The diversity of terrestrial and marine life in the serial property is extraordinary and constitutes a unique ecoregion of high priority for biodiversity conservation. The number of species of vascular plants (695) present in this serial property is higher than that reported in other marine and insular properties included in the WH List. The number of species of fish (891) is also highest when compared to a number of marine and insular properties. In addition the marine endemism is important, with 90 endemic fishes. The serial property contains 39% of the world's total number of marine mammal's species and a third of the world's total number of marine cetacean's species. In addition the serial property includes a good sample of the Sonora desert ecosystems, considered one of the richest deserts in the world from the biodiversity point of view.*

3. Commends the State Party for its efforts in conserving this complex property, as well as to all other institutions, NGOs and the private sector that are contributing to its conservation.
4. Recommends the State Party to:
  - (i) *continue working towards creating marine reserves around all of the islands included in this serial property and, subsequently, to propose these areas as an extension of the WH property;*
  - (ii) *keep the Committee informed on the revised plan proposed to develop the "Nautical Stairway for the Sea of Cortez" and to ensure that the revision of this project place due considerations on the international responsibility of the State Party in ensuring the long-term integrity of the property;*
  - (iii) *keep the Committee informed on progress achieved towards the development and implementation of the Marine Ecological Planning of the Sea of Cortez.*



**Annex 1: Descriptive Comparative Analysis of serial nomination “Islands and Protected Areas of the Gulf of California” (Mexico)**

WH property	(i) - Earth's History and geological features	(ii) - Ecological Processes	(iii) - Superlative Natural Phenomena/ Exceptional Natural Beauty	(iv) - Biodiversity and Threatened Species
<b>Shark Bay, Australia</b>	Contains the most diverse and abundant examples of stromatolitic microbialities in the world.	The Hamelin Pool stromatolites are considered the world's classic site for the study of these living fossils.	It contains the largest seabed in the world and a number of coastal features of exceptional beauty.	Contains 5 out of the 26 globally threatened mammal species of Australia. There are 323sp of fishes, 230 birds, 100 reptiles, 620sp of plants and 80sp of corals.
<b>Heard and MacDonal Islands, Australia</b>	Limestone and volcanic accumulations located in the Kerguelen plateau which raises 3,700m above the deep sea floor. The only active volcano in Australia.	Exceptional combination of processes occurring between glaciated, marine and volcanic systems.	Huge populations of penguins in a spectacular setting of glaciers and active volcano.	Important breeding location for Antarctic fur seal. 7sp of mammals, 16% of the world's population of macaroni penguin. 15sp of fishes.
<b>Belize Barrier Reef System, Belize</b>	Submarine shelf is the drowned expression of a low-relief karst surface with sinkholes and fault blocks that have created submarine escarpments.	Interaction between coastal areas including mangroves, coral reefs and seagrass beds systems.	World's second largest barrier reef system and one of the few sites where a major barrier reef meets the coast.	500sp of fish, 65sp of corals, and 178sp of vascular plants in the islands and islets.
<b>Brazilian Atlantic Islands, Brazil</b>	Peaks of submarine volcanic system raising from the ocean floor some 4000m deep. Origin between 1.8 - 12.3 million years.	Complex insular and marine ecological systems.	Complex coastline with high cliffs and 16 sandy beaches. Isolated and pristine atoll with large lagoon.	Relict of Insular Atlantic Rainforest. 95sp of fishes, 15sp of corals, 2 reptiles and 400 vascular plants.
<b>Cocos Island National Park, Costa Rica</b>	Islands of volcanic origin with rugged relief. Underwater landscape consist of stepwise shelves and a shallow submerged fringing reef.	Only island in the tropical eastern Pacific that supports a humid tropical forest. Important larval dispersal centre in the Pacific.	Impressive landscape of step cliffs covered by forest in a marine setting.	Critical habitat as a nursery for marine life. 300sp of fishes, 87sp of birds, 32sp of corals, 3sp of turtles, 235 sp of vascular plants.
<b>Galapagos Islands, Ecuador</b>	Origin associated with the meeting of 3 major tectonic plates. Combination of younger volcanic areas in the west with older areas in the east. On-going volcanic processes.	Influenced by the convergence of 3 major eastern Pacific marine currents. On-going ecological and biological processes that conditioned speciation and endemism.	One of the top dive sites in the world. Underwater wildlife spectacle with diversity of underwater geomorphologic forms.	Melting pot of species forming a distinct biotic province. 447sp of fishes, 57sp of birds, 10 marine mammals, 625sp of vascular plants.
<b>Komodo National Park, Indonesia</b>	Regional volcanism within Pleistocene and Holocene deposits, with conglomerates and raised coral formations forming a rugged topographic.	Fringing and extensive coral reefs and sea grass beds systems of high marine productivity.	Park's landscape is regarded as among the most dramatic in Indonesia with rugged hillsides, dry savanna and pockets of vegetation contrasting with white sandy beaches.	Only place in the world with a population of around 5,700 Komodo dragon. 72sp of birds, 13 mammals, 102sp of vascular plants.

WH property	(i) - Earth's History and geological features	(ii) - Ecological Processes	(iii) - Superlative Natural Phenomena/ Exceptional Natural Beauty	(iv) - Biodiversity and Threatened Species
<b>Ujung Kulon National Park, Indonesia.</b>	Geologically part of a young Tertiary mountain system overlaying pre-Tertiary strata. Central and Eastern Ujung Kulon comprise raised Miocene limestone formations. Extensive local modifications following 1883 Krakatau eruption.	Complex association of primary lowland rainforest with sand dunes formations and fringing reefs.	High scenic attraction associated to its forests, coastline and islands in a natural setting. Contains the most extensive remaining stand of lowland rainforest in Java.	Several sp of threatened plant and animal species are present, notably the Javan rhinoceros. 2 endemic sp of primates, 259sp of birds and 57sp of vascular plants.
<b>Banc d'Arguin National Park, Mauritania.</b>	Island and coastline largely composed of windblown sand from the Sahara desert with large expanse of mudflats.	Important coastal processes associated to the large mangrove swamp that is a relict of a vast estuary. It provides and important breeding and nursery area for fishes.	Its scenery is mainly associated to the largest association of wintering waders in the world.	Largest colonies of water birds in West Africa and worldwide with between 25,000 - 40,000 pairs belonging 15sp of birds.
<b>Tubbataha Reef Marine Park, Philippines.</b>	Classic atoll reef with an altitude of 2m to 100m deep with associated lagoon of 24m deep.	Unique role in larvae dissemination and fish's recruitment within the whole Sulu Sea system.	Represents a unique example of pristine atoll reef with high diversity of marine life in extensive reef flat that alternate with a 100m perpendicular submarine wall.	Important centre of larvae dispersion in the Sulu Sea with 379sp of fishes, 46sp of birds and 46sp of coral.
<b>East Rennell, Solomon Islands</b>	Group of islands of volcanic origin formed along a spreading mid-ocean ridge in the late Cretaceous and early Eocene. Its structure indicates a phase of active uplifting following a long history of subsidence.	Ecological marine and coastal processes associated to the on-going atoll development.	It is the world largest raised coral atoll. Lake Tegano, in the central basin of Rennell Island, is the largest body of enclosed water in the insular Pacific.	Constitutes a major transition point in the sequence of decreasing floral diversity eastward into the tropical Pacific. 43sp of birds, 14 reptiles and 650 vascular plants are reported.
<b>Islands and PAs of the Gulf of California, Mexico.</b>	The sites are located in an area that is one of the most recent (4.5 Million years) and active land separation in the world. The Gulf is a new ocean in the first stages of formation, thus important for geological research. There are three types of islands: of sedimentary origin, volcanic and those originated by uplifting processes.	It represents a unique example in which in very short distance there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air). Almost all major oceanographic processes occurring in the planet's ocean occurs and can be studied in this area.	It is one of the world's remaining wildernesses with most islands and marine areas in pristine conditions. The islands provide a dramatic setting due to their rugged forms with high cliffs and sandy beaches surrounded by turquoise waters. The diversity and abundance of marine life associated to spectacular submarine forms and high water transparency makes the site a diver's paradise.	The site is considered and "ocean oasis" and the "world's aquarium" for its diversity and abundance of marine life, with 891sp of fishes, 34 cetaceans, 5sp of marine turtles and 25 sp of corals. It is also important worldwide for its marine endemism, with 90sp of endemic fishes. It includes 181sp of birds with 90% of the world's population of Heermanns Gulls.

Map 1: General Location of nominated property



Map 2: Boundaries of nominated property



- Nominated Islands of the Gulf of California
- Core zones
- Buffer zones
- Marine Protected Areas in the process of being established

LATIN AMERICA / CARIBBEAN

MBARACAYÚ FOREST NATURE RESERVE

PARAGUAY





## 1. DOCUMENTATION

- (i) **Date nomination received by IUCN:** April 2004
- (ii) **Dates on which any additional information was officially requested from and provided by the State Party:** No additional information was requested.
- (iii) **IUCN/WCMC Data Sheet:** (18 references)
- (iv) **Additional Literature Consulted:** Hill, K. et al., 1997. **Impact of hunting on large vertebrates in the Mbaracayú Reserve, Paraguay.** *Conservation Biology* 11(6): 1339-1353. Hill, K., et al. 2003. **Hunting-related changes in game encounter rates from 1994 to 2001 in the Mbaracayú Reserve, Paraguay.** *Conservation Biology* 17(5): 1312-1323. DiBitetti, M.S., Placci, G., Dietz, L.A. 2003. **A Biodiversity Vision for the Upper Paraná Atlantic Forest Ecoregion—Designing a Biodiversity Conservation Landscape and Setting Priorities for Conservation Action.** Washington, D.C., World Wildlife Fund. Hill, K. and Hurtado, A.M., 1996. **Aché Life History. The Ecology and Demography of a Foraging People.** De Gruyter. New York. Reed, R. 1995. **Prophets of Agroforestry. Guaraní Communities and Commercial Gathering.** University of Texas Press. Austin; Davis, S. D. et. al. 1997. **Centres of Plant Diversity.** Vol. 3. WWF/IUCN; Harcourt, C. S. and J. Sayer. 1996. **Conservation Atlas of Tropical Forests – The Americas.** Simon and Schuster; Dinerstein, E. et al. 1995. **A Conservation Assessment of the Terrestrial Ecoregions of Latin America.** WWF/World Bank; CIFOR/UNESCO. 1999. **World Heritage Forests - The World Heritage Convention as a Mechanism for Conserving Tropical Forest Biodiversity.** Workshop Proceedings.
- (v) **Consultations:** 9 external reviewers. The monitoring mission also met with Paraguayan government agencies, universities, and conservation NGOs, and UNDP Paraguay.
- (vi) **Field Visit:** James R. Barborak, September, 2004
- (vii) **Date of IUCN approval of this report:** May 2005

## 2. SUMMARY OF NATURAL VALUES

The Mbaracayú Forest Nature Reserve (MFNR) represents the core area of this nominated property, covering 64,405.7ha, and is located in the eastern region of Paraguay, approximately 350 km northeast of Paraguay's capital city, Asuncion, in the eastern Cordillera de Mbaracayú. The reserve is adjacent to the Brazilian border and in several cases extends to the deforested border strip and border roads that run parallel to the Brazil-Paraguay border. The nominated property also includes a buffer zone of 226,964ha around MFNR, with a total area of 291,369.7ha.

MNFR extends over most of the headwaters of the upper River Jejuí-Mí which runs east towards the Paraguay River from the escarpment of the Cordillera de Mbaracayú on the Brazilian border. It falls into a 150m escarpment in the northeast from hills over 400m high on top of the Mbaracayú Ridge to a belt of erosional remnant hills of 150-200m high.

The nominated property is within a south-eastern extension of the interior Atlantic Forest of Brazil, here called the Upper Paraná Atlantic Forest, which covers 80% of the nominated property. The eastern extension of MNFR also covers the southernmost occurrence of *cerrado* grassland in South America. Varieties of subtropical and temperate forest include the Upper Paraná forest in the east and south, the Central

Paraguayan forest in the west and the Amambayan forest in the north. While the nomination document noted that the 2,500 species of plants have been estimated for MNFR, Annex 3 of the nomination only reports 249 species.

MNFR, being transitional between subtropical and temperate forest, has a correspondingly varied fauna. There are 52 species of mammals, 408 species of birds, 19 species of reptiles, 24 species of amphibians and 24 species of fish. Among the endangered mammals are giant armadillo and the giant Brazilian otter, giant ant eater, ocelot, little spotted cat, and jaguar.

## 3. COMPARISON WITH OTHER AREAS

The nominated property is located within Udvardy's Brazilian Rainforest Biogeographic Region. Two other World Heritage properties are also located in this region: Iguazú National Park (Argentina) and Iguazu National Park (Brazil). Both are also located within the Upper Paraná Atlantic Forest and together comprise almost two-thirds of the territory that is protected in this Biogeographic region. The nomination does not specifically state under which criteria the nomination is proposed, but from the text it can be inferred that the nomination is put forward under criterion (iv).

While Iguazú National Park (Argentina), with its 67,000ha, is almost of the same area of the core of the nominated property (64,405.7ha) it has a higher number of vascular plants (2000), mammals (68), birds (422) and reptiles (38) when compared with MNFR. In relation to the number of birds, MNFR ranks as the second Important Bird Area (IBA) of Paraguay, thus the nominated property can only be seen to be of national significance in this regard.

On the other hand Iguazu National Park (Brazil) with its 185,262.5ha is larger than the core area of the nominated property and protects a large area of well conserved rainforest with over 2,500 species of plants, from which it is estimated that 30% are endemics. It shares with MNFR almost similar number of species of mammals and birds, but its size and the fact that 80% of the park is strictly protected, allows for more viable populations, particularly of large mammals. Furthermore the Iguazu / Iguazú complex shares one of the world's largest and most impressive waterfalls, extending over some 2,700 m; which is a distinct key difference when compared with MNFR.

The nomination document argues that one of the elements that supports the outstanding universal value of the property is that it contains a patch (<10,000 ha) of Cerrado habitat, which is the southernmost extension of this ecosystem type in South America. This element by itself is a narrow approach and does not ensure that the property is of Outstanding Universal Value. Furthermore the serial World Heritage property of Chapada dos Veadeiros/Emas National Park in Brazil covers all the key habitats of the Cerrado Biogeographical region. Emas National Park contains 78 species of mammals, compared to the 52 species reported for MNFR, and 69 species of reptiles (73% of all the species of reptiles reported for the Cerrado) compared to the 19 reported for MNFR.

Ecoregional priority setting assessments for the Upper Paraná Atlantic Forest clearly state that Mbaracayú is, after the Iguazú / Iguazu complex and adjacent wildlands, the most important area for conservation of this ecoregion and the biodiversity and threatened species it contains. However Mbaracayú by itself is of less global significance than the already-listed Iguazú / Iguazu complex. Finally it is important to note that MNFR has not been identified in any of the global and thematic studies on World Heritage Forests as a property that may merit consideration for World Heritage nomination, thus indicating that the values it contains are only of national or regional significance.

## 4. INTEGRITY

### 4.1 Boundaries and Legal Status

The boundaries of the nominated property are adequate to cover the key ecological areas required for maintaining for the Mbaracayú Forest and its associated wildlife. The nominated property is owned by the Mbaracayú Foundation and administered by the Moisés Bertoni Foundation. Most of the area was purchased from the International Finance Corporation, which held the area for development, through donations by the AES Corporation and the Nature Conservancy.

National Law #112 created the Mbaracayú Forest Nature Reserve in 1991. The initial area of the reserve was 57,716 ha. In 1992, 1994, and 1996 purchase or transfer of lands have added additional areas totalling 6,090 ha. In 1994 Mbaracayú became part of the National System of Protected Wildlands through Law #352. In 2002, the surrounding area of the Jejuí-Mí and Jejuí-Guazu watersheds upstream from their confluence was declared a Biosphere Reserve, under the UNESCO's MAB Programme, with MNFR as its core area.

### 4.2 Management

The management of MFNR is guided by a long-term management plan and annual operational plans. The management plan was last updated in 1997 but a new five-year management plan is being developed with international assistance. The Moisés Bertoni Foundation is unique in that all plans and procedures are being developed within the framework of "Total Quality Assurance" consistent with ISO 9001-2000 standards and the Foundation itself has been ISO certified.

Mbaracayú is the best funded and most professionally managed protected area in Paraguay and the quality of its management is an example for Latin America. The Moisés Bertoni Foundation, a partner organization of The Nature Conservancy, manages the reserve. Working together they have raised over US\$15 million in under 15 years to acquire and manage Mbaracayú and also to support the operations of the Bertoni Foundation.

Mbaracayú has a staff of approximately 35 individuals living and working in the reserve or the adjacent buffer zone. This staff includes a reserve manager, program coordinators for research, protection, and rural development programs, support technicians and 17 rangers. This staff is assisted and coordinated by well-trained administrative and technical staff from the Asuncion office of the Moisés Bertoni Foundation.

### 4.3 Research and Monitoring

The nominated property contains a biological station, a laboratory and housing for scientists, with the capacity for 14 researchers. From 1994 until 2003, a long term faunal monitoring project was conducted at Mbaracayú, together with local Aché Indigenous Peoples, to monitor wildlife populations and the impact of continued subsistence hunting by the Aché peoples that live in adjacent communities.

### 4.4 Threats and Human Impacts

There are three principal threats to Mbaracayú: encroachment by the rapidly expanding population in the buffer zone; pressure for illegal extraction of timber and wildlife; and illegal colonization of the reserve. Recently a group of indigenous people, from other regions of Paraguay and from Brazil, invaded the reserve and had a violent encounter with rangers and local police. There are on-going reports of indigenous people's claims over the rights of their traditional lands and territories, some within the nominated property. Overall the key threat is increased isolation of the reserve as a forest fragment in a region almost totally transformed for agricultural use. The long-term isolation of



Mbaracayú will undoubtedly result in eventual loss of some top predators and species with large area requirements.

Several types of landholdings and land use surround the reserve. These include small landholdings used for mixed cropping systems and numerous cattle ranches. In the east there are two indigenous communities of different ethnic groups, and in the south and east, there are farms of varying sizes. Government-sponsored agrarian settlements occur along some of the reserve boundary. There is a trend towards consolidation of landholdings in those portions of the perimeter with better soils, for their conversion to soya bean production. Even on the Paraguayan side of the border, there is a speculative boom by Brazilian interests that are acquiring large tracts of land for conversion of pastures, forests, and other land uses for soya production.

There are 28,800 people living in the Biosphere Reserve, which includes MNFR's buffer zone, in at least 23 communities. There are also some Guaraní farming and fishing communities, one within the Reserve. Poor Paraguayan and Brazilian peasants have migrated into the area of the Biosphere Reserve forming farm communities and small landholdings, which degrade and destroy the forest. To address this challenge the Reserve has worked with peasant and indigenous communities, as well as with other neighboring landowners through social investments to build greater local stakeholder support for the reserve. Projects in the buffer zone are aiming to alleviate poverty through sustainable production techniques; assistance in marketing products and obtaining organic certification, and in improving basic social services. Mbaracayú Forest Nature Reserve has facilitated the successful search for international funding for investments in environmental education, health, formal education, and infrastructure. Much of the annual investment in reserve management goes to buffer zone poverty alleviation and resource management initiatives. This strategy has been adopted to reduce the pressure on the core area and to promote more sustainable land use, ecological restoration and the establishment of corridors in the buffer zone. As noted above, despite progress achieved on these issues, conflicts still remains with indigenous peoples communities.

Development of a strong visitor use programme has not been a priority for the Bertoni Foundation to date, in part due to the relative isolation of the reserve. However, the reserve has only recently begun allowing carefully controlled visits by groups of tourists led by a Paraguayan tour operator.

The reserve does have a small but well equipped visitor center, and an outreach center in a nearby community, and has an active environmental education and outreach program for surrounding towns. Brochures, lectures, a web page, newspaper articles and a daily radio programme in Guaraní are also used to inform people about the Reserve and its importance.

## 5. ADDITIONAL COMMENTS

Paraguay does not currently have a natural property on the World Heritage List. The national government and

cooperating NGOs should be congratulated for their recent efforts to create a Biosphere Reserve in the Chaco Ecoregion of northwestern Paraguay. Because the landforms, flora and fauna of the Chaco Ecoregion are at present unrepresented on the World Heritage List, the State Party may wish to consider the possible nomination of core areas of the proposed Chaco Biosphere Reserve which may merit inscription in the World Heritage List. The State Parties of Paraguay and Bolivia may also wish to explore the feasibility of proposing the conservation complex in the Chaco region as a transboundary nomination which may include protected areas along the joint border of both countries.

## 6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

As noted previously the nomination does not specifically state under which criteria it is proposed, but from the text it can be inferred that the Mbaracayú Forest Nature Reserve is put forward under criterion (iv).

Criterion (iv): Biodiversity and threatened species  
The nomination states that the Mbaracayú Forest Nature Reserve contains the most important and significant natural habitat for *in-situ* conservation of biological diversity in the Upper Paraná Atlantic Forest in Paraguay. However, as noted in Section 3, the importance of MNFR for biodiversity is less than the existing Iguazú / Iguazu National Parks complex. It is also noted that the values associated to the patch of Cerrado habitat in the nominated property are secondary in importance when compared with Chapada dos Veadeiros and Emas National Parks World Heritage property. IUCN considers therefore that the nominated property does not meet this criterion.

## 7. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

*The World Heritage Committee,*

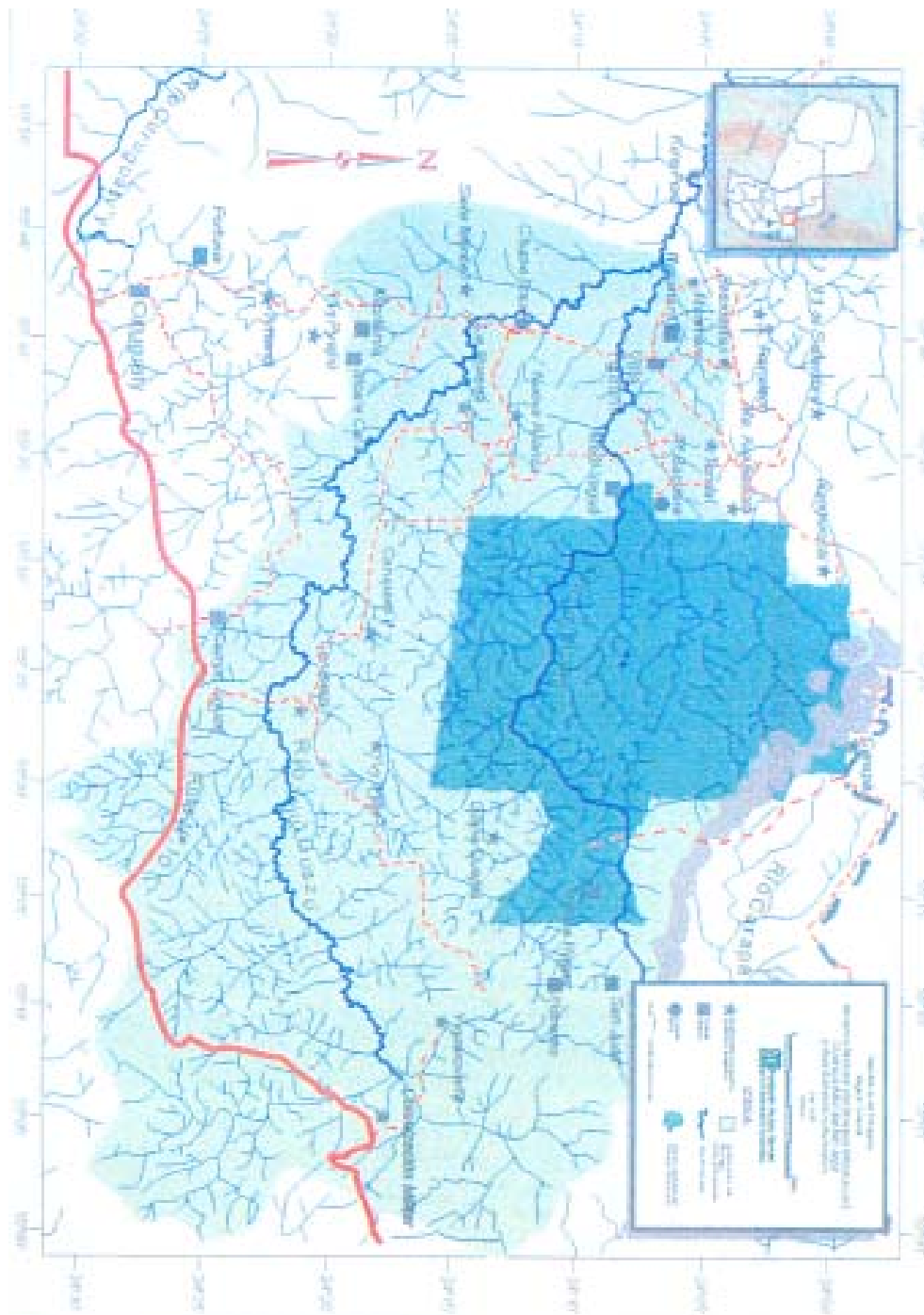
1. Having examined document **WHC-05/29.COM/8B**,
2. Decides not to inscribe Mbaracayu Forest Nature Reserve, Paraguay, on the World Heritage List on the basis of natural criteria,
3. Commends the State Party, and in particular the Bertoni Foundation, for its innovative management and protection efforts at the property, which is example to follow in achieving the effective and professional management of protected areas in the Latin America region,
4. Encourages the State Party to consider options to prepare a nomination that would focus on the values of the Chaco region.

Map 1: General Location of nominated property



Location of the  
Mbaracayu Reserve  
within Paraguay  
and South America

Map 2: Boundaries of nominated property





## A. Nominations of Natural Properties to the World Heritage List

A2 Deferred Nominations of Natural Properties for which additional information has been received



ASIA / PACIFIC

DONG PHAYAYEN-KHAO YAI FOREST COMPLEX

THAILAND







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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### DONG PHAYAYEN-KHAO YAI FOREST COMPLEX (THAILAND) ID N° 590 Rev

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#### Background Note:

In 1991 the Government of Thailand nominated Khao Yai National Park (NP) to the World Heritage (WH) List. The nomination was deferred by the 15<sup>th</sup> Session of the WH Bureau and the government was requested to:

- a) “provide a better assessment of the Park’s international significance;
- b) elaborate the site’s potential links with adjacent parks with a view to increasing the size of the nominated area; and
- c) clarify their intention with regard to the construction of dams within the Park boundaries.”

Since 1991 the State Party has included Khao Yai NP within a complex with three other national parks and a wildlife sanctuary, with one of the national parks and the wildlife sanctuary established as recently as 1996, to form the Dong Phrayayen-Khao Forest Complex (DPKY-FC). This nomination of the DPKY-FC is therefore a response to the deferral of 1991.

#### 1. DOCUMENTATION

- i) **Date nomination received by IUCN:** April 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** IUCN requested supplementary information on the 6 November 2004, after the field mission, and 10 January 2005, after the IUCN WH Panel. State Party responses were received on 30 November 2004 and 11 March 2005 respectively.
- iii) **IUCN/WCMC Data Sheet:** 60 references in the nomination document.
- iv) **Additional Literature Consulted:** Department National Parks, Wildlife and Plant Conservation (2004) **GIS Database and its Applications for Ecosystem Management - WEFKOM Ecosystem Management Project**; C. Magin and S. Chape (2004) **Review of the World Heritage Network: Biogeography, Habitats and Biodiversity**; S. Chettamart (2003) **Ecotourism Resources and Management in Thailand**; J. Parr (2003) **A Guide to the Large Mammals of Thailand** (Sarakadee Press, Bangkok); A. Lynam (2003) **A National Tiger Action Plan for the Union of Myanmar**; J. MacKinnon (1997) **Protected Area Systems Review of the Indo-Malayan Realm**.
- v) **Consultations:** 7 external reviewers. Superintendents and staff of Khao Yai, Thap Lan, Pang Sida and Ta Phraya National Parks, and Dong Yai Wildlife Sanctuary; 2 consultation meetings were held: with the Department of National Parks, Wildlife and Plant Conservation, and the Office of Natural Resources and Environmental Policy and Planning in Bangkok, and with local stakeholders at Pang Sida NP; and superintendent and staff of Huai Kha Khaeng Wildlife Sanctuary WH Site.
- vi) **Field Visit:** Stuart Chape, 19-28 October 2004.
- vii) **Date of IUCN approval of this report:** April 2005

#### 2. MAIN FEATURES AND SUMMARY OF NATURAL VALUES

The Dong Phrayayen-Khao Yai Forest Complex (DPKY) lies in an east-west alignment along and below the Korat Plateau, the southern edge of which is formed by the Phanom Dongrek escarpment. This places the complex inside the Udvardy (1975) Thaiandian Monsoon Forest biogeographic province, bordering the Indochinese Rainforest biogeographic province; modified by MacKinnon (1997) to the Central Indochina and Cardamom Mountains biogeographic units, respectively. The complex also lies at the edge of WWF Global 200 Ecoregion 35 (Tropical and Subtropical Moist Broadleaf Forest) and Ecoregion 54 (Indochina Dry Forests). The Cardamom Mountains biogeographic unit also

corresponds to a Conservation International biogeographic hotspot.

The complex comprises five almost contiguous protected areas spanning 230km between Ta Phraya NP on the Cambodian border in the east, and Khao Yai NP at the west end of the complex. Khao Yai is the only mountainous section, with an elevational range between 100-1351m. It is rugged with a steep south-facing scarp, at places 500m high, which dips back gently to the north, and slopes gradually down over the southeast half of the site. About 7,500ha lies above 1000m. The north side is drained by several tributaries into the Mun River, a tributary of the Mekong River. The southern side is drained via numerous scenic waterfalls and gorges by four main fast-flowing streams into the Prachinburi River.

Thap Lan NP to its east has an elevational range of 100-992m with much of its area lying between 300-500m and draining mainly north to the Mun river. Pang Sida NP lies to the south of Thap Lan NP across a watershed ridge, sloping south. It lies between 70-849m with part of the broad Phanom Dongrak escarpment at its western end. The Ta Phraya NP (120-562m) extends to the east, with north-draining uplands between 280-300m, which

fall in a 200m scarp to the lowland valley of the Lam Sathorn River to the east. Lying between the last three areas and connecting them all is the low hilly Dong Yai Sanctuary (230-685m) which has a small outlier to its east adjacent to Ta Phraya NP. The total area of the complex, excluding any buffer areas outside of protected area boundaries, is 615,500ha. The details are included in Table 1.

**Table 1:** The details of the protected areas included in the nominated serial property

Protected Area Name	Year Est.	Area (ha)	IUCN PA Management Category	Other Existing Designation
Khao Yai NP	1962	216,800	II	ASEAN Heritage Park
Thap Lan NP	1981	223,600	II	
Pang Sida NP	1982	84,400	II	
Ta Phraya NP	1996	58,400	Unassigned	
Dong Yai WS	1996	31,300	Unassigned	

The rugged western half of Khao Yai NP lies on Permo-Triassic igneous volcanic rocks. To the south and east this is replaced by Jurassic calcareous and micaceous siltstones and sandstones. In the northwest part of Khao Yai there are small areas of limestone karst with steep cliffs, gorges, columns and caves. All of Thap Lan, as far as upland Ta Phraya, forms the rim of the quartz-rich sandstone Korat Plateau, the edge of which is the Phanom Dongrek range and escarpment. Formation of the Phanom Dongrek escarpment is attributed to crustal uptilting.

Annual rainfall over the complex ranges from 3000mm in the west to under 1000mm in the east, mainly during the southwest monsoon between May and October. Higher elevations and south-facing slopes, in common with the rest of Thailand's lower central plains, receive more rain. Khao Yai NP is the wettest area, averaging 2270mm per annum. There is a long dry season between November to April when moist evergreen forests retain their humidity but which favours the growth of dry open forest towards the east.

The complex has a well defined topographic, climatic and vegetation east-west gradient. It contains all major habitat types of eastern Thailand and at least 2500 plant species are recorded (16 endemic) of the 20,000-25,000 species estimated for Thailand (MacKinnon 1997). Within the area three main types of vegetation are dominant: evergreen forests (73.8% of all five reserves), mixed dipterocarp/deciduous forest (5.3%) and deforested scrub, grassland and secondary growth (18%). The first two categories, with karst and riverine ecosystems, comprise the most significant habitats. The evergreen forests are of three types: dry (28.7%), moist evergreen above 600m (25.8%) and hill and lower montane rainforests (19.3%). They provide a wide range of ecosystems and habitats. The dipterocarp/deciduous mixed forests provide a similarly wide range but in drier fire-prone areas with sandy soils. As well as mixed

forests the drier areas include dry dipterocarp forest and grassland. The small area of karst in the northwest of Khao Yai NP has distinctive microhabitats. Riverine ecosystems wind through other forest types, with distinct features and limited habitats such as cascades, waterfalls and deep pools.

More than 80% of Khao Yai NP is covered in evergreen or semi-evergreen forest, much of it tall, good quality primary forest. Moist and dry evergreen forests also occur in the other protected areas of the complex: Thap Lan 59%, Pang Sida 86.5%, Ta Phraya 72.5%, and Dong Yai 70.6%. A greater proportion (32%) of Thap Lan has been degraded, mostly through loss of dry dipterocarp forest by clearing for agriculture and tree plantations in the northern and northwestern sections. However, it also has about 700ha of the fan-leaved corypha or *lan* palm, on the leaves of which Buddhist sermons were originally inscribed. Pang Sida has wide south-facing hill-slope habitats. There are also extensive areas of bamboo forest. In Ta Phraya 25% and in Dong-Yai almost 20% of the land is grassland or scrub. The protected areas in the DPKY complex were logged to a varying extent prior to the declaration of the 1989 logging ban by the Thailand Government, with secondary regrowth forest succession evident in many areas. Nevertheless, there are significant core areas of primary forest in all protected areas of the complex, as evidenced in a low altitude overflight during the evaluation mission.

The complex contains more than 800 fauna species, and protects some of the largest remaining populations in the region of many important wildlife species. A total of 112 species of mammals are known from the four parks: in Khao Yai - 72 species, Thap Lan - 76, Pang Sida - 85 and Ta Phraya - 21. Complete data are not yet available for Dong Yai but the wildlife sanctuary is known to contain important large mammal species. Globally threatened mammals found in the complex include the

Asian Elephant (EN), Tiger (EN), Leopard Cat (EN), Clouded Leopard (VU), Marbled Cat (VU), Asian Golden Cat (VU), Pigtailed Macaque (VU), Stump-tailed Macaque (VU), Pileated Gibbon (VU), Asiatic Black Bear (VU), Malayan Sun Bear (VU), Asiatic Wild Dog (VU), Large Spotted Civet (VU), Malayan Porcupine (VU), Wild Pig (VU), Serow (VU), Banteng (EN) and Gaur (VU). The karst area has endemic species of reptiles and bats (63 reptile species are recorded in Khao Yai). Important riverine species include the Smooth-coated Otter (VU) and the endangered Siamese Crocodile (CR), rediscovered in Pang Sida NP in 1992. The Department of National Parks, Wildlife and Plant Conservation (DNPWPC) is currently implementing a scientifically controlled crocodile re-introduction programme in Pang Sida NP in collaboration with Mahidol and Kasetsart Universities. Khao Yai NP is scientifically important at a global scale, as it is the only known location where White-handed and Pileated Gibbon species have overlapping ranges and interbreed.

Other notable species found in the complex include: Long-tailed Macaque, Silvered Langur, White-handed Gibbon, Slow Loris, Malayan Pangolin, Black Giant Squirrel, Hairy-footed Flying Squirrel, Whitehead's Rat, Brush-tailed Porcupine, Palm Civet, Binturong, Marbled Cat, Jungle Cat and Leopard. There are also unconfirmed reports of Wild Water Buffalo (EN). Recent surveys of herpetofauna indicate more than 200 species of reptiles and amphibians, with nine endemic species.

A total of 392 species of birds have been recorded within the DPKY-FC: Khao Yai - 358 species, Thap Lan - 284, Pang Sida - 238 and Ta Phraya - 200. The complex provides resident habitat for three globally threatened bird species: Pale-capped Pigeon (VU) and Silver Oriole (VU) (evergreen forest), Green Peafowl (VU) (dipterocarp/deciduous forest) and Masked Finfoot (VU) (riverine habitat). In addition, 53 species considered nationally threatened or near threatened occur including four species of hornbill. Some 12.5% of birds are vagrant or passage migrants, including the Spot-billed Pelican (VU) and Greater Adjutant (CR).

### 3. COMPARISONS WITH OTHER AREAS

Thailand has 82 terrestrial national parks and 55 wildlife sanctuaries. Of these, 17 protected area complexes have been identified as important for large mammal conservation (Parr 2003), including DPKY-FC, which at 6,155 km<sup>2</sup>, is the second largest forest complex in Thailand and the fourth largest in the region. The largest complex in Thailand is the Western Forest Complex (WEFCOM), comprised of 17 protected areas covering 18,730 km<sup>2</sup> and located in the Indochinese Rainforest biogeographic province biogeographic unit. The Huai Kha Khaeng-Thung Yai (HKK-TY) Wildlife Sanctuaries WH property forms the core of this huge area, and presents a logical point of comparison with the DPKY-FC nomination. A comparison with HKK-TY was central to the evaluation of the 1991 Khao Yai nomination. A field visit to HKK Wildlife Sanctuaries and extensive overflight of both HKK and TY was carried out following the evaluation of the DPKY complex nomination.

With the addition of Thap Lan, Pang Sida and Ta Phraya NPs, and the Dong Yai Wildlife Sanctuary, the concern of

the 1991 Khao Yai evaluation regarding the size of the area has to a large extent been addressed - provided that effective wildlife corridors are constructed to ensure connectivity. The DPKY-FC is known to protect representative populations of most of the large mammal species of Thailand and has an intact carnivore community (reviewer comment). The overall species count (relative to HKK-TY and other complexes) has increased significantly from the nomination of Khao Yai in 1991. The largest contiguous area within the complex (Thap Lan, Pang Sida, Dong Yai and Ta Phraya) covers almost 3,500 km<sup>2</sup>. However, apart from Khao Yai, all areas show impacts from logging (prior to the Government of Thailand 1989 logging ban), and other anthropogenic impacts. Nevertheless, even HKK-TY has had historic and ongoing anthropogenic impacts in some areas as a result of past human habitation and clearing of vegetation. Overall, DPKY presents a complex mosaic of all vegetation/habitat types remaining in northeast Thailand, including rainforest habitats; reflecting not only successional processes but also resulting from landform and soil diversity, and the east-west climatic gradient that characterises the complex. DPKY-FC Khao Yai NP contains a significant area of hill evergreen forest (39% of total KY NP area) above 600m altitude. Table 2 compares the DPKY-FC to other relevant WH properties and protected areas in the Indo-Malayan Realm.

The comparative examples given below are a mix of protected area remnant 'islands' in modified landscapes and those that are part of larger natural landscapes. The WEFCOM is the most outstanding example of the latter, not only a huge area in its own right but also (currently) functionally linked to large natural ecosystems in Myanmar. The smaller Kaeng Krachan complex also has ecological linkages with Myanmar. The Laos example is within the larger Annamite Mountains forested ecosystems on both sides of the Laos-Vietnam border, including linkages to Phong Nha-Ke Bang WH property. The DPKY-FC falls into the former category, and is the last substantial remnant habitat in northeastern Thailand capable of sustaining viable populations of large fauna. In terms of fauna biodiversity values, the DPKY complex compares favourably with both existing WH properties and other protected areas in the region. In particular, its suite of mammal species includes populations of the globally endangered tiger and elephant. Actual numbers of tiger are currently unknown but all protected areas report sightings/tracks, although it appears unclear whether or not tigers remain in Khao Yai NP. The elephant population in the complex is estimated to be about 300 animals.

Properties in other countries in the region, including Laos, Cambodia and Myanmar have greater apparent habitat integrity but also greater problems with regard to poaching and wildlife trade, and major management capacity issues. (There is, nevertheless, great potential in these countries). For example, a recent survey report by the Wildlife Conservation Society (Lynam 2003) on the status of tigers in Myanmar concluded that "the tiger in Myanmar has suffered a range collapse and is in an advanced state of decline towards extinction". The survey compared the status of tigers in Thailand, noting that conservation in that country was more successful as a result of protected area establishment and management, even though "both countries had similar richness and abundance of [other] large mammals".

**Table 2: Comparison of the nominated property to other WH properties and protected areas in the Indo-Malayan Realm**

PA/PA Complex	Area (rounded km <sup>2</sup> )	Mammals	Birds	Reptiles & Amphibians	Biogeographic Province	Human Impact
DPKY	6,155	112	392	200	Thailandian Monsoon Forest	Old logging, agriculture, poaching, roads
Thung Yai-Huai Kha Khaeng WHS, Thailand	6,222	120	400	139	Indochinese Rainforest	Some habitation, agriculture
Phong Nha-Ke Bang WHS, Vietnam	858	113	302	81	Indochinese Rainforest	Roads, poaching, cultivation
Kaziranga NP WHS, India	378	35 (*Indian Rhinoceros)	300	?	Burma Monsoon Forest	Poaching, incursions
Manas NP WHS, India	520	55	450	53	Burma Monsoon Forest	Poaching, incursions, separatist conflict
Sinharaja Forest Reserve WHS, Sri Lanka	87	38	147	60	Ceylonese Rainforest	Old logging, poaching, incursions
Tropical Rainforest Heritage of Sumatra WHS	26,000	180	450	?	Sumatra	Illegal logging, agriculture, settlements and roads
Western Forest Complex (including TY-HKK WHS)	18,730	150	490	130	Indochinese Rainforest	Poaching, refugees agriculture, proposed road development
Kaeng Krachan Forest Complex	4,373	57	400	?	Indochinese Rainforest	Poaching, incursions
Nakai-Nam Theun National Protected Area, Laos	3,445	Important representation of major species found in Indochina, including CR, EN and VU mammal species and 400 bird species			Thailandian Monsoon Forest/ Indochinese Rainforest	High level of poaching for wildlife trade, incursions
Cardamom Mtns, Cambodia	14,500 (several scattered PAs)	+100	450	?	Indochinese Rainforest	High level of poaching, wildlife trade, logging

In relation to Criterion (iv), on a comparative basis the DPKY-FC is clearly of global significance with regard to wildlife conservation. It also contains important core areas of relatively unmodified habitat representative of globally important tropical forest ecosystems. The DPKY-FC is located within the Udvardy Thailandian Monsoon Forest biogeographical province and contains elements of the WWF Cardamom Mountains Rainforest Ecoregion, which currently do not have a WH property (Magin and Chape 2004). However, in relation to Criteria (i), (ii) and (iii), the DPKY-FC does not have features that meet or surpass values in other areas at international scales. Nominated under Criterion (i), the escarpment feature is similar to a number of locations and also extends beyond the nominated area as a regional feature. With regard to Criterion (ii), while the area contains valuable habitats and ecosystems, and plays a key role in local, national and regional hydrological and ecological processes, these do not constitute global values. By comparison, Thung Yai-Huai Kha Khaeng WH property,

especially within the larger WEFKOM, protects huge contiguous areas of tropical forest ecosystems. The protected areas in Laos along the Annamite Range protect a much larger proportion of the catchment inflow of the Mekong Basin. Similarly, with regard to Criterion (iii), while the DPKY-FC does contain landscapes and species that represent a “significant aesthetic experience”, many of which are accessible in Khao Yai NP, the scale of such experiences is met or exceeded in other WH properties and protected areas.

#### 4. INTEGRITY

##### 4.1. Legal Status

The protected areas are the property of the Government of Thailand, with the four national parks declared under the National Parks Act of 1961 and the Dong Yai Wildlife Sanctuary declared under the Wild Animals Reservation

Protection Act 1960 (amended 1992). The Department of National Parks, Wildlife and Plant Conservation (DNPWPC), through the Office of National Parks (ONP) in the Division of Plant Conservation and Protection and the Office of Wildlife Conservation (OWC) within the Division of Laws, administer both national parks and wildlife sanctuaries respectively. Both national park and wildlife laws provide sufficient legal protection but each has distinct management objectives or primary emphases that have required operational clarification by the managing agencies. The National Parks Act states that a national park is established to “preserve its natural state for the benefit of public education and enjoyment”, placing a strong emphasis on human use rather than conservation. Therefore guiding principles have been established for national parks that refer to preserving and maintaining “ecosystem integrity, biodiversity and scenic beauty” (Chettamart 2003). The OWC has also developed objectives that refer to providing “opportunities for the public to learn and enjoy the areas”. Nevertheless, the fundamental differences in the objectives of the supporting legislation, as well as the division of administrative responsibilities between two agencies within the DNPWPC emphasise the importance of collaborative management approaches and harmonised objectives. In the case of WH properties the State Party could consider development of specific national WH legislation to ensure a more coherent and integrated approach to manage of WH properties.

**Table 3: Staffing levels in the nominated property**

Category	Khao Yai	Thap Lan	Pang Sida	Ta Phraya	Dong Yai	Total
Professional	9	5	6	3	3	26
Permanent employees	68	18	21	7	8	122
Seasonal employees	305	211	135	49	56	756
<b>Total</b>	<b>305</b>	<b>211</b>	<b>135</b>	<b>59</b>	<b>67</b>	<b>904</b>

The evaluation mission supported the view of the nomination document that “present levels of coordination within the complex are not optimal”. Geographically contiguous areas are administratively separated, each with a superintendent-in-charge. The rationale for establishing the administratively and legislatively separate, but in part ecologically contiguous, Dong Yai WS was also not apparent during the field evaluation. It creates perceptual and managerial boundaries, when in fact the whole area needs to be managed as a cohesive unit. This would be greatly assisted through a ‘whole-of-complex’ management approach (as in the WEFCON Ecosystem Management Project) directed by a ‘chief superintendent’ responsible for overall management coordination and budget allocation, with an appropriate level of seniority and professional expertise. The supplementary information provided by the State Party in March 2005 states that a forest complex Manager will be appointed in 2006 after the completion of a new management plan (see below).

The existing legislation has been criticised for precluding “involvement of local communities in protected area management issues” and that “the National Parks Division and the Wildlife Conservation Division place heavy emphasis on law enforcement, in line with the legal framework” (WWF Thailand website). Discussions with park staff and stakeholders during the evaluation mission suggested that this approach is changing. A recent collaborative initiative in Khao-Yai NP, the Khao Yai Conservation Project involving a range of stakeholders, provides a good example that could be replicated in other parts of the complex.

#### 4.2 Management

All the protected areas in the DPKY-FC have full-time resident staff, including superintendents for each area. There are 80 ranger stations located around and in the complex. Basic management capacity at non-professional levels is adequate by international standards and good by regional levels. This is particularly the case relative to the neighbouring high biodiversity countries of Laos and Cambodia. However, the level of professional (tertiary trained) staffing needs strengthening in all of the protected areas in the complex, especially in Thap Lan NP the largest protected area, but also in Ta Phraya NP with its cross-border issues – which also needs strengthening of its ranger staff for the same reason, although police also patrol the border area. The nomination document lists staffing levels as noted in Table 3.

Three of the five protected areas have operational management plans. Plans for the most recently established areas, Ta Phraya NP and Dong Yai WS, are scheduled to be prepared in 2004. As well as the individual operational plans, a strategic management plan for the entire complex was prepared by the Office of Environmental Planning and Policy and Kasetsart University in 1997. This plan was updated by the Office of National Parks and Kasetsart University in 2004. It is essential that the plan move from strategic intent to coordinated action as soon as possible. However, in its supplementary information the State Party has indicated that a further management plan for the whole complex will be prepared by a private company, contracted in June 2004. The relationship to the existing plan is not clear, nor the rationale in appointing the complex manager after the new plan has been completed. It would be helpful if the complex manager participated in development of the new plan.

While budgets for Thap Lan and Pang Sida remained fairly constant between 1998-2003, they increased for Khao Yai NP and declined for Ta Phraya NP and Dong Yai WS (both received 11% of the funds provided to Khao Yai in 2003). Khao Yai NP is the primary visitor attraction in the complex, not surprising given its proximity to the national capital, role as Thailand's first national park, its place in the national psyche as a symbol of nature conservation, and promotion as a tourist centre. The park received more than half a million visitors in 2003 and has well established visitor facilities that require high maintenance levels and therefore the need for significant funding is understood. In contrast, Ta Phraya NP received only 280 visitors in 2003, down from a peak of 2,720 in 1999. The reasons for this significant decline are not entirely clear but the border area is less accessible, there are fewer facilities and security issues. However, it is evident that there is a substantial disparity in financial resourcing across the complex, reflected in lower levels of staffing and equipment in the eastern protected areas, that needs to be corrected.

### 4.3 Boundaries

The boundaries of the DPKY-FC follow contour lines and were originally drawn around remaining areas of forest and natural habitat, in common with many of the world's protected areas. This has resulted in a complicated boundary, especially on the northern side of Thap Lan NP and almost the entire area of Ta Phraya NP. Ta Phraya also has a high boundary to area ratio, protecting the remaining linear stretch of forest along the Thai-Cambodian border, increasing management difficulty. In some areas significant incursion and agricultural conversion has occurred, especially in the north and northwest part of Thap Lan NP. There is no clear external buffer zone delineation, with other land uses bordering directly onto the protected areas. The exception is part of the northern boundary of Thap Lan NP, which borders with the Sakaraet Biosphere Reserve, administered by the Ministry of Science and Technology. There is a need to rationalise the complex boundaries and this has been recognised by the Government. In its supplementary information the State Party has committed to boundary adjustment by 2007, with the exclusion of 437.73km<sup>2</sup> of inhabited and degraded land and the addition of 176.27km<sup>2</sup> of National Forest Reserve to Thap Lan. The successful reforestation at Khao Pheng Ma, on the northeast border of Khao Yai, undertaken by WWF Thailand is an excellent example of what can be achieved to re-establish natural forest, and this approach should be replicated in buffer zones.

### 4.4 Human Impact

As the last major area of extensive forest in northeastern Thailand, surrounded by almost completely converted landscapes, human pressures are significant and diverse:

#### *Roads*

Major roads divide the complex between Khao Yai NP and Thap Lan NP (Road 304), and separate Dong Yai WS and Ta Phraya NP (Road 348) and currently limit the effectiveness of the complex for ecosystem scale conservation and wildlife protection. Road 304 presents

a particular problem because it is a busy highway that separates Khao Yai and Thap Lan. Nevertheless, the Government recognises the problem and has undertaken to develop wildlife corridors at two points along Road 304 and one on Road 348 where natural vegetation and topography offer opportunities to do so. The Government has budgeted 20 million Thai Baht (approximately US\$500,000) to undertake a feasibility study for development of these corridors (State Party supplementary information November 2004). However, in the supplementary information provided in March 2005, the State Party advised that the feasibility study would commence in 2006, take 2 years, followed by a construction period of 5 years, with completion in 2013. IUCN is concerned, however, that this 8 year time frame currently proposed by the State Party to complete the design and construction of the corridors will compromise the values of the complex. IUCN considers that the viability of the complex retaining outstanding universal value is highly dependent on re-establishing and maintaining connectivity between different ecological components of the complex currently compromised by the roads. Ecologically effective wildlife corridors will be an essential part of the strategy to ensure connectivity within the complex but the process to construct these corridors must be expedited.

Although the State Party's supplementary advice states that the ecological suitability of various construction methods will be assessed, it also indicates that "at this point, it appears that the corridors will be in the form of a wildlife underpass". It is important that all options are considered. Underpasses are unlikely to encourage movement between protected areas of larger mammals and the State Party should evaluate the construction of "green or ecological bridges" over the roads. Such bridges have been used successfully in a number of countries (e.g. Banff National Park in Canada).

Two other north-south roads (Road 3462 in Pang Sida-Thap Lan and Road 3308 in Ta Phraya) have already been closed to public through-traffic, with Road 3462 used only for tourist entry into Pang Sida NP.

#### *Incursions, Conversion and Separation*

The DPKY-FC is located in an economically poorer part of Thailand and significant areas on the northern and northwestern periphery of Thap Lan NP have been taken over in past years and converted to agriculture. A number of villages are still located in the northeastern section of Thap Lan. As noted above, action needs to be taken to rationalise boundaries and establish effective buffer zones in collaboration with local communities. Pang Sida NP has a number of community groups that actively support the park and this needs to be replicated in all areas.

Between Khao Yai NP and Thap Lan NP there is a significant area of developed agricultural land separating the two national parks either side of Road 304. This area needs to be carefully managed as a buffer zone in conjunction with construction of wildlife corridors to the north and the south of this area. Planning controls need to be applied to the types of development permitted in this area.

### Tourism

Of the four national parks in the complex, Khao Yai receives the most pressure from tourism. At peak times the carrying capacity of the park is exceeded, placing intense pressure on management and facilities. Ongoing concerns relate to use of the main north-south park road, in particular the impact on wildlife and the significant number of road kills. Speed bumps were recently installed and have had some effect. However, other strategies will need to be considered to bring people into the park, and setting limits on the numbers of people allowed entry. Some tourist activities occur in other parts of the complex, especially in Pang Sida NP, and a whole-of-complex tourism strategy needs to be developed and implemented to deal with increasing pressures and opportunities.

### Poaching

Although park staff report a drop in illegal hunting and poaching activities as a result of increased patrolling activities, this remains an issue (as it is in all protected areas in the region, including TY-HKK WH property). As well as wildlife poaching, the high value wood *Aquilaria crassna*, used to produce incense for Middle East markets, is also illegally taken from the park. Cambodian small-scale loggers are known to occasionally cross the border into Ta Phraya NP to take timber. Additional resources are required to ensure that park staff can adequately deal with these threats, including additional staff trained in community participatory management processes.

### 4.5 Other Threats

The eastern protected areas, Dong Yai and Ta Phraya, contain unexploded ordinance, including land mines in Ta Phraya NP, as a result of the 1970s-1980s conflicts in Cambodia and insurgent activities in Thailand. These areas need to be thoroughly surveyed and cleared in places where management staff require access, and to provide for safe future public access.

## 5. ADDITIONAL COMMENTS

The Government of Thailand is to be commended for its efforts to conserve the country's natural heritage, especially through the designation of large areas and complexes, and its recent allocation of funding to develop a national protected areas system plan. This important initiative should ensure that all important habitats are not only effectively conserved but also linked to a range of management objectives that ensure community participation.

The IUCN evaluation mission also visited Thung Yai-Hua Kha Khaeng (TY-HKK) WH property in order to compare the current nomination with the existing property. It was observed that there appeared to be no active promotion of the WH status of TY-HKK at the property entrance. As a result of an extension to the original boundary, the WH inscription marker now lies 9 km inside the property. The State Party should consider a more active and visual promotion of the WH status of TY-HKK at the property entrance to increase local and visitor awareness of the WH values.

## 6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

The Dong Phayayen-Khao Yai Forest Complex has been nominated under all four natural criteria.

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

The Phanom Dongrek escarpment is a significant geomorphological feature of the DPKY-FC, especially within Ta Phraya NP along the Thailand-Cambodia border. However, although an important regional landscape feature it is not of outstanding universal value. IUCN does not consider that the nominated property meets this criterion.

### Criterion (ii): Ecological processes

While acknowledging the key role that the DPKY-FC plays in local, national and regional hydrological and ecological processes there are other larger, more globally important properties that contribute to these values in the wider region. IUCN does not consider that the nominated property meets this criterion.

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

The DPKY-FC contains landscapes of national and regional importance. It also contains species of international importance with high aesthetic value, many of which are visible in Khao Yai NP. However, the scale of the landscape aesthetic experience is met or exceeded in other WH properties and protected areas, including TY-HKK WH property, and the aesthetic interaction with wildlife, in terms of global experiences, is also exceeded in other properties. IUCN does not consider that the nominated property meets this criterion.

### Criterion (iv): Biodiversity and threatened species

The DPKY-FC contains more than 800 fauna species, including 112 species of mammals, 392 species of birds and 200 reptiles and amphibians. It is internationally important for the conservation of globally threatened and endangered mammal, bird and reptile species that are recognised as being of outstanding universal value. This includes 1 critically endangered, 4 endangered and 19 vulnerable species. The complex contains the last substantial area of globally important tropical forest ecosystems of the Thai Monsoon Forest biogeographic province in northeast Thailand, which in turn can provide a viable area for the long-term survival of these globally important species. The unique overlap of the range of two species of gibbon, including the vulnerable Pileated Gibbon, further adds to the global value of the complex. IUCN considers that the nominated property meets this criterion.

## 7. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

*The World Heritage Committee,*

1. Having examined Document WHC-05/29.COM/8B

2. Inscribes the Dong Phayayen-Khao Yai Forest Complex, Thailand, on the World Heritage List on the basis of natural criterion (iv).

**Criterion (iv):** The DPKY-FC contains more than 800 fauna species, including 112 species of mammals, 392 species of birds and 200 reptiles and amphibians. It is internationally important for the conservation of globally threatened and endangered mammal, bird and reptile species that are recognised as being of outstanding universal value. This includes 1 critically endangered, 4 endangered and 19 vulnerable species. The area contains the last substantial area of globally important tropical forest ecosystems of the Thai Monsoon Forest biogeographic province in northeast Thailand, which in turn can provide a viable area for the long-term survival of these globally important species. The unique overlap of the range of two species of gibbon, including the vulnerable Pileated Gibbon, further adds to the global value of the complex.

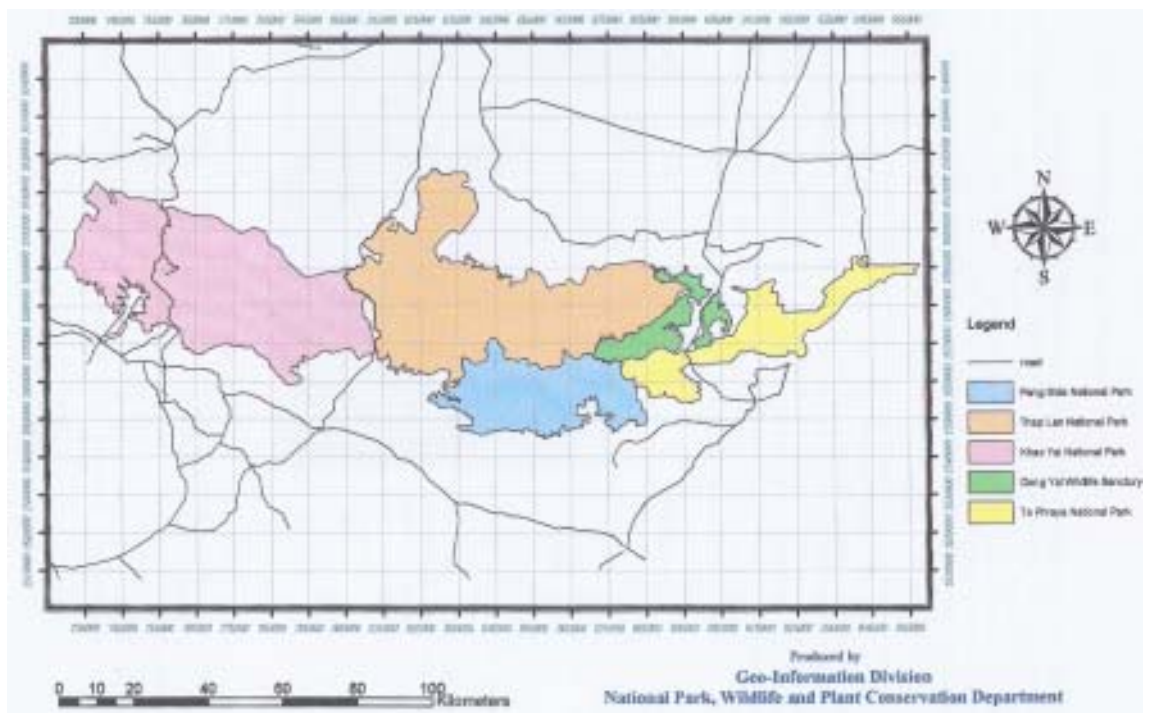
3. Requests the State Party to carry out a design study for the construction of ecologically effective wildlife corridors to functionally link the western and eastern sectors of the complex, and to report on its findings; as well as an implementation time table, to the 31<sup>st</sup> session of the World Heritage Committee in 2007;
4. Further recommends that the State Party:
- i) expedite the implementation of the Dong Phayayen-Khao Yai Forest Complex management planning and appoint a manager responsible for the entire PA complex
  - ii) provide increased resources for management across the complex;
  - iii) undertake comprehensive and ongoing wildlife status monitoring;
  - iv) implement measures to control the speed of traffic on the major roads that bisect the complex, especially before ecological corridors are constructed;
  - v) ensure that the World Heritage status of the complex is actively promoted to further encourage public cooperation in the conservation of the complex; and
  - vi) explore transboundary protected area cooperation with the Government of Cambodia with regard to Banteay Chmor Protected Landscape, as well as other transborder resource management issues that affect the DPKY-FC.
5. Commends the State Party for its establishment of protected area complexes to maximize conservation opportunities.



Map 1: General location of nominated property



Map 2: Boundaries of nominated property

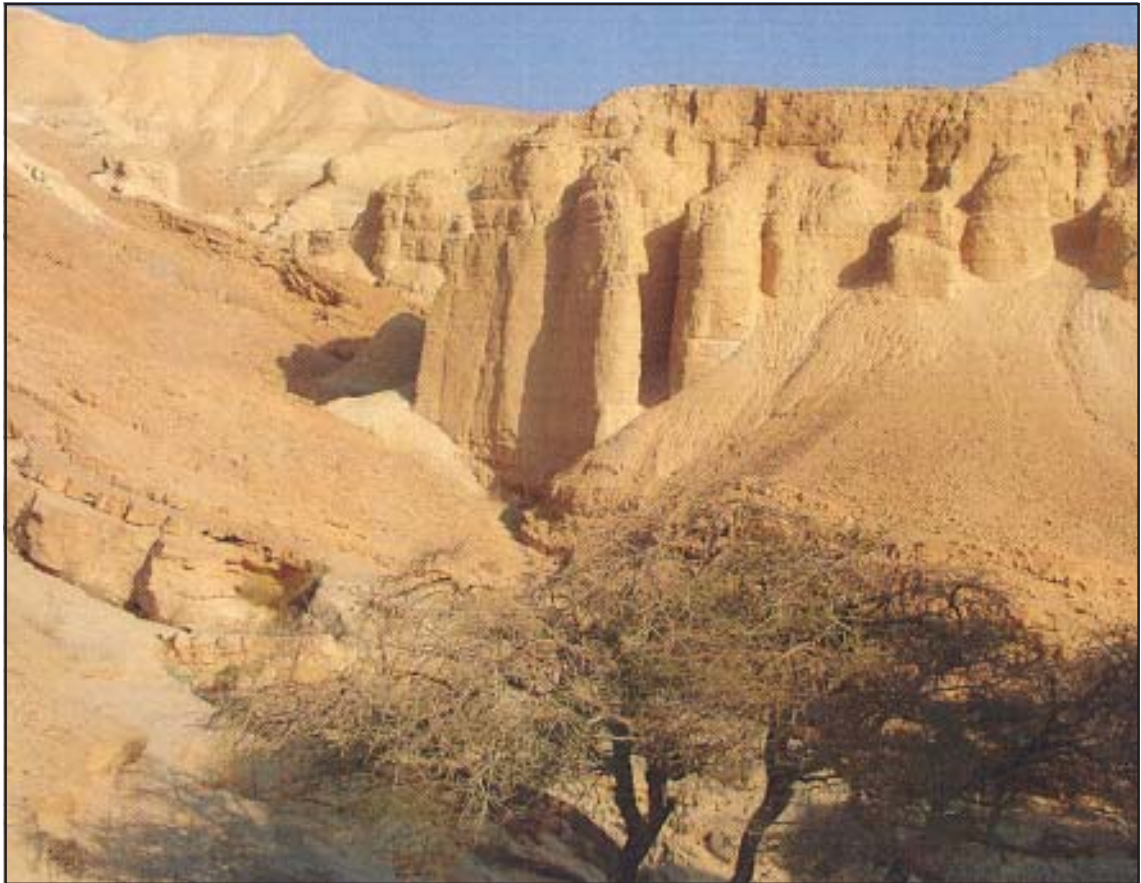




EUROPE / NORTH AMERICA

## THE MAKHTESHIM COUNTRY

ISRAEL





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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### THE MAKHTESHIM COUNTRY – (ISRAEL) ID N° 1041 Rev

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#### Background Note:

The Makhteshim Country was first nominated by Israel in 2000 on the basis of natural criteria (i) and (iii). The IUCN evaluation report, presented to the 25<sup>th</sup> session of the Bureau of the World Heritage Committee in June 2001, recommended not to inscribe the property on the World Heritage List but noted that ICOMOS would be ready to consider a new, more culturally-focused nomination, which would contain important (but not outstanding universal) natural values. The Bureau subsequently deferred the nomination, and the State Party was encouraged to review the suggestion of bringing forward a cultural nomination. It was also noted by the Bureau that efforts were underway, including an international experts' workshop, to consider nominations within the Rift Valley from Syria to East Africa.

In response to the recommendation to bring back a cultural nomination, Israel submitted a nomination in 2004 for *The Incense Route and Desert Cities of the Negev*, which will be examined by the 29<sup>th</sup> session of the World Heritage Committee in July 2005.

In December 2004, Israel submitted a revised nomination for the Makhteshim Country on the basis of criterion (i), (iii) and (iv). However, the supplementary information provided on the 31 March 2005, included a revised nomination on the basis of criterion (i) only. This nomination is described and examined below. It should be noted that the Incense Route of the 2004 cultural nomination crosses through one of the component sites of this revised nomination for the Makhteshim Country, but a mixed property is not considered.

#### 1. DOCUMENTATION

- i) **Date nomination received by IUCN:** December 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** The State Party provided considerable supplementary information, including a revised nomination on 31 March 2005.
- iii) **IUCN / WCMC Data Sheet :** 34 references in February 2001 version. No updated datasheet prepared.
- iv) **Consultations:** 2 external reviewers.
- v) **Field Visit:** Paul Dingwall. March 2001.
- vi) **Date of IUCN approval of this report:** May 2005

#### 2. NEW INFORMATION

The re-nomination of the Makhteshim Country is changed substantially from the original version submitted in 2000, and is supported by supplementary information. Having deleted the previous claim to outstanding universal scenic and aesthetic value (criterion iii), the case for World Heritage is now argued solely on a geological basis under criterion (i). It remains a serial property but there are now six discrete components in the property, with two new components added – Nahal Arava and the Sdom Rift Valley segment. The new components are intended to set the Makhteshim Country within the context of a tectonic plate margin and demonstrate its relationship to the formation of the Great Rift Valley, as reflected in the title of the nomination. The results of a more comprehensive comparative analysis are included and there is an expanded description of the universal value of the makhteshim. Up-dated data have been provided to demonstrate action taken since the original nomination to strengthen the protection of

the property, improve the management procedures and capacity and remedy problems that detracted from the integrity of the property, as noted in the 2001 IUCN technical evaluation report.

#### 3. SUMMARY OF NATURAL VALUES

The originally nominated property of 43,485 ha has been increased through the addition of buffer zones and the two new areas to a total of 132,044 ha. The nomination remains focused on the five makhteshim. They are deep elliptical or mortar-shaped basins at the crest of anticlines, each drained by a single river. Ranging up to 25,000 ha in size, with encircling cliffs up to 400 m high, the makhteshim formed by erosion during tectonic uplift of the Syrian Arc Fold Belt and subsidence of the Dead Sea Rift Valley, beginning some 5 million years ago.

The two areas added to the property include segments of the Great Rift Valley. The first contains the Kikar

Badlands, bounded by a 50m-high escarpment and comprising a labyrinth of valleys formed by dissection of sediments deposited in a large inland lake that formed during invasion by the Mediterranean Sea in the Pleistocene. Associated with the badlands is a flat alluvium-filled depression, the Arvat Sdom Basin. The second new area is the Mt Sdom Salt Diapir Complex. Mt Sdom is a diapir (or piercement fold) built of evaporitic sediments (salt beds) that are thrust to near vertical angles by folding and now protrude some 70m above the older Lissan sedimentary formation. Also included are the Prazim and Amiaz areas, with gorges recently eroded out of Lissan sediments, and a segment of the fault escarpment.

#### 4. COMPARISON WITH OTHER AREAS

The makhteshim are compared in the nomination document with similar formations at the crests of anticlines (the generic term “anticlinal erosion summit valley” is used for them). Comparisons are made with seven areas in North America and Europe, including the four makhteshim-like features in the neighbouring Sinai Peninsula of Egypt. No account is given of the protection status of these comparable sites. The comparative analysis concludes that, despite being little-studied and relatively unknown, these landforms are a “rather common geomorphological feature”. Among all of them, the makhteshim are judged to be outstanding for the following reasons: they are drained by a single river; they are almost entirely bounded by rock walls; there are five of them in a single fold belt; they are the best-studied and most accessible; and they are formed at the rifted margin of a continental plate. This judgment is questionable because some of the distinguishing points are of little geological substance and some are equivocal. Thus, the four Sinai examples, though drained by several rivers, are described as resembling the makhteshim and, like the makhteshim, they are formed on a single series of asymmetrical folds. The Red Valley in Dakota, USA is more than twice the size of Makhtesh Ramon, the largest of the makhteshim, and is more topographically pronounced than it. Sinbad Valley in Colorado, USA is similar in scale and topography to the makhteshim and is almost entirely surrounded by a rock escarpment. The comparative analysis, therefore, does not establish a claim to either uniqueness or outstanding universal value for the makhteshim.

No attempt is made to compare the geological character of the two new components of the nominated property with other similar sites elsewhere, so their relative standing among other uplifted and dissected, salt-rich sedimentary formations at rift valley margins is unknown. The Dead Sea Rift Valley is identified as part of the northernmost of three sections of the Great Rift Valley, and in turn is divided into six segments, two of which are included in the nominated property. The interrelationship between the Great Rift Valley and the makhteshim is briefly discussed in terms of their geological history.

## 5. INTEGRITY

### 5.1 Boundaries

The makhteshim are designated as core zones and the boundaries have been expanded from those of the original nomination to provide for surrounding buffer zones, some of which are substantially larger than the core zones. Although the buffer zones are specifically designed to encompass more of the outer flanks of the makhteshim, they do not appear to coincide with any topographic or administrative boundaries. More significantly, they include only a tiny fraction of the surrounding fold belt, which is the regional-scale tectonic structure from which the makhteshim derive their common origin. The Mt Sdom and Arava Valley components, which are intended to provide a geological link between the makhteshim and the Dead Sea Rift valley, also have substantial buffer zones, but with no clear or consistent natural boundaries. There is no explanation why the buffer zone for the latter component is some four times larger than the core zone, despite being described as of “direct interest” to the property. These new components provide only a narrow connecting corridor between the makhteshim country and the rift valley, and include only a very limited range of the complexity of geological associations found along the length of the rift valley.

### 5.2 Management

Management of the property has been substantially improved over recent years, and there are no serious integrity concerns or threats to geological values. Physical and visual impacts have been reduced through removal of a huge communication tower from the rim of Makhtesh Ramon, the burial of power transmission lines, and the closure or reduction of quarries and mines in Makhtesh Ramon and Makhtesh Gadol, where terrain re-habilitation is planned in association with tourist facilities and geological interpretation. Except in two of the makhteshim, there are no roads in the core zones. Resource uses are confined to light stock grazing and scrub clearing, and there are no adverse effects from pest animals or plants. There are no permanent residents in core zones and the ca. 6,000 in buffer zones mainly live in the community of Mizpe Ramon. Estimated annual numbers of visitors to the respective sites vary from 5,000 to 500,000 with a total around 2 million, more than half of whom are school children. There are few overseas tourists. Existing visitor facilities are largely unobtrusive and appear to be adequate for the carrying capacity and staffing levels, though the carrying capacity of the component sites is not well established or monitored. Problems are confined to minor vandalism, taking geological souvenirs, and off-road damage from 4-wheel drive vehicles. Two new hotels are planned for Makhtesh Ramon but they will be excluded from the nominated property.

The six components of the property are all within nature reserves and are securely protected by legislation and policy. There is a Special Government Resolution for Protection of the Makhteshim Country. A World Heritage Forum of governmental and non-governmental stakeholder representatives provides management oversight of the property, and dossiers detailing

management procedures and mechanisms replace the need for a management plan. Financial support appears adequate. Staffing, organized within two regions, included five field rangers and their supervisors supported by maintenance workers and volunteers. Professional advice is readily available, especially from the Ramon Science Centre.

## 6. ADDITIONAL COMMENTS

The Makhteshim Country lies within the transition zone between the steppe and true desert eco-regions, so has a rich biodiversity with some species at their distributional limits. The property, therefore, has important biological values, but they are not included in the nomination so remain unassessed. There are also important, though not well documented, archaeological sites in the property, some of which may be included in the Negev region cultural property nomination mentioned above.

## 7. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Makhteshim Country has been nominated on the basis of natural criterion (i)

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

The claim to World Heritage status is based on the view that it is a universally outstanding representation of geological evolution, geomorphological processes and physiographic features at a rifted continental plate margin. The makhteshim, which are the focus of the nomination, are revealed as members of a group of landforms, called "anticlinal erosion summit valleys", that is demonstrably common and widespread throughout Europe and North America, at least. Equivalent landforms are well developed on the same mega-anticlinorium (extended folded sequence of anticlines and synclines) in the Sinai Peninsula of Egypt. The particular, mature topographic expression of the makhteshim reflects the very specific pre-existing geological conditions and geomorphic evolutionary history under the prevailing semi-arid climatic regime of the Negev region. They are not unique landforms and the claim that they are the world's best examples of their type cannot be substantiated on the evidence provided. The makhteshim are also relict landforms that evolved more than 3 million years ago in a period of intense tectonic activity and associated denudation. Today, they are essentially stable landforms subject to relatively minor geomorphic change, and thus are not outstanding examples of on-going geomorphological processes.

Aside from the weaknesses in claims of outstanding universal value for the property, too little of the surrounding geological system is included in the nomination to demonstrate the overall development of the makhteshim, and thus integrity requirements are also not met in relation to the area proposed. Although development of the makhteshim was clearly linked to the opening and subsidence of the Dead Sea Rift Valley, the evolutionary connection between the two is displayed only through a very narrow corridor of limited geological

complexity, and it is not strongly argued in the nomination document. . There is also insufficient individual justification for claiming outstanding universal value in respect of the Mt Sdom and Arava Valley components of the serial property nomination, Thus the overall basis of the serial approach proposed is not convincing, in relation to either the sites selected or the demonstration of their interrelationships. For the above reasons, IUCN considers that the nominated property does not meet this criterion.

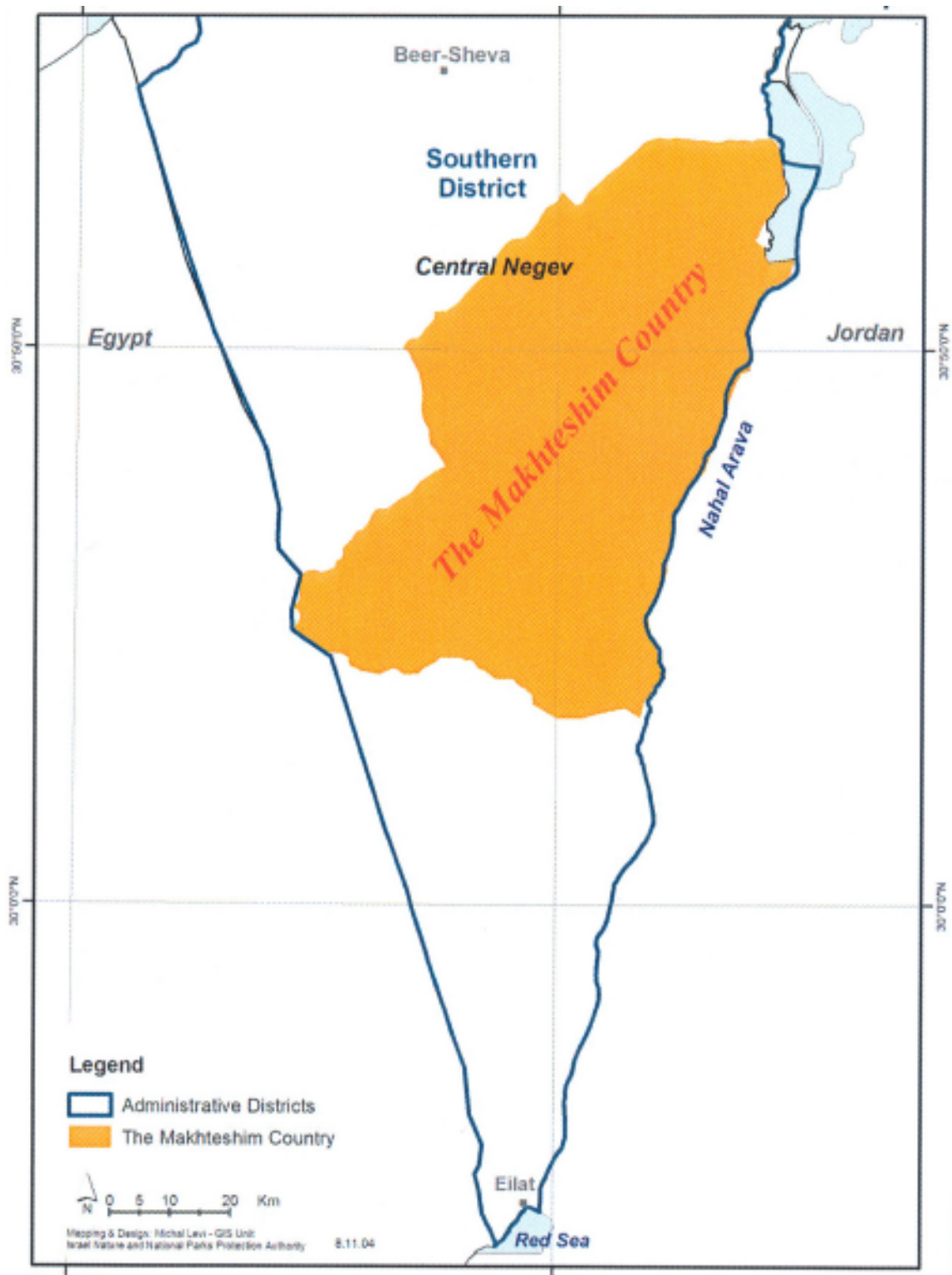
## 8. DRAFT DECISION

IUCN recommends that the Committee adopts the following draft decision:

*The World Heritage Committee,*

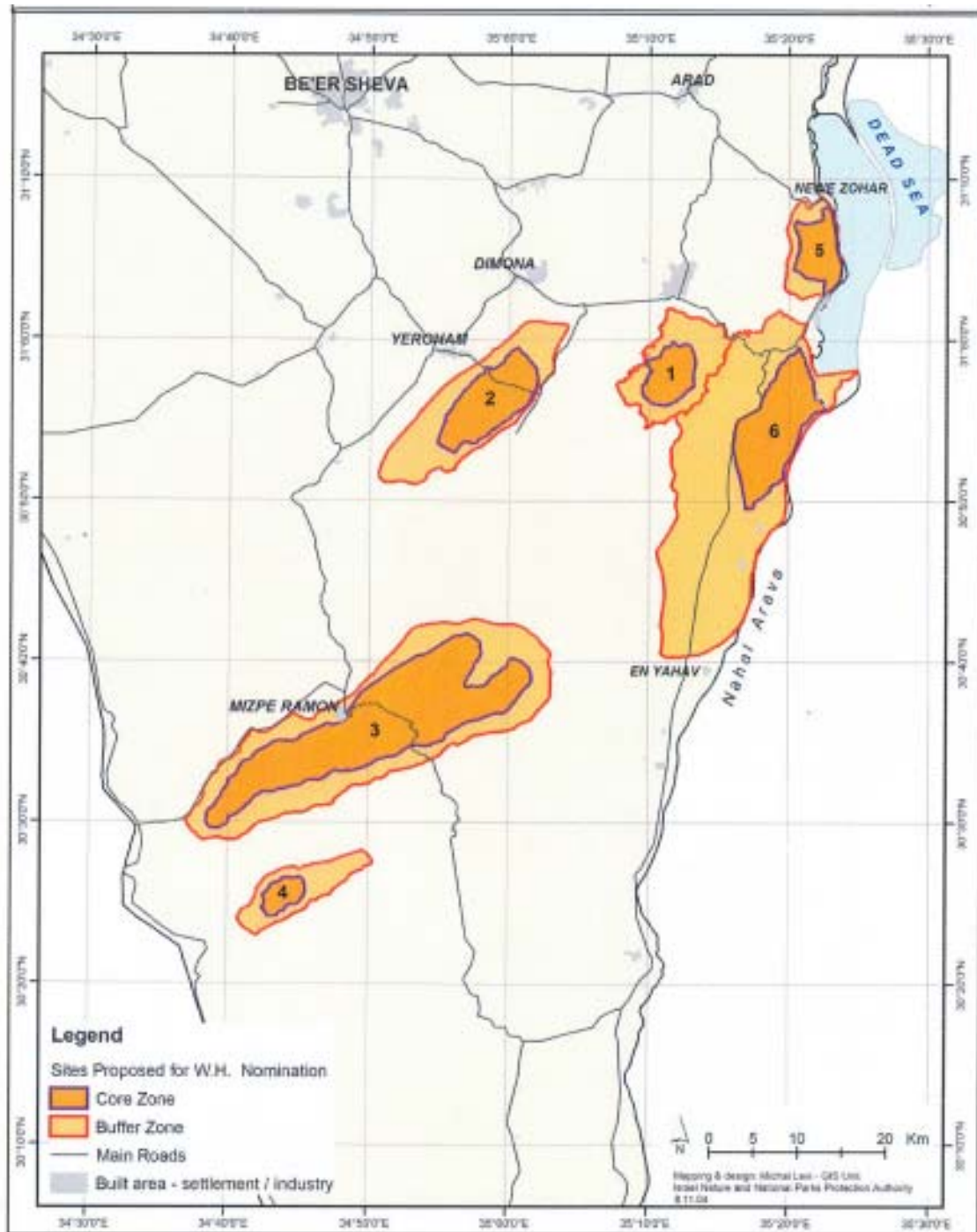
1. Having examined Document **WHC-05/29.COM/8B**,
2. Decides not to inscribe *The Makhteshim Country, Israel on the World Heritage List on the basis of natural criteria,*
3. Commends *the State Party for the very positive steps it has taken for the conservation of the property, particularly in relation to site management.*

Map 1: General location of nominated property





Map 2: Boundaries of nominated property





LATIN AMERICA / CARIBBEAN

COIBA NATIONAL PARK

PANAMA





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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### COIBA NATIONAL PARK (PANAMA) ID N° 1138 Bis

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#### Background note:

Coiba National Park was nominated for inscription on the World Heritage List in 2003 on the basis of natural criteria (ii), (iii) and (iv). Coiba National Park is located in the Gulf of Chiriquí, south-west of the Pacific Coast of Panama, in the Central Pacific Ocean. The park protects Coiba Island and 38 smaller islands and islets. The nominated property is well known for its marine biodiversity and for protecting remaining areas of Pacific tropical moist forest of insular character on the Central American Pacific coast.

IUCN considered in its original evaluation report provided to the 28th session of the World Heritage Committee in June 2004 (document WHC-04/28.COM/INF.14B), that the nominated property as presented did not meet any of the natural criteria. However, IUCN recommended that a revised nomination be submitted once legal protection for the property was provided under national law and the boundaries of the property were substantially expanded to provide greater coverage of the key marine and coastal areas of the Gulf of Chiriquí.

Additional information provided by the State Party in June 2004, which was not available at the time of preparing the nomination or evaluation report, confirms the scientific importance of the property but also represents a constructive response to the recommendations made by IUCN in its evaluation. The State Party reported at that time that actions had already been taken by the State Party to: (a) provide legal protection to the property under national law; and (b) expand the property to provide greater coverage of the Gulf of Chiriquí. IUCN congratulated the State Party for these actions and considered that, based on this new information; an extended property could have potential to meet natural criteria (ii) and (iv).

Based on this recommendation the World Heritage Committee, at its 28<sup>th</sup> session (decision 28 COM/14B.10), decided to:

1. *Defer the nomination of Coiba National Park, Panama, until the new proposed national law establishing the National Park is approved by the President of Panama and a revised, expanded nomination is submitted for examination;*
2. *Encourage the State Party to continue its participation in the development of the proposed Cocos Islands – Galapagos Marine Biological Corridor where Coiba National Park can play an important role as a stepping-stone core area for marine conservation.*

#### 1. NEW INFORMATION

On 19 October 2004 IUCN received from the World Heritage Centre a copy of National Law No. 44, signed by the Legislative Assembly of the Republic of Panama

on 26 July 2004, establishing Coiba National Park (in line with IUCN Category II Protected Area) and a Special Zone of Marine Protection within the Gulf of Chiriquí. The new law established the boundaries of the National Park and its Zone of Marine Protection, as well as the protection and management regulations for both areas. The Coiba National Park encompasses over 270,125 ha of which 216,500 ha are marine and 53,625ha are insular, including Coiba Island and 38 smaller islands. The Special Zone of Marine Protection is included as a buffer zone to the National Park and encompasses an area of 160,700 ha, which incorporates Montuosa Island, an island of 136 ha located 21.3 nautical miles to the West of Coiba Island, and Hannibal Bank, located 12.6 nautical miles to the West of Coiba Island, which is an underwater seamount known for its high marine productivity.

In the National Park, activities such as human settlements (except for those associated to the Park's administration), infrastructure development, agriculture, forest cutting and exploration and exploitation of mineral and oil resources are strictly forbidden. Traditional fishing would be only allowed and regulated through provisions of the Park's Management Plan. In the Special Zone of Marine Protection, commercial fisheries activities, including use of long-lines and nylon gill nets, are prohibited. The Law calls for drafting of a revised Management Plan, an activity that has already started, and also stipulates that activities for the protection and sustainable use of marine resources in the Special Zone of Marine Protection should be included in the revised Management Plan so as to guide the integrated and coordinated management of the entire area. Furthermore the Law established a Trust Fund as a mechanism to ensure the sustainable financing of Coiba National Park.

On 20 January 2005, IUCN received a revised nomination document for the Coiba National Park. This revised nomination includes the following:

- Revised boundaries for the nominated property including Coiba National Park as the core area of the property and the Special Zone of Marine Protection as its buffer zone, with a total extension of 430,825ha, from which 53,761ha are terrestrial (an increment of 0.25% with respect of the original nomination) and 377,064ha are marine (an increment of 74.2% with respect of the original nomination);
- A comprehensive comparative analysis with similar properties already inscribed on the World Heritage List and other insular and marine properties that have been identified as meriting consideration for World Heritage nomination;
- A detailed justification for inscription including recent results of scientific research on the values of the

nominated property, including an assessment of the significance of the Special Zone of Marine Protection for conserving the marine ecosystems of the Gulf of Chiriquí; and

- Updated information on the State of Conservation of the nominated property, particularly noting progress towards the preparation of a revised Management Plan for the property as required under the new Law No. 44. This work will be supported by a number of NGOs particularly by the Smithsonian Tropical Research Institute (STRI) through funding provided by the Eastern Tropical Pacific Seascape Project. Preparation of the revised management plan is receiving the highest priority by the government and all NGOs working in this area. The development of explicit regulations for artisanal fishing in the Coiba National Park and the Special Zone of Marine Protection will ensure effective protection of the park's marine resources. It is anticipated that these regulations will be drafted in early 2005 by the Directive Council created by the Law No. 44 to oversee and guide the management of the property. These regulations will be included in the revised Management Plan, as well as the establishment of zones that will indicate where and how fishing is permitted. The Management Plan will also provide regulations on the development of tourism activities in the property.

## 2. IUCN COMMENTS ON NEW INFORMATION

The approval of National Law No. 44 establishing Coiba National Park and a Special Zone of Marine Protection within the Gulf of Chiriquí, and the revised nomination provided by the State Party, adequately address all the key concerns noted in the IUCN 2004 evaluation report (WHC-04/28.COM/INF.14B) on the original nomination of Coiba National Park. It should be noted that the Coiba National Park, combined with the Special Zone of Marine Protection, now comprises 90% of the islands and 60% of the edge of the continental shelf within the Gulf of Chiriquí. The overall size of the nominated property of 430,825ha covers almost half of the entire Gulf of Chiriquí.

IUCN emphasises, in addition to comments made in its previous report on issues of integrity, that commercial fishing within the property requires very careful management and the State Party should ensure that a clear fisheries management monitoring system is put in place.

### 2.1 Application of criteria / Statement of Significance

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

#### Criterion (ii): Ecological processes

The additional information provided in the revised nomination notes that, despite the short time of isolation of the islands of the Gulf of Chiriquí (most of which are incorporated in the nominated property) on an evolutionary timeframe, new species are being formed, which is evident from the levels of endemism reported

for many groups (mammals, birds, plants), making the nominated property an outstanding natural laboratory for scientific research. Furthermore the Eastern Pacific reefs such as those in the nominated property are characterized by complex biological interactions of their inhabitants and provide a key ecological link in the Tropical Eastern Pacific for the transit and survival of numerous pelagic fish as well as marine mammals. IUCN therefore considers that the nominated property meets this criterion.

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

While the revised nomination makes again the case for criterion (iii) the additional information provided does not substantially differ from that included in the original nomination. IUCN reiterates that there are a number of other islands in the Pacific, the Caribbean and elsewhere that have a similar appearance to that of the terrestrial and marine components of the nominated property. IUCN therefore considers that the nominated property does not meet this criterion.

#### Criterion (iv): Biodiversity and threatened species

The additional information provided in the revised nomination clearly demonstrates that the forests of Coiba Island are fundamentally different than those of the Darién Province and possess a high variety of endemic birds, mammals and plants when compared to this region. Coiba Island also serves as the last refuge for a number of threatened species that have largely disappeared from the rest of Panama, such as the Crested Eagle and the Scarlet Macaw. Furthermore the marine ecosystems within the nominated property are repositories of extraordinary biodiversity conditioned to the ability of the Gulf of Chiriquí to buffer against temperature extremes associated to El Niño/Southern Oscillation (ENSO) phenomenon. The nominated property includes 760 species of marine fishes, 33 species of sharks and 20 species of cetaceans. The islands within the nominated property are the only group of inshore islands in the tropical eastern Pacific that have significant populations of trans-Pacific fishes, namely, Indo-Pacific species that have established themselves in the eastern Pacific. IUCN considers that the nominated property meets this criterion.

With the addition of the Special Zone of Marine Protection in the nominated property, the State Party should consider modifying the name of the property to avoid confusion over the boundaries.

## 3. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

*The World Heritage Committee,*

1. Having examined Document WHC-05/29.COM/8B
2. Recalling its Decision 28COM/14B.10
3. Commends the State Party, and the NGOs supporting conservation efforts in Coiba National Park, for their excellent response to address the key issues requested by the Committee at its 28<sup>th</sup> session, in

*particular for the adoption of National Law No. 44 which established Coiba National Park and its Special Zone of Marine Protection.*

4. *Inscribes Coiba National Park and its Special Zone of Marine Protection, Panama, on the World Heritage List under natural criteria (ii) and (iv).*

**Criterion (ii):** *Despite the short time of isolation of the islands of the Gulf of Chiriquí on an evolutionary timeframe, new species are being formed, which is evident from the levels of endemism reported for many groups (mammals, birds, plants), making the property an outstanding natural laboratory for scientific research. Furthermore the Eastern Pacific reefs, such as those within the property, are characterized by complex biological interactions of their inhabitants and provide a key ecological link in the Tropical Eastern Pacific for the transit and survival of numerous pelagic fish as well as marine mammals.*

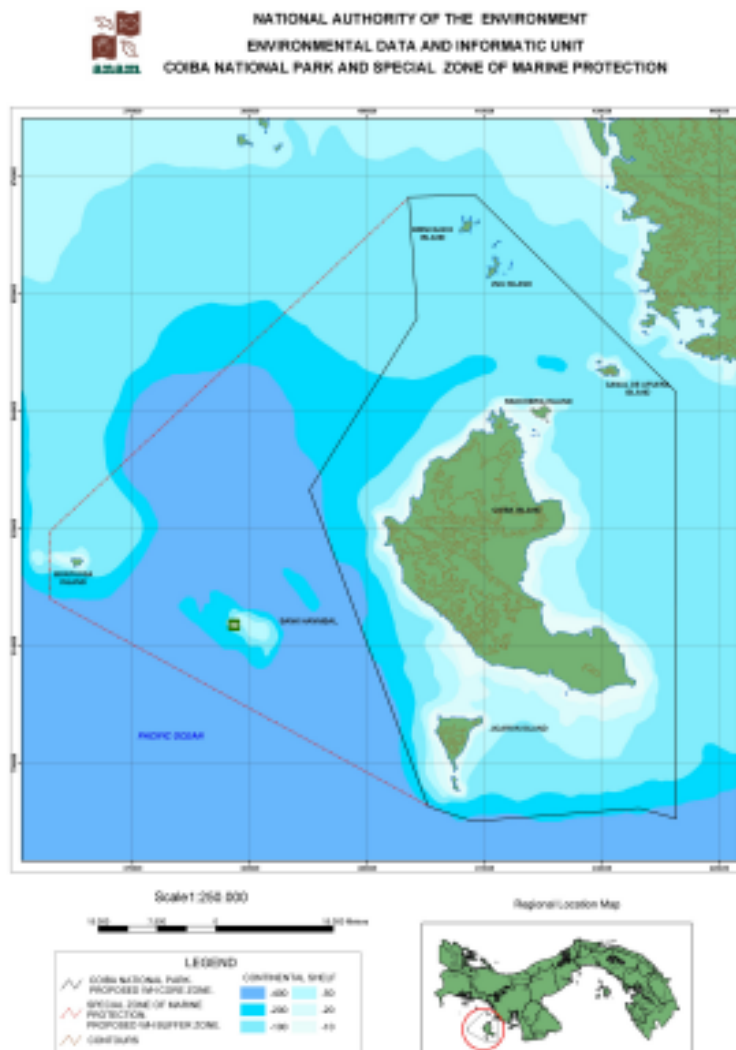
**Criterion (iv):** *The forests of Coiba Island possess a high variety of endemic birds, mammals and plants. Coiba Island also serves as the last refuge for a number of threatened species that have largely disappeared from the rest of Panama, such as the Crested Eagle and the Scarlet Macaw. Furthermore the marine ecosystems within the property are repositories of extraordinary biodiversity conditioned to the ability of the Gulf of Chiriquí to buffer against temperature extremes associated to El Niño/Southern Oscillation (ENSO) phenomenon. The property includes 760 species of marine fishes, 33 species of sharks and 20 species of cetaceans. The islands within the property are the only group of inshore islands in the tropical eastern Pacific that have significant populations of trans-Pacific fishes, namely, Indo-Pacific species that have established themselves in the eastern Pacific.*

5. *Requests the State Party to consider options to expedite the preparation, adoption and further implementation of the revised Management Plan for the property, and to very carefully control and monitor fisheries management. The State Party may wish to consider requesting international assistance under the World Heritage Fund to support the effective implementation of this important task.*
6. *Requests the State Party to confirm the name of the property to the World Heritage Centre as soon as possible.*

Map 1: General location of nominated property



Map 2: Boundaries of nominated property





## A. Nominations of Natural Properties to the World Heritage List

A3 Extension of Natural Properties inscribed on the World Heritage List



ASIA /PACIFIC

VALLEY OF FLOWERS NATIONAL PARK  
(Proposed extension to Nanda Devi National Park)

INDIA





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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### VALLEY OF FLOWERS NATIONAL PARK (INDIA) (Proposed extension to Nanda Devi National Park), ID N° 335 Bis

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**Background note:** The Valley of Flowers National Park (VoF) is proposed as an extension to the existing World Heritage (WH) property, Nanda Devi National Park (NDNP), inscribed on the List in 1988 for its mountain wilderness and spectacular topographical features (natural criterion iii) and threatened mammals (natural criterion iv). Key issues at that time concerned the status of the management plan, status of wildlife populations, enforcement provisions and the closure of the National Park to visitors. At its 22nd Extraordinary session (Kyoto, November 1988), the Bureau of the WH Committee encouraged the Government of India to extend the boundaries of the NDNP WH property to include the VoF National Park and Kedarnath Wildlife Sanctuary. Both the VoF and NDNP were visited during the 2004 IUCN mission, the latter not visited at the time of its nomination in 1987 due to weather conditions.

#### 1. DOCUMENTATION

- i) **Date nomination received by IUCN:** April 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** IUCN requested supplementary information on the 23 September 2004 following the mission, and the State Party response was received on 19 November 2004.
- iii) **IUCN/WCMC Data Sheet:** 2 references, of which the nomination contains a further 44 references
- iv) **Additional Literature Consulted:** Green/WCMC and IUCN CNPPA, 1993, **Nature reserves of the Himalaya and the mountains of Central Asia**. Oxford University Press, New Delhi; Jyotsna Sitling, 2004, **Guidelines for mountaineering expeditions in Uttaranchal**. Government of Uttaranchal; C.P. Kala, G.S. Rawat and V.K. Uniyal, 1998. **Ecology and conservation of the Valley of Flowers National Park, Garhwal Himalaya**. Wildlife Institute of India, Dehra Dun; S.S. Samant, 2003. **Nanda Devi Biosphere Reserve (Nomination Form for UNESCO-MAB net)**. G.B. Pant Institute of Himalayan Environment and Development / Ministry of Environment & Forests, New Delhi; W.A. Rodgers, H.S. Panwar, 1988. **Planning a wildlife protected area network in India**, Wildlife Institute of India, Dehra Dun; W.A. Rodgers, H.S. Panwar and V.B. Mathur, 2000. **Wildlife protected area network in India: a review**. Wildlife Institute of India, Dehra Dun; G.S. Rawat and W.A. Rodgers, 1988. **The alpine meadows of Uttar Pradesh: an ecological review**. In: Rangeland Resource and Management (Eds P. Singh and P.S. Pathak), Range Management Society of India, Jhansi; S.D. Davis, V.H. Heywood and A.C. Hamilton, 1995. **Centres of plant diversity: A guide and strategy for their conservation**. WWF and IUCN; O. Polunin and A. Stainton, 1984. **Flowers of the Himalaya**. Oxford University Press, Delhi; F.S. Smythe, 1938. **The mountain scene**. Adam and Charles Black, London; Jagdish Kaur, 1985. **Himalayan pilgrimages and the new tourism**. Himalayan Books, New Delhi; Hugh Thomson, 2004. **Nanda Devi: A journey to the last sanctuary**. Weidenfeld and Nicolson, London; J. Thorsell and L. Hamilton, 2002. **A global overview of mountain protected areas on the World Heritage List**. IUCN, Gland, Switzerland. BirdLife International, 2003 **BirdLife's online World Bird Database: the site for bird conservation**. BirdLife International, Cambridge, UK Version 2.0 (<http://www.birdlife.org>); C.P. Kala, 2004. **Pastoralism, plant conservation, and conflicts on proliferation of Himalayan knotweed in high altitude protected areas of the Western Himalaya, India**. Biodiversity and Conservation 13: 985-995; C.P. Kala, 2005. **Indigenous uses, population density, and conservation of threatened medicinal plants in protected areas of the Indian Himalayas**. Conservation Biology 19:368.
- v) **Consultations:** 5 external reviewers consulted. The mission met with the Secretary of Environment & Forests and other senior officials of the Government of India, Uttaranchal State Government officials, the Director and officers responsible for the Nanda Devi Biosphere Reserve, representatives of the Wildlife Institute of India and WWF-India, independent scientists, as well as the Eco-Development Committees at Govindghat and Bhiundar, the Women's Welfare Groups at Lata, Tolma, Reni and Paing villages, and local religious leaders.
- vi) **Field Visit:** Michael Green and Georgina Peard, September 2004
- vii) **Date of IUCN approval of this report:** April 2005

## 2. SUMMARY OF NATURAL VALUES

The nominated property, the Valley of Flowers National Park (VoF), is located in the Garhwal Himalaya of eastern Uttaranchal State<sup>1</sup>, 340 km northeast of Delhi. It covers an area of 8750ha and is nominated as an extension to the current World Heritage property, Nanda Devi National Park (NDNP), which lies at a distance of 23km. Together

the VoF and NDNP comprise the two core zones within Nanda Devi Biosphere Reserve (NDBR). Respective details are summarised in table 1 below. The two core zones are contained within a large buffer zone of 514,857 ha, comprising civil forest (460,048 ha), reserved forest (49,017 ha) and forest panchayat (community reserved) (5,792 ha). A transition zone (54,634 ha) fringes the boundary of NDBR in the south and southwest.

**Table 1: Details of the protected areas**

Site	Area	Altitudinal range	Establishment	IUCN Category
VoF NP	8,750 ha	3,350-6,708 m	6 September 1982	II (National Park)
NDNP*	62,460 ha	2,100-7,817 m	6 November 1982	1a (Strict Nature Reserve)
NDBR **	586,069 ha	1,800-7,817 m	November 2004	Unassigned

\* *Inscribed on the World Heritage List in 1988.*

\*\* *Originally established as a national biosphere reserve on 18 January 1988.*

The VoF is one of two hanging valleys lying at the head of the Bhiundhar Valley, the other featuring Hem Kund (4,150 m), a sacred lake to the east of the National Park. The Paspawati River runs westwards through the VoF, its source being the Tipra Glacier, which descends from Ghori Parbat (6,708 m)<sup>2</sup>, the highest of several named, flanking peaks. The middle of the Valley lies at about 3,500 m and extends over some 1,000 ha, its gently inclined basin of alpine meadows and forested slopes rising sharply to rocky ridges and snow-covered peaks.

Geologically, the VoF falls within the Zaskar Range<sup>3</sup>: its rocks are primarily sedimentary with mica schists and shales, and its soils are acidic. Although shielded from the full impact of the south-west summer monsoon by its east-west orientation and the Great Himalaya Range to the south, conditions are cool (19°C maximum), wet and misty from late June to early September. The Valley is snowbound in winter, from November / December to April.

Within a global context, the VoF lies in the Himalayan Highlands biogeographical province of Udvardy. It falls within the West Himalaya, based on the national biogeographic classification of India. From satellite imagery, 73% of the national park is under perpetual snow and ice, 6% is forested and 21% comprises alpine meadows. The vegetation zones range from sub-alpine forest (below 3,500 m) to alpine shrubs and meadows (above 3,700 m).

The VoF has been subject to several floral surveys, some extending beyond the boundaries of the national park see Table 2:

The flora is important on account of its diversity and rarity. This reflects both the biogeographical location of the VoF and the impact from grazing and collection of

medicinal plants on alpine valleys in Garhwal (and elsewhere throughout the Himalaya). Six species are internationally threatened, of which *Aconitum balfourii* (I) and *A. falconeri* (V) are endemic to the West Himalaya, and *Acer caesium* (V), *Meconopsis aculeate* (E) and *Saussurea atkinsoni* (I) have not been recorded from elsewhere in Uttaranchal. A further three species have not been recorded elsewhere in Uttaranchal, and two species have not been recorded in NDNP. The flora is also of social and economic importance. Local people are known to use 45 species for medicinal purposes and several species, such as Brahmakamal (*Saussurea obvallata*), are collected to offer to Nanda Devi and other deities on auspicious days.

Less is known about the fauna. Ten mammal species have been recorded, of which Asiatic Black Bear (VU), Himalayan Tahr (VU) and Serow (VU) are threatened, and Himalayan Musk Deer (LR/nt) is near threatened. Local people report that Snow Leopard (EN), Common Leopard, Brown Bear and Blue Sheep (LR/nt) are also present. A first census of mammals was undertaken in October 2004 and will be repeated regularly. All of these species occur in NDNP, although the present status of Brown Bear is uncertain. Information provided in the nomination on birds is very anecdotal. While there are fairly extensive data on mammals, birds, reptiles, amphibians, fishes, butterflies, molluscs and annelids for the Biosphere Reserve, none of the distributional records relate specifically to the VoF.

## 3. COMPARISONS WITH OTHER AREAS

The nominated property lies in the West Himalaya, which stretches from the Sutlej River in Himachal Pradesh State to the Kali River that forms the border with Nepal. This biotic province falls mostly within Uttaranchal State

<sup>1</sup> *Uttaranchal is a new state, established in 2000. It was formerly part of Uttar Pradesh, occupying the Himalayan portion. Thus, references to Uttar Pradesh in the literature are often synonymous with Uttaranchal. The spellings of villages, rivers and peaks vary throughout the literature. Spellings are taken from the 1:150 000 map of Garhwal-Himalaya-Ost, in the first instance, this being based on the Survey of India series.*

<sup>2</sup> *The height of Ghori Parbat (also spelt as Gauri Parbat) is based on records from the Survey of India and Himalayan Club. The nomination incorrectly cites 6,590 m (and the altitudinal range as 3,200–6,675 m), and the Guidelines for Mountaineering Expeditions in Uttaranchal incorrectly cite 6,601 m.*

<sup>3</sup> *Also referred to as Zaskar Range.*

**Table 2: Floral Surveys of the Valley of Flowers**

Authority, year	Survey area	Vascular plants	Plant diversity		
			Families	Genera	Species
Frank Smythe and R.L. Holdsworth, 1931	VoF and neighbourhood	Angiosperms Gymnosperms	44	142	253
		Ferns + allies	1	8	9
Botanical Survey of India (Wadhwa et al.), 1987	VoF extending to Govindghat, 1,800 m	Angiosperms Gymnosperms Ferns + allies	?	?	<sup>a</sup> 613
Forest Research Institute (Naithani et al.), 1992	VoF and surrounding area	Angiosperms	82	294	<sup>b</sup> 600
		Ferns + allies	12	18	30

<sup>a</sup> Included 9 rare species listed in Red Data Book of Indian Plants.

<sup>b</sup> Included 57 species additional to those previously recorded by Botanical Survey of India.

<sup>c</sup> Included 58 new records for VoF, of which 4 are new for Himalaya in Uttar Pradesh.

<sup>d</sup> Included 2 new records for VoF.

and equates to the Kumaon Himalaya, the northern parts of which are separately known as the Garhwal Himalaya. Comparative studies between the VoF and other potentially similar sites are limited because Garhwal has remained largely unstudied and unknown to the outside world due to its difficult access and strategic sensitivity.

In relation to natural beauty and aesthetic importance (criterion iii), Garhwal is renowned in Himalayan literature for its magnificent mountain scenery and associated religious importance (e.g. Longstaff in Tilman 1937; Groetzbach in Kaur 1985). The nomination refers to the VoF as being one of the most picturesque alpine valleys in the Western Himalaya, well known for its high floral diversity amidst a backdrop of majestic peaks and all within a relatively compact area of 78.5 km<sup>2</sup>.

The VoF is widely acclaimed for its landscape and alpine meadows of flowering plants. In Hindu mythology it is named Nandan Kana, meaning 'Garden of Indra in Paradise'. The Valley takes its name from the mountaineer Frank Smythe who described his crossing the "Bhyundar Khanta Pass" in 1931 and entering an Eden of flowers: "It was the loveliest valley any of us had ever seen and it remains in memory as the VoF." Such views, subsequently endorsed by botanists from the Royal Botanic Gardens, Kew in 1939 and from the Botanical Survey of India in the 1950s and 1960s, eventually led to the Valley becoming India's first national park established specifically for conserving plants. Unlike most other protected areas in the West Himalaya, both the VoF and Nanda Devi are uninhabited, and grazing by livestock has been prohibited since their establishment as National Parks in 1982.

In terms of adding value to the existing WH property, the VoF complements NDNP in a number of key respects, as summarised in Table 3 below.

In relation to its biological diversity (criterion iv) the Nanda Devi region is a Centre of Plant Diversity (WWF/IUCN). This is due to its central location between the East and West Himalayan phytogeographic regions and its position at the junction of the Garhwal and Kumaon

Himalaya, where the Trans-Himalaya (including the Zaskar Range) meets the Great Himalaya. It features a rich mixture of species from both these phytogeographic regions, as well as some endemics (Polunin and Stainton 1984).

The flora comprises 25% of that found in Chamoli District, although the VoF constitutes only 1.3% of the District's total area. Comparison with much larger areas in the West Himalaya, notably the Tons Valley and the alpine parts of the Kumaon Himalaya, confirm that the VoF is rich in plant species as outlined in Table 4 below.

While some of the alpine valleys in the West Himalaya (Ralam, 20,000 ha; Pindari, 5,000 ha; Sunderdhunga, 13,000 ha; Khatling, 12,000 ha; and Harkidoon, 16,000 ha, within Govind Pashu Vihar Wildlife Sanctuary) are comparable with the VoF in their original floral richness (and aesthetic values), their meadows and alpine slopes have been degraded from overgrazing by livestock and collection of medicinal herbs. Field research by the Wildlife Institute of India has shown that the VoF has a much more diverse flora than three adjacent valleys (Khiron, Kakkhusandi and Bedini-Ali), with higher population densities of certain species listed as rare in the national Red Data Book of Indian Plants. The diversity of threatened medicinal plants is also higher than for any other Indian Himalayan protected area studied to date (Kala 2005).

Seventeen protected areas in the West Himalaya cover 6,028.5km<sup>2</sup> or 11.6% of this biotic province. The largest are Sangla Wildlife Sanctuary (650km<sup>2</sup>) in Himachal Pradesh, and Ascot Wildlife Sanctuary (600km<sup>2</sup>), Gangotri National Park (1,552km<sup>2</sup>), Govind National Park (472km<sup>2</sup>), Govind Pashu Vihar Wildlife Sanctuary (481km<sup>2</sup>) and Kedarnath Wildlife Sanctuary (957km<sup>2</sup>) in Uttaranchal: none is floristically comparable to VoF in terms of diversity.

Along with NDNP, the only other natural WH property in the Himalaya is Sagarmatha National Park (114,800 ha) in the Eastern Himalaya of Nepal. Other

**Table 3: Complementarity of VoF and NDNP**

Attribute	VoF National Park	NDNP
Geology	Lies in Zaskar Range	Lies in Great Himalaya Range
Geomorphology landscape	Glacial valley with terraces either side of river	Mountain wilderness presided over by Nanda Devi - "epitome of the inviolate mountain" (Hugh Thompson 2004)
Access	Easy - one day's gentle climb from road along well maintained trail, with food and lodging readily available en route.	Renowned as being extremely difficult, requiring at least one week and mountaineering equipment to reach the inner sanctuary.

**Table 4: Comparison with other floral rich areas in the Himalayas**

Name (Location)	Area ha	Altitudinal range (m)	Angiosperm plant diversity			Reference
			Families	Genera	Species	
VoF (Uttaranchal)	87,500	3,200 - 6,708	61	234	499	Kala et al., 1998
Tons Valley (Uttaranchal)	450,000	1,500 - 4,500	132	480	761	Rana et al., 2003
Alpine flora of Kumaon Himalaya (Uttaranchal)	683,000	3,300 - 5,600	72	304	803	Rawat, 1984

Himalayan sites identified with having potential for consideration for nomination include Jigme Dorji National Park (Bhutan), Kangchendzonga National Park (Nepal/China/India) and Mustang (Nepal) (Thorsell and Hamilton, 2002). The VoF is distinct from all of these sites in terms of its flora and fauna, absence of human settlements and exclusion of livestock.

In terms of adding value to the existing WH property, the VoF holds a small number of plant species that have not been recorded in NDNP, perhaps reflecting its more northerly location within the Zaskar Range.

## 4. INTEGRITY

### 4.1 Legal Status

The VoF was declared a national park on 6 September 1982, under the Wildlife (Protection) Act, 1972. All rights in respect of land (including ownership) is vested in the Government of Uttaranchal State and, in accordance with this Act, livestock grazing ceased from 1982. The VoF was designated a core zone within the NDBR in February 2000, in addition to NDNP which was designated in 1988. UNESCO approved the addition of NDBR to its World Network of Biosphere Reserves in November 2004.

Mountaineering is regulated under State Government Order No. 997/CS/MT/2004, in accordance with new *Guidelines for Mountaineering Expeditions in Uttaranchal*. Two peaks, Rataban (6,126 m) and Ghori Parbat (6,601 m), within VoF National Park are open for mountaineering, subject to permission from the Chief Wildlife Warden and special conditions.

Legal and policy provisions for the protection and management of the VoF are considered to be adequate and will be enhanced by forthcoming regulations for trekking.

### 4.2 Management

The Forest Department of the State Government of Uttaranchal is the management authority. A Divisional Forest Officer, who reports to the Director of NDBR, manages both the VoF and NDNP. Overall responsibility lies with the Chief Wildlife Warden of Uttaranchal.

Management of the VoF is planned and carried out within the overall management of the NDBR, for which there is a Landscape Management Plan for the period 2003/04 – 2012/13. This Plan is implemented through a series of annual plans prepared in consultation with relevant bodies at village, district and state levels.

The management plan for VoF National Park was prepared in 1992 for implementation over a period of ten years. A new management plan is under preparation and expected to be ready by June 2005. The Landscape Management Plan for the Biosphere Reserve provides the overall management framework, while focusing on direct interventions in the buffer and transition zones in cooperation with local communities. Direct management intervention inside the core zones is minimal, focusing on biodiversity conservation and tourism management.

The total annual budget for NDBR equates to US \$ 272,000, of which US \$ 45,000 is for VoF National Park and US \$ 75,000 for NDNP. There are 67 permanent staff for the Biosphere Reserve, with 16 deployed in VoF National Park and 20 in NDNP. Resources for VoF are considered to be adequate; importantly, much of the management effort is directed towards the surrounding buffer and transition zones. A significant amount of management, such as trail maintenance along the approach route to the VoF and promoting environmental awareness, is achieved through the close partnership established with the local communities. For example, local employees of the Eco-Development Committees keep the trail along the Bhiundhar Valley clean and free



of litter. Similarly, three university graduates employed by the local Eco-Development Committee run the visitor centre at Ghangrea.

#### 4.3 Boundaries

##### *Connectivity*

The VoF National Park is self-contained within a rim of peaks and geographically separated from NDNP by some 23km. Its relatively small size and isolation from NDNP is not a limiting factor with respect to the integrity of its flora, but provision of a protected corridor between these two core zones is important to enhance genetic exchange between large mammal populations and the conservation of wide-ranging species such as snow leopard.

The two national parks are separated by the Dhuli Ganga, which flows southwest from the international border with China, and its tributaries. Land either side of this river is largely reserved forest (comprising thick forest) under the jurisdiction of the Forest Department and civil forest (high mountains with snow, ice and scree) under the jurisdiction of the District Magistrate. A relatively small proportion of the reserved forest is community forest, for example 1,200ha is assigned to Tolma Village, which lies just outside NDNP. There are also some tiny pockets of private land along the valley floor. All of the intervening land lies within the buffer zone of NDBR.

It is recommended that the corridor between the VoF and NDNP, in its present status as reserved and civil forest, eventually be included in the WH property to create a contiguous WH property. Protection measures for reserved and civil forests are considered to be adequate for nature conservation purposes. Under the Forest Conservation Act 1980, conversion of any forest land for non-forestry purposes is prohibited without prior approval from Central Government. Moreover, the felling of trees in forests in hill areas is banned.

##### *Altitudinal range*

The boundaries of both NDNP and VoF are confined largely to the sub-alpine, lower alpine and higher alpine zones. Some temperate fir forest occurs in the lower altitudes of the Rishi Gorge in NDNP. Consideration needs to be given to having the full range of altitude (1,800–7,817 m) and vegetation in the biosphere reserve represented within the core zones. As noted by Rodgers and Panwar (1988), it tends to be the lower slopes of the West Himalaya that are least well represented in protected areas. It is recommended that the corridor to connect VoF and NDNP, proposed above, include lower altitudinal areas to at least partly address this concern. Consideration also needs to be given to the trans-Himalayan element, which lies adjacent to the eastern border with China in the vicinity of Laphthal, being designated as a third core zone within the NDBR and a possible further extension to the WH property. Apart from the recommended corridor area, representation of the full altitudinal range within the WH property and the inclusion of a new trans-Himalayan core zone are recommended in the long term. It is acknowledged that they will require time for desk and field survey work and for notification of new boundaries.

#### 4.4 Management of human impacts

##### *Local people*

The VoF is uninhabited. Shepherds used to live here during the summer but livestock grazing ceased following the establishment of the national park in 1982. The nearest settlement is at Ghangrea (3,072 m), just below the entrance to the Valley. It is occupied only in summer to provide services to pilgrims and tourists.

##### *Visitors*

The VoF receives about 4,000 visitors annually, over 90% of whom are Indian nationals, between May and October when access is not impeded by snow. Numbers have increased steadily from about 1,500 in the late 1970s. Access to the National Park is principally via Ghangrea, where there is a Forest Department check post and an entrance fee is charged. Most visitors confine their movements to the 5km of trail along the valley floor and return within the day. However, each summer Ghangrea hosts up to 500,000 pilgrims bound for the Sikh temple at Hemkund, which is outside the National Park.

##### *Community participation*

The VoF and its main approach via the Bhiundhar Valley have been brought under effective management from 2003 as a direct result of the Forest Department fully engaging with local communities to address major problems arising from tourism and associated uncontrolled development. The main problems were: litter (300,000 plastic drinks bottles annually) and 'open toilets' along the approach route generated by the pilgrims en route to Hemkund; dung from the mules (500-600 kg per day) used to transport pilgrims and goods; and 400 shops that had sprung up along the route.

These problems were addressed by establishing Eco-Development Committees (EDCs) in Govindghat and Ghangrea, and working collaboratively with Women's Welfare Groups. Over 50 tonnes of plastic, cans and other rubbish were removed in 2003, while 120 stalls along the route were dismantled. Mechanisms have been put in place by the EDCs to manage the situation sustainably. The Forest Department has recently established a visitor and interpretation centre at Ghangrea, which is run by the EDC. The Forest Department and EDC also support local youths to be trained in eco-tourism and mountaineering skills. This model of collaboration between the local people and the Forest Department is exemplary.

#### 4.5 Management of threats

##### *Tourism*

The current number of up to 50 visitors per day is not considered to be a threat, either to the integrity of the flora or the experience. Trampling of the alpine flora needs to be monitored with vigilance and visitors encouraged to stick to the trail. Mules are not permitted within the VoF, to safeguard the flora. Visitor management is a much bigger issue along the main approach to the Valley, between Govindghat and Ghangrea. It is now contained and regulated, as described in Section 4.4.

### *Invasive plants and other grazing impacts*

While concerns about the impact of livestock on the floral diversity led to the establishment of the VoF as a national park, cessation of grazing since 1982 has led to the proliferation of virtual monocultures of *Polygonum polystachium* in areas where livestock used to congregate. The impact of livestock grazing, or its removal, on alpine meadows continues to be a subject of much uncertainty among ecologists. While there is plenty of good evidence that overgrazing and accumulation of nutrients at sites where livestock congregate is detrimental to floral diversity, extensive grazing by livestock may also enhance diversity of herbaceous plants (Rawat and Rodgers 1988). Alternatively, such weedy species may enhance the recovery of the original flora through their ability to stabilise erosion prone slopes (Kala 2004). The Forest Department is carrying out experiments to inform its management of this species. It is recommended, therefore, that the following research and monitoring be undertaken:

- Aerial surveys to be undertaken every five years to monitor the distribution of forest, scrub and meadows.
- The present status of herbaceous species recorded prior to 1982 to be assessed to identify any species that might have disappeared following the cessation of grazing.
- The herbaceous flora to be subject to a rigorous long-term monitoring programme to detect changes in species diversity and abundance, thereby informing management about such issues as absence of livestock grazing, potential increases in grazing by wild herbivores and climate change.
- The distribution of stands of *Polygonum polystachium* and other weedy species (balsam and the fern *Osmunda claytoniana*) to be accurately mapped annually, using a Global Positioning System, to monitor changes in distribution while cutting experiments continue.

### *Poaching and collection of flowers/medicinal plants*

Poaching is not reported to be a serious problem in the VoF, but the low frequency of sightings of large mammals raises questions, particularly in the absence of grazing competition from livestock. Hunters may enter the VoF via high passes to the west and east between the end of the summer (visitor) season and prior to the onset of winter snow. It is recommended that a comprehensive monitoring and analysis of the status of wildlife in the NDBR, in general, and the VoF/NDNP, in particular, be undertaken to assess the level and impact of poaching, and more extensive and rigorous patrolling be undertaken during the winter period. In addition, a comprehensive survey of the mammals and birds in the VoF should be carried out, particularly with respect to its potential importance for restricted-range endemic birds.

Certain flowers were traditionally collected from the Valley by Bhotia women for religious offerings. Medicinal plants were also heavily exploited for local use and selling in the markets. These practices are now largely under control. The Forest Department has also established a 2ha nursery at Musadhar, just above Ghangrea, for conservation and future propagation of medicinal plants, as well for the education and benefit of visitors.

### *Development*

The Forest Department needs to remain vigilant with respect to future development pressures. It did not agree to proposals a few years ago to build a road up to Ghangrea in view of the instability of the valley sides and biodiversity conservation interests. Given the ever-increasing numbers of pilgrims visiting Hemkund, such proposals may re-emerge and should continue to be refused.

## **5. ADDITIONAL COMMENTS**

### **5.1 Serial property**

The State Party has nominated the VoF as a serial extension to the existing NDNP WH property. IUCN usually asks the three following questions in relation to serial nominations:

#### *What is the justification for the serial approach?*

The VoF is one of two geomorphologically discrete, self-contained units designated as core zones within NDBR and fully protected as national parks. A serial approach is merited to complement the existing WH listing of NDNP.

#### *Are the separate elements of the property functionally linked?*

The VoF National Park and NDNP are discrete sub-catchments that lie either side of the Dhaulti Ganga and are collectively drained by the Alaknanda River. They are functionally linked, while complementing each other in geomorphological and biodiversity terms. In ecological terms, they are linked by a protected corridor to the east, as discussed above.

#### *Is there an overall management framework for all the units?*

The VoF National Park and NDNP comprise the core zones of NDBR for which there is a ten-year Landscape Management Plan that embraces the separate management plans of the individual national parks. Management of the two national parks and encompassing biosphere reserve is integrated, as described in Section 4.2.

### **5.2 Name of property**

In the event of NDNP being extended to include the VoF National Park, the Government of India has proposed, in additional information to the nomination provided on 11 November 2004, that the WH property be renamed as *Nanda Devi and Valley of Flowers National Parks*.

### **5.3 Nanda Devi National Park WH property visitor policy**

The existing NDNP WH property, is currently classified as IUCN Category 1a (Strict Scientific Reserve), based on the previous policy of visitors (mountaineers and trekkers) not being allowed into the property. A 9km section of the route into the outer sanctuary of Nanda Devi was opened in 2003, subject to strict controls and a maximum number of 500 visitors per year. The Government of India proposes that the National Park should continue to be allocated to Category 1a, given that the section open to tourism is small relative to the total area. This policy of opening up NDNP to small groups of trekkers, subject to strict management measures, is welcomed by IUCN because it enables

people to experience the WH qualities of the property and tourism to contribute to the local economy and IUCN encourages the State Party to further develop opportunities for small numbers of visitors to experience this mountain wilderness in accordance with existing and emerging regulations on mountaineering and trekking. Given this change in policy, IUCN considers that IUCN Category 1b (Wilderness Area) is more appropriate.

#### 5.4 Nanda Devi Biosphere Reserve

The concept of core, buffer and outer transition zones is being effectively applied to the NDBR and further enhanced by the WH status of one of the existing core zones. The developing interdependence and integration of WH with the MAB Programme is proving to be a model of synergy.

### 6. APPLICATION OF CRITERIA/ STATEMENT OF SIGNIFICANCE

The VoF National Park has been nominated as an extension to Nanda Devi National Park under natural criteria (iii) and (iv). IUCN considers that the nominated property adds value to the existing WH property and therefore merits inclusion as an extension.

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

The VoF is an outstandingly beautiful high-altitude Himalayan valley that has been acknowledged as such by renowned mountaineers and botanists in literature for over a century and in Hindu mythology for much longer. Its 'gentle' landscape, breath-takingly beautiful meadows of alpine flowers and ease of access complement the rugged, mountain wilderness for which the inner basin of NDNP is renowned. IUCN considers that the nominated property meets this criterion.

#### Criterion (iv): Biodiversity and threatened species

The VoF is internationally important on account of its diverse alpine flora, representative of the West Himalaya biogeographic zone. It is also the first property to have been protected by the Government of India specifically for its flora. The rich diversity of species reflects the valley's location within a transition zone between the Zaskar and Great Himalaya ranges to the north and south, respectively, and between the Eastern and Western Himalaya flora. A number of plant species are internationally threatened, several have not been recorded from elsewhere in Uttaranchal and two have not been recorded in NDNP. The diversity of threatened species of medicinal plants is higher than has been recorded in other Indian Himalayan protected areas. The entire NDBR lies within the Western Himalayas Endemic Bird Area (EBA). Seven restricted-range bird species are endemic to this part of the EBA. IUCN considers that the nominated property meets this criterion.

### 7. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

The World Heritage Committee,

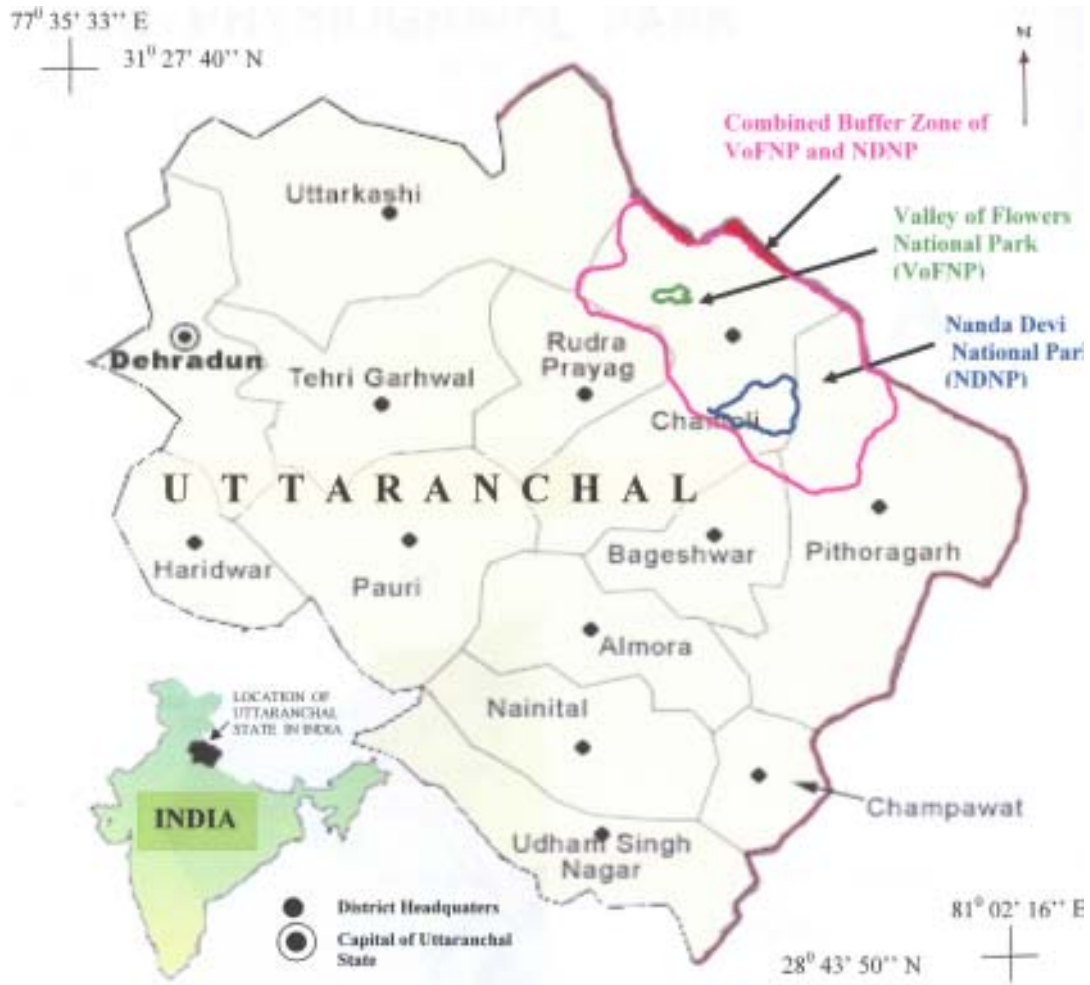
1. Having examined Document **WHC-05/29.COM/8B**,
2. Decides to extend Nanda Devi National Park World Heritage property to include the Valley of Flowers National Park on the basis of natural criteria (iii) and (iv),

**Criterion (iii):** *The Valley of Flowers is an outstandingly beautiful high-altitude Himalayan valley that has been acknowledged as such by renowned mountaineers and botanists in literature for over a century and in Hindu mythology for much longer. Its 'gentle' landscape, breath-takingly beautiful meadows of alpine flowers and ease of access complement the rugged, mountain wilderness for which the inner basin of Nanda Devi National Park is renowned.*

**Criterion (iv):** *The Valley of Flowers is internationally important on account of its diverse alpine flora, representative of the West Himalaya biogeographic zone. The rich diversity of species reflects the valley's location within a transition zone between the Zaskar and Great Himalaya ranges to the north and south, respectively, and between the Eastern and Western Himalaya flora. A number of plant species are internationally threatened, several have not been recorded from elsewhere in Uttaranchal and two have not been recorded in Nanda Devi National Park. The diversity of threatened species of medicinal plants is higher than has been recorded in other Indian Himalayan protected areas. The entire Nanda Devi Biosphere Reserve lies within the Western Himalayas Endemic Bird Area (EBA). Seven restricted-range bird species are endemic to this part of the EBA.*

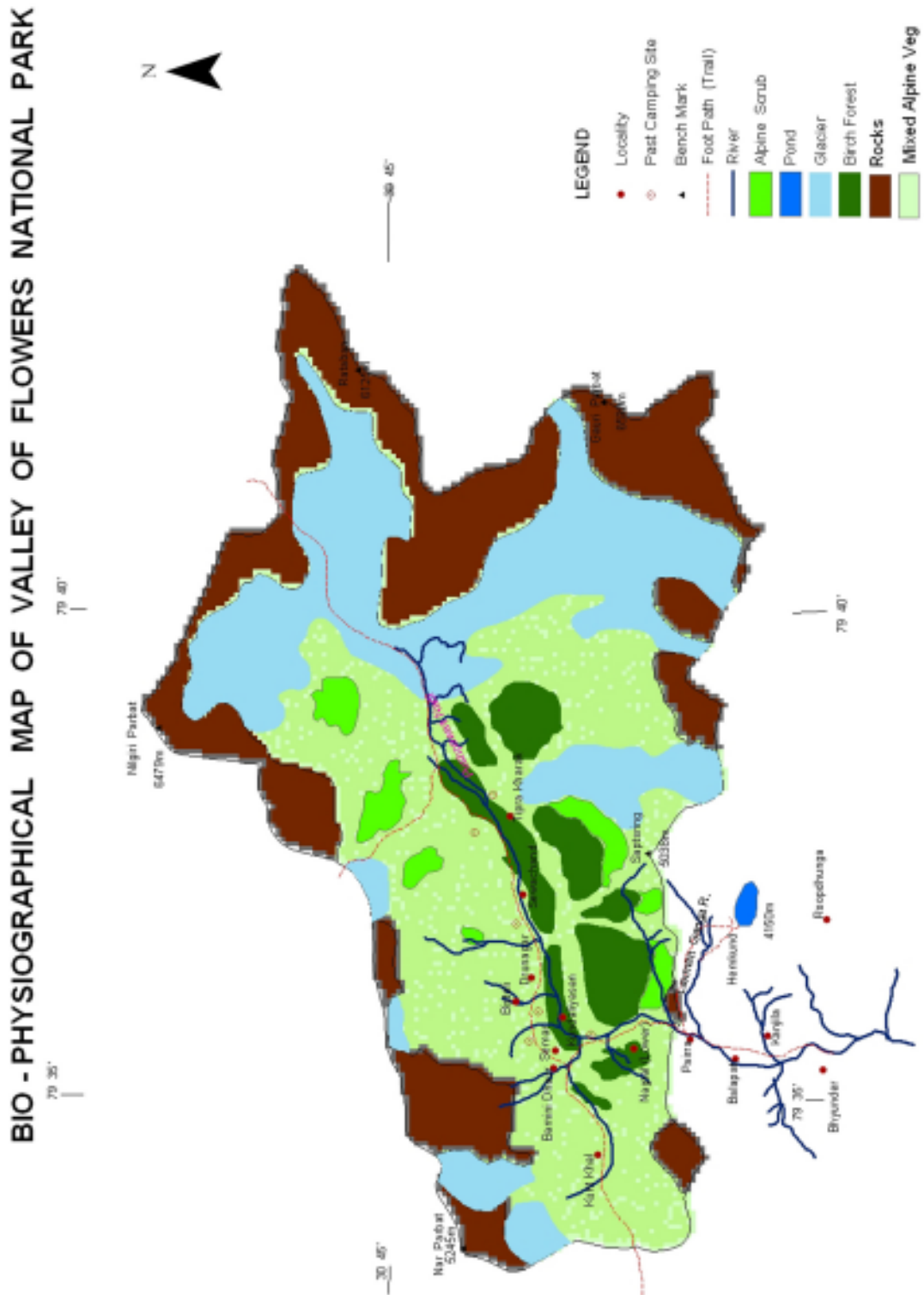
3. Notes that the extended property of 71,210 ha will comprise Nanda Devi National Park (62,460 ha) and Valley of Flowers National Park (8,750 ha), and that its name should be amended to Nanda Devi and Valley of Flowers National Parks,
4. Encourages the State Party to enhance the natural values and protection of the World Heritage property by further extensions to include the corridor connecting Nanda Devi and the Valley of Flowers National Parks, and other areas to include the full altitudinal range and the trans-Himalayan element represented within the Biosphere Reserve.
5. Congratulates the State Party for its environmental clean-up of the approach to the property, and measures to manage tourism sustainably, notably through community-led initiatives and the introduction of regulations,
6. Welcomes the opening of part of Nanda Devi National Park to limited numbers of visitors, which ensure that benefits from such tourism help to sustain local economies; and encourages the State Party to further develop opportunities for small numbers of visitors to further experience this mountain wilderness.

Map 1: General location of nominated property



**LOCATION MAP OF NANDA DEVI BIOSPHERE RESERVE IN UTTARANCHAL STATE (PROVINCE), INDIA**

Map 2: Boundaries of nominated property





## A. Nominations of Natural Properties to the World Heritage List

- A4 Minor Modifications of Boundaries to Natural Properties inscribed on the World Heritage List





EUROPE / NORTH AMERICA

DURMITOR NATIONAL  
PARK

SERBIA & MONTENEGRO





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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### DURMITOR NATIONAL PARK (SERBIA AND MONTENEGRO) ID N° 100 Bis MINOR MODIFICATION OF BOUNDARIES

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#### Background note:

Durmitor National Park was inscribed on the World Heritage List in 1980, on the basis of natural criteria (ii), (iii) and (iv). Formed by glaciers and traversed by rivers and underground streams, the Park is particularly known for the Tara river canyon, which has the deepest gorges in Europe, as well as for its dense pine forests, interspersed with clear lakes, and a wide range of endemic flora.

At its 20<sup>th</sup> session in 1996, the World Heritage Committee noted the following in relation to the property:

*“The Bureau at its extraordinary twentieth session took note of the World Heritage Centre’s mission to the site .... The mission noted the rapid unplanned and uncontrolled expansion of the village of Zabljak and adjacent development ..... The Bureau considered the situation at the site and decided the following: The Bureau ..... (b) expressed its concerns over the rapid town development within the site and lack of investment in the Park infrastructure; (c) requested clarification of possible boundary adjustments under consideration; ...”*

Further, at its 21<sup>st</sup> session in June 1997, the Bureau of the World Heritage Committee, noted:

*“... that the Committee at its last session had been concerned about the unplanned and uncontrolled expansion of the village of Zabljak and its environs and requested clarification regarding the boundary adjustments under consideration... The Bureau was informed that the Management of the Durmitor National Park have informed the Centre that their proposal to excise the 40 ha area around the village of Zabljak from the Park area had been approved by the Government of the Republic of Montenegro and that the Management wished to know whether the World Heritage Committee would agree with the proposed modification of the Park boundary..... The Bureau requested the Park Management to submit to the Centre, before 15 September 1997, a map showing the proposed modification of the Park’s boundaries to excise the 40 ha area around the village of Zabljak and recommended that the Committee at its next session in December 1997 decide whether or not the proposed boundary modification is acceptable.”*

The information requested by the Bureau in June 1997 was not submitted by December 1997 and therefore the World Heritage Committee has not been in a position to make a decision on the boundary modification.

Following concerns over the proposed construction of a dam that would potentially flood part of the Tara Gorge and part of the World Heritage property, IUCN and UNESCO carried out a monitoring mission to the property in January 2005. At that time the mission team

made enquiries about the proposed boundary modification and requested the State Party to submit the relevant documentation for examination by the 29<sup>th</sup> session of the World Heritage Committee. The report of the monitoring mission is being presented in the State of Conservation report in a separate document to the same session of the Committee.

#### 1. NEW INFORMATION

During the IUCN / UNESCO monitoring mission to the property in January 2005, the Physical Plan for the Durmitor National Park (Prostorni plan područja posebne namjene NP Durmitor (Sl. list RCG br. 20/97)), concerning the legal area of the Park approved in 1997, was made available to the mission team. This document was however not available in English. The mission was also informed that the borders of the property are defined by the Law on National Parks (Sl. List RCG, br. 47/91). In a letter to the World Heritage Centre on the 27 January 2005, the State Party submitted a set of large maps, which accompany the Physical Plan, outlining the boundaries of the National Park, although due to their size and number these are difficult to examine. In a further letter to the World Heritage Centre dated 28 February 2005, the State Party confirmed that this information was official and legally binding.

The State Party noted that the boundaries set in 1997 under the Physical Plan did not include the town of Zabljak within the Park. The total area of the Park was set at 34,000 ha which has been divided into three zones. Zone I, covering 3400 ha, is the most strictly protected area; Zone II comprises 25,400 ha, and Zone III comprises 5200ha. The latter being the area where various uses of natural resources are possible. The State Party noted that no map was available in A3 or A4 size to show the overall boundaries of the Park and the exclusion of Zabljak, and the responsible Ministry did not have the necessary equipment to prepare such a map.

The State Party explained that there were certain communication problems in the past due to the troubles in the region and they had never received the 1996 mission report. They noted that since the Ministry of Environmental Protection and Physical Planning is now responsible for natural protected areas in Montenegro there would be no further communication problems.

#### 2. IUCN COMMENTS

The IUCN monitoring mission to the property in January 2005 noted that the draft Management Plan for the Durmitor National Park (2005 – 2010) (Program zastite i razvoja Nacionalnog parka Durmitor (2005 – 2010)), dated June 2004, proposes the enlargement of the

protection zones since the current borders do not include all the natural phenomena and unique natural features; for example some nature reserves and natural monuments close to the park and also a part of the Tara Canyon are not included. This enlargement should occur during the period of 2005 – 2010 on the basis of further evaluation and review. A list of ten additional areas is included in the draft management plan.

IUCN recommends that the boundaries of the World Heritage property be modified so that they are in line with the current boundaries of the National Park, as approved in 1997. Following the enlargement of the National Park, proposed by the Draft Management Plan, the State Party should inform the World Heritage Committee about the new boundaries and zones, and should consider whether those additional areas would meet natural World Heritage criteria.

Since the Physical Plan for the National Park was not in English, IUCN was not able to examine it in detail. IUCN recommends that the State Party ensure that the zoning within the National Park is consistent with the World Heritage Convention and should ensure that conservation is the main objective over at least three-quarters of the area and the management of the remaining area is not in conflict with that primary purpose.

### 3. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

*The World Heritage Committee,*

1. *Having examined Document **WHC-05/29.COM/8B**,*
2. *Decides to adjust the boundaries of the **Durmitor National Park** World Heritage property to be in line with the boundaries of the National Park approved by the State Party in 1997, thus excluding the town of Zabljak from the property. The World Heritage property, therefore, in line with the current boundaries of the National Park, comprises an area of 34,000ha.*
3. *Requests the State Party to submit a topographical map of the entire National Park on one sheet, and to inform the World Heritage Centre of what assistance it requires to prepare this map, and to inform the World Heritage Committee of any future changes in the boundaries of the National Park.*

EUROPE / NORTH AMERICA

DOÑANA NATIONAL PARK  
(MINOR EXTENSION)

SPAIN





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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### DOÑANA NATIONAL PARK (SPAIN) ID Nº 685 Bis (MINOR EXTENSION)

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#### Background note:

Doñana National Park (50,720ha) in Andalusia, Spain, occupies the right bank of the Guadalquivir river at its estuary on the Atlantic Ocean. It was inscribed in the World Heritage List in 1994 mainly for the great diversity of its biotopes, especially lagoons, marshlands, fixed and mobile dunes, scrub woodland and maquis. It is home to five threatened bird species. It is one of the largest heronries in the Mediterranean region and is the wintering site for more than 500,000 water fowl each year. IUCN in its evaluation report (1994) stressed the need of incorporating appropriate portions of adjacent lands into the World Heritage property in order to enhance its integrity through a better design of the Park's boundaries.

Name of the area	Extension (ha)
West Traingle	723.7
Flood plain of the Partido stream	142.6
Los Caracoles	2,665.4
<b>TOTAL</b>	<b>3,531.7</b>

In this information note the State Party requested that three areas added to the National Park be considered as an extension of the World Heritage property in order to bring the boundaries of the World Heritage property in line with the extended National Park. This extension is requested on the basis of the following arguments:

- The nature and ecological characteristics of these three areas are similar to those that characterize the current World Heritage property, and contribute to maintain the hydrological processes that are vital to the integrity of the Park's ecosystems;
- The areas substantially contribute to enhance the boundaries of the Park by reducing the length of its limits, thus contributing to a more effective management and control of the Park; and
- The proposed areas will be managed by the same administration and under the same legal framework and management regime of that existing for the National Park.

#### 2. IUCN COMMENTS

IUCN considers that the areas proposed for extension are of similar natural character to the rest of the World Heritage property and the extension will contribute to maintaining the integrity of the property. This is also in line with IUCN recommendations at the time of the evaluation of the property. IUCN considers that the World

#### 1. NEW INFORMATION

On 1 February 2005 IUCN received an information note from the State Party noting that Doñana National Park was extended by Resolution 3371 of February 2004 adopted by the Autonomous Organization for National Parks, Ministry of the Environment. The extension incorporates into the Park three adjacent areas, all of them of public property. The three areas contain similar ecosystems to those of the rest of the Park, mainly Mediterranean bush, fresh water marshes, low basin tributary streams of the marshes and lagoons. The total area incorporated into the Park, as noted in the table below, is of 3,531.7ha.

Heritage property should be extended to include the three proposed areas.

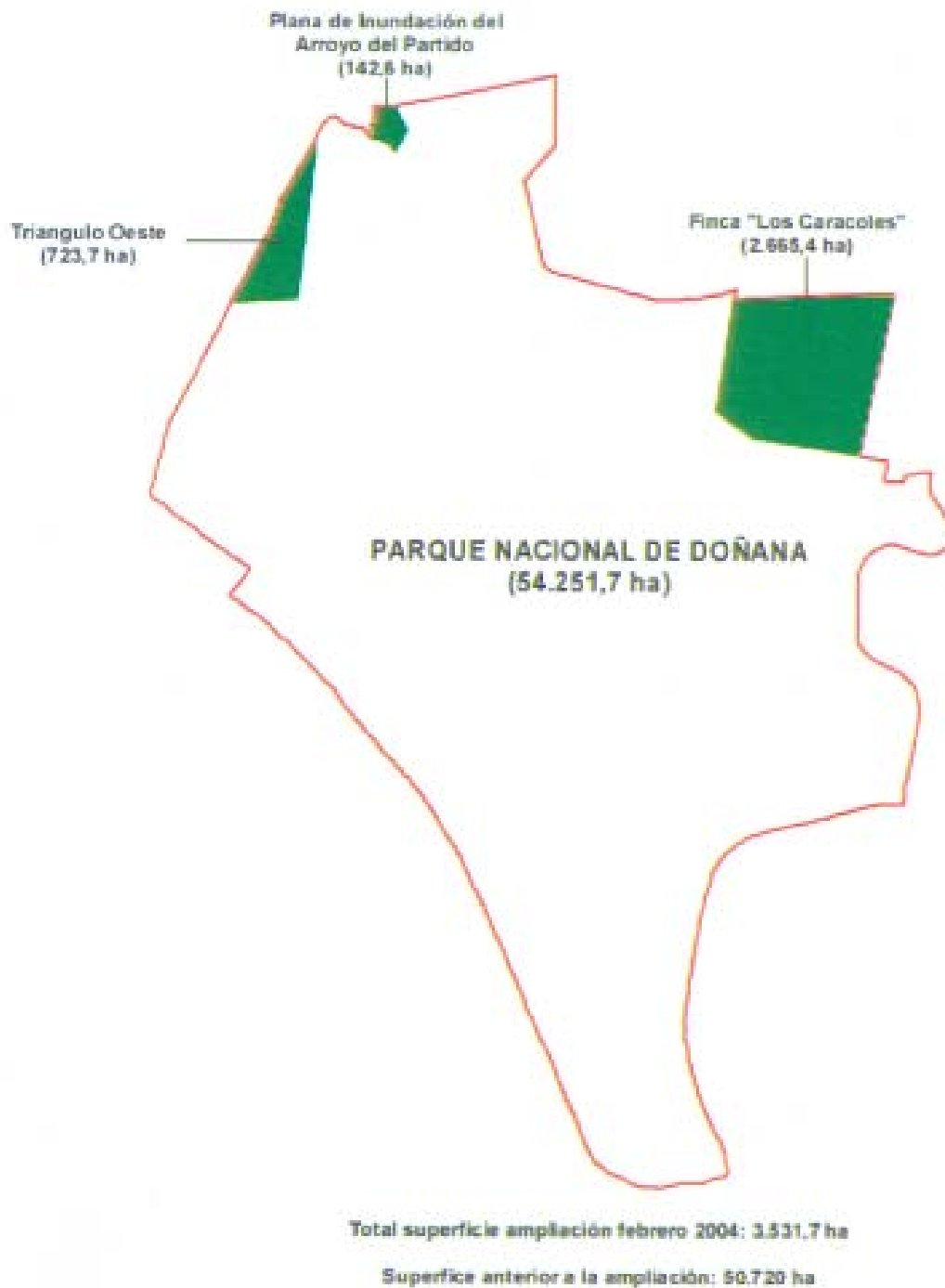
#### 3. DRAFT DECISION

IUCN recommends that the Committee adopt the following decision:

*The World Heritage Committee,*

1. *Having examined Document WHC-05/29.COM/8B*
2. *Decides to extend Doñana National Park to bring the boundaries of the World Heritage property in line with the extended National Park; thus the total area of the World Heritage property will be 54,251.7ha.*
3. *Commends the State Party for its efforts to enhance the protection and management of the property.*

Map 1: Boundaries of World Heritage property and proposed extensions





B. New Nominations for Mixed Properties



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## NOMINATED GABON WORLD HERITAGE PROPERTIES

### GENERAL COMMENT BY IUCN

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Two properties were nominated by the State Party of Gabon in 2004: the "Ecosystem and Relict Cultural Landscape of Lopé-Okanda" and the "Ecosystem and Cultural Landscape of the Minkébé Massif". At the outset IUCN would like to congratulate the State Party for its effort to conserve its important natural heritage and, specifically, the initiative to establish, by Presidential Decree, 13 National Parks throughout Gabon in 2002.

IUCN noted that both nomination documents had a number of deficiencies and there were further points which required clarification. Accordingly further information was requested from the State Party. In relation to Lopé-Okanda the State Party response was received on 30 and 31 March 2005, and this included a completely revised nomination document. It was not possible for IUCN to adequately review this material within the time frame available. IUCN wishes to highlight to the Committee and States Parties the importance of following correct procedure in the evaluation process and wishes to emphasize that completely revised nominations should not be accepted at the final deadline.

IUCN notes that the data on the two nominated properties is still in a preliminary state. Data for several groups of plant and animal species for the properties is only preliminary, estimated or non-existent. Given the current state of knowledge, it is therefore impossible to make valid comparisons with complete confidence. Within Lopé-Okanda, for example, most of the biological and archaeological fieldwork has occurred in the northern section, leaving the remaining area, a densely forested and remote mountainous region, to be surveyed and studied.

A number of integrity issues exist in each property and these are noted within the text of the evaluation report for each property.

Further, IUCN notes that there have been suggestions from a number of expert reviewers as to other sites which may have potential for World Heritage Listing within Gabon.

Accordingly, IUCN recommends that both of the nominated properties be deferred, pending the preparation of a clear Tentative List for Gabon which more clearly identifies priorities for World Heritage within Gabon. The deferral would also allow the State Party to respond to the issues relating to integrity raised within the IUCN evaluation reports. IUCN also recommends that Gabon receive support from the World Heritage Fund in development of such a Tentative List.

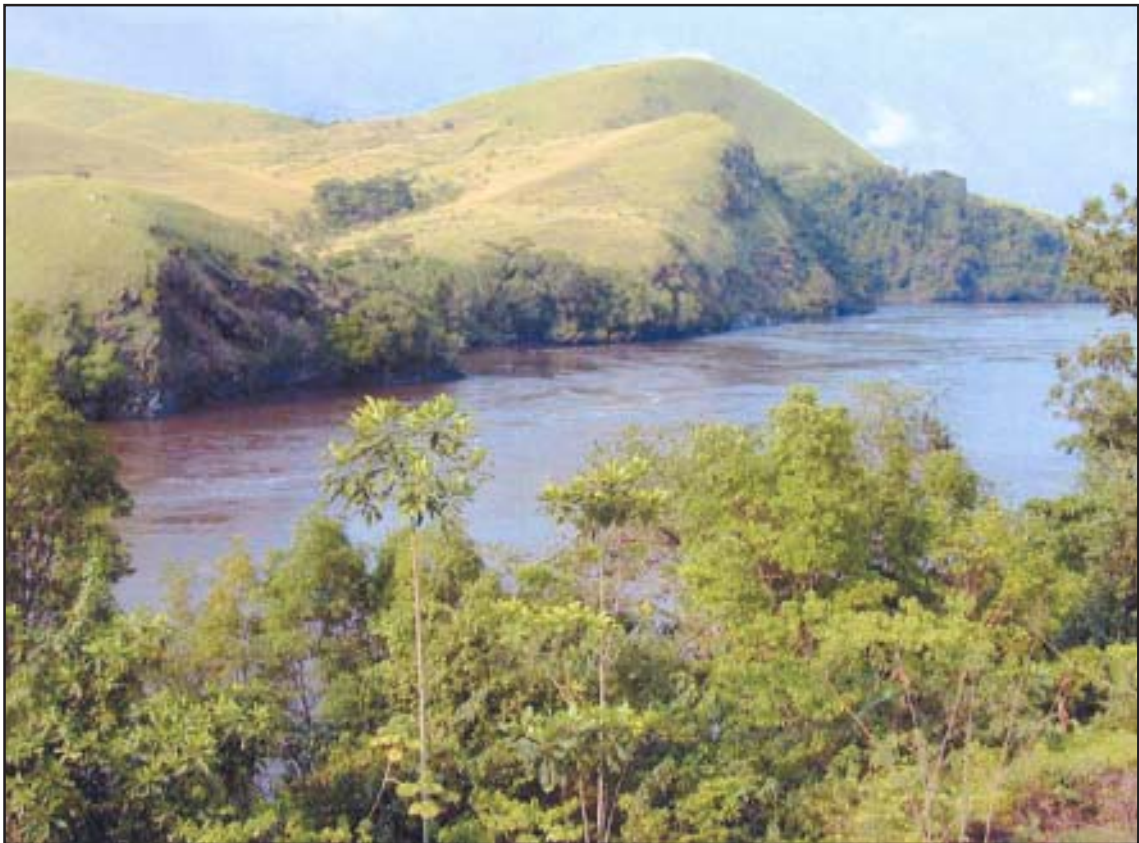


AFRICA

ECOSYSTEM AND RELICT CULTURAL

LANDSCAPE OF LOPÉ-OKANDA

GABON





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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### ECOSYSTEM AND RELICT CULTURAL LANDSCAPE OF LOPÉ-OKANDA (GABON) ID N° 1147

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#### 1. DOCUMENTATION

i) **Date nomination received by IUCN:** April 2004

ii) **Dates on which any additional information was officially requested from and provided by the State Party:** IUCN requested supplementary information on the 1 February 2005, after the IUCN WH Panel. The State Party response was received on 30 and 31 March 2005, including a completely revised nomination document.

iii) **IUCN / WCMC Data Sheet :** 5 references

iv) **Additional Literature Consulted :** Abernethy, K., Tutin, C. & White, L. (1997): **Un groupe de 1350 mandrills à la Lopé.** *Canopée* 9. ECOFAC, Libreville ; Abernethy, K. & White, L. (1999) : **Etude des mandrills : application de la recherche au tourisme.** *Canopée* 15. ECOFAC, Libreville ; Adiahen, R.H. (2003) : **Présentation des objectifs et de la planification du CNPN.** Conseil National des Parcs Nationaux. Présentation *Power Point*. Décembre 2003; Anon. (2001) : **Loi 016/2001 portant code forestier en République Gabonaise.** Présidence de la République. 64pp. Libreville ; Anon. (2002) : **La politique des parcs nationaux.** Ordonnance 6/2002 et Décrets 607 à 619 portant classement de nouveaux parcs nationaux. *Hebdo informations* n°463 du 14 décembre 2002: 209-223. Libreville; Anon (2004): **Lopé : situation conflictuelle entre riverains animaux et gestionnaires du parc.** Journal l'Union Plus du 22/06/2004. [http://www.internetafrica.com/gabon/actu/actu\\_22062004c.htm](http://www.internetafrica.com/gabon/actu/actu_22062004c.htm); **CARPE (2003) :** Louesse – Chaillu – Lopé Forest Landscape (Gabon and Congo). [http://carpe.umd.edu/locations2004/landscapes/3\\_Lopé.pdf](http://carpe.umd.edu/locations2004/landscapes/3_Lopé.pdf) ; Christy, P. (1999): **Parc National d'Odzala: carnet de voyage.** ECOFAC, Libreville, 56pp.; **Endemic Bird Areas of the World (pp.353-354) :** CIFOR, Government of Indonesia and UNESCO (1999) : **World Heritage Forests;** Conseil National des Parcs Nationaux (2003) : **Stratégie de mise en œuvre d'un réseau de Parcs Nationaux au Gabon.** Présidence de la République. 18pp. Libreville; CNPN (2004): <http://gabonnationalparks.com/nationalparksfr>. Site visited 11 october 2004 ; de Mérode, E., Bermejo, M. & Illera, G. (2001) : **Lopé, Aire Protégée et Tourisme.** *Canopée* 20 : 15-16. ECOFAC, Libreville ; EARTH (2003) : **Evaluation prospective et audit du programme ECOFAC.** Rapport final. 223pp + annexes ; ECOFAC (2003) : **Composante Nationale Gabon : Parc National de la Lopé.** Rapports d'activités 2003 ; Gautier-Hion, A., Colyn, M. & Gautier, J.P. (1999): **Histoire naturelle des primates d'Afrique centrale.** ECOFAC, Libreville. 162pp. ; Nichols, N. & Fay, M. (2002) : **Les Parcs Nationaux du Gabon. Stratégie pour le troisième millénaire.** National Geographic Society et Wildlife Conservation Society. Libreville. 52pp.; Vande weghe, J.P. (2004): **Forests of Central Africa, Nature and man.** Lannoo, Tielt. 367pp.; White, L. & Abernethy, K. (1996): **Guide de la végétation de la Réserve de la Lopé.** ECOFAC, Libreville. 224pp. ; Wilmé, L. & Vande Weghe, J.P. (2002): **La Réserve de Faune du Dja: à la découverte de la forêt tropicale.** ECOFAC, Libreville, 56pp.

v) **Consultations :** 6 external reviewers. The mission met with the National Director of WCS for Gabon and the representative of the national component of ECOFAC (EU funded Programme "Conservation et utilisation rationnelle des écosystèmes forestiers en Afrique Centrale") for Lopé National Park; representatives of UNESCO Gabon, the UNESCO National Commission, the National Council of National Parks, the Ministry of Water and Forests (Direction de la Faune et de la Chasse), Ministry of Mining, Ministry of Culture and Education, local authorities, local communities, European Union, Forestry societies, local NGOs and international NGOs.

vi) **Field visit :** Jean Pierre d'Huart (IUCN), Mamadi Dembele (ICOMOS), October 2004.

vii) **Date of IUCN approval of this report:** May 2005

#### 2. SUMMARY OF NATURAL VALUES

The nominated property comprises Lopé National Park (LNP) and includes several small peripheral multiple use zones. LNP is located in the centre of Gabon, to the west of the town of Booue, south of the Ogooue river

which forms the northern border of the park. LNP spans the provinces of Ogooué-Ivindo, Ogooué-Lolo, Moyen-Ogooué, and Ngounié. Access to the property, situated in the commune of Lopé, lies 300 km south-east of Libreville. A main road and a railway line pass through the northern part of LNP.

LNP covers an area of 484,894 ha and the multiple use zones cover an area of 6,397 ha, making a total nominated area of 491,291 ha. The buffer zone, estimated at 150,000 ha, consists of the external 5 km zone surrounding the Park's boundaries. The Equator lies just a kilometre or two to the north of the northern limit of the property.

The underlying geology of the area comprises ancient igneous rock some 2.7 billion years old, covered by slightly younger igneous and metamorphic rocks dating back 2 - 1.95 billion years.

LNP is located in the Gabonese central forest area. It extends to the south of the river Ogooué for approximately 120 km and has an average width of 45 km. Included within it are the Okanda Mountains, and it is bounded by the valley of Mingoué to the west and by the valleys of Offoué and Mighakou to the east and south. Two tributary rivers, the Lopé and the Lélédi, run north through the centre of the park to flow directly into the Ogooué river. The Okanda Mountains run south from the Ogooué rapids ("Portes de l'Okanda"), and form a succession of forested hills, culminating in the Chaillu massif (960m) outside the property to the south. In its northern, north-eastern and central-eastern parts, the Park comprises stretches of savannas and mosaics of forest/savannah landscape alternating with plateaus, ravines, rapids, rivers and marshy swamps, forming an area well suited to a great diversity of fauna and flora. These open spaces were inhabited by people from a very early period (approx. 400,000 years ago) who left various traces of their activities on the property. The significance of these human remains in terms of cultural criteria (iii) and (iv) has been separately evaluated by ICOMOS.

The equatorial climate is hot and humid with an average and fairly constant temperature of approximately 26°C. Four seasons can be distinguished: a long dry season from mid-June to mid-September, a short dry season from mid-December to mid-February, and two rainy seasons.

Compared with other dense equatorial forest areas, the rainfall in the northern area is unusually low, with an annual average of 1522mm in Lopé (in comparison to more than 3000mm in Libreville). The Chaillu massif causes a foehn effect, reducing rainfall in areas sheltered from the southerly wind. Thus Lopé has the driest climate in Gabon, is most susceptible to climatic variations, and is therefore the area where the forest is most fragile.

Vegetation in the northern part of LNP consists of savannah grasslands with small bushes. Riparian forest fringes the Ogooué and follows its tributaries southwards into the main forest block where there is a mosaic of gallery forest and marantaceous forest. The mosaic of palaeotropical rainforests and ancient savannas which characterise the northern sector of LNP reflect biological evolution over the last 15,000 years; the landscapes of this area have been significantly shaped by human influence. The mosaic consists of 6 types of savannah (covering 5% of the property) and 17 types of forests. Towards the centre of LNP there are mixed forests with high canopies. At a higher altitude, there are semi-montane forests on rocky grounds up to 500m. However,

the forests of the LNP are not pristine as a large proportion of the forest was exploited before the creation of the park. In all, more than 1500 plant species are recorded, including 40 which were not previously found in Gabon.

LNP contains ecosystems which are extensive enough to maintain its animal populations over the long term. Thanks to the work done by the « Station d'Etude des Gorilles et Chimpanzés » (SEGC), LNP has acquired an important amount of information on the fauna and flora and benefits from a programme that monitors several habitats and species. The park provides habitat for many animal species that are threatened elsewhere in the Congo Basin. There are at least 63 species of mammals (of which 21 species are threatened) and nearly 400 species of birds, over 50% of all bird species listed in Gabon, including at least 290 that breed within the park. Information on reptiles, amphibians, fish and insects is however poor.

With 15 diurnal and nocturnal species (of which 7 are threatened), the primates are a dominant group including the lowland gorilla, the mandrill, the chimpanzee, the black colobus, and - discovered only in 1984 - the sun-tailed monkey, found only in Gabon. LNP shelters the most important populations of lowland gorillas and chimpanzees of Central Africa and, with the exception of the suntailed monkey, these species are not in danger in the Park. Numbers of gorillas (2000-3000) and mandrills (approx. 50,000) is stable but those of chimpanzees (approx. 2250) have declined due to forest exploitation. The property is famous for the spectacular observation of mandrills travelling in groups of several hundred animals, up to 1350 at the maximum. The elephant population was estimated at 8100 individuals in 2001. There are 7 species of duikers, and several other ungulate species. However, the hippopotamus population was eradicated through illegal hunting by 1998. There are 13 species of carnivores, including a leopard population of more than 1000 individuals. There are several rare forest bird species (including the grey-necked rockfowl, the Dja River scrub-warbler, the lyre-tailed honey guide, and the red-fronted parrot), but the avifauna of the savannah is relatively impoverished.

### 3. COMPARISON WITH OTHER AREAS

The nomination argues that LNP, with its large rivers, and many and varied forest and savannah habitats, along with its abundance of species, make LNP of outstanding universal value. In addition, the archaeological remains dating from different prehistoric times add a potentially important cultural dimension to this property and this is the subject of a separate report by ICOMOS. Although a large portion of the forest was exploited before the creation of LNP, the property retains many of its essential components, and its display of transitions from forest to savannah ecosystems are also of interest.

Comparable sites within the Congo rainforest include: Dja Faunal Reserve (526,000ha) in Cameroon; Salonga National Park (3,650,000ha), Okapi Faunal Reserve (1,372,000ha) and Kahuzi-Biega National Park



(600,000ha), all in the Democratic Republic of Congo, the eastern parks of In the Guinean forest region Tai National Park (330,000ha) in Cote d'Ivoire also has similar characteristics. In Gabon there are several similar National Parks which were also created in 2002, including Minkébé NP (756,000ha), Ivindo NP (300,000ha) and Mwagne National Park (116,000ha). All are dense tropical rainforests rich in biodiversity.

LNP has been recognized by IUCN as one of 15 critical zones for the conservation of biodiversity in Central Africa, and BirdLife has recognized it as one of seven *Important Birds Areas* of Gabon. However, these are regional and national, rather than global, assessments. In order to establish the international significance of the forests and savannas of LNP, it is necessary to examine the property (a) in the context of analyses of biogeographical regions and habitats (Table 1), and (b) against relevant frameworks designed to establish conservation priorities (Table 2).

**Table 1: Biogeographical and Habitat Analyses**

Biogeographical System	Unit in which LNP occurs	Existing WH properties in unit
Udvardy Biome	Congo Rain Forest Province (in Afrotropical Realm and Humid Tropical Forest Biome)	Dja Faunal Reserve Salonga National Park Okapi Faunal Reserve
WWF Global 200 Ecoregion	Western Congo Ecoregion	Dja Faunal Reserve
*IUCN/SSC World Habitat Types	African Tropical Moist Forest Habitat	Mt Nimba Strict Nature Reserve Tai National Park Dja Faunal Reserve Salonga National Park Okapi Faunal Reserve

**Table 2: Conservation Priority Analyses**

Prioritisation system	Priority area covering LNP	Suggested priority for WH
CI Hotspots*	None identified	Not relevant
BirdLife Endemic Bird Areas	None identified	Not relevant
SSC Centres of Plant Diversity*	None identified	Not relevant
WH Forests (Berastagi Report)	Western Congo Basin Forests	Dja Faunal Reserve

\*CI = *Conservation International*; SSC = *Species Survival Commission of IUCN*

Table 1 shows that several other WH properties appear in the same biogeographical region or habitats as LNP, with Dja Faunal Reserve (Cameroon) appearing under all three systems of classification. Salonga NP and Okapi FR (DRC) also have a number of similarities with LNP.

Table 2 shows that the western Congo basin forests, though regionally important, do not appear as globally significant under three of four key global prioritisation systems. Under the fourth system, (that prepared in 1999 through a UNESCO/IUCN/UNEP-WCMC meeting on tropical forests at Berastagi, Indonesia), the forests of the region were recognized as suitable for a WH property, but the existing one at Dja was considered as a site which already meets this requirement.

A comparison of species numbers within comparable sites within the Congo rainforest is shown in Table 3. It is noted that most of these protected areas contain high biodiversity, but data for several groups of plant and animal species is only preliminary, estimated or even non-existent. Given the current state of knowledge, it is therefore impossible to make valid comparisons with complete confidence. Within Lopé, most of the biological and archaeological fieldwork has occurred in the northern section, leaving the remaining area, a densely forested and remote mountainous region, to be surveyed and studied.

There are a number of other forest protected areas in the region (Boumba-Bek and Nki NP in Cameroon, Odzala NP in the Congo, Minkébé, Mwagne, Ivindo NPs). The mosaic of savannas and forests that are represented in LNP are also represented in the Odzala National Park in the northern part of Congo. It is noted that Odzala was proposed for World Heritage listing in 1994 but the WH Committee recommended that it not be inscribed. The Minkébé NP – also nominated in 2004 as a mixed property (756,000 ha) - which is located 150 km north-east, has a larger number of mammal species but a smaller number of endemic and threatened species. The forest portion of LNP contains a comparatively high density and animal biomass, providing the potential to preserve the genetic diversity over the long term. Unlike other properties, LNP preserves a register of the biological evolution associated with the interface between the forest and the savannah over the last 15000 years. Moreover, Lopé is best located to profit from tourism, being the most accessible from Libreville and the most developed for tourism.

There is no doubt that Lopé-Okanda is significant in a national context. In a regional context it is also important, with close similarities to Odzala for example, in respect

**Table 3: Comparison of numbers of species in Protected Areas in the region**

	Minkébé NP	Odzala NP	Dja FR	Lopé NP
Mammals	191	114	109	84+
(diurnal primates)	12	11	10	9
(no. of elephants)	29,000	18,000	1,500	8,100
Birds	520	444	325	400
Reptiles	121			
Amphibians	75			
Fish			60	
Flora		1500	2000	1400+

of the forest/savannah mosaic, but also with marked differences with the Odzala grasslands containing true savannah species. At a global level the case for Outstanding Universal Value is less clear.

The conclusions that can be drawn from the above analyses are as follows:

- LNP is undoubtedly of national and regional importance;
- Its global significance is not established at this stage; and
- LNP has been less adversely affected by external pressures and retains some important populations of globally threatened species, especially primates.

#### 4. INTEGRITY

##### 4.1 Legal Status

The nominated property is the oldest protected area in Gabon. The Hunting Reserve of Lopé-Okanda, the Okanda National Park, and the Integral National Reserve of Offoué were established in 1946. They were later combined to form the "aire d'exploitation rationnelle de faune de l'Offoué" (1962), the Lopé Faunal Reserve (1982) and finally the Lopé National Park created by the Decree n°607 of the 30 August 2002, at the same time as 12 other new national parks. Land ownership for the Park is held by the state.

Pending the preparation of a management plan and the adoption of detailed regulations, the Law on the Conservation of Nature (Law 16/93 of August 1993) and the new Forest Code (Law 16/2001 of December 2001) regulate most of the activities in the protected area. They also provide some controls over the buffer zone around the park. This legislation should provide adequate protection to the property if the capacity of the management authority is reinforced and if no new harmful activity, such as mining exploitation is permitted in or near it.

##### 4.2 Boundaries

The current boundaries of LNP mainly follow rivers, roads, and other tangible physical landmarks. The articles 77 and 78 of the Forestry Code (Law 16/2001)

plans the creation of a buffer zone of at least 5 km to mark the transition between the national park and areas where other economic activities (forestry, mining, hunting or agricultural) may take place. This would seem to ensure that many exploitative activities will not take place directly adjacent to the Park boundaries, and forest concessions should also be excluded from the buffer zone. The Agreements with the affected communities, however, have not yet been signed, and it is also questionable as to whether a strip of standard width, rather than one based on watersheds or habitats for example, can function well as a buffer for the Park.

Shortly before the Lopé Faunal Reserve was set up as a National Park in 2002, its boundaries were modified by land exchange in order to exclude forest concessions from the protected area. However, the current boundaries of LNP still contain a portion of a concession for the logging company NSG, whose exploitation permit was due to expire at the end of 2004

##### 4.3 Management

The revised nomination received on the 31 March 2005, notes that the National Council of National Parks (Conseil National des Parcs Nationaux - CNPN), an inter-ministerial committee set up in 2002 under the authority of the President of the Republic (Order 6/2002 of 22 August 2002), is responsible for the management and development of the network of 13 new national parks in Gabon, including LNP. It acts in close collaboration with the "Direction de la Faune et de la Chasse" (DFC) under the Ministry of Forests, Waters and Fishing. However, there is still a lack of clarity on the respective roles and responsibilities of the two institutions on the ground. It appears that the legal and institutional arrangements of the CNPN are still being developed.

The objectives of LNP, set out in the Decree creating the Park, include the conservation of fauna and flora, habitat management, the protection of 'sites of public interest', and tourism development. Outside LNP, in the multiple use zones, only "traditional" activities are authorized as defined by the Forest Code. The original nomination submitted by 1 February 2004, noted that a management plan was under preparation. However, the revised nomination of 31 March 2005 states in one section that a management plan was adopted in 2002 (page 41), and in another that a development plan was adopted in

2002 (page 39). So far only the “Development Plan for the Lopé-Okanda Faunal Reserve”, supported by ECOFAC, adopted in 2002 and due to be revised before the end of 2006, has been received by IUCN and so it is understood that no management plan is available for the National Park. The elaboration of the plans and internal regulations for all of Gabon’s National Parks is the responsibility of the CNPN. They have given priority to LNP and the Loango NP and in both cases the development of these plans is being supported of the US Forest Service and international conservation NGOs.

Working with the DFC staff, the ECOFAC project has developed management strategies for tourism management, grassland burning, research and monitoring, controlling the trade of bush meat, the conservation of fauna in the peripheral forest concessions, the collaboration of the neighbouring village communities and anti-poaching campaigns. However, few of the protocols required to bring these into effect have yet been signed by the State.

The management capacity of the property is currently inadequate according to a number of reviewers. Field activities are organised from Lopé, where most of the personnel is based. The DFC team consists of 8 guards and one conservation expert, assisted by a small number of support staff. Support is occasionally provided by two staff from the forest stations to the east and west of LNP and by police at the railway stations of Lopé and Ayem. DFC staff are supported by the European Union ECOFAC project team (38 people) and the Wildlife Conservation Society (WCS) team of the “Station d’Etude des Gorilles et Chimpanzés” (32 people) for research, monitoring or training. Apart from the DFC team’s salary, which is paid by the State, the financial and material resources invested in LNP come from international partners, mainly from the EU-funded ECOFAC project (av. of 598,000 €/year between 1992 and 2002) and WCS (approx. 300,000 US\$/year from various sources). One use of these budgets has been to supplement the otherwise insufficient salaries of the DFC field staff. It is difficult to identify the exact contribution from the Government for the management of LNP.

Inadequate staffing is a major constraint in relation to the effective surveillance of LNP and only the northern sector of the park is patrolled to any extent. The small DFC team is currently required to patrol both the National Park and the surrounding forest concessions, as well as control the transport and trade of bush meat via the railway stations and national roads. The level of staff is inadequate for this task and these men are neither armed nor adequately equipped. The training provided is a basic level acquired in the national or regional wildlife management schools. It is planned eventually to transfer staff from the ECOFAC project to the DFC, but this depends on satisfactory arrangements being put in place by the State to ensure the status of these staff and their financing.

The absence of a formally adopted management plan and associated regulations, along with the limited capacity and resources available for the area’s management, means that a policy of income sharing with local communities cannot be put in place; serious issues of animal crop raiding affecting adjoining

communities, caused mainly by elephants from the Park, go un-addressed; and large parts of LNP are left undefended against pressures, such as poaching for bush meat.

#### 4.4 Human Impact

Human pressure at present is relatively low due to the low population density around most of LNP, and the absence of roads in its southern and western portions. The need to improve relations with local communities between LNP staff and local communities was noted as an important issue by some reviewers. This is particularly in relation to human wildlife conflicts, including animal crop raiding. Public awareness programmes, such as that run by the Wildlife Conservation Society at Lopé, are important and should be expanded. The number of visitors to LNP has been small, with approximately 1000 tourists per year between 2000 and 2003.

The LNP is surrounded on its south-eastern and western limits by several active forest concessions, and some of these activities still take place in the Park. It has been estimated by one reviewer that approximately half of the area contained in LNP has been logged over the last 40 years and that some parts of LNP have been logged more than once. Logging companies also impact the buffer zone of the national park through hunting for meat by their employees. Articles 9 to 11, of the 2002 Decree allows forest activities granted prior to the creation of LNP to preserve their rights, but does not allow for the existing permits to be renewed. All exploitation was therefore expected to be forbidden after the last permit expired in December 2004. Poaching, by those working in the logging concessions adjoining the Park and the local population, exists in sectors of the Park that are poorly supervised. The national road and trans-gabonese railway line through the north of the property greatly facilitate the removal of bush meat to urban markets. A further potential threat of diamond exploitation exists on the outskirts of LNP, should reserves be identified by the Motapa Diamonds Inc. company which holds exploration rights for the whole region.

IUCN considers that, at present, the nominated document does not meet the conditions of integrity.

## 5. ADDITIONAL COMMENTS

### 5.1 Transboundary conservation

LNP is located in a sub-region within the Congo Basin where several integrated transboundary conservation initiatives have been developed. Under the Yaoundé Declaration and the COMIFAC Convergence Plan a number of projects have been established to help States to implement a coordinated approach to the conservation of transboundary natural resources. LNP is an integral part of one of 13 landscape zones included in the Congo Basin Forest Partnership (USAID/CARPE), developed to help protect forest zones of the Congo Basin which are a priority for biodiversity conservation. This particular zone, the Lopé – Chaillu – Louesse Forest Landscape (Gabon and Congo), was selected for the transboundary conservation of old mountainous forest massifs which are rich with species, including large populations of big

mammals, with a significant proportion of species that are globally threatened and/or endemic. LNP should benefit from the support of this project which is managed by the Wildlife Conservation Society. It involves planning at the landscape scale, and the establishment of conservation corridors linking core zones, an approach intended to protect the remaining large forest blocks of the Congo Basin and ensure natural biological exchanges between them.

## 5.2 Nomination preparation and documentation

IUCN evaluated this property based on the nomination submitted by 1 February 2004 and the visit to the property in October 2004. It was clear to the IUCN expert during the field mission that there was a lack of coordination in the preparation of this nomination and that key stakeholders had not been consulted, including the main management authority, the CNPN. On the 31 March 2005, IUCN received a completely revised nomination without any indication of the changes within that document relative to the original document. IUCN wishes to highlight to the Committee and States Parties the importance of following correct procedure in the evaluation process and wishes to emphasise that completely revised nominations should not be accepted at the final deadline. IUCN recommends that Gabon receive support in development of a revised Tentative List, harmonized at the regional level, and in setting up a National World Heritage Committee to act as focal point between key stakeholders in the preparation of future nominations and the implementation of the Convention.

## 6. APPLICATION OF CRITERIA

The Ecosystem and Relict Cultural Landscape of Lopé-Okanda has been nominated 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 not been demonstrated at this stage. 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 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.

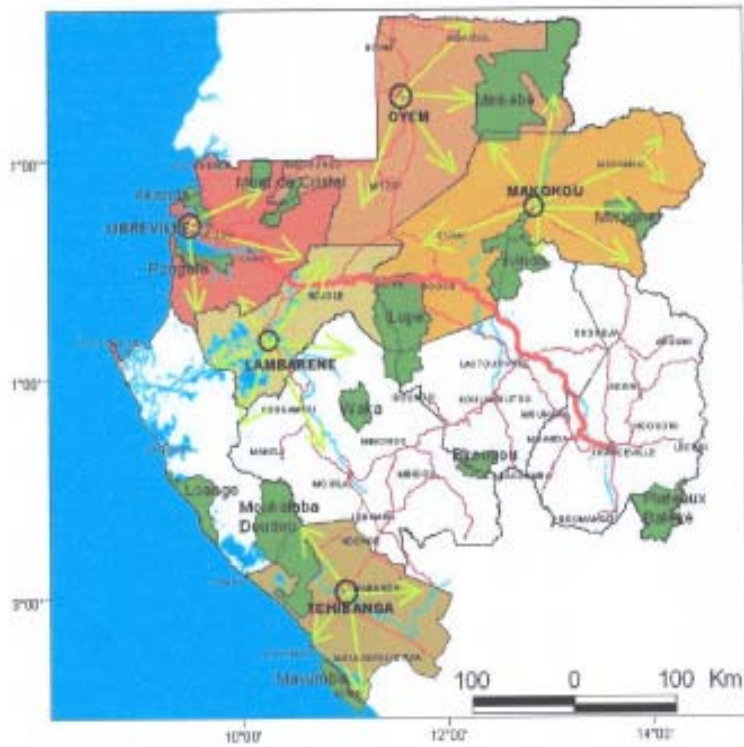
## 7. DRAFT DECISION

IUCN recommends the World Heritage Committee adopt the following draft decision:

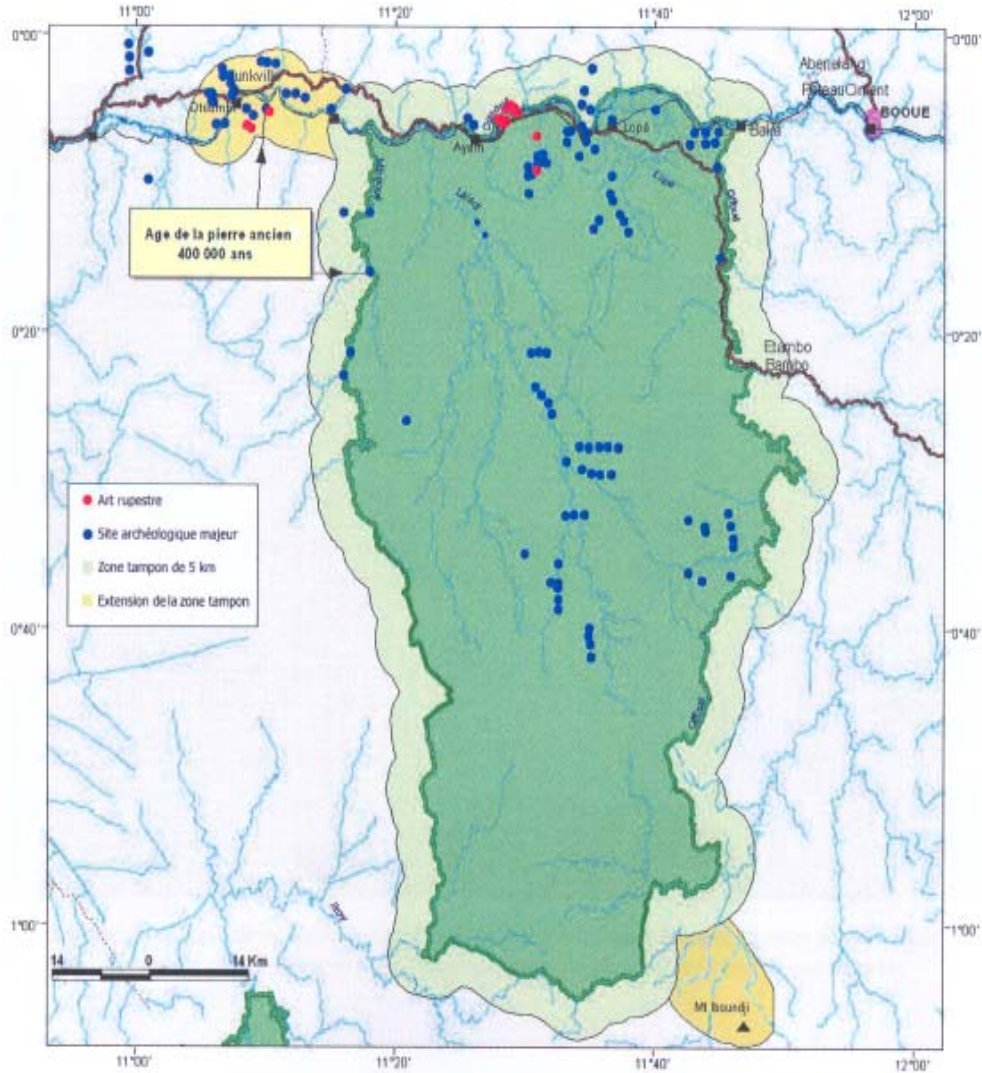
*The World Heritage Committee,*

1. *Having examined document **WHC-05/29.COM/B.2***
2. *Decides to defer the examination of the **Ecosystem and Relict Cultural Landscape of Lopé-Okanda, Gabon, on the World Heritage List on the basis of natural criteria,***
3. *Congratulates the State Party on its efforts to secure international support for the management of Lopé National Park and commends the support provided to date by the EU, through the ECOFAC programme, and NGOs, in particular the Wildlife Conservation Society,*
4. *Urges the State Party to undertake a clear Tentative List which more clearly identifies priorities for World Heritage in Gabon*
5. *Further Urges the State Party to substantially increase management capacity at the property to effectively address integrity issues and to give priority to:*
  - (i) *the early adoption and implementation of a management plan;*
  - (ii) *increasing staffing levels within the LNP; and*
  - (iii) *clarifying the leading management authority and the respective roles and responsibilities of the CNPN and the DFC in the management of the National Park.*

Map 1: General location of nominated property



Map 2: Boundaries of nominated property

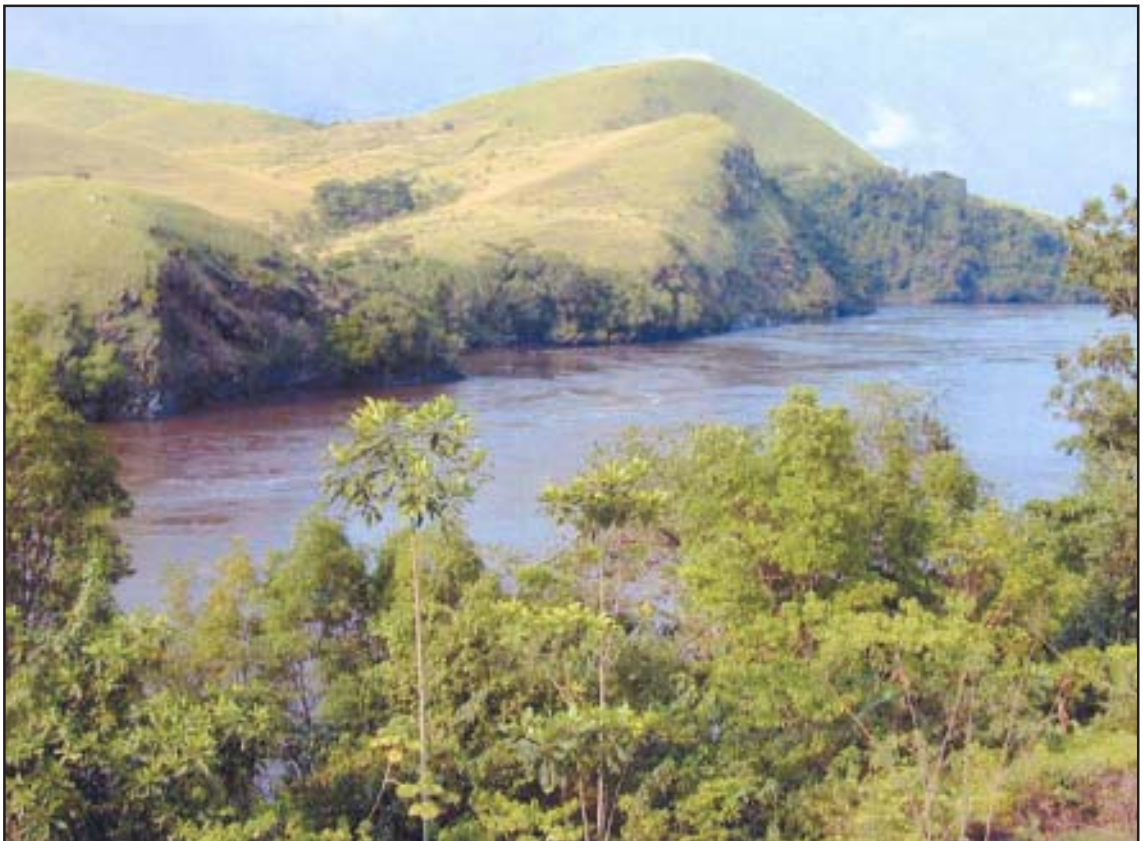




AFRICA

ECOSYSTEM AND CULTURAL LANDSCAPE  
OF THE MINKÉBÉ MASSIF

GABON







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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### ECOSYSTEM AND CULTURAL LANDSCAPE OF THE MINKÉBÉ MASSIF (GABON) ID N° 1148

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#### 1. DOCUMENTATION

- i) **Date nomination received by IUCN:** April 2004
- ii) **Dates on which any additional information was officially requested from and provided by the State Party:** IUCN requested supplementary information on 1 February 2005, after the IUCN WH Panel. The State Party response was received on 30 March 2005.
- iii) **IUCN / WCMC Data Sheet :** 11 references
- iv) **Additional Literature Consulted :** Adiahenou, R.H. (2003), **Présentation des objectifs et de la planification du CNPN.** Conseil National des Parcs Nationaux. Présentation Power Point ; Anon (2001), **Loi 016/2001 portant code forestier en République Gabonaise.** Présidence de la République. 64pp. Libreville ; Anon (2002), **La politique des parcs nationaux.** Ordonnance 6/2002 et Décrets 607 à 619 portant classement de nouveaux parcs nationaux. Hebdo informations n°463 du 14 décembre 2002: 209-223. Libreville ; Christy, P. (1999) **Parc National d'Odzala: carnet de voyage.** ECOFAC, Libreville, 56pp.; Conseil National des Parcs Nationaux (2003), **Stratégie de mise en œuvre d'un réseau de Parcs Nationaux au Gabon.** Présidence de la République. 18pp. Libreville ; Direction de la Faune et de la Chasse (2004) **Protocole d'entente portant sur la gestion de l'orpaillage à la périphérie du Parc National de Minkébé.** Libreville, mai 2004. 10pp ; Direction de la Faune et de la Chasse (2004), **Protocole d'entente portant sur la gestion de la rivière Wa dans la périphérie sud-est du Parc National de Minkébé.** Libreville, mai 2004. Draft. 6pp. ; Huybregts, B., de Wachter, P. & Ndong Obiang, L.S. (2000) **Les forêts d'Afrique centrale se vident-elles ? Forte baisse des populations de grands singes dans le massif forestier de Minkébé, au nord-est du Gabon.** Canopée 18 ; Nichols, N. & Fay, M. (2002) **Les Parcs Nationaux du Gabon. Stratégie pour le troisième millénaire.** National Geographic Society et Wildlife Conservation Society. Libreville. 52pp; UNDP-GEF (2004) **Conservation of Transboundary Biodiversity in the Minkébé-Odzala-Dja Interzone in Gabon, Congo, and Cameroon.** Project Brief. 62pp.; UNESCO and FAO (2002) : **Central African World Heritage Forest Initiative.** Project document submitted to the United Nations Foundation. 91pp + App.; Vande weghe, J.P. (2004) **Forests of Central Africa, Nature and man.** Lannoo, Tiel. 367pp.; Wilmé, L. & Vande weghe, J.P. (2002) **La Réserve de Faune du Dja: à la découverte de la forêt tropicale.** ECOFAC, Libreville, 56pp. ; WWF (2000) **Les forêts d'Afrique centrale se vident-elles? Le commerce de gibier en périphérie de la réserve de Minkébé** ECOFAC. Canopée 18 ; WWF (2002): **Minkébé Project.** WWF Africa and Madagascar Project Data Sheet. 4pp.
- v) **Consultations :** 4 external reviewers. The mission met with the National Director of WCS for Gabon; representatives of UNESCO Gabon, the UNESCO National Commission, the National Council of National Parks, the Ministry of Water and Forests (Direction de la Faune et de la Chasse), Ministry of Mining, Ministry of Culture and Education, local authorities, local communities, European Union, Forestry societies, local NGOs and international NGOs.
- vi) **Field visit :** Jean Pierre d'Huart (IUCN), Mamadi Dembele (ICOMOS), October 2004.
- vii) **Date of IUCN approval of this report:** May 2005

#### 2. SUMMARY OF NATURAL VALUES

The nominated property comprises the Minkébé National Park (MNP) and is located in the north-east of Gabon, in the provinces of Woleu-Ntem and l'Ogooué-Ivindo. A portion of its northern and eastern limits mark the border with Cameroon and the Republic of Congo respectively. The nominated property covers a total area of 756,669 ha, with a proposed buffer zone, estimated at 180,000 ha, consisting of an external strip of 5 km surrounding the Park's boundaries, except where the

boundaries form the national borders. Due to its recent designation as a National Park in 2002, MNP is not yet officially classified under the IUCN protected areas categories system, but the legislation suggests that MNP should be regarded as a Category II protected area.

MNP is situated amidst a vast range of dense forest of more than 3 million ha, covering a series of plateaux interspersed with more or less steep-sided valleys. The area is dominated by a large number of spectacular

granite inselbergs covered in vegetation or just bare rock and often wrapped in fog. The altitude varies between 500m and 900m, with the highest point at Mount Kokomeguel (937m).

The geology of the region includes Precambrian formations (2.6 billion years) composed of metamorphic and granite rock. The modification of the metamorphic rock has led to the formation of important deposits of iron ore in the Minkébé Mountains, whereas in areas dominated by granite, alluvial gold deposits are to be found. Certain granite rock also contains traces of molybdenum, copper, nickel, chrome, and colombo-tantalite (coltan). Continuous erosion of the bed rock has led to the formation of the plateaus intersected by valleys.

The equatorial climate is characterized by a cycle of four seasons of equivalent length, annual average temperatures of 23° to 24°C, with few extremes, relatively little sunshine and frequent storms and tornadoes in the rainy season, which result in a lot of forest windfall. With relatively low annual precipitation of 1500 to 1700 mm, the formation of fog and thick layers of cloud in the dry season, which restrict evaporation and preserve the water reserves on the ground, help keep the dense evergreen forest humid.

A number of waterways cross the Minkébé mountains, nearly all of which flow into the Ivindo Basin.

The vegetation of MNP and its peripheral massif is characteristic of the forest stretching from Guinea to Congo. The dominant forest type is a dense evergreen humid forest of low and medium altitude, comprising a significant proportion of deciduous species, more typical of South Cameroon and north-western Congo. The diversity of vegetation of MNP has not been subject to thorough investigations and is therefore not well-known. However, its floristic composition, characterized by a strong dominance of *Cesalpiniaceae*, suggests that this phyto-geographic unit is situated at a junction of influences with an intermediate flora where semi-deciduous Biafran and Congolese species are found. The massif includes various types of forests, including old secondary forests, islands of dense rainforests, stands dominated by *Gilbertiodendron dewevrei* on alluvial plains, *Marantaceae* forests in marshy valleys, and formations found only on inselbergs, which are typical of the microclimate present on the granite domes. Corridors of grasslands and natural clearings link forests with sedimentary pools, seasonally flooded valleys and marsh zones.

Due to its inaccessibility, the Minkébé forest is one of the least disturbed ecosystems in Gabon. In addition, the combination of its transitional climate, floristic diversity and location between the Congo and Ogooué basins, led to the persistence of a rich and abundant fauna. Minkébé and its peripheral forests represent one of the most important biological reserves of Central Africa. WWF considers the massif to be 4<sup>th</sup> in matter of importance amongst the 32 eco-regions of tropical forests and it is one of the 15 critical zones of conservation among IUCN priority for Central Africa. Several limited surveys were carried out in MNP through the WWF project, but the UNEP-WCMC data concerning

the massif note the presence of 191 species of mammals including 15 endemic, 520 species of birds of which 7 are endemic, 121 species of reptiles including 17 endemic, and 75 species of amphibians of which 5 are endemic.

The recent inventories (2003-2004) of the MIKE (Monitoring of Illegal Killing of Elephants) programme (of which MNP is one of the sample sites), estimated the elephant population in MNP to be around 22,678. That of the entire massif could reach double this number, thus comprising virtually 25% of the population of Gabon, and would potentially make Minkébé elephants – comprising both forest and savanna elephants – one of the most significant populations on the continent. Gorilla and chimpanzee populations, were seriously impacted between 1994 and 1996 by the Ebola virus. The abundance and diversity of the other primates is nonetheless remarkable, including the mandrill (of which groups of more than 100 individuals have been observed), 2 species of mangabeys, 2 species of colobus, 4 species of monkeys, 1 species of talapoin. Amongst the ungulates, MNP provides habitat for significant populations of forest buffalo, bongo, chevrotain, sitatunga, bushbuck, red river hog, and forest hog. MNP has a particularly large population of duikers with 5 species recorded. Amongst the other mammals, the presence of the African clawless otter, the giant pangolin, and the aardvark can be noted. Even though the inventory is not finished, it is estimated that approximately 500 species of birds live in the massif, including several species threatened on a global scale such as the grey-necked rockfowl and the Dja River scrub-warbler. The fauna of MNP also includes reptiles, such as monitor lizards, crocodiles, tortoises and snakes, and a number of amphibians.

### 3. COMPARISON WITH OTHER SITES

Located in a zone of transition between the Ogooué and Congo basins, MNP is characterised by the diversity of 7 kinds of forests and small savanna zones, its inaccessibility and one of the areas least modified by humans in the region. Its isolation and low density of human population has favoured the maintenance of a large forest ensemble. In addition, previous agreements and frequent contacts between the Direction de la Faune et de la Chasse (DFC) of the Ministry of Forests, Water and Fishing, the forest operators and gold-diggers operating in the West and South of MNP, have contributed to minimising the harmful impact of logging that in other places often facilitate illegal hunting and trade in bush meat. With an elephant population estimated at 22,678 animals, the park represents a particularly important habitat for the protection of this species, of primates and of all other species that are subject to illegal hunting across the sub-region. The central location of Minkébé in the sub-regional network of the protected areas supported by the Tri-national Dja - Odzala – Minkébé project (TRIDOM) and the Central African World Heritage Forest Initiative project (CAWHFI) is crucial; MNP is one of the key elements in a nexus of rain forest conservation sites in Gabon, Cameroon and Congo. This underlines the importance of this site and also the need for effective transboundary conservation efforts in this region.

In comparison to other protected areas of dense forests, Minkébé represents an opportunity to preserve a block of dense forest virtually untouched. The core of Minkébé has never been logged and, accordingly, represents a critically important core of Congo basin rainforests that are being increasingly threatened by logging and shifting cultivation. Only two other protected areas – the Dja Faunal Reserve (526,000 ha, Cameroon) and Salonga National Park (3,600,000 ha, DRC), which are both World Heritage properties - comprise a comparable range of forest habitats and wild species, but the level of external pressure on these properties is much higher and their state of conservation is not as good as for MNP. Salonga National Park was seriously affected by the war and, even though it still possesses unique characteristics (notably the presence of bonobos and the Congolese peacock), it has lost a large number of its elephants. The Lopé National Park, a mixed nominated property (640,000 ha, Gabon) which is located 150 km south-

west, has a larger number of endemic species but a smaller total number of species. Odzala (135,000 ha, Congo), Boumba-Bek (309,300 ha, Cameroon) and Nki (238.300 ha, Cameroon) National Parks, and the Mengamé Gorilla Sanctuary (130,000 ha, Cameroon) that belong to the transboundary conservation network, TRIDOM, are all located at colonisation crossroads that have been subjected to recent interpenetration of species originating from neighbouring faunal regions. The fact that no endemic primates occur there, but only forms of hybridization and unique associations, is a manifestation of this. The variety of habitats and the exceptional abundance and diversity of fauna and flora of this group of protected areas offer an opportunity to support the preservation of their unique and complementary natural resources for the long term through integrated transboundary conservation. Comparative species data is shown in the Table below.

	Minkébé NP	Odzala NP	Dja FR	Lopé NP
<b>Mammals</b>	191	114	109	84+
<b>(diurnal primates)</b>	12	11	10	9
<b>(no. of elephants)</b>	22,678	18,000	1,500	8,100
<b>Birds</b>	520	444	325	400
<b>Reptiles</b>	121			
<b>Amphibians</b>	75			
<b>Fish</b>			60	
<b>Flora</b>		1500	2000	1400+

MNP appears to have greater biological diversity than Dja Reserve in Cameroon, particularly regarding primates and ungulates. Further, MNP has large, generally intact plant and animal communities in a remote scarcely populated region, whereas Dja has considerable problems with surrounding logging concessions and a growing regional population. MNP has higher habitat diversity than Salonga and Kahuzi Biega WH properties and the latter two sites have been negatively impacted by civil war

MNP ranks highly on most global assessment scales. For example, WWF considers the Minkébé massif to be 4<sup>th</sup> in importance amongst the 32 eco-regions of tropical forests and it is one of the 15 critical zones of conservation among IUCN priority for Central Africa

## 4. INTEGRITY

### 4.1 Legal status and ownership

Minkébé was created as a Provisional Forest Reserve in September 1997, classified as the “Réserve des Monts Minkébé” in October 2000, and finally established as a National Park by Decree n° 615 of 30 August 2002, at the same time as 12 other new national parks in Gabon. Land ownership for the Park is held by the state.

Pending the preparation of a management plan and the adoption of the detailed regulations, the Law on the Conservation of Nature (Law 16/93 of August 1993) and the new Forest Code (Law 16/2001 of December 2001) regulate most of the activities in the protected area. They also provide some controls over the proposed buffer zone around the park. This legislation should provide adequate protection to the property if the capacity of the management authority is reinforced and if no new harmful activity (for example mining exploitation) is permitted in or near it. The supplementary information provided by the State Party on 30 March 2005 notes that the National Parks Law, currently under discussion, states that hunting, fishing, logging, agriculture and mining are strictly prohibited in a National Park. It also states that in peripheral zones, fishing, hunting, mining and forestry can take place under land management agreements between the Park manager and local community representatives with reciprocal benefits for both conservation and the local communities.

### 4.2 Boundaries

When the National Park was established in 2002, its boundaries were modified, in particular to exclude forest concessions. The property is surrounded on its western and southern limits by forest concessions, many of which are being exploited. The current boundaries thus follow in some parts the natural limits of rivers, in others

the straight lines of forest concessions, as well as the national borders with Congo and Cameroon. A large strip of land, including a rich primary forest in the Minkébé Mountains, cutting into the centre of the Park between the Nouna and Sing rivers, was excluded from the Park due to the presence of iron deposits. This mining concession essentially gives access to the geographic centre of the nominated property and represents a considerable risk for its conservation. Including this enclave within the Park would provide much greater assurances for its conservation.

Articles 77 and 78 of the Forest Code (Law 16/2001) plan the creation of a buffer zone of at least 5 km around the Park (except along the national borders), destined to mark the transition between the national park and areas where other economic activities (forestry, mining, hunting or agricultural) may take place. In the case of the strip of land between the Nouna and Sing rivers, the buffer zone should therefore in principle only allow iron extraction in a central strip still to be defined. The buffer zone should however also exclude all forest concessions and exploitation. Agreements with the affected communities have not yet been signed, and it might be questioned as to whether a strip of standard width, taking no account of watersheds or habitats for example, can function well as a buffer for the Park. It is stated in the supplementary information provided by the State Party on the 30 March 2005 that the TRIDOM project is likely result in the establishment of a suitable buffer zone along the national borders with Cameroon and Congo, depending on the final results of the zoning process.

#### 4.3 Management

The National Council of National Parks (Conseil National des Parcs Nationaux - CNPN), an inter-ministerial committee set up in 2002 under the authority of the President of the Republic (Order 6/2002 of 22 August 2002), is responsible for the management and development of the network of 13 new national parks in Gabon, including the MNP. It acts in close collaboration with the "Direction de la Faune et de la Chasse" (DFC) under the Ministry of Forests, Waters and Fishing. However, the original nomination was not clear on this point and there is a lack of clarity on the respective roles and responsibilities of the two institutions on the ground. It appears that the legal and institutional set-up of the CNPN is still being developed.

The management structure and regulations of MNP still have to be defined, although the Decree that created the Park in 2002 notes that only tourist activities and activities with traditional rights are authorized within the Park. No management or development plan exists for MNP at present, but the elaboration of the plans and regulations for all of Gabon's National Parks is the responsibility of the CNPN. In collaboration with the DFC, the WWF Minkébé Project has elaborated various management strategies concerning the monitoring of rivers, the conservation of fauna in the peripheral forest concessions, gold-digging, transboundary collaboration, collaboration with the pygmy communities, and anti-poaching campaigns.

The management capacity of the property is currently inadequate. Field activities are organised by two

operational bases in Oyem and Makokou, both situated far from MNP. Management is ensured by a team of 7 DFC staff (1 conservationist and 6 guards), helped by a team of 15 staff (2 conservationists, 5 technical staff, 8 guards) from the WWF Minkébé Project. It is planned to progressively shift WWF personnel towards DFC, but this depends on finding satisfactory arrangements and on the financial capacities of the State. Current staffing levels are inadequate as guards are required to patrol both the National Park and the surrounding forest concessions, as well as control the transport and trade of bushmeat. These men are neither armed nor adequately equipped. The training provided is a basic level acquired in the national or regional wildlife management schools. Apart from the payment of salaries for DFC staff, which are covered by the State, the running costs of MNP depend entirely on the support of WWF, which mobilizes an average budget of 500,000 €/year from various sources. These funds also help supplement the otherwise insufficient salaries of the DFC field staff.

#### 4.4 Human impact

Given the low population density as well as the relative isolation of the property, current human pressure on the property is relatively low. The need to improve relations between park staff and local communities was noted by a number of reviewers; in some cases park management activities has engendered a negative attitude on the part of local people towards the park. Increased public awareness and consultation programmes are required. Currently, there is no tourist development plan, although the presence of the hemorrhagic Ebola virus that has impacted great ape and human populations in Minkébé, would require careful consideration in any tourism management plan. No roads cross the Park and existing roads are situated at a distance of 50 km. Some forest tracks exist within the neighbouring forest concessions. Threats to the property however come from: (a) mining concessions; (b) elephant poaching, mainly along the border with Cameroon, sometimes carried out with heavy weapons and often implicating pygmy hunters, in sectors that where Park guards carry out few patrols. This is particularly an issue in the north of the MNP and also in other areas. Management of poaching requires a combination of management approaches, including improving relations with local communities and improving surveillance activities; (c) illegal hunting for the bushmeat trade, carried out by the local population in the peripheral forest concessions; (d) certain logging practices harmful to the environment carried out without adequate supervision in certain forest concessions; and (e) gold extraction by gold-digging artisans. The TRIDOM project, outlined in section 5 below, seeks to increase resources and capacity and develop transboundary collaboration for dealing with many of the above issues, notably for anti-poaching campaigns, collaborative management with local communities and the sustainable management of forest concessions.

In relation to mining, there are known iron ore resources at Belinga of 1000 million tons, Mekambo of 560 million tons, and at Mount Kokamegual of 100 million tons (within the confines of Minkébé) Access to Belinga or Kokamegual would require road or rail construction

through Minkébé and access to Mekambo would almost certainly have a highly negative impact on the protected areas. Thus, the potential threats posed by the exploitation of iron deposits in the Minkébé Mountains could be significant. The Belinga deposit lie south east of MNP and stretch north-west into the Minkébé mountains and the heart of the National Park. It is understood that one of the sites where extractions are planned is situated in a strip of land outside of the park which expands to the geographical centre of the park. The exclusion of this area from the park suggests a wish to exploit this area for mineral deposits and, accordingly, the risks of impacts on the park and the periphery are immense. The mission team was informed that a Chinese company, China Minmetals Corporation, currently holds an exploitation concession for this area, but the supplementary information received on the 30 March 2005, only mentions a Brazilian company, CVRD. It is noted by the State Party that the permit with CVRD allows for a 5km buffer zone between the Park and the area of potential exploitation. The State Party further notes that it is seeking to work with mining companies whose experience and practice in relation to environmental considerations is well known. Such is the case, apparently for CVRD, which manages three National Parks within its concession at Carajas in the Amazon. The Ministry of Mining expects the Belinga deposit to be able to produce 900 million tons of iron, of which 180 to 200 tons would come from Minkébé. At the rate of 15 – 20 million tons a year, this exploitation would last more than 45 years. Construction plans have been signed for new sections of railways, for a hydro-electric dam on the Ivindo River and for an off-shore port. Before the exploitation phase, the company China Minmetals Corporation is requested to submit an environmental impact study, and the State has declared its intention of imposing operational practices aiming to minimize any harmful impact on MNP, inspired in particular by the experience of the CVRD society from Brazil.

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

## 5. ADDITIONAL COMMENTS

Within the Congo Basin, the MNP is located in a sub-region where several integrated transboundary conservation initiatives have been developed. Indeed, within the context of the Yaoundé Declaration and the COMIFAC (Commission des Ministres en charge des Forêts en Afrique Centrale) Convergence Plan, a number of projects have come to support the States in the implementation of a coordinated approach in order to ensure the conservation of transboundary natural resources. MNP benefits or will benefit, with other protected areas, from the support of the Congo Basin Forest Partnership (CBFP, USAID/CARPE), the Central African World Heritage Forest Initiative project (CAWHFI, UNF/UNESCO), and the Tri-national Dja - Odzala – Minkébé project (TRIDOM, UNDP/GEF). These projects, in which several international NGOs are involved such as WCS and WWF, also integrate other sub-regional programmes (RAPAC, ECOFAC, MIKE, etc.) The TRIDOM project was officially recognized by the three governments of Gabon, Cameroon and the Republic of Congo, through the signature of an Agreement of

Collaboration in February 2005, and a copy was provided to IUCN on the 30 March 2005. The project will set up a tri-national coordination system and establish a zoning system with ecological corridors connecting protected areas.

These projects acknowledge that long term conservation of the existing protected areas and of the sub-regional natural resources can only be guaranteed by a concerted landscape approach, and the establishment of conservation corridors that link the protected areas. This approach should preserve the last large areas of forests in the Congo Basin and ensure biological exchanges amongst them. In Gabon, the Minkébé, Ivindo and Mwagné National Parks are located in this transnational conservation complex (TRIDOM) of 40,000 km<sup>2</sup>, which also includes the Dja Faunal Reserve (also a World Heritage property and Biosphere Reserve), the Mengamé Gorilla Sanctuary and Boumba-Bek and Nki National Parks in Cameroon; and the Odzala National Park, the Lossi Sanctuary and Djoua-Ivindo nominated protected area in the Congo. It should be noted that while MNP is not contiguous with other protected areas in the cluster complex, many of the protected areas are still connected ecologically, including through extensions of the forest cover, for example Minkébé and Odzala National parks and Minkébé National Park and Mengamé Sanctuary.

Given the collective importance of this complex to ensure the conservation of major types of primary forests in the Congo Basin and of the wild species that it shelters and considering that the Dja Faunal Reserve is already a World Heritage property, and that the CAWHFI and TRIDOM projects both aim to significantly reinforce the management quality in these key-protected areas and the coordination amongst them, it would seem logical to invite the concerned States Parties to jointly consider, after a feasibility study, the submission of a transboundary, serial World Heritage nomination, including the most outstanding protected areas of this complex. Although the conditions to submit such a nomination are not yet met, the implementation of the projects could make this conceivable in a few years.

## 6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Ecosystem and Cultural Landscape of the Minkébé Massif has been nominated on the basis of natural criteria (ii), (iii), and (iv).

### Criterion (ii): Ecological processes.

In view of its topography, its surface area and unique situation at the interface between forest and grassland environments, MNP is among the world's tropical forest areas. The property constitutes a melting pot of exchange and evolution between various natural habitats and communities of wild species that depend on it. IUCN considers that the nominated property has potential to meet this criterion.

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

Despite the great beauty of the various kinds of primary forests, natural clearings, granite inselbergs and rivers of the nominated property, all of these characteristics are also included in other protected areas in Gabon or in the sub-region. Thus their presence in MNP is not exceptional. IUCN, therefore, considers that the nominated property does not meet this criterion.

**Criterion (iv) : Biodiversity and Threatened Species**

The diversity of habitats, the large hydrographic system, and the expanse of the nominated property are sufficient to ensure the long term conservation of the significant diversity of fauna and flora that the park contains. Considering the current pressures and threats on the forest ecosystems of the Congo Basin, a sub-regional approach to the conservation of significant transboundary forest ecosystems would offer higher protection to this shared diversity. IUCN considers that the nominated property may have potential to meet this criterion.

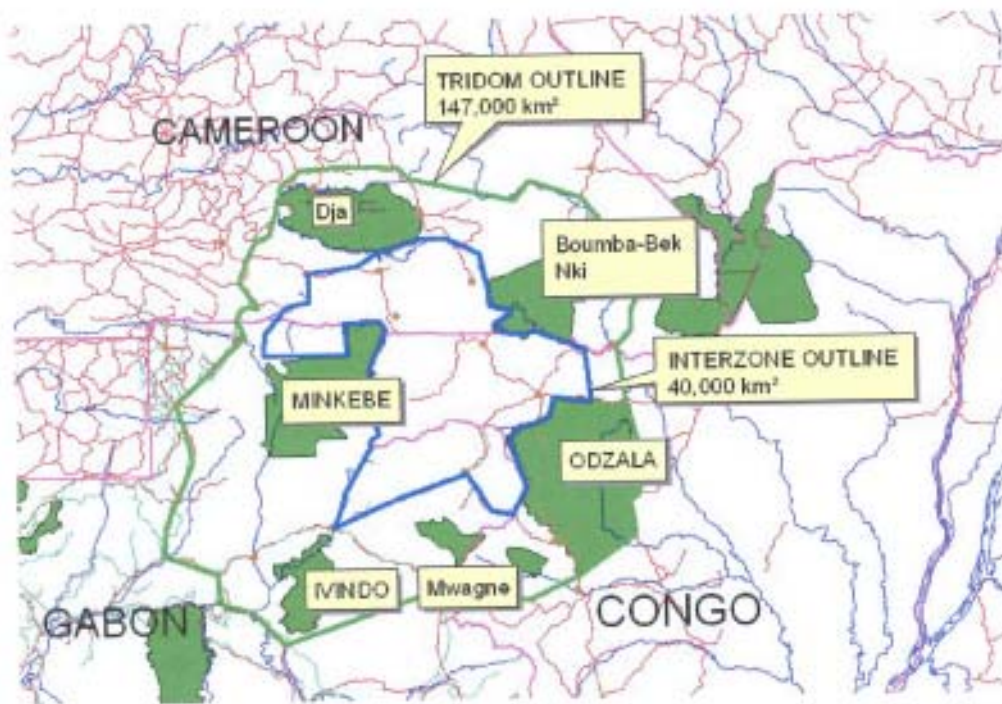
**7. DRAFT DECISION**

IUCN recommends the World Heritage Committee adopt the following draft decision:

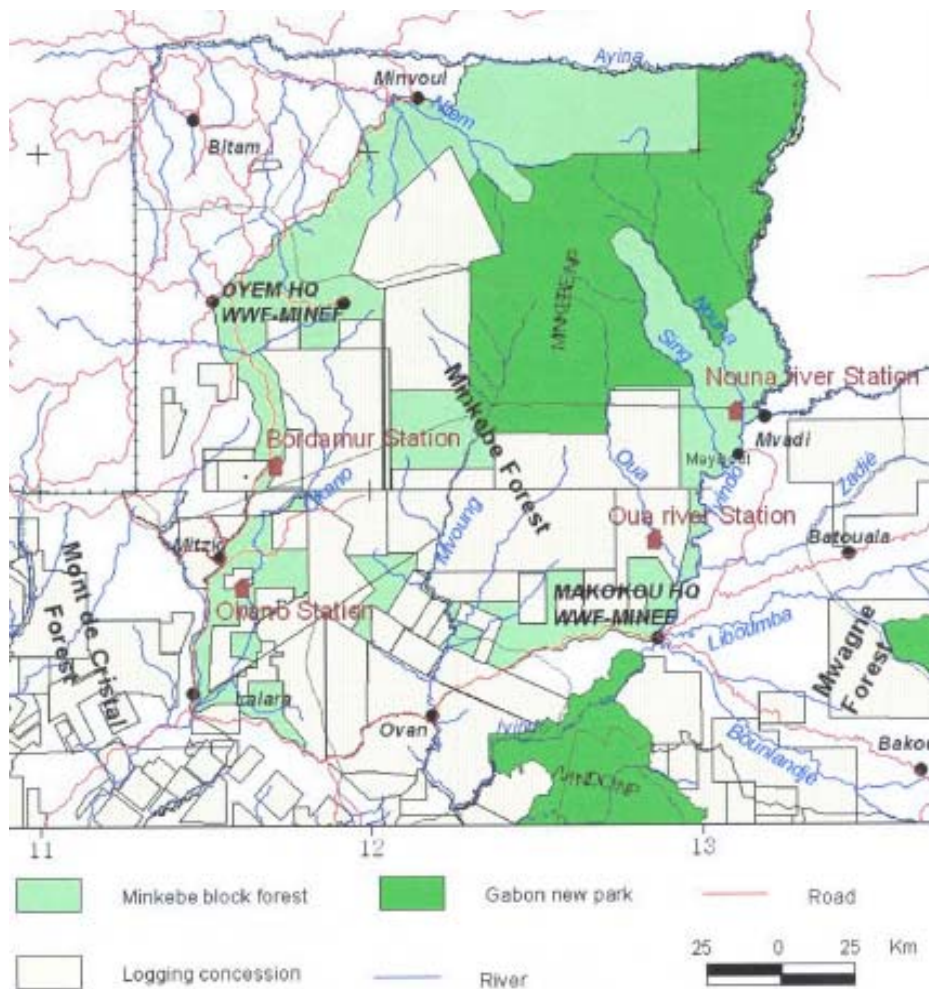
*The World Heritage Committee,*

1. After examining document WHC-05/29.COM/8B
2. Decides to defer examination of the nomination of the **Ecosystem and Cultural Landscape of the Minkébé Massif, Gabon**, to the World Heritage List to allow the State Party to:
  - (i) *better document the values of this property, particularly in relation to criteria (ii) and (iv);*
  - (ii) *clarify the status and potential impacts of proposed mining activities adjacent to the property, specifically in relation to the potential exploitation of iron deposits in Belinga/Minkébé;*
  - (iii) *consider, in collaboration with Cameroon and the Republic of Congo, and under the current TRIDOM project, the potential for including the property within an expanded transboundary nomination;*
  - (iv) *prepare a management plan for the property, incorporating the sub-regional approach to the property's conservation;*
  - (v) *clarify the management authority and the respective responsibilities of the CNPN and the DFC, and increase management capacity*
3. Urges the State Party to undertake a clear Tentative List which more clearly identifies priorities for World Heritage in Gabon.

Map 1: General location of nominated property



Map 2: Boundaries of nominated property







LATIN AMERICA / CARIBBEAN

SERRANIA DEL CHIRIBIQUETE

NATIONAL NATURAL PARK

COLOMBIA





## 1. DOCUMENTATION

- (i) **Date nomination received by IUCN:** April 2004
- (ii) **Dates on which any additional information was officially requested from and provided by the State Party:** The State Party submitted supplementary information in December 2004 but only in Spanish. IUCN requested additional information on 20 January 2005 but the State Party appears not to have received that letter. A revised nomination and appendices were received by IUCN by email on the 1 April 2005, and in hard copy along with a Management Plan (2005-2009) on 2 May 2005, but as this information was received after the deadline for 31 March 2005, it could not be considered by IUCN in its current evaluation.
- (iii) **IUCN / WCMC Data Sheet :** 2 references.
- (iv) **Additional Literature Consulted:** Castaño-Uribe, Carlos. 1988. **Parque Nacional Natural Chiribiquete, La peregrinacion de los jaguars.** Conservation International Center for Applied Biodiversity Science. 2002. **Prioridades de Conservación para el escudo de Guayana.** Thorsell, J. 1997. **A global overview of forested protected areas on the World Heritage List.** IUCN. 58 p; UNDP. 2000. **Conservation of Globally Significant Forest Ecosystems in Suriname's Guyana Shield.** Programme Document; Davis, S. D. *et al.* 1997. **Centres of Plant Diversity.** Vol. 3. WWF/IUCN; Harcourt, C. S. and J. Sayer. 1996. **Conservation Atlas of Tropical Forests – The Americas.** Simon and Schuster; Dinerstein, E. *et al.* 1995. **A Conservation Assessment of the Terrestrial Ecoregions of Latin America.** WWF/World Bank; CIFOR/UNESCO. 1999. **World Heritage Forests.** The World Heritage Convention as a Mechanism for Conserving Tropical Forest Biodiversity. Workshop Proceedings; **A global review of solutional weathering forms on quartz sandstones,** Earth-Science Reviews 42:137-160. Wray, R.A.L. 1997;
- (v) **Consultations:** 3 external reviewers. The mission met with National Government officials, the park director, scientists, local NGOs, local government and community representatives.
- (vi) **Field Visit:** José Courrau (IUCN) and André Prous (ICOMOS), November, 2004. The planned field visit to the nominated property was not possible, due to security concerns. IUCN could not participate in a second mission proposed by the State Party in April 2005. However, this mission again did not visit the Park due to security concerns, but only carried out an overflight by helicopter.
- (vii) **Date of IUCN approval of this report:** May 2005

## 2. SUMMARY OF NATURAL VALUES

The nominated property, the Serranía del Chiribiquete National Natural Park (CNNP), is located in the Amazon area of Colombia, in the Departments of Guaviare and Caquetá, where three important rivers rise (Guaviare, Caquetá and Putumayo). CNNP encompasses 1,280,000 ha and was declared as a national natural park in 1989.

Rocky formations from the Precambrian and Paleozoic ages are the geological basis of CNNP. The physical features include valleys, waterfalls, tepuyes and caves. It is located at the western end of the Guyana Shield.

The property is part of the Udvardy's Guyana Biogeographic Province. Flora and fauna values are influenced from three different regions: Andean, Guianan and Amazonian. They include a variety of vegetation types; six of these types grow in seasonally flooded (or poorly drained) areas; eight types grow in terra firme; and four types of open/scrubby vegetation types generally associated to lakes, waterfalls, canyons and caves that have not been extensively studied. The evergreen, moist

tropical forests that cover most of the Tertiary sediments and Quaternary alluvial plains of the Chiribiquete area and Middle Caquetá River Basin represent one of the remaining extensive, undisturbed rain-forest ecosystems in the Amazon basin.

The CNNP includes at least five endemic species and over ten vulnerable or critically endangered species. The nomination cites over 3,000 species of vascular plants. Plants include two new species and one new family. The property also includes one endemic species of hummingbird and one endemic reptile subspecies. Some of the rivers are used by different species of fish to migrate, congregate and lay their eggs which helps to sustain their populations. The documents also cite nine vulnerable and one critically endangered species for CNNP according to the IUCN Red List (IUCN 2000).

According to the study "Conservation Priorities for the Guayana Shield" (Conservation International 2002), CNNP is considered a relic of the Guayana Shield region. Biologically the property is poorly known, but it is expected to contain high biodiversity. CNNP has biogeographical importance due to its location along the westernmost

extension of the Guayana's sandstone mountains. The study estimates that CNNP presents high wilderness value. According to the study, the *Tepui*-like sandstone formations in Chiribiquete (Aporis river drainage) contain submontane forests. Isolated systems of table mountains, white sand forests and open bonnetia scrub on rocky-sandy substrates can also be found in CNNP.

Shrublands, meadows, and other herbaceous vegetation are present. Sandstone outcrops and white sand soils exist in Araracuara on the Caquetá river, with forests, shrublands, meadows, and other herbaceous vegetation. The elevation varies from 100 to 850m. The Park also includes different aesthetic features such as waterfalls, caves, valleys, tepuy formations, multicolor rocks, rapids and the different types of forest.

### 3. COMPARISONS WITH OTHER AREAS

Within the Udvardy's Guyana Biogeographical Province, two existing WH properties, Canaima National Park (Venezuela) and Central Suriname Nature Reserve (Suriname), also contain tepuys as characteristic geological features and are located within the Guyana Shield. Canaima, with an extension of 3 million ha, is more than twice the size of CNNP. The nomination document acknowledges that the general sedimentological characteristics and geomorphological expressions present in CNNP are similar to those reported for extensive zones of the Guyana Shield. However, it is argued in the nomination that the specific geomorphological manifestations in CNNP are different due to the specific combination of rocks of different origin and hardness in each case. However IUCN considers that this is too narrow an approach to differentiate the nominated property as the resulting geoforms are very similar. In addition the nomination document emphasizes that CNNP is distinctive in relation to the altitudinal range of its relief with its highest point over 1000m. However the Central Suriname Nature Reserve reaches 1230m in its southern portion and the highest tepuy in Canaima reaches 2810m. On the other hand Mount Roraima National Park (Brazil) reaches 2875m high.

The geology of CNNP is similar to that of Canaima, characterized by Precambrian rocks that are around 1700 million years old and both contain a significant proportion of sandstone and granite that have been eroded over 600 million years. However the resulting relief in Canaima is much more dramatic and reaches, as noted above, a higher altitudinal range than in CNNP.

In addition, Canaima represents the best-documented and most spectacular cavernous sandstone region in the world, including the presence of 10 of the 12 deepest caves (Wray, 1997). The WH properties of Wulingyuan Scenic & Historic Interest Area and Three Parallel Rivers Protected Areas, both in China, also contain spectacular karstic and pseudo-karstic sandstone features. Purnululu National Park in Australia was inscribed in the WH List in 2003 for its outstanding geological values and the uniqueness of its cone karts in sandstone. Similar impressive sandstone landscapes are well-displayed on the Chimanimanie Highlands on the Zimbabwe/Mozambique border, which has the deepest

caves in Africa, up to 350 m deep, and in the Vila Velha region of S. Brazil. Sandstone landscapes with tower-like formations and caves are also found in the tablelands of the Central African Republic; the Tibesti region of Chad; in S. Nigeria, in the Saharan region of E. Niger and in South Africa's Cape Peninsula. In addition the nomination document does not provide enough quantitative information on the main features of the existing landscape, making it impossible to undertake an objective global comparative assessment; which has been aggravated by the fact that it was not possible to undertake a field mission to the property.

Similarly, the aesthetic values of the property are difficult to assess without a field mission. However, Canaima National Park arguably presents more dramatic scenery, associated mainly to the tepuys, waterways and waterfalls. Canaima includes the highest (1002m) waterfall in the world. In addition the Central Suriname Nature Reserve shares similar natural features and scenery with that of CNNP, including a high degree of naturalness.

Regarding the significance of CNNP in relation to its role in supporting important ecological processes, it is noted that it is the only major protected area located in a confluence point of Andean, Amazonian and Guianan biogeographic sectors, which may give to the nominated property a distinctive ecological characteristic. However, neither the nomination document nor the additional information provided by the State Party contain enough scientific data and information to objectively make the case for CNNP's significance for maintaining important ecological processes.

In relation to the importance of the property for biodiversity conservation, it is important to note that, while there are 101 species of mammals and 355 birds in the nominated property, Canaima presents 118 species of mammals and 550 birds. 3000 vascular plants have been reported for Chiribiquete, including 4 endemic species. However, Canaima contains close to 5000 vascular plants with a very high level of endemism. For example, 900 species of higher plants have been identified from only one tepuy, the Auyán-tepui, of which some 90 species (10%) are endemic to this massif. Canaima is also world famous for its diversity of orchids, with an estimated 500 species recorded in the park. On the other hand there are reports noting that Mount Roraima National Park contains over 6000 species of vascular plants, from which it is estimated that 50% of them are endemic.

CNNP does not rank high when compared with the Central Suriname Nature Reserve (CSNR). This property comprises 1.6 million ha of primary tropical forest of west-central Suriname and it is the second largest protected area in the Guyana Shield region. As for CNNP the Central Suriname Nature Reserve is of notable conservation value due to its pristine state as an uninhabited region. However, the Nature Reserve contains a higher number of plants than CNNP, with almost 6000 vascular plant species collected to date, from which 47 are endemic. It also contains 185 species of mammals and 680 species of birds, with viable populations of animals typical of the region including

jaguar, giant armadillo, giant river otter, tapir, sloths and eight species of primates.

In summary, both existing WH properties in the Guyana Shield region (Canaima and Central Suriname) are larger than CNNP and have recorded a higher diversity of species. CNNP is thus seen as a regionally important property but secondary in importance to Canaima National Park and Central Suriname Nature Reserve.

## 4. INTEGRITY

### 4.1. Legal Status

CNNP is owned by the Ministry of the Environment through the Unidad Administrativa Especial del Sistema de Parques Nacionales (UAESPNN). The nominated property was declared a National Park by Executive Resolution in 1989. However additional information received by IUCN noted that the State Party has recently changed the status of this area from National Park to Natural Reserve, which restricts the use of the property only to scientific research and strict conservation (Category Ia, IUCN).

The government institution legally responsible for the management of CNNP is the UAESPNN. This agency is responsible for the management of 49 strict protection areas. It is also responsible for the coordination of the National System of Protected Areas (SINAP). At the institutional level, the Territorial Directorate of Amazonía-Orinoquía is responsible for on-ground management of the CNNP.

### 4.2 Management

Direct management of the nominated property is limited due to:

- a) the presence of “illegal armed groups” (guerrilla and paramilitary) in the region, of which the Colombian military is in charge of controlling. The authority of the park staff is therefore secondary and dependant on the army;
- b) the difficult access making the property almost inaccessible except by air;
- c) the lack of management capacity and basic infrastructure, which provides only one park director and one ranger, with only basic equipment and no vehicle or airplane. The park authorities depend on the military and the governor’s office for transportation; and
- d) a very restricted budget and financial resources.

CNNP has a management plan and a recent review was completed in October 2004. Although there is no assessment of the degree of implementation of the management plan, on the ground activities are very limited and when they occur have an emphasis on research. Participatory work with local governments and local people has been promoted particularly in areas around the nominated property. CNNP authorities have made significant efforts to work with local authorities and stakeholders, who are supportive of the nomination.

### 4.3 Boundaries

The boundaries of the nominated property, while these seem to be adequate to maintain viable populations of the flora and fauna of the property, have not been clearly demarcated in the field. This is an important management requirement for the near future because, as the agriculture frontier advances further to the limits of the park, better demarcation and control will be needed.

### 4.4 Human Impact

Although it was not possible for IUCN to verify it on the ground, experts and stakeholders consulted stated that, because the access is difficult and the soils are poor, there are no human impacts in CNNP. The most important human impact in the region is the coca plantations. Park authorities, military, local government and stakeholders, researchers and a central government inter-institutional coordination body, insisted that there are no coca plantations in the CNNP. In addition, the UAESPNN provided the mission with documents that indicate that no illegal uses are allowed in parks. When illegal plantations occur in parks, the elimination methods are different than in a regular area. No fumigation is allowed inside parks, the illegal cultivations have to be removed by hand and special units exist for this type of work in other parks of Colombia. The park authorities informed the mission that high level coordination takes place when illegal cultivations are found inside parks. A project to monitor the status of illegal cultivations in Colombia, coordinated by the United Nations, includes satellite monitoring and regular reporting. Based on results from this project the State Party has indicated that no illegal cultivations have been reported inside CNNP.

There is a concern about the presence of illegal armed groups in the region of CNNP. The significant presence of the military supports that concern (1 military person for every 3 civilians is the rate reported in San Jose del Guaviare). San Jose del Guaviare, the capital of the state of El Guaviare, has recently recovered from guerilla control. A military colonel stated that the presence of these illegal groups inside CNNP is common. However, other sources denied it. Nonetheless, the mission could not visit the property or leave the area of downtown San Jose because of security issues. A second attempt to field a mission to the property was also unsuccessful. Similarly the park authorities could not exercise their authority over the property because of the military control. Due to access and security/control issues, there is no public use or tourism in CNNP.

### 4.5 Scientific Research

The natural values of CNNP have been the subject of scientific research by several institutions, mainly the Puerto Rastrojo Foundation. Due to the size and complexity of the property more research needs to be done. However, this is difficult at present due to the security situation.

Based on the above information, IUCN considers that the nominated property does not meet the conditions of

integrity as required under Paragraph 44 (b) of the Operational Guidelines.

## 5. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

The Serranía del Chiribiquete National Natural Park has been nominated under all four natural criteria.

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

The property includes extensive and elevated remnants of Paleozoic sandstones that covered the northern region of the Amazon in which pseudo-karstic landscapes have evolved. However, as noted in Section 3, these features are considered secondary in importance when compared to other properties inscribed on the WH List under this criterion. IUCN considers that the nominated property does not meet this criterion.

### Criterion (ii): Ecological processes

CNNP includes 80% of the Chiribiquete-Araracuara phytogeographic district, part of the Western Guayana phytogeographic province. In addition, it contains the confluence area of the biodiversity from Andean, Amazonian and Guianan sectors. Furthermore, the size of CNNP is large enough to support the natural processes occurring in the nominated property. These may be considered distinctive characteristics but their level of significance, in relation to meeting the criteria of Outstanding Universal Value, have not been demonstrated at this stage. IUCN considers that the nominated property may have the potential to meet this criterion.

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

CNNP includes a number of aesthetic features and landscapes generated by erosive processes. However, as noted in Section 3, these features seem to be better represented in other existing WH properties, such as Canaima National Park, and other protected areas, such as Roraima National Park in Brazil, within the same region. IUCN considers that the nominated property does not meet this criterion.

### Criterion (iv): Biodiversity and threatened species

CNNP includes a variety of natural habitats that support a number of endemic species and, threatened species. However, the species reported as vulnerable and threatened are represented in several protected areas of the Neotropics. Higher numbers of flora and fauna species as well as higher levels of endemism are found in other protected areas of the region, including in two existing WH properties (Canaima National Park and Central Suriname Nature Reserve). IUCN considers that the nominated property does not meet this criterion.

As noted in Section 4, at this point in time IUCN considers that the nominated property does not meet the conditions of integrity.

## 6. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

*The World Heritage Committee,*

1. *Having examined Document WHC-05/29.COM/8B,*
2. *Decides to defer examination of the nomination of Serranía del Chiribiquete National Natural Park to allow the State Party to:*
  - (i) *further research and document the values of the property, particularly in relation to criterion (ii);*
  - (ii) *consolidate the management authority and presence in the field and increase the capacity, both in human and financial resources and infrastructure, to ensure the effective management of the property and the implementation of its management plan;*
  - (iii) *guarantee the long-term security condition including the control of the illegal armed groups operating inside the nominated property.*







C. New Nominations for Cultural Properties



ARAB STATES

AZOUGUI OASIS & ALMORAVIDE CAPITAL

MAURITANIA



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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### AZOUGUI OASIS AND ALMORAVIDE CAPITAL (MAURITANIA) ID N° 1157

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IUCN undertook a desk review of this Cultural Landscape nomination, the full text of which was provided to ICOMOS as an input to their evaluation process. In addition the IUCN World Heritage Panel approved the following brief summary for the information of the World Heritage Committee.

#### *Natural Values*

The natural qualities of the site certainly exist but, because of the thinness of the nomination documentation, it is difficult to give a definitive statement as to their value. Though there is a good description of the area's flora, nothing is said concerning the dynamic of the vegetation under natural changes or human activities. The report does not discuss the importance of the listed plants, nor if any are under threat. There is no scientific explanation of the importance of the "bafour" palm trees. The analysis of the fauna found on the site is rather weak and anecdotal, with no reference to the IUCN Red List. There is no description of the hydrology of the area, nor is the landscape described with precision. The geological chapter lacks interpretation and nothing is said on the geomorphology, on the erosion phenomena, or on the impact of former humid climatic periods on landforms. There are no comments on the scenic value of the landscape. It is particularly unfortunate that there is no historic analysis of the human/nature interactions in this area.

#### *Management aspects*

IUCN has a number of concerns about the management of the nominated site. These include: several internal contradictions (e.g. the existence or otherwise of a strictly protected area; the need for irrigation of the palm grove); insufficient scientific evidence for some claims; weak legislative protection for the cultural landscape; and management bodies and the management plan that do not adequately cover all aspects of conservation and development.

IUCN suggests that before the site is inscribed, the State Party should be asked to: determine the precise limits of the protected areas (with detailed maps); establish precise objectives for these areas (e.g. strictly protected, central area, buffer area); develop more information about the area's prehistory, the "bafour" palm tree grove, and its flora and fauna; and prepare a complete management plan that takes account of the full range of issues concerning the site's biodiversity as well as its cultural values, its development and conservation, and which fully addresses key issues like tourism.



AFRICA

OSUN-OSOGBO SACRED GROVE

NIGERIA





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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

### OSUN-OSOGBO SACRED GROVE (NIGERIA) ID N° 1118

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IUCN undertook a desk review of this Cultural Landscape nomination, the full text of which was provided to ICOMOS as an input to their evaluation process. In addition the IUCN World Heritage Panel approved the following brief summary for the information of the World Heritage Committee.

#### *Natural values*

The Osun-Osogbo Sacred Grove is situated in the southern part of Nigeria. The property is nominated as an “organically evolved cultural landscape”.

The nomination dossier displays some information on the natural features of the 75 ha property, mainly consisting of forests, the Osun river and its banks. According to this the “Grove is a large area of undisturbed primary forest along the banks of the Osun river.” With 400 plant species of 63 families, including more than 200 plant species of medicinal values, the floral biodiversity is remarkable, but there is only a comparison to a permanent sample plot in a forest reserve and another forest reserve. There are also 7 species of primates, among them some threatened species, and other vertebrate species in the property. A comprehensive ecological study of the property is apparently existing but not added to the file. On basis of the given information, the natural values are significant on a local to regional level but would not be of ‘outstanding universal value’.

#### *Management aspects*

The following management issues and recommendations were highlighted by the IUCN desk review:

No specific information is given on the legal state of protection of the ecosystem and the species. However, the strict sacred state of this place might be an example of nature protection by other means than legal ones. In general the factual state of protection is obviously high.

The draft management plan (exclusively relating to cultural aspects) highlights impacting activities by poachers, illegal fishers, hunters and encroachment arising from Christian and Islamic fundamentalists. There is a report on the “Development of a Management Plan”, carried out by the University of Ibadan, but there is a need to prepare a comprehensive management plan that takes into consideration impacts on the natural and cultural values.

There is some confusion resulting from the fact that the property is nominated as an “organically evolved cultural landscape”. Such a landscape should be the result of the interaction of humans and nature, which normally becomes manifest by significant changes of the natural ecosystems (like in agricultural landscapes). In this

case, however, the nomination file claims that the property is covered by a “true primary rainforest”. Nonetheless, the ecosystem structure is impacted and changed by harvesting medical plants and the considerable pressure by pilgrims and visitors, including two roads and several footpaths.



EUROPE / NORTH AMERICA

GNISHIKADZOR AREA CULTURAL LANDSCAPE

ARMENIA



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**WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION**  
**GNISHIKADZOR CULTURAL AREA LANDSCAPE (ARMENIA) ID N° 1092**

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IUCN undertook a desk review of this Cultural Landscape nomination, the full text of which was provided to ICOMOS as an input to their evaluation process. In addition the IUCN World Heritage Panel approved the following brief summary for the information of the World Heritage Committee.

The arrangements for community participation need critical review and strengthening in accordance with good practice.

*Natural Values*

The nominated property is set in the Varyk Mountains, in a tectonically unstable region, with exceptional geo-diversity. The area has no special status as a protected area as far as can be ascertained, but the nomination devotes a page and half to a description of flora and fauna. Among mammals, there are reports of occasional sighting of leopards, while Brown Bears (two sub-species) are common, along with lynx, grey wolf and the Bezoar goat. A number of rare birds can be found in the vicinity (including pigmy cormorant, glossy ibis and white-headed duck). The Caucasus region in general, and the Varyk Mountains and Vayots Dzor region in particular, have high plant biodiversity and endemism. The region is also a Vavilov Centre for wild relatives of domesticated crops (wheat, rye and barley) and fruits. The Armenian plateau is also an important area for the origin of cultivated plants. The natural beauty of the area is borne out by the photographs and the tourist-focused web sites. In short, if inscribed this site would be important for a number of reasons relating to natural values.

*Management aspects*

The following management issues and recommendations were highlighted by the IUCN desk review:

The nomination lacks a management plan. This should be in place before the site is inscribed and should cover the full range of cultural and natural values of the area;

The current management of natural values appears to be unsatisfactory. There should be a natural expert on the management team, a field presence for nature conservation (a ranger) and the Ministry for Nature Protection should have a recognised role in advising on the area's planning and management. The area should be designated for protection under natural conservation laws;

Current tourism proposals should not be proceeded with before an Environmental Impact Assessment is undertaken which addresses all possible impacts on cultural and natural values;

The proposals for agricultural revival need a proper socio-economic assessment, and should take account of the value of using traditional varieties of crops, fruit etc.;



EUROPE / NORTH AMERICA

HISTORIC CENTRE OF INNSBRUCK WITH  
SCHLOSS AMBRAS AND NORDKETTE /  
KARWENDELALPINE PARK

AUSTRIA





HISTORIC CENTRE OF INNSBRUCK WITH SCHLOSS AMBRAS AND NORDKETTE / KARWENDEL ALPINE PARK  
(AUSTRIA) ID N° 1169

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## 1. DOCUMENTATION

- (i) **Date nomination received by IUCN:** April 2004
- (ii) **Consultations:** 2 external reviewers. The mission met with National Government officials, the park director, local government and community representatives.
- (iii) **Field Visit:** Pierre Galland (IUCN) and Jaroslav Kilian (ICOMOS), September 2004.
- (iv) **Date of IUCN approval of this report:** May 2005

## 2. SUMMARY OF NATURAL VALUES

The Historic Centre of Innsbruck with Schloss Ambras and Nordkette / Karwendel Alpine Park is nominated as a cultural landscape. The nomination includes a number of important natural features and displays interactions between cultural (structurally represented by the Historic Centre of Innsbruck) and natural features (part of the Karwendel Alpine Park). IUCN therefore participated in the mission to the property and carried out a general assessment of its natural values, which are included within this report.

The nominated property comprises three core zones, the inner city (251ha), the Schloss Ambras (21ha) and part of the Karwendel Alpine Park (4982ha), making up a total area of 5254ha, and a buffer zone of 398ha surrounding the inner city core zone. The IUCN evaluation deals only with the Karwendel Alpine Park.

The Karwendel Alpine Park (KAP) covers a total area of 7300ha, and it is only a small portion of this, immediately adjacent to the city of Innsbruck, which is included in the nominated property. The larger Park, including 3 nature conservation areas, 2 recreation areas and 6 landscape conservation areas, is the largest conservation area in Tyrol. It also extends across the border into Bavaria, Germany, for an additional 1900ha.

The Park is predominantly composed of dolomite and Wetterstein limestone, shaped by glacial forces of the Tertiary and Quaternary. The steep slopes of the Nordkette, which dominate the view from the city of Innsbruck, are evidence of these forces of erosion. The landscape is dominated by bare rock and extensive gullies of scree.

The flora and fauna found here are typical of the northern European Alps. There are no endemic species and an absence of large predators. Mammals include the chamois and ibex, while the golden eagle, ptarmigan, black grouse, capercaillie, and wall creeper are bird species finding habitat here. The flora is dependant on micro-climatic conditions and varies between altitudinal level, with typical alpine species populating the Alpine and sub-Alpine zones. A number of reptiles, including the salamandra atra are also present. Numbers of species are, however, not provided in the nomination

dossier, and very little detail is provided on the natural values of the Alpine Park included within the nominated property.

## 3. COMPARISON WITH OTHER AREAS

The comparative analysis of the property is poorly developed in the nomination document and requires further development to make a case for outstanding universal value. The natural features of the natural component are, however, typical of the alpine zone in Europe and there are other examples of similar town-nature relationships in Europe. Sofia (Bulgaria), for example, has a comparable situation with a historical high mountain nature park with skiing facilities behind the city, as does Grenoble (France) which is an Olympic alpine town with two Regional Natural Parks in the vicinity.

## 4. INTEGRITY

### 4.1 Management

Funding available for the natural component of the nomination is limited, according to the figures presented. There are no permanent staff, only a few part-time positions with the Tyrolean provincial authority. However there is a high level of collaboration with the forest and other authorities. The collaboration with the Austrian Alpine Club is excellent; this organization carries the responsibility for the management of the mountain huts, the maintenance of the trails and their marking. Use of motor vehicles and helicopters are restricted to a minimum. As the Park is not recognized at the Federal level, there are no subsidies from the Austrian government (according to the Austrian legal system, the 'Land' or county is entirely responsible).

The nomination document notes there are 2 separate management plans, one for the Historic town centre of Innsbruck and one for the Alpine Park. While recognizing the quite specific aspects of management of cultural and natural elements, IUCN recommends that these management plans be used to develop a coherent management framework. Such a management framework should include clear zoning for regulating different land use practices.

## 4.2 Human impact

The Alpine Park as a whole is well protected and maintained. Activities include hiking, tourism, cattle grazing (limited to a few valley bottoms), some forest management, and hunting, which could lead to potential human impacts on the nominated property if not properly managed. It is important that these issues be effectively addressed within the management plan for the Alpine Park and the integrated management framework for the property. Other issues that should be addressed include, (i) the need for improved conservation measures on the southern slope of the Nordkette; (ii) the establishment of a clearer buffer zone, with appropriate controls on infrastructure projects, (iii) ensuring any reconstruction projects for buildings are carefully designed and fully integrated within the landscape.

## 5. ADDITIONAL COMMENTS

The links between town and mountain are relatively weakly presented in the nomination; the dependence of the town on its surrounding mountains for drinking water is certainly relevant but other social and historical linkages between the natural and cultural components of the nomination have not been further developed.

The nominated property displays a big spatial gap between the cultural core and buffer zones, and the natural core zone. While intensively used for recreation and housing, this “gap” represents a functional link between the two core zones and could potentially be integrated into the nomination as an extension to the buffer zone.

## 6. CONCLUSIONS

IUCN considers that the case has not been adequately made by the nomination to justify meeting criteria for a cultural landscape World Heritage property.

EUROPE / NORTH AMERICA

TRAKAI HISTORICAL NATIONAL PARK

LITHUANIA



IUCN undertook a desk review of this Cultural Landscape nomination, the full text of which was provided to ICOMOS as an input to their evaluation process. In addition the IUCN World Heritage Panel approved the following brief summary for the information of the World Heritage Committee.

This nomination was originally submitted by Lithuania as a mixed property nomination, including natural criteria (i) and (iii). However the natural values, and their interrelationships with cultural values, were inadequately considered and poorly documented in the documentation submitted. Therefore, the nomination was considered incomplete in terms of natural criteria, and the property was only examined in relation to cultural criteria. A revised nomination was received in January 2005, omitting the natural criteria.

#### **Natural Values**

Trakai is a glaciated landscape, its modern-day landforms having been created by, or at the margins of, a series of continental ice sheets during the Pleistocene. Post-glacial geomorphic development by fluvial processes, some of which are subterranean, have created an environment composed of wetlands of various origins and types. The description of the property contained in the document, however, fails to explain the natural landscape and the scenic and aesthetic values of the property. The nomination has not considered ways in which landforms have dictated or influenced how people have sited towns and transport networks and otherwise used the land, and how these have expression as a cultural landscape.

The property is considered unique in the Baltic uplands because of the range of lacustrine ecosystems; complex lakebed relief; diversity of marshes; high water quality; the evidence of long-term climatic and environmental change; the natural/human canal network; and the landform-influenced human settlement pattern. None of these is systematically or rigorously analysed in comparison to areas in Lithuania, regionally (e.g., with reference to the lake lands of Finland) or globally. It is argued that the property differs from all other WH properties on the basis of its history; political background; historic, cultural and natural heritage; and the exceptional skills and ingenuity revealed by the co-existence of people and nature. This may be so, particularly in the greater regional context, but it is not argued convincingly in terms of outstanding universal value. The recognition given to the wetland complex as a Natura 2000 site conveys a regional rather than global significance. The marshes, as described, appear primarily to have biological rather than geological/geomorphological values. From the evidence presented, the nominated property does not meet WH status as a cultural landscape in terms of stated natural values.

#### **Management Aspects**

The following management issues and recommendations were highlighted by the IUCN desk review:

There is no evidence that the boundaries of the property encompass a complete watershed (though two tributary catchments are included) or follow natural alignments.

The legal conservation status of the Park appears sound, with a principal protection statute under central Government control. Various planning regulations and policies are in place for protection and conservation of cultural sites and values. Park management is on a sound administrative footing within a central Government ministry, and it is well supported by various other State agencies and a widely representative consultative board. Park staff, comprising 13 employees (about half of whom are professional) distributed among 22 park offices/stations, appears adequate for current and anticipated management demands. However, a reported reduction in the park budget of 60% since 1998 gives cause for concern.

There are no apparent development pressures threatening park protection. The worst impacts, such as quarrying, are confined to the buffer zone and are being progressively phased out or re-located. Park visitation is seasonal, with some pressure on campsites and car parks, and overcrowding at cultural sites. It is recognised that visitor facilities and educational resources and programmes require upgrading to cope with the expected increase in visitor numbers.



EUROPE

MEADOW-PASTURE LANDSCAPE OF SLOVAKIA

SLOVAKIA





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**WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION**  
**MEADOW-PASTURE LANDSCAPE OF SLOVAKIA (SLOVAKIA) ID N° 1095**

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IUCN undertook a desk review of this Cultural Landscape nomination, the full text of which was provided to ICOMOS as an input to their evaluation process. In addition the IUCN World Heritage Panel approved the following brief summary for the information of the World Heritage Committee.

*Natural values*

This serial nomination includes six isolated landscape patches located along the Carpathian mountain range in the northern part of Slovakia. They are nominated as an “organically evolved landscape”. All six sites, although significantly differing in landscape structure, belong to the same group of landscape types, namely grassland-dominated agricultural landscapes of highlands and lower mountain areas. Landscapes of this type evolved commonly on the edge of higher mountains like the Carpathians, the Alps and the Caucasus. During the past decades, however, these landscapes have been gradually disappearing all over Europe and in other continents (representing variants of the same basic type), mainly as a result of changes of landuse or abandonment. Thus they are now recognised as one of the most threatened types of rural landscapes in Europe.

Landscapes of the given type are often excellent examples of a long-lasting interaction between nature and local cultures, often resulting in a comparatively high level of biodiversity on a landscape level. This is the result of the mosaic-like combination of different ecosystems with varying micro-climates and ecotones, and presumably the fact that many species of the former natural landscapes could occupy the modified ecosystems due to a gradual co-evolution.

The nomination file, however, does not refer to these aspects. The information given relates almost exclusively to general landscape structures and cultural aspects. Information on biodiversity and any rare or endangered species is brief, often too general and does not prove any of the site’s values going beyond a local level. A comparative study with similar landscapes beyond Slovakia (e.g. Ukraine, Poland, Romania, the Alps and Pyrenees) is missing.

*Nomination dossier and management aspects*

The following issues and recommendations were highlighted by the IUCN desk review:

The nomination dossier lacks essential data on the serial sites (such as current landuse statistics, size), and does not provide an explanation as to why these six components are nominated.

The management of the natural values of the site appears unsatisfactory. Nature conservation specialists

and the Ministry responsible for nature protection should have a recognised role in advising on the nominated area’s planning and management.

A considerable area of the nominated property appears to have minimal protection (level 1 out of 5) provided by the Constitution of the Slovak Republic, the nature conservation law of Slovakia, or communal planning regulations, while the legal binding of the boundaries of the component sites remains unclear.

A unifying management plan or framework for the whole property is necessary. Currently a high diversity of local plans and regulations exists but these are not harmonized. No umbrella organisation or body is in place to coordinate management and there is no specific staff for the nominated property. These key issues need to be addressed.