

Convention Concerning the Protection of the World Cultural and Natural Heritage

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



Report to the World Heritage Committee
Twenty-seventh session
30 June – 5 July 2003 - Paris, France



Prepared by IUCN – The World Conservation Union
May 2003

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THE WORLD HERITAGE CONVENTION

IUCN TECHNICAL EVALUATION REPORTS

1 May 2003

1. INTRODUCTION

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

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

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

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

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

The WCPA membership network now totals over 1300 protected area managers and specialists from 120 countries. This network has provided much of the basis for conducting the IUCN technical evaluations. In addition, the Protected Areas Programme has been able to call on experts from IUCN's other five Commissions (Species Survival, Environmental Law, Education and Communication,

Ecosystem Management, and Environmental, Economic and Social Policy), from other specialist officers in the IUCN Secretariat, and from scientific contacts in universities and other international agencies. This highlights the considerable “added value” from investing in the use of the extensive networks of IUCN and partner institutions.

2. FORMAT

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

3. SITES REVIEWED

21 site files were reviewed by IUCN in the 2002/2003 period, involving 15 field inspections. These comprised:

- 8 natural site nominations (including 1 extension and 1 referred site where additional information had been received),
- 7 mixed site nominations (including 3 extensions), and
- 6 cultural landscapes.

Joint missions were carried out with ICOMOS for all new mixed site nominations. Joint missions were also carried out with ICOMOS to 2 cultural landscapes and the reports for these sites are included in this document. IUCN reviewed an additional 4 cultural landscape nominations and provided comments directly to ICOMOS to assist them in their evaluation process.

The files reviewed by IUCN in 2002/2003 are as follows:

ID Number	State Party	World Heritage property proposed
A. Nominations of natural properties to the World Heritage List		
A1. New Nominations		
1083	China	Three Parallel Rivers of Yunnan Protected Areas
1086	Egypt	Ras Mohammed
1102	Kazakhstan	Saryarka - Steppe and Lakes of Northern Kazakhstan
1023	Russian Federation	Natural System of "Wrangel Island" Sanctuary
1090	Switzerland	Monte San Giorgio
951 Rev	Viet Nam	Phong Nha-Ke Bang National Park
A2. Referred nominations for which additional information has been received		
769 Rev	Russian Federation / Mongolia	Uvs Nuur Basin

A3. Extension of properties inscribed on the World Heritage List

740 Bis United Kingdom Gough Island Wildlife Reserve Minor extension

B. Nominations of mixed properties to the World Heritage List

B1. New nominations

1094 Australia Purnululu National Park
1100 Brazil Rio de Janeiro: Sugar Loaf, Tijuca Forest and the Botanical Gardens
1080 Dominican Republic Parque Nacional del Este and its buffer zone
1117 Portugal Landscape of the Pico Island Vineyard Culture

B2. Extension of properties inscribed on the World Heritage List

998 Bis Brazil Jaú National Park (extension to form the Central Amazon Protected Areas)
606 Bis Brazil Serra da Capivara National Park
954 Bis Egypt Saint Catherine Area

C. Nominations of Cultural Landscapes to the World Heritage List

C1. Cultural Landscapes for which IUCN took part in a joint field inspection

1085 Poland The Valley of the Pradnik River in the Ojcowski National Park - a unique complex of cultural landscape
1084 United Kingdom Royal Botanic Gardens, Kew

C2. Cultural Landscapes for which IUCN provided comments directly to ICOMOS

925 India Rock Shelters of Bhimbetka
1081 Mongolia Orkhon Valley Cultural Landscape
1099 South Africa Mapungubwe Cultural Landscape
306 Rev Zimbabwe Matobo Hills

4. REVIEW PROCESS

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

1. **Data Assembly.** A standardised data sheet is compiled on the site, using the protected area database at UNEP-WCMC;
2. **External Review.** The nomination is sent to experts knowledgeable about the site, primarily consisting of members of IUCN specialist commissions and networks and contacts from the region (approx. 85 outside reviewers provided input in relation to the sites reviewed in 2002/2003);
3. **Field Inspection.** Missions are sent to evaluate the site on the ground and to discuss the nomination with relevant authorities and stakeholders;
4. **IUCN World Heritage Operational Panel Review.** The IUCN World Heritage Operational Panel intensively reviews all field inspection reports, comments from reviewers and associated background material, and agrees a final text and recommendation for each nomination;
5. **Final Recommendations.** After the World Heritage Bureau has reviewed the evaluations, clarifications are often sought. Changes based on the Bureau's recommendations and on any further information from State Parties will be incorporated into the final IUCN evaluation report which is sent to the World Heritage Centre eight weeks prior to the Committee meeting.

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

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

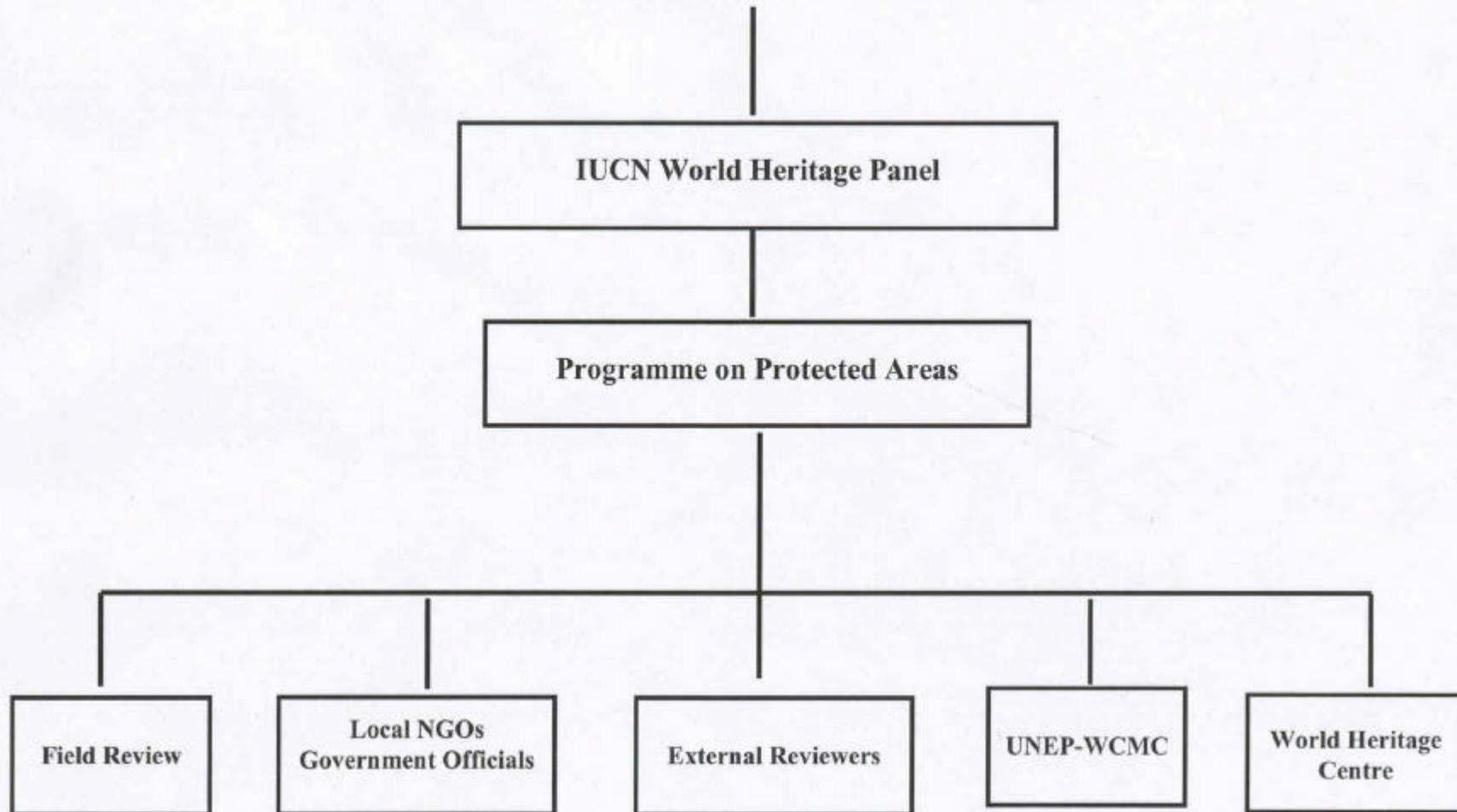
Finally, it is noted that the evaluation process is aided by the publication of some 20 reference volumes on the world's protected areas published by IUCN, UNEP-WCMC and several other publishers. These include (1) Reviews of Protected Area Systems in Oceania, Africa, and Asia; (2) the four volume directory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

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

This report presents the official position of IUCN.

Figure 1

IUCN REPORT TO WORLD HERITAGE BUREAU AND COMMITTEE



A. Nominations of Natural Properties to the World Heritage List

A1 New Nominations

THREE PARALLEL RIVERS OF YUNNAN PROTECTED AREAS

CHINA



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

THREE PARALLEL RIVERS OF YUNNAN PROTECTED AREAS (CHINA) ID N° 1083

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 10 references
- ii) **Additional Literature Consulted:** IUCN/WWF.1995. **Centres of Plant Diversity**. Vol. 2; Mittermeier, R. et.al., 2000. **Hotspots: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions**. Cons. Intl.; Myers, N. et al, 2000. Biodiversity hotspots for conservation priorities. *Nature*, 403,853-8; WWF/ICIMOD. 2001. **Ecoregion-Based Conservation in the Eastern Himalaya**; Thorsell, J. and L.Hamilton. 2002. **A Global Overview of Mountain Protected Areas on the World Heritage List**. Working Paper 6. IUCN; Gurung. H.1999. **Mountains of Asia**. ICIMOD; **China's Biodiversity: A Country Study**. 1998. China Environ. Science Press; Mackinnon, J. et.al. 1996. **A Biodiversity Review of China**. WWF; Birdlife Intl. 1992. **Putting Biodiversity on the Map**; Kingdon- Ward, F. 1985 (reprint); **The Mystery Rivers of Tibet**. Asian Publications; Wilkes, A. et.al. eds. **Links Between Cultures and Biodiversity**; Congress Proceedings. Yunnan Science and Technology Press.1033p. Fisher R.D. 1995. **Earth's Mystical Canyons** . Sunracer Publications Tucson. 152 p
- iii) **Consultations:** 8 external reviewers contacted. Various government officials from Yunnan Construction Bureau and relevant Provincial and Prefecture contacts as coordinated by WH Management Committee Office; representatives from Yunnan and Tsinghua Universities and Chinese Academy of Sciences; The Nature Conservancy China Programme.
- iv) **Field Visit:** Jim Thorsell and Les Molloy. October, 2002.

2. SUMMARY OF NATURAL VALUES

The Three Parallel Rivers nomination (1.7 mil.ha. in extent) consists of 15 protected areas in seven geographic clusters in the mountainous northwest of Yunnan Province. The 7 clusters are contained within a larger geographic unit of 3.4 mil. ha. administratively referred to as the Three Parallel Rivers National Park (IUCN Category VI) . The northern and western boundaries of the nomination abut Tibet and Myanmar respectively. The site name relates to the inclusion of sections of the upper reaches of three of the great rivers of Asia -the Yangtze (Jinsha), Mekong (Lancang) and Salween (Nu Jiang). Here the three rivers run roughly parallel, north to south, through steep gorges which in places are 3,000 m deep. At their closest, the three gorges are only 18 and 66 km apart, and for 70 km a fourth parallel river, the Dulong Jiang, flows along the western margin before entering Myanmar as one of the headwaters of the Irrawaddy River system.

The 1.7 million hectare site consists of a large portion of the Hengduan Shan, the major arc of mountains curving into Indochina from the eastern end of the Himalayas. The extent of the site is 310km from north to south (29° to 25° 30' N) and 180km from east to west (98° to 100° 30' E). More than 100 peaks in the Yunling, Gaoligong, Haba, and Baimang ranges are over 5000 m, while the

Meili Snow Mountains on the Tibetan AR border contain an impressive range of glaciated peaks over 6000 m. The highest peak is Mt Kawagebo (6740 m), from which the southernmost glacier in China, Mingyongqia, descends to an altitude of 2700 m.

The nominated area lies within an orogenic belt, where the edge of the Eurasian plate is being compressed by the underlying Indian plate as it is subducted along the line of the Lancang River fault. As the Hengduan Mountains were uplifted and intensely sheared, the pre-existing rivers continued to downcut, resulting in the extreme vertical relief of the mountains and gorges. Four types of igneous rock are evident: ultrabasic, basic, intermediate acid and alkali rock, as well as ophiolites (assemblages of igneous rocks that were once sea floor crust). The wide range of rock types throughout the site provide ample evidence of marine evolution under the Tethys seas (the shallow sea that existed during the early Mesozoic Era and separated the landmass of Laurasia in the north from Gondwanaland in the south).

The site also contains an outstanding variety of landforms, especially those in the alpine landscapes. There are more than 400 glacial lakes, each surrounded by moraines and other glacial landforms. A variety of spectacular alpine karst features include karst caves, calcareous tuff deposits and alpine karst peak clusters. There are also large areas of granite peaks and sandstone monoliths, the most impressive of the latter being the alpine *Danxia* landforms (old Tertiary red calcareous sandstone eroded by wind and water). Such varied terrain gives the region great scenic and geological interest.

The climate variety within the site is as outstanding as its topography, varying from subtropical in the valleys to frigid on the snow-covered mountain peaks. In the west, the south-western monsoon from the Indian Ocean brings an annual rainfall of up to 4,600 mm and creates a permanent snow-cover on peaks over 5,000m. The effect of this moist airstream drops off sharply as it moves eastwards, so that, at the other extreme, is in a rain-shadow and receives only 300 mm of rainfall annually. The Pacific Ocean monsoon affects the southeast of the site less strongly but does create humid, subtropical conditions in the valleys. Persistent fog limits human settlement above 2,500m.

The Three Parallel Rivers site is an epicentre of Chinese biodiversity. The southern part of the Hengduan Shan is considered by the Chinese Academy of Sciences to be the foremost of China's 11 terrestrial 'critical regions for biodiversity conservation'. It is also recognized as one of the world's 25 major biodiversity 'hotspots'. The reasons for the region's outstanding biodiversity are fourfold:

- The N-S river valleys have provided a corridor for the movement of biota for a long period. The Hengduan Mountains are a boundary 'mixing zone' for three of the world's major bio-geographical realms --East Asia, Southeast Asia and the Tibetan Plateau. The WWF consider this part of NW Yunnan to lie at the juncture of five of their 'Ecoregions'.
- The remarkable altitudinal gradients within the area, with mountain summits reaching 5000-6500 m while the riverbanks in the gorges below are around 1500-2000 m.
- The monsoonal climate (wet summers) affecting most of the area
- The ice-free status of most of NW Yunnan during the Pleistocene glaciations, allowing a variety of plants and animals to remain relatively undisturbed in refugia.

The site supports the richest diversity of higher plants in China as well as a remarkable range of fungi and lichens. Over 6000 plant species are listed and distributed within 22 recognised vegetation types, which range from the savannah shrublands of the hot, dry valley floors, through both evergreen and deciduous forests, and a wide variety of coniferous forests, to alpine meadows. These diverse vegetation communities contain over 20% of China's higher plants and 2,700 of the site's plants are endemic to China (distributed within 45 endemic

genera), while 600 of them are endemic to NW Yunnan; the Three Parallel Rivers Protected Areas contains the type locality for 1,500 of these plants. The history of the site has resulted in marked species differentiation from relict and primitive to highly evolved species, and 8.5% of China's rare and endangered species have been recorded in the area.

The site contains more than 200 species of rhododendrons, over 100 species each for gentians and primulas, and many species of lily and orchid, as well as many of the most noted Chinese endemic ornamental plants: ginkgo, the dove tree, four species of the blue poppy and two species of *Cycas*. The site is famous in European plant-collecting history because of the work of the Rev. Jean Marie Delavay, George Forrest, and Frank Kingdon-Ward (among many others) who made these plants known to Western horticulturalists. The diversity of conifers is outstanding; in addition to dozens of the main mountain forest trees (*Abies*, *Picea*, *Pinus*, *Cupressus* and *Larix*), there are many endemic or rare conifers. There are also around 20 rare and endangered plants which are relict species and survived the Pleistocene glaciations, including the Yunnan yew.

The area is the most outstanding region for animal diversity in China, and likely in the Northern Hemisphere. Two-thirds of the fauna within the nominated site are either endemic, or are of Himalayan-Hengduan Mountain types. The area is believed to support over 25% of China's animal species, many being relict and endangered. Many of China's rare and endangered animals are within the nominated area: 80 are listed in the Red Book of Chinese animals, 20 of which are considered endangered; 79 animals are listed on the CITES 1997 appendices; 57 are listed in the IUCN Red List of the World's Threatened Animals. Being near the boundaries of the East Asian, Southeast Asian and Tibetan biogeographic realms, the site also acts as a corridor where many species from each realm meet and reach their limits of distribution. Most of the rarer and endangered animals lie in the western part of the site, especially the long, narrow Gaoligong Shan border with Myanmar and the Yunling Mountains between the Lancang and Jinsha Rivers.

Approximately 40% of the protected areas in the nominated site are inhabited by some 278,000 people while 36,000 inhabitants reside in the core zones (mostly engaged in subsistence agriculture).

3. COMPARISONS WITH OTHER AREAS

Currently (Thorsell and Hamilton, 2002), 55 sites in the mountain biome have been inscribed on the World Heritage List, 16 of which are in the same biogeographic realm (Palearctic), two of which are in the Himalayan region (Sagarmatha and Nanda Devi) and three in China's eastern Himalaya. The Three Parallel Rivers area is distinct from all of these particularly for its high level of bio/geodiversity and due to the geographical feature of 4 major parallel rivers. Although the summits of its mountain peaks do not reach those of Sagarmatha (8848m) or Nanda Devi (7800m), the nominated area contains 118 peaks over 5000m elevation. The 1.7 mil. ha. extent of the nomination is much greater than the median size for other World Heritage mountain sites (285,000ha) and it would rank in the top 10 of the 55 existing sites in terms of size. Other major mountains in the eastern Himalaya – Hengduan Mountain system, such as in the Gongga Shan (Minya Konka), are also of high natural value but do not contain the exceptional bio/geodiversity of the Three Parallel Rivers area.

The Three Parallel Rivers of Yunnan Protected Areas site includes several of the 110 protected areas listed in the WCMC database for Udvardy's 'Sichuan Highlands' Biogeographic Province (BP). Its area of almost 1.7 million ha is not matched by any of the other protected areas in this BP. Three other protected areas within the 'Sichuan Highlands' are listed as natural World Heritage sites -the two natural sites, Jiuzhaigou (72,000 ha) and Huanglong (70,000 ha), both within the Min Shan in northern Sichuan, and a third mixed site,

Emei Shan, on the eastern margin of the Daxue Shan above the Chengdu Basin. Other mountainous forested nature reserves previously nominated within this province are Wolong and Longxi-Hongkou (the latter as part of the Mt Qingcheng nomination); both were deferred for further consideration by Chinese authorities as part of a future giant panda habitat nomination.

Jiuzhaigou and Huanglong are primarily listed because of their geochemical phenomena, especially their travertine terraces and pools. They are high altitude sites with none of the topographic complexity of the Three Parallel Rivers. They share some of the alpine and higher altitude coniferous and deciduous broadleaf forests, but have none of the humid or schlerophyllous evergreen broadleaf forests nor the *Taiwania* forests or the shrublands of the dry, hot river valleys. In terms of plant diversity, the proposed Three Parallel Rivers site is much richer than Jiuzhaigou, Huanglong, and Emei Shan (see Table 1 below).

Table 1: Numbers of plant species in World Heritage sites in ‘Sichuan Highlands’

Plant Type	3 Parallel Rivers	Jiuzhaigou	Huanglong	Emei Shan
Pteridophyta	500	100	100	200
Gymnospermae	40	20	20	20
Angiospermae	5,500	2,000	2,000	2,500

North-west Yunnan and the Hengduan Mountains have always been ranked very highly because of their biodiversity in all major international studies comparing the world's remaining natural habitats and their priorities for conservation. These global studies include: the *Global 200* of WWF, the 25 'hot spots' as defined by Conservation International and Birdlife International priority bird areas. The Three Parallel Rivers site encompasses a large proportion of the Hengduan Mountains, and can therefore be considered to equate to a large extent with this global priority area for biodiversity.

The site covers less than 3% of the area of Yunnan (and only 0.2% of that of China) yet it contains an extraordinary concentration of animal biodiversity: 173 mammals (81 endemic), 414 birds (22 endemic), 59 reptiles (27 endemic), 36 amphibians (25 endemic), and 76 fish (35 endemic). When the diverse animal life within the nominated site is compared with the full Hengduan Mountains (see Table 2, below), it can be seen that the Three Parallel Rivers site contains 70-78% of the mammal and bird species, and 45-55% of the reptile, amphibian and fish species. This table also compares the animal diversity of the nominated site with that of the large neighbouring provinces of Tibet and Sichuan, and indeed, all of China, Myanmar or India. In all of these comparisons, the Three Parallel Rivers of Yunnan site stands out as an area of outstanding universal value in terms of its animal biodiversity.

Table 2: Richness of Wildlife in Three Parallel Rivers compared with neighbouring areas

Area	Mammals		Birds		Reptiles		Amphibians		Freshwater Fishes	
	Species	%*	Species	%*	Species	%*	Species	%*	Species	%*
3 Par. River	173		414		59		36		76	
Hengduan	221	78.3	590	70.7	117	50.4	81	44.4	137	55.5
Yunnan	300	57.7	802	52.0	152	38.8	112	32.1	382	19.7
Sichuan	222	77.9	625	60.6	85	69.4	91	39.6	241	31.5
Tibet	126	137	473	88.2	58	101.7	39	92.3		
China	609	25.1	1260	33.1	403	14.6	278	12.9	1010	7.5
Myanmar	300	57.7	967	43.1	241	24.3	75	48.0		
India	350	50.3	1200	37.7	453	13.2	182	19.8		

*species in the Three Parallel Rivers site as % of species in the area being compared

In landform terms, the extreme differences in altitude between the mountains and gorges within the site is matched elsewhere within the Himalaya-Karakoram mountain chain, especially the gorge of the Yarlung Tsangpo in Tibet, Kali Gandaki between Annapurna and Dhaulagiri in Nepal, and the Indus Gorge beneath Nanga Parbat in Pakistan (each of which exhibit an altitudinal difference of more than 5000 m). However, the proximity of the parallel gorges of four major rivers is unique in Asia and elsewhere. For comparative purposes, Fisher (1995) lists the depth at their narrowest point of some of the world's most dramatic canyons:

Table 3: The depth at their narrowest point of some of the world's most dramatic canyons

Yarlung Tsangpo, Tibet	5045 m
Kali Gandaki, Nepal	4375 m
Colca Canyon, Peru	3670 m
Tiger Leaping Gorge, China	3640 m
*Salween Canyon, China	3046 m
Pilaya Canyon, Bolivia	3030 m
*Mekong Canyon, China	2500 m
Urique Canyon, Mexico	1860 m
Sinforosa Canyon, Mexico	1818 m
Batopilas Canyon, Mexico	1790 m
Copper Canyon, Mexico	1750 m
Grand Canyon, USA	1416 m

* Part of nominated site

The assemblage of ophiolite rocks associated with the mountain uplift and folding in this vast orogenic belt also occurs in the Karakoram Mountains of northern Pakistan. The mountains of NW Yunnan and the Karakoram have both resulted from the collision of the Indian Plate with the Eurasian Plate. Consequently, there are many similarities between the diverse deep ocean floor and 'island arc' rocks of both areas, each squeezed to the east and west, respectively, of the main collision uplands -the Himalaya Range and Tibet-Qinghai Plateau. The Karakoram ophiolite sequences are a key geological feature of the Central Karakoram National Park, an extremely mountainous area of more than 1,000,000 ha that has been nominated for World Heritage status by Pakistan (but subsequently withdrawn after objections relating to the unresolved Kashmir sovereignty issue were raised by India).

The Danxia (red/purple sandstone) within the Laojun Shan portion of the Three Parallel Rivers site is outstanding in terms of its high elevation (up to 4200 m), which results in extreme 'freeze-thaw' weathering and contributes to some remarkable Danxia landform features, including the 'tortoise shell' surface pattern. The Danxia rocks in the site are also outstanding in that they overlie directly rocks which are considered to be 1.3 billion years older. Danxia landforms are found at similar latitudes in southern China and are a major landscape feature of another World Heritage site -Wuyi Shan in Fujian Province. However, the Danxia in Wuyi is at much lower altitude and smaller in extent (less than 10,000 ha) compared with the Danxia in Laojun Shan (150,000 ha).

In summary, the Three Parallel Rivers site has an exceptionally wide range of natural features ranging from distinctive topography and varied geology to particularly high levels of biodiversity. All this is set within the spectacular setting of glaciated peaks rising from 760m in the depth of river gorges to 6740m. As one reviewer noted, "it would be difficult to find an area in any other mountainous region that would surpass the ecological and topographical diversity of this proposed site".

4. INTEGRITY

4.1. Legal Status

The 15 different protected areas that make up the nomination have a range of legal designations including national and provincial level Nature Reserves, national Scenic Areas as well as small areas administered by two Prefectures and one County. A further complication is the division of the area into core areas totalling about 60% of the nominated site (corresponding to IUCN Category I and II) and Buffer Zones (corresponding to IUCN Category IV). Another 1.7 million hectares envelope the entire unit and serves as an additional de facto buffer. This multiple-use buffer zone (IUCN Category VI) includes most of the lower altitude lands in the Jinsha, Lancang and Nu Jiang river valleys, -- more accessible localities which for the most part are used for agriculture, settlement (800,000 human residents), transportation and industry. All land within the nominated area is thus under some form of protection but the level varies considerably from strict protection (ie. no human use) to areas where human settlement and subsistence agriculture occurs. One of the 15 areas (Yunling Nature Reserve) was approved for provincial Nature Reserve status in December, 2002. It is also be noted that a UNESCO Biosphere Reserve exists in part of the Gaoligong Nature Reserve which may (or should) be expanded in future.

If it were not for the establishment of the Yunnan Three Parallel Rivers Management Committee as the coordinating and management body for the site, IUCN would have greater concerns over the mix of legal designations, the overlap between the various administrative agencies and the balance between the core and buffer zones. On the broader issue of protected area legislation in China, IUCN also would suggest this may be in need of review in order to rationalise procedures but this is a separate issue from this evaluation. At this point in time the legal status is considered adequate but may prove difficult and require reassessment in future.

4.2. Boundaries and rationale for serial nomination

As noted in section 2, this is a serial nomination comprising 7 separate clusters. Each unit in the cluster is intended to add "a piece of the puzzle" and a representative sample of the range of the biogeodiversity of the Hengduan Mountains. One cluster highlights the glaciers of the high peaks, another is important for habitat of endangered species such as the Golden Monkey, while others incorporate the Danxia landforms, alpine lakes or other natural features. Such an approach in an area that has been modified by human activities over thousands of years is similar to that in other serial sites, such as the Central Eastern Rainforests of Australia where intervening areas have transformed the natural landscape. In the case of the Three Parallel Rivers site, several of the units are proximal but others are separated by a distance of 15 km. with little opportunity for corridors to link them. The boundary/area ratio is extremely high. Spaces between the units occur due to their separation by precipitous river gorges, high mountain glacial divides and/or human settlement. Such a condition will result in a certain biological isolation which the authorities are aware of and are studying options for linking the units via protected area 'corridors' (eg. in the Gaoligong Mountains corridor and in several of the gorge reserves). This initiative is strongly supported by IUCN as it would help considerably to enhance the integrity of the overall site.

Along with consideration of corridors, continuing inventory and research is leading to identification of additional areas that merit protection to more fully provide coverage to the range of natural values found in the region. For instance, it has been suggested that the Meili Snow Mt. reserve might be extended into the Tibetan Autonomous Region. Yulong Xue Shan is another area which is a sacred mountain of the Naxi and has high biological values on its western slopes. Tiger Leap Gorge (Jinsha Jiang) is adjacent to the Haba Snow Mt. reserve and, as one of the most dramatic expressions of an incised canyon, would also add to the

overall justification for the nominated area. Finally, as more information on existing reserves is obtained, an expansion of the core zones within the total area is expected over the next few years.

In light of these ongoing initiatives, IUCN suggested to the Chinese authorities during the field mission that a review of a revised protected area system in the Hengduan be presented in 3 years time. Such a recommendation from the Committee has been made in other cases and, although the delineation of the 7 clusters is considered adequate at this time, it is clear that potential for improvements exists.

Finally, it is noted that the Hengduan mountain area extends partially into Myanmar as well as into the neighbouring province of Sichuan. Discussions with nature conservation agencies in those jurisdictions should be held with a view to potential transboundary cooperation. One existing mechanism to do this is through the “Greater Mekong Subregion Programme”.

4.3. Management Planning

Substantial planning effort for the area has been conducted both at the regional level and site level. On the regional scale, the Yunnan Three Parallel Rivers Management Committee has prepared a “General Management Plan for the Three Parallel Rivers NP” as well as an “Action Plan on Protection of Three Parallel Rivers Area” and has begun a separate plan for resource conservation and monitoring. Nine of the 15 separate protected areas within the nominated site have approved management plans and the remaining 6 are underway with completion dates set for 2003. Additional support for the preparation of these plans has been contributed by the GEF and The Nature Conservancy (who also have prepared an ecoregion conservation plan and action plan for the area).

IUCN has not had the opportunity to review all the plans but several samples were seen during the field mission and were very well prepared (especially those prepared with the assistance of Tsinghua University). The General Management Plan, however, was of concern because it currently has a much greater emphasis on development (especially through tourism) than on nature conservation. The Plan mentions increases in the use of hydro power which, at the micro level can provide clean energy, but at more extensive levels could be potentially damaging to the natural values of the main rivers. This General Plan is due to be revised over the next few years and this imbalance between development and conservation should be corrected.

Planning documents thus abound, and implementation is now the key challenge. An impressive start has been made with visitor centres, boundary signs and field offices as visible examples of a conservation management presence. The Yunnan provincial government has budgeted 15 million yuan for each of the next 5 years for management and administration and an additional 200 million yuan for field conservation projects. The staffing of the World Heritage Management Bureau will grow to 25 by 2004. While all the signs for establishing an effective management regime are positive and government commitment is clearly behind conservation of the site IUCN has suggested to the authorities that a mission to review progress (along with expanded boundaries) should be conducted in 3-4 years time.

4.4. Human Activities

The nominated site is occupied by some 315,000 human residents (including 36,500 in the core zones) and has partially been modified by grazing, forestry, roads and settlement. For example, there are 27 villages in the Meili Snow Mts. reserve with 15 human economic activities recorded (mostly subsistence uses). This number of people within a World Heritage natural site is substantially higher than any other site (Lake Baikal in Russia has some 50,000 residents). Fortunately, much of the site is still relatively undisturbed and continues to

perform its ecosystem functions. This is partially explained by the inaccessibility of the higher slopes and the relatively light impact of the subsistence activities of the resident populations. Nevertheless, the “naturalness” of the nominated area, mostly at the lower elevations and plateaus, has been reduced by several thousand years of human use.

To partially address the problem, particularly on steep slopes where farming is unsustainable, the Chinese authorities have had a poverty alleviation programme in place for some years to provide alternate lands outside the protected areas. The policy is to aim for a reduction of an additional 16,000 people from the core zones and a limit placed of 298,000 in the buffer zone. In any case, the management of the site is certainly complicated by the presence of the human population (most of whom are ethnic minorities) and principles of consultation and participation must necessarily follow.

4.5 Tourism

Despite the remoteness of the area and the difficulty of access, the natural and cultural attractions of the region drew an estimated 188,500 visitors in 2001. About 90% of these were domestic in origin. Most of the tourism is concentrated in the peripheral areas of Gaoligong Mt. where hotels are available. Secondary sites are at the Meili Snow Mt. viewpoint and at the Shudu Lake. There are plans to develop driving, hiking, boating and riding opportunities; accommodation will be based in the main six (and 17 smaller) towns and the recreational use will be concentrated at the margins of the nominated site. Nevertheless, the General Management Plan forecasts that tourism growth will increase at least five-fold. Core areas do not allow entry to visitors.

From experience IUCN has gained with the inability of some World Heritage site managements to handle the pressures of rapidly-increasing numbers of tourists in other natural World Heritage sites in China, IUCN registers concern over future rapid tourist growth in the Three Parallel Rivers site. Although there is obvious potential for expansion of visitor facilities and attendant economic benefits to local communities, large scale mass tourism with its tendency to introduce inappropriate facilities is likely to cause damage to the intrinsic values of the site, and to the cultural stability of the minority peoples. Tourism development thus should be carefully planned in advance and its impacts closely monitored.

4.6 Involvement of NGO's and donors

Not surprisingly, the area has gained the attention of several international conservation groups who are supporting projects in the area, primarily TNC but also WWF and CI. The National Science Foundation (USA) has done resource inventory studies. The Government of the Netherlands is supporting community projects and the GEF has provided funds for management plans. Additional support from all these groups for the efforts of the Chinese authorities is an indication of the wide interest and concern about conservation in the area.

5. ADDITIONAL COMMENTS

5.1 Cultural values

Similar to many other countries in Asia, nature and culture are seen as inseparable in China. This is especially the case in the nominated area where the Tibetan, Lisu, Nu, Dulong, Bai, Pumi and Naxi minority peoples have been residing in the area and utilising its accessible resources (mostly on a subsistence basis) for thousands of years. The linkage of their rich cultures to the land are evident in many ways -through their religion and their mythology, art, dance, music, poetry and songs. The local status of the Meili Snow Mountain as a sacred area, off-limits to mountaineers, is one reflection of their reverence for wild nature and the vigour

of the local culture. The continued existence of the cultural heritage of the area is well-recognised and supported in the management plans and in the slogan and logo of the site.

5.2 Name of site

As the term "Three Parallel Rivers National Park" used in the original nomination document covers a much larger area than the nominated site (including lands which were not protected areas), a more accurate name for the site was requested. During the field inspection a technical group discussion on the issue suggested the alternative name: "Three Parallel Rivers Protected Areas". The name "Three Parallel Rivers of Yunnan Protected Areas" has been proposed by the Chinese authorities in a supplementary information report. Confirmation of this revised name is required.

6. APPLICATION OF WORLD HERITAGE CRITERIA

The Three Parallel Rivers of Yunnan Protected Areas have been nominated under all four natural criteria.

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

The site is of outstanding value for displaying the geological history of the last 50 million years associated with the collision of the Indian Plate with the Eurasian Plate, the closure of the ancient Tethys Sea, and the uplifting of the Himalaya Range and the Tibetan Plateau. These were major geological events in the evolution of the land surface of Asia and they are on-going. The diverse rock types within the site record this history and, in addition, the range of karst, granite monolith, and *Danxia* sandstone landforms in the alpine zone include some of the best of their type in the mountains of the world. *IUCN considers that the nominated site meets this criterion.*

Criterion (ii): Ecological processes

The dramatic expression of ecological processes in the Three Parallel Rivers site has resulted from a mix of geological, climatic and topographical effects. First, the location of the area within an active orographic belt has resulted in a wide range of rock substrates from igneous (four types) through to various sedimentary types including limestones, sandstones and conglomerates. An exceptional range of topographical features - from gorges to karst to glaciated peaks -- is associated with the site being at a "collision point" of tectonic plates. Add the fact that the area was a Pleistocene refugium and is located at a biogeographical convergence zone (ie. with temperate and tropical elements) and the physical foundations for evolution of its high biodiversity are all present. Along with the landscape diversity with a steep gradient of almost 6000m vertical, a monsoon climate affects most of the area and provides another favourable ecological stimulus that has allowed the full range of temperate Palearctic biomes to develop.

IUCN considers that the nominated site meets this criterion.

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

The deep, parallel gorges of the Jinsha, Lancang and Nu Jiang are the outstanding natural feature of the site; while large sections of the three rivers lie just outside the site boundaries, the river gorges are nevertheless the dominant scenic element in the area. High mountains are everywhere, with the glaciated peaks of the Meili, Baima and Haba Snow Mountains providing a spectacular scenic skyline. The Mingyongqia Glacier is a notable natural

phenomenon, descending to 2700 m altitude from Mt Kawagebo (6740 m), and is claimed to be the glacier descending to the lowest altitude for such a low latitude (28° N) in the northern hemisphere. Other outstanding scenic landforms are the alpine karst (especially the 'stone moon' in the Moon Mountain Scenic Area above the Nu Jiang Gorge) and the 'tortoise shell' weathering of the alpine Danxia.

IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

Northwest Yunnan is the area of richest biodiversity in China and may be the most biologically diverse temperate region on earth. The site encompasses most of the natural habitats in the Hengduan Mountains, one of the world's most important remaining areas for the conservation of the earth's biodiversity. The outstanding topographic and climatic diversity of the site, coupled with its location at the juncture of the East Asia, Southeast Asia, and Tibetan Plateau biogeographical realms and its function as a N-S corridor for the movement of plants and animals (especially during the ice ages), marks it as a truly unique landscape, which still retains a high degree of natural character despite thousands of years of human habitation. As the last remaining stronghold for an extensive suite of rare and endangered plants and animals, the site is of outstanding universal value.

IUCN considers that the nominated site meets this criterion.

7. RECOMMENDATIONS

IUCN recommends that the Committee **inscribe** the Three Parallel Rivers of Yunnan Protected Areas on the World Heritage List on the basis of natural criteria (i), (ii), (iii) and (iv). The Committee is also advised, based on the above discussion on integrity issues, to make the following recommendations:

- Commend the authorities for the planning initiatives made to date and encourage completion of the remaining six protected area management plans and a revision of the General Management Plan,
- Note concerns over the nature and extent of future tourism (section 4.5 above), resident human population (section 4.4 above) and hydro development (section 4.3 above) that may affect the nominated site.
- Encourage the continued refinement of the boundaries of the site, including the addition of other areas of equally high natural value, expansion of core zones, controls over extent of resident populations and discussion of transboundary issues with neighbouring jurisdictions,
- Request the Chinese authorities to invite a mission in 3-4 years time to: (1) review progress with implementation of management plans and, (2) to assess revisions to the boundaries of the site.
- Confirm the revised name of the site with the Chinese authorities,
- Commend the cooperative efforts of The Nature Conservancy, WWF, the GEF and others for their assistance in strengthening the efforts of the Chinese authorities,

RAS MOHAMMED

EGYPT



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

RAS MOHAMMED (EGYPT) ID N° 1086

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 7 references
- ii) **Additional Literature Consulted:** IUCN/UNEP. **Coral Reefs of the World**. Vol.2; Kelleher G. et.al. eds.1995. **A Global Representative System of Marine Protected Areas** . IUCN/World Bank; UNEP/WCMC. 2001. **World Atlas of Coral Reefs** . U. Calif. Press; Salvat, B. et.al. 2002. **Coral Reef Protected Areas in International Instruments**. 196p.; Fishpool, L and M. Evans eds. 2001. **Important Bird Areas in Africa**. Birdlife Intl; Green E. 2001. **A Global Overview of Tropical Marine, Coastal and Small Island Ecosystems on the WH List**. Discussion Paper. UNEP/WCMC; Ayyad, Mohamed. 1999. **Identification of Potential Natural Sites in Arab Countries**. Contract Report to WH Centre. 139p.; Technical Expert Group on Marine and Coastal Protected Areas. 2001. **The Value and Effects of Marine and Coastal Protected Areas on Marine and Coastal Biological Diversity**. UNEP/CBD; Pearson, M and A. Shehata. n.d. **Protectorates management in the Arab Republic of Egypt: The South Sinai Sector**. Unpublished manuscript; Egyptian Environ. Affairs Agency. 2002. **Abstracts from the First Egyptian International Conference of Protected Areas and Sustainable Development**; Siliotti A. 1994. **Guide to Exploration of the Sinai**; Boye, R. 1989. **Underwater Paradise**. Abrams; Wilkinson, C. ed. 2000 and 2001. **Status of Coral Reefs of the World: Draft Preliminary Findings (Egypt)**; National Biodiversity Unit. 1993. **Habitat Diversity: Egypt**. UNEP/EEAA; **WH Marine Biodiversity Workshop: List of Priority Areas**. Feb. 2002. Hanoi; IUCN. 1981. **General Assembly Action Points 15/29**; www.goredsea.com and www.reefbase.org.
- iii) **Consultations:** 8 external reviewers contacted. Various government officials from park staff in the South Sinai Protectorate office, Alexandria University, UNESCO Regional Office and staff of Environmental Affairs Agency.
- iv) **Field Visit:** Jim Thorsell. December 2002

2. SUMMARY OF NATURAL VALUES

Ras Mohammed is a headland at the southernmost tip of the Sinai Peninsula at the juncture of the Gulfs of Suez and Aqaba. The nominated area is a 40,110 ha. portion of the Ras Mohammed National Park (RMNP) which, in its entirety covers 93,560 ha. and extends across the Straits of Tiran to the border with Saudi Arabia. The park is one of Egypt's 3 contiguous Gulf of Aqaba Protected Areas which extend north along 260 km. of coast to the border with Israel. RMNP is primarily a marine park (70% of the area nominated is marine) but its boundaries also encompass a range of terrestrial habitats including sandstone mountains (elevations up to 321m), gravel plains, wadis, uplifted fossil coral terraces and sand dunes. Littoral habitats include a mangrove community, salt marshes, intertidal flats and a diversity of shoreline features. Climate is hyper-arid with less than 30mm of precipitation per year.

A fringing reef encircles the headland and a number of patch reefs occur offshore. Corals, which account for some 60% of the total park area, are profuse and well-developed. This is partly due to low wave action and the low run-off from the surrounding desert which results in high water clarity. As is the case in the Red Sea generally, salinity levels are especially high. Another distinguishing feature is that the reefs of this part of the Red Sea extend relatively far into the northern latitudes and have adapted to the lower water temperatures. As a result, the site has not been affected by coral bleaching which has been the case for many other reefs in the world. Some 210 species of reef-building and 120 species of soft coral have been recorded. Over 350 species of fish, including several shark species and 272 species of macro-invertebrates (clams, crustaceans, molluscs, etc.) are also found in the park. A rich invertebrate fauna (algae, sponges, shrimps, worms, etc.) is present and Green and Hawksbill turtles are common. RMNP is also one of 34 Important Bird Areas in Egypt as it hosts as many as 470,000 migrants which pass through the area during the autumn months. White storks and raptors are the most numerous species.

3. COMPARISON WITH OTHER AREAS

There are currently 56 natural and mixed sites on the World Heritage (WH) List that have a marine and coastal component. Along with terrestrial wetlands (60) and mountains (55), marine and coastal features are one of the most common biomes found in natural WH sites. Eighteen of these 56 sites contain coral reefs and 9 sites have been inscribed primarily (or for the most part) based on the universal value of their reefs and/or associated marine life: Great Barrier Reef (Australia), Tubbataha (Phillipines), Belize Barrier Reef (Belize), Cocos Island (Costa Rica), Aldabra (Seychelles), Shark Bay (Australia), Galapagos NP and Marine Reserve (Ecuador), El Vizcaino (Mexico) and Fernando de Noronha/Rocas Atoll (Brazil).

RMNP is the second site nominated from the region of the Red Sea (in 1983 the Committee deferred a decision on Sudan's Sanganeb Atoll). It differs significantly from the above existing sites due to the distinctive characteristics of this body of water in terms of its location, bathymetry, climate and species make-up. Although not as diverse as the reefs of insular Southeast Asia which have the highest numbers of species of any area, the Red Sea is considered to be the second-most diverse coral reef area on the planet. (Using the number of genera of *Scleractinia* (hard) corals as an indicator, the Red Sea in Egypt contains 57, while Indonesia records 77 and Australia has 75). The Red Sea is a favoured area for divers due to the clarity of the water and because its reefs often abut the shoreline of the narrow continental shelf forming an almost continuous fringing reef.

UNEP/WCMC (2001) have an inventory of 525 coral reef protected areas (plus a potential 100 others where data are missing). In the Red Sea (considering the main countries of Egypt, Saudi Arabia, Sudan and Eritrea) only 14 protected areas with marine components have been established (plus two very small sites in Jordan and Israel). In terms of size, RMNP is the seventh largest of these. At least four marine sites in the region stand out as being of at least equal biological importance as RMNP: the Farasan Islands and Al-Wajah Bank in Saudi Arabia, the Sanganeb Atoll NP in Sudan and the Dahlak Archipelago in Eritrea. Most of these also have raised fossil reef terraces. The extensive reefs in the Gebel Elba Conservation Area in Egypt also contain a major reef area much larger than RMNP and the adjacent marine protected areas in the Gulf of Aqaba (Nabq and Abu Galum) contain equivalent natural values. Not all sites, however, have the same level of management. All of the above mentioned seven sites (except Dahlak) have been identified as potential WH sites in the Ayyad (1999) report to the WH Centre. The findings of the WH Marine Biodiversity workshop held in Hanoi in February, 2002 also identify 2 complexes in the Red Sea region on its list of potential marine sites: Northeast Red Sea (Saudi Arabia and Egypt, including the sites Ras Mohammed, Al Wejh bank, Gabal Elba) and Southern Red Sea Complex (Saudi Arabia, Yemen, Djibouti, Eritrea).

In conclusion, the RMNP is one of a network of 8 internationally important coral reef protected areas in the Red Sea region. No comparative section was contained in Egypt's nomination document for the site so it is not possible to state definitively the relative values of RMNP compared to the others. However, from what data are available, its overall size is surpassed by 6 other marine protected areas in the Red Sea.

4. INTEGRITY

4.1 Site Management

RMNP is Egypt's oldest and best-known national park having been established in 1983 (although prior to this it also had partial protection during the Israeli occupation). Over the past 20 years a major effort has been made to establish an effective management regime as a strategy to complement the policy of encouraging tourism development in the south Sinai. The Egyptian Environmental Affairs Agency, with support from the EU, has succeeded in implementing one of the best-managed marine parks in the region. The network of protected areas now extends all the way up the coast to the border with Israel and incorporates much of the inland and coastal zone which gives it control over adjacent development. Close liaison with other local government agencies, the private tourism sector and dive operators has been crucial to the success of the park as has a strong public awareness program. Policies exist to control coastal alteration, discharge, setbacks from the shore, waste disposal, and building heights. Protocols with local Bedouins have been concluded which either ban or place limits on the artisan fisheries of the protected areas adjoining RMNP.

Practical measures within the park to address issues created by some 200,000 divers who visit the park annually include a visitor centre, marked access points, designated dive sites, mooring buoys, oil spill contingency stations and a monitoring program. For staff training a Nature Conservation and Management Centre has been established in association with park headquarters complete with accommodation and library.

In view of the rapidly expanding knowledge of the park's resources, a management plan document has not yet been prepared. Instead, the park has operated under the principle of adaptive management using objectives, flexible regulations and annually modified procedures to ensure its conservation. This approach has certainly worked to date but, for longer term stability, it would be essential to carry out a management planning exercise soon.

4.2 Boundaries and size

The total area of coral reef within the Red Sea as estimated by UNEP/WCMC (2001) is 16,440km² including 3800 in Egypt, 6660 in Saudi Arabia, 2720 in Sudan and 3260 in Eritrea. The coral reef area within the nominated site of RMNP (approximately 40 km²) is equivalent to only 0.24% of the Red Sea total. This very small segment and scattered distribution of reefs would lend itself to formulation of a serial nomination which would better reflect the full range of values of those coral reefs in the Red Sea that have outstanding universal value. (This approach is, in fact, being followed for the Line Islands in the central Pacific where 4 countries are involved in preparing a nomination.) A recommendation for a serial approach is also reinforced by the 1999 "Identification of Potential Natural Heritage Sites" report to the WH Centre which suggests that 6 sites in the Red Sea region merit consideration for WH status.

During the field evaluation it was noted that only a portion of the RMNP has been put forward for nomination and that it is contiguous with two other protected areas (Nabq and Abu Galum) that extend 260 km north along the coastal zone and which include some spectacular fringing reefs. Indeed, if the distribution of dive sites can be used to illustrate where the best reefs are, the majority of them occur outside the nominated area.

These 3 contiguous areas are all under unified management and it would seem reasonable to widen the scope of the nomination to incorporate the appropriate additional marine zones. IUCN recognises that there would be some difficulty in addressing management issues in the marine sector off the tourist resort of Sharm and that there are some border and security issues with Saudi Arabia relating to the Tiran Islands sector. However, many reviewers felt that a truly outstanding WH site containing an expanded area of coral and marine features would have much stronger justification (as was the case when the Committee requested Brazil to add the Atoll Las Rocas to the Fernando Noronha area before inscription was approved).

5. ADDITIONAL COMMENTS

In February, 2003 a regional experts meeting was to be held in Cairo to review the Tentative Lists (TL) of countries in the region with a view to “harmonising” their lists. This initiative could provide a useful framework for devising an approach to considering a serial nomination for important marine sites in the Red Sea and IUCN looks forward to reviewing the report of this meeting. Should countries in the region wish to pursue a serial nomination, they may wish to involve of the Regional Organisation for the Conservation of the Environment of the Red Sea and Gulf of Aden who could provide a coordinating function.

6. APPLICATION OF WORLD HERITAGE CRITERIA

Egypt should be commended for leading the way in the region in the establishment of marine protected areas and for initiating the nomination of a marine site in the Red Sea. IUCN believes there may be a potential case for RMNP under criteria (ii), (iii), and (iv). However, as noted in sections 3 and 4.2 above, the very small size of the site would suggest that the conditions of integrity as defined in the Operational Guidelines are not met. Consistent with (1) suggestions made in the 1999 report to the WH Centre on “Potential Natural Heritage Sites in the Arab Region” and (2) findings of the 2002 WH Marine Biodiversity Workshop, IUCN concludes that:

- As an immediate step, the State Party should be asked to consider extending the boundaries of the nomination to include the eastern portion of RMNP as well as appropriate sectors of the adjoining protected marine areas in the coastal zone of the Gulf of Aqaba;
- In the longer term (i.e. Phase 2), the State Party should be encouraged to consider, with neighboring countries surrounding the Red Sea, a serial coral reef nomination.

7. RECOMMENDATIONS

IUCN recommends that the Committee, noting the above two conclusions, **defer** a decision on the inscription of Ras Mohammed.

SARYARKA - STEPPE AND LAKES OF
NORTHERN KAZAKHSTAN

KAZAKHSTAN



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

SARYARKA - STEPPE AND LAKES OF NORTHERN KAZAKHSTAN (KAZAKHSTAN) ID N° 1102

1. DOCUMENTATION

- i) **UNEP-WCMC Data Sheet:** (4 references)
- ii) **Additional Literature Consulted:** Krever, V. et al, (Eds). 1998. **Biodiversity Conservation in Central Asia: An Analysis of Biodiversity and Current Threats and Initial Investment Portfolio.** WWF; Dugan, P. et al (Eds), 1993. **Wetlands in Danger – A Mitchell Beazley World Conservation Atlas**; Mitchell Beazley & IUCN, London; Kovshar, A. F., (Ed), 2000. **The Key Wetlands of the North Kazakhstan.** Tethys, Almaty, 16pp; Tolvanen, P., Aarvak, T., Bragina, T., 2001. **Conservation work for the wetlands and monitoring the autumn staging of Lesser White-fronted Goose in the Kustanay region, north-west Kazakhstan,** in 2000, pp. 30-3, in WWF Finland Report 13; Aitzhanov, M., 1998. **Creating a Biosphere Reserve: Opportunities for the Tengiz Lakes, Kazakhstan,** pp. 261-4 in S. Dompke and M. Succow (Eds.), “Cultural Landscapes and Nature Conservation in Northern Eurasia”, NABU, Bonn; Yerokhov, S. 2001. **Overview of Undertaken Measures on Migratory Waterfowls Conservation in Kazakhstan; Northeast and East Central Asia - National Biodiversity Strategies Action Plans Newsletter.** Issue 3/4. Biodiversity Planning Support Programme UNEP/UNDP; **Film of wildlife of Korgalzhin NR** by Prof. Frende. **Proceedings of the Seminar for the Protection and Conservation of of Grasslands in East Asia.** WCPA and IUCN, 2000, pp 11-44; Vlasov, A. **Preserving the steppes of Russia, Ukraine and Kasakhstan,** in Russian Conservation News, Spring 2002, No. 29, pp 20-21.
- iii) **Consultations:** Eight external reviewers; local experts and relevant officials from the Kazakhstan Ministry for Natural Resources and Environment; representatives of the local governments; NABU (Naturschutzbund Deutschland or the German Society for Nature Protection) field experts.
- iv) **Field visit:** L. F. Molloy and R. Hogan, August 2002

2. SUMMARY OF NATURAL VALUES

‘Saryarka’ - The Steppe and Lakes of Northern Kazakhstan (SLNK) comprise three protected areas:

- Naurzum State Nature Reserve (NSNR) [87,700 ha],
- Sarykopa Wildlife Reserve [82,500 ha], and
- Korgalzhin State Nature Reserve (KSNR) [258,947 ha],

The reserves include three groups of fresh and salt water lakes on the watershed between rivers flowing north to the Arctic and south into the Turgai Depression of the Ara-Irtysh

basin. They lie within the broad strip of temperate Eurasian steppe grassland extending from the Black Sea to the Chinese border; a huge area of 13,000 km from west to east and 500-900 km from north to south. The Eurasian Steppe extends over the northern half of Kazakhstan, bounded by coniferous taiga forests to the north and semi-deserts to the south.

Naurzum State Nature Reserve (NSNR) and Sarykopa Wildlife Reserve (Sary-Kopinskiy State Nature Protection Area) are both located in the Turgai Depression, which is of tectonic origin and runs north-south for hundreds of kilometers from the Ob-Irtysh-Tobol basin in western Siberia, to the great inland lakes of the Aral and Caspian Seas. The Turgai Depression in this region is a 25-30km wide valley with intermittent scarp slopes; the floor of the depression consists of former river and lake terraces, now dotted with an intricate chain of winter-flooded lakes. The Sarykopa wetlands lie about 100km south of the Naurzum lakes. The Naurzum Nature Reserve consists of three discrete parcels of land: 30km to the northwest of the main Naurzum wetlands, there is an area of steppe with patches of forest and striking outcrops of red and yellow “clay hills” (the *Tersek* outlier), and about 20km to the west another area of high quality steppe (the *Sypsyn* outlier). The climatic cycles are complex (with both a 12-year and 25-year periodicity) and are not completely understood as yet. In some extreme years many of the lakes dry out, allowing the algae and many of the mineral nutrients to blow away into the surrounding steppe, forcing the whole aquatic ecosystem to re-establish itself again with the commencement of the next wetting phase of the cycle.

Korgalzhin State Nature Reserve (KSNR) is located 300km to the east of Naurzum, in a former lake bottom depression in the Kazakh Rolling Hills. It consists of the vast Korgalzhin-Tengiz lake system, an inward-draining complex of marshes, and freshwater and saltwater lakes of fluctuating water level, fed by the permanent Nura and intermittent Kulanuptes rivers. This intricate landscape of colorful lakes enveloping fingers of semi-desert and steppe is hard to appreciate from the ground (because of the limited elevation) but it is a spectacular sight from the air. The total water area in the nature reserve is an estimated 260,000ha. Lake Tengiz is the largest at 159,000ha, but can shrink to 113,000ha after drought. It is saline with a thick silt lake bottom and surrounded by wide mudflats. Most of the freshwater builds up in the Nura River delta which, when flooded, becomes a huge shallow lake -- Lake Korgalzhin (47,100ha), a labyrinth of myriad channels lined with *Phragmites* reeds. Most of the watercourses and lakes are shallow, saline and seasonal; when their margins dry out they form areas of *solonchak* and *sor soloncha*, as well as deposits of salt and medicinal muds. The groundwater is saline but there are some freshwater springs. The diverse flora and fauna of the wetlands has evolved in phase with these wetting/drying cycles. The dynamic nature of the site is a key factor in its use as a habitat for diverse and large numbers of migratory birds.

The wetlands of SLNK are an important crossroads of central Asian migratory flyways -- between northern Scandinavia and the east, and between Siberia and the south. Waterfowl from as far away as Italy and Finland on the west to Yakutia on the east, and from the Arctic in the north and Australia to the south, rely on wetlands in Kazakhstan for nesting, moulting and feeding habitat during the migration seasons. The Korgalzhin-Tengiz lakes are capable of feeding 15-16 million birds, among them migratory flocks of 2 - 2.5 million geese. After rains, these lakes support 350,000 nesting waterfowl, and the Naurzum and Sarykopa lakes, 250,000. Resident species come from northern boreal forest, steppe, semi-desert and southern desert habitats. In total, 351 bird species have been recorded (112 breeding and 239 migratory) within the nature reserves. Lake Tengiz is a globally important breeding site for greater flamingo and 6,000 - 10,000 pairs have been counted on islands in the lake in the last 5 years, and at times numbers are reputed to reach 60,000.

Globally endangered species that occur in the SLNK include the Siberian white crane (three birds were observed in 2001), slenderbilled curlew and white-headed duck (which nests in the area), lesser white-fronted goose, red-breasted goose, Pallas's fish eagle, greater spotted eagle and imperial eagle, lesser kestrel, corncrake, great bustard and sociable lapwing. This last species and the black and whitewinged larks are local endemics. Migrating birds, moulting and resting, pass through in huge numbers: 40,000 widgeon, 20-40,000 mallard, 150,000 pochard, 50,000 redcrested pochard, 100,000 ruff, 40,000 coot, 50-80,000 rednecked phalarope. Naurzum is also one of two places where the Siberian crane stops for

long periods when migrating to Iran from Siberia (the other site is the Volga Delta). In 1976, the reserves were designated a Ramsar wetland site and in 2000 they were included in the international network of “Living Lakes”.

SLNK also contains significant areas of unploughed steppe, especially in the western part of Naurzum. The nominated area has nearly 770 species of plants, a third of Kazakhstan’s plant species and over half of the region’s steppe flora. Naurzum is the most botanically diverse part of the nomination, with 687 of the plant species in the reserve. Here the northern *Pinus sylvestris* forest reaches its southernmost point and meets the semi-arid desert flora at its northernmost. Naurzum also contains a variety of steppe types including feather-grass dominated dry steppe, and sandy scrub steppe with almond, cherry, and juniper shrubs. The discontinuous forest/steppe edge is a very important habitat for raptors, many of which nest in the pine trees, close to plentiful prey in the steppe landscape. The site contains 70% of the Falconidae order in Kazakhstan, 28 species in all, with 18 species (including imperial eagle, golden eagle, white-tailed eagle and steppe eagle) nesting within the site; it also contains one of the few stable populations of saker falcon in Kazakhstan.

Many of the 53 mammal species in the nominated areas are steppe rodents such as marmot, ground squirrel and lemmings. Saiga antelope once migrated from the south to all the reserves in summer but this once abundant species is now vulnerable to extinction. Some saiga are still found in Korgalzhin, an important area for calving females, which now represents the northernmost limit of the antelope’s range. The nominated area also contains 10 reptiles and amphibians, 16 fish and over 1,000 invertebrate species have so far been identified.

3. COMPARISON WITH OTHER AREAS

There are as yet no natural World Heritage sites in the vast Eurasian Steppe which extends eastwards from the Ukraine, through much of the five former soviet Central Asian republics, to Mongolia. The nominated area is part of the Pontian Steppe biogeographic province. Although Hortobágy (Hungary) cultural landscape falls within this province, the Danube Delta (Romania) is the only natural World Heritage site in the Pontian Steppe.

The Central European steppes are characterized by sand dunes, forests, and freshwater and sodic lakes and marshes but most have been significantly modified. Hortobágy includes seasonal salt marshes along the flood plains of ancient rivers. However, it is a man-made or secondary steppe and therefore not comparable to the natural steppe and wetlands of SLNK. Steppe remnants in Europe are also much smaller than SLNK and are therefore unlikely to fulfill World Heritage ‘Conditions of Integrity’.

The nomination notes (page 9) that “the property presents a large territory of virgin steppe sufficient for the conservation of rare and zonal elements of steppe flora and fauna”. However, this statement is not substantiated by the site’s boundaries which show that the vast majority of the area within the site corresponds to wetlands ecosystems and only a very limited extension of adjacent steppe is actually included in the nomination. Thus the nominated site only represents a small sample of the steppe areas existing in Central Asia.

Assessing the Outstanding Universal Value of SLNK in the context of existing steppe ecosystems in Central Asia is a difficult task due to the limited scientific information available on this ecosystem. As noted by IUCN in the evaluation of the Uvs Nuur Basin, Mongolia/Russian Federation (IUCN, 1999) “it is difficult to assess whether Uvs Nuur contains the best of the world’s steppe landscapes without a detailed knowledge of a biome that extends across 8,000km of Eurasia”. This limitation in making an objective comparative assessment also applies to SLNK. In addition it is important to consider that there are 34 protected areas in Russia, Ukraine, Kazakhstan and Mongolia that contain steppe ecosystems. There are also two large steppe grasslands protected areas within China: the Tian Shan Zhongbu Gongnaisi Grassland Nature Reserve (66,667ha) and the Xilinguole Grassland Nature Reserve (1,078,600ha). The latter also encompasses two salt lake systems – Qagan Nur and Dalai

Nur- but it is difficult to obtain comparative data and information on these areas. Thus there is an urgent need to develop a thematic study on the steppe ecosystem in Central Asia to support an objective comparative analysis of SLNK and other sites that could be nominated in future within this region.

In terms of wetland values, the Danube River has the largest delta and best remaining wetlands in central Europe. The Danube Delta World Heritage site (679,222ha, including 103,000ha marine) covers most of the delta, is larger than the nominated area of SLNK (429,147 ha) but is comparable to SLNK in terms of bird diversity (over 300 species recorded). The Danube site is considered a critical site for migration of pygmy cormorant (61% of the global population) and the red-breasted goose and contains important breeding populations of white and Dalmatian pelican. In winter, the Danube delta supports large numbers of waterfowl comparable to the nominated area. However, there have been major reductions in the natural integrity of the Danube site since the beginning of the twentieth century, mainly through conversion to agricultural land, engineering works and pollution. Waterbird numbers are now only a fraction of what they once were.

Other comparable World Heritage wetland sites in Eurasia and Africa include Doñana National Park (Spain), and Lake Turkana National Parks (Kenya) as well as the Rift Valley Lake Reserves (Kenya) (deferred in 2001). Doñana is an important wetland site for migrating waterfowl. However, the site is in another biogeographical province (Mediterranean Sclerophyll) and numbers of wintering birds are much lower (420,000) than SLNK. The World Heritages site with outstanding value for its large populations of lesser and greater flamingoes is the Lake Turkana National Parks in Kenya, while the same value exists in the Rift Valley Lake Reserves, currently a deferred World Heritage nomination. The soda lakes of East Africa's Rift Valley support millions of flamingoes, compared with the tens of thousands of greater flamingoes breeding at Lake Tengiz (reputed to be the northernmost breeding colony in the world). However, Lake Tengiz lies in temperate latitudes (50° N), is strongly continental with low precipitation, and most of its inflow comes from the melting of winter snowfall; the African Rift Valley Lakes are equatorial, snowfree, have much higher precipitation, and are subject to on-going volcanic activity.

Central Asia's wetland and lake ecosystems are important for the survival of many waterfowl species. The lakes provide food and shelter along the migratory routes of more than 150 species of birds (30 of which are globally rare or endangered). The large lakes of Inner Asia, such as the Aral Sea, Balkash, Issyk-Kul, Sasykkol, Alakol, Zaisan, Uvs Nuur and Karakul, possess unique communities of flora and fauna with many endemic species. An important wintering site for many birds that nest in Europe and Siberia is the southeastern coast of Caspian Sea in Turkmenistan (the Khazar Reserve area); however, few birds breed there. The western Caspian coast, with reedbeds stretching from the Volga delta through the Kalmykian coast to the Terek Delta and Kyzylagach Bay in Azerbaijan, is also a very important stopover site.

Uvs Nuur, the largest saline lake in the western Mongolian steppe, has also been nominated for the World Heritage list for its value as a wildlife habitat. Although Uvs is larger (335,000 ha) than Lake Tengiz, it is less important for migrating wildfowl and has a simpler hydrology, lacking the intricate network of transient delta lakes and the extremes of the seasonal flooding/drying in the Korgalzhin wetland system. On the other hand the 5 Tuvan "cluster reserves" that constitute the "Uvs Nuur Zapovednik" contain important areas of steppe ecosystems that are also representative of the Eurasian Steppe region.

Another key wetland site is the delta of the Volga River, 1500km WSW of Lake Tengiz. Although an area of 650,000 ha of the Volga Delta was designated a Ramsar wetland site in 1976, only 66,816 ha is strictly protected as the Astrakhanshiy zapovednik (of which 90% is under water for the two months of high water). Unlike much of the Danube delta, the Volga delta is largely in a natural state, with no roads or human settlements; it has not been canalized to allow the passage of large ships. The Volga delta is a very important wildlife habitat, supporting 5-7 million birds during the spring and autumn migration. A number of reviewers considered the nominated area as the best example of migratory

waterfowl habitat in Kazakhstan and the region; however, the Caspian Ural Delta, which is included in the Tentative List of Kazakhstan, contains significant habitats for migratory birds that, according to estimations, can support 25 million migratory birds.

4. INTEGRITY

4.1 Boundary issues and legal status

As noted above, a valid criticism of the current proposed boundaries for the nominated site is the exclusion of extensive areas of steppe grasslands which surround the wetlands. This is particularly true of the Naurzum Nature Reserve, where the outlying Tersek and Sypsyn forest and steppe protected area units could be easily linked to the main Naurzum wetlands by the inclusion of the intervening steppe within the nomination. The nomination document states that 103,000 ha of steppe and scattered forest are already proposed for addition to Naurzum NSNR. This proposal was discussed with officials during the evaluation inspection, along with the possibility of a further extension to include the intervening steppe but excluding the wheatfields near Tersek. By letter from the Permanent Delegation of the Republic of Kazakhstan to IUCN dated 20 February 2003, it was noted as a response to IUCN's queries on this issue from the Minister of the Environment of Kazakhstan that the process of adding the sectors of Tersek and Sypsyn to the Naurzum NSNR "will start very soon because the necessary financial resources will be made available at the end of February 2003".

The lack of full protected area status for the Sarykopa wetlands is an integrity issue which needs to be addressed. It is currently treated as part of the Naurzum zapovednik for management purposes, and its international significance is recognized through its inclusion in the Ramsar wetland site. With the impending privatization of former State lands in Kazakhstan, it is important for a zapovednik to be developed around the Sarykopa wetlands in the near future if this unit is to meet the conditions of integrity. In the same letter mentioned above from the Permanent Delegation of the Republic of Kazakhstan to IUCN dated 20 February 2003, it was noted that "the Sarykopa Reserve already has the status of a special protected area and additional financial resources are programmed to improve its protection. But the decision of its conversion to a Nature Reserve ... will require scientific studies and appropriate techniques which can be envisaged".

Planning is also under way to enlarge the buffer around Korgalzhin Nature Reserve by 211,700 ha, as a basis for establishing a UNESCO Biosphere Reserve. In addition, there is interest in gaining protected area status for a further one million hectares of what the Kazakhs term "hunger steppe" - semi-desert steppe to the southwest of Lake Tengiz (around Lakes Kipshak and Kirey) in Karagandinski oblast, an area which historically has been a significant saiga habitat. This possible extension of the site is particularly important as key threatened species, such as the Great Bustard and the Saiga Antelope, require larger areas of steppe to maintain viable populations.

4.2 Maintenance of water flows and quality in the Nura River

The continued viability of the Lake Tengiz ecosystem depends upon the maintenance of the hydrological regime, primarily the size and periodicity of the inflows from the Nura River. A canal was built in 1974 to divert water from the Nura to the Ishim River (which flows through the present capital, Astana). This was closed in 1977 because of fears of mercury pollution from discharges into the Nura from chemical plants at Temirtau. Today, no water for industrial or metropolitan water supply purposes is drawn from this section of the Nura and the source of the mercury pollution is said to be contained. Again, in the letter from the Permanent Delegation to IUCN dated 20 February 2003, it was noted that "the existing natural water flow of the River Nura will be maintained". It is also important that the Kazakhstan Government assures that the deposits of mercury pollution in the river will be contained.

4.3 Management

A key issue of concern relates to the overall ecological integrity of the individual areas that form this cluster in the context of the larger steppe ecosystem. There are a number of references in the nomination document to the high levels of alteration of the areas surrounding the nominated site, and given the large distances between the clusters components, there appear to be little potential for connectivity and the maintenance of ecosystems functions and processes. Thus the cluster components may remain to be ecological islands.

The staffing levels at Korgalzhin and Naurzum are considered to be adequate and the sites benefit from the support of NABU and WWF respectively. However, there is no permanent staff based in Sarykopa which is managed by the Naurzum reserve staff. Permanent staff will be essential for the protection of this part of the site.

An integrated management plan for the entire nominated area has been developed and submitted to the government for adoption. However, it is not clear whether resources would be available after its adoption for ensuring its effective implementation.

4.4 Alien Species

Only a very limited number of alien species have become established in SLNK. Muskrat became acclimatised in 1944 but they are not considered to be a threat to the ecology of the wetlands. Common carp, carp-bream and pike-perch have also been introduced to the lakes but they have not had a significant adverse effect on the native fish species.

4.5 Human Activities

Visitation to the nominated site is very low (circa. 1,500 in 1999) but tourism is likely to increase in the future. Small-scale accommodation facilities are being developed within Korgalzhin but there are no facilities in Naurzum or Sarykopa. A tourism management plan should be incorporated into the management plan for the nominated area.

The transition to a market economy over the last decade has had a huge impact on agriculture in Kazakhstan as a whole. The Naurzum region was previously a large producer of grain and livestock but the area under wheat is now less than 50% of that a decade ago and livestock numbers are less than 10% of former levels. The area is one of the poorest in Kazakhstan, with high unemployment. There are currently no plans for the economic development of the region and depopulation is likely to increase. The privatisation of land in the future may lead to large-scale private farms; should this situation arise, efforts will have to be made to ensure that any irrigation or use of chemicals do not effect the nominated area.

Hay-making and grazing of livestock is allowed in the existing (and projected) buffer zones of the nominated area, except during nesting season when these activities are prohibited. However, low wages for park staff mean that rangers have had to become increasingly self-sufficient in food production. This has led to a localized increase in grazing and haymaking within the protected areas and more time spent by ranger staff in tending their animals.

5. ADDITIONAL COMMENTS

5.1 Saiga

The collapse during the 1980s of the saiga herds which once roamed the steppes around Korgalzhin and Sarykopa is puzzling. While loss of habitat is not considered to be the reason, poaching and other human interventions may be the cause of their catastrophic decline, from hundreds of thousands to

only hundreds today. The reduction in numbers of saiga is probably the most serious alternation of natural processes within the nominated area. As the top herbivore, saiga once played a key role in the maintenance of the sward of steppe grasses and herbs through grazing. Although a small number of saiga were seen on the shores of Lake Tengiz and in Sarykopa during the field inspection, numbers are only a fraction of previous levels and the antelope no longer ventures as far north as Naurzum, which used to be frequented in years of high saiga population density. Some grazing pressure is currently maintained in buffer areas by domestic stock and the cutting of hay -- but this is not an ideal situation and the restoration of saiga herds throughout their previous range is preferable. International efforts are underway to achieve this and a new protected area has been proposed in southern Kazakhstan to conserve the winter range of the saiga. In the meantime, however, it is of crucial importance for the government of Kazakhstan to make every effort to eliminate the pressure of poaching during the annual migration of the saiga.

5.2 Justification for Serial Approach

When IUCN evaluates a serial (or cluster) nomination it asks the following questions:

- a) **What is the justification for the serial approach?** The reserves are complementary, in that they are important resting areas along major Central Asian flyways and contain significant wetlands within the Eurasian region. Therefore, all the reserves represent a similar natural theme. While the ecosystem linkages between Korgalzhin and the other two reserves are limited because of the distance between them, the serial approach in the nomination is justified on a thematic basis.
- b) **Are the separate elements of the site functionally linked?** The functional linkages between Naurzum and Sarykopa are very strong as both sites lie in the Turgai depression and within the same flyway. Korgalzhin is further east and although some birds migrate between Lake Tengiz and the Turgai reserves, functional linkages are not as strong.
- c) **Is there an overall management framework for all the units?** An Integrated Management Plan for the entire nominated area has been developed and submitted to the Ministry of Natural Resources and Environmental Protection for adoption. However, the government will need to commit resources for its effective implementation.

6. APPLICATION OF WORLD HERITAGE CRITERIA

SLNK has been nominated for inscription in the World Heritage List on the basis of all four natural criteria.

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

The site is claimed to be the best remaining example of 'humus-building gramineous steppe' between the Black Sea and the Altai Mountains. While the high level of naturalness within the site is accepted, no convincing evidence has been presented to establish the global significance of the site because of its geological setting or present-day landforms. IUCN does not consider that the site meets this criterion.

Criterion (ii): Ecological processes

The seasonal dynamics of the hydrology, chemistry and biology of the lakes are considered to be of considerable scientific interest and may be of outstanding universal value. The diverse flora and fauna of the wetlands has evolved through complex wetting/drying cycles. However, as noted in Section 3, there is a need to develop a more comprehensive thematic study for Central Asia to objectively assess how SLNK compare to other important areas within this region in relation to this criterion.

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

The steppe and lakes landscape is difficult to appreciate from ground level because of the flatness of the topography and the impenetrable nature of the wetlands. However, the wetlands are a most impressive, colourful sight from the air. However, the only geological feature or landmark which stands out is the series of low ‘clay hills’ in the Tersek unit. IUCN does not consider that the site meets this criterion.

Criterion (iv): Biodiversity and threatened species

The wetlands of northern and western Kazakhstan are of international importance and may be of outstanding universal value for the conservation of migratory waterfowl as they stopover on their way from Africa, India and southern Europe to their breeding places in Western and Eastern Siberia. However, as noted in Section 3, there is a need to develop a more comprehensive thematic study for Central Asia to objectively assess how SLNK compare to other important areas within this region in relation to this criterion.

As noted in Section 4 there are integrity concerns that need to be addressed by the State Party in relation to the boundaries of the site, the legal status of some important areas, the need to maintain the water flow of the lower Nura River, and the lack of capacity to protect and manage the site. Thus IUCN considers that, at present, the site does not meet the conditions of integrity.

7. RECOMMENDATIONS

IUCN recommends that the Committee **defer** the inscription of Saryarka - Steppe and Lakes of Northern Kazakhstan. This recommendation is based on:

1. The need for the State Party to fulfill its commitments noted in the letter from the Permanent Delegation of the Republic of Kazakhstan to IUCN dated 20 February 2003, addressing a number of integrity issues. It is suggested that the Committee recommend that the State Party prepare and make available a detailed action plan, supported by an implementation programme, to realize these commitments, in particular in relation to:
 - (a) maintaining the existing natural flows in the Nura River and containing deposits of mercury pollution;
 - (b) upgrading the Sarykopa Wildlife Reserve to Nature Reserve protected status; and
 - (c) linking the Tersek and Sypsyn outliers to an extended main Naurzum Nature Reserve by protecting the intervening corridors of unmodified steppe.
2. The need to prepare a comprehensive thematic study for Central Asia so as to provide the context for an objective assessment of the outstanding universal values of this site, particularly in relation to criteria (ii) and (iv). IUCN, through its WCPA Network on Grasslands Ecosystems and supported by UNEP-WCMC, is committed to prepare this assessment to be made available to the 28th Session of the World Heritage Committee in June 2004.

NATURAL SYSTEM OF WRANGEL ISLAND SANCTUARY

RUSSIAN FEDERATION



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

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

1. DOCUMENTATION

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

2. SUMMARY OF NATURAL VALUES

2.1 Geographical Location

The Natural System of Wrangel Island Sanctuary is made up of Wrangel Island (7608.7 km²), Herald Island¹ (11.3km²) and a marine area (48,996km²). The Islands are located well above the Arctic Circle at 70° N and are surrounded by the East Siberian Sea to the north and west and the Chuckchi Sea to the south and east. They lie 140 km off the northeast coast of the Chukotka mainland. Herald Island lies within the western hemisphere at 175° W whereas

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

Wrangel Island, located from 178° E to 177° W, straddles the 180° meridian and both eastern and western hemispheres. The 180° meridian is marked only by a small pile of rocks on a hill. There is no signage.

2.2 Physical Features

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

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

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

2.3 Climate

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

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

There are noticeable differences in climate between the northern, central and southern parts of the Island. The central and southern portion is warmer, with some of the valleys having semi-

continental climates that support a number sub-Arctic steppe-like meadow species. This is a unique feature in the High Arctic.

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

2.4 Biodiversity

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

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

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

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

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

According to palaeontological evidence, muskoxen and reindeer inhabited the island in the late Pleistocene and even later, but have since disappeared. Muskoxen were introduced from Canada during the 1970's and continue to inhabit the island. Reindeer were brought to Wrangel Island in the 1940's to establish a domestic reindeer industry. That practice resulted

in severe localised overgrazing, destruction of ancient nesting areas and disruption of the ecological balance. There are differing opinions on whether these two ungulate species are at or beyond the carrying capacity of the island and various options on how to maintain a balance on the populations have been proposed.

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

3. COMPARISONS WITH OTHER AREAS

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

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

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

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

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

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

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

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

4. INTEGRITY

4.1 Boundaries

As noted above, the proposed World Heritage site, including the marine component, is under federal jurisdiction, although there is a "work-sharing" agreement with the Chukot Autonomous Area (or Okrug). However, there has been no documentation provided to verify that the Contiguous Zone (24 nm) is part of the protection zone of the Reserve. The village of Ushakovskoe, (with two resident families, several border guards and eight polar station staff), a section of the surrounding of land and the marine zone between the Khistchnikov River and Cape Hawaii are outside the boundaries of the nominated site and reserve and do not come under its strict provisions, including access. However, entry is controlled by a system of permits and enforced by the resident border guards.

4.2 Legal Status

The nominated site is federal property under the Ministry of Natural Resources. The surrounding marine zone is within Russia's territorial waters under the Law of the Sea and the Geneva Conventions. Under the Russian system of protected areas, the nominated site is classified as a "Zapovednik" (IUCN Category Ia, Strict Nature Reserve). This accords it the highest level of protection and excludes practically all human activity other than for scientific purposes. The Zapovednik was established in 1976 as the Wrangel Island State Sanctuary by the State Planning Department of the USSR. At that time all buildings, structures and the reindeer herd were transferred from the Zapovednik by the Ministry of Agriculture. To provide better protection for marine mammals, the Reserve protection was extended to the

Territorial Sea (out to the 12 nautical mile limit) in 1997 by federal Decree. In 1999, the Government of the Chukot Autonomous Area (CAA) or Okrug recommended a further 24 mile extension. However, no record of a federal Decree or approval document legally needed for the extension was provided with the nomination and, despite requests to the federal authorities in the Ministry of Natural Resources, has still not been provided. This is a serious omission for the nomination.

4.3 Management

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

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

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

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

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

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

4.4 Research and Monitoring

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

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

4.5 Threats and Human Impacts

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

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

In June 1994, Russia and the United States signed a Memorandum of Understanding for a joint oil and gas lease sale in the Chukchi Sea. The proposed lease sale area came within a short distance of Wrangel Island and surrounded Herald Island. According to federal authorities, the agreement and proposed lease sale have been cancelled and, in any case, drilling would no longer be permitted in the extended marine zone of the Sanctuary.

Nevertheless, the situation could change if Russia amends its policy on oil and gas exploration and exploitation. Therefore, it is important to receive verification that the federal authorities approved the additional 24 mile extension recommended by the Chukot authorities in 1999 and that, should drilling occur in the Chukchi Sea in the future, it would be subject to very stringent regulations to protect the Reserve and wildlife migratory routes.

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

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

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

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

5. ADDITIONAL INFORMATION

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

It is also important to note the cultural values associated to this site. These include a palaeoeskimo site as well as several small deserted reindeer herder's settlements with artefacts intact, and also the deserted village and airfield of Doubtful in which many houses and buildings with all the previous inhabitants' personal belongings, including hand-written letters, books and other objects, are well preserved and quite undisturbed. They tell an

interesting story about the inhabitants themselves and their efforts to settle in a remote and very challenging environment. Another interesting aspect of the island's cultural history is that it served as the refuge for the survivors of the great Canadian Arctic Expedition of 1914 and the harrowing journey by their leader, Robert Bartlett, to procure a rescue ship – the *King and Winge*.

6. APPLICATION OF WORLD HERITAGE CRITERIA

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

Criterion (ii): Ecological process

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

Criterion (iv): Biodiversity and threatened species

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

7. RECOMMENDATIONS

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

The Committee may wish to recommend the State Party to urgently implement the following activities:

- To prepare a management plan and implementation strategy, supported by adequate financial resources, that incorporates *inter alia*: technical and management communications; a tourism and visitor strategy; options for alternative energy supply; transportation; a monitoring and research programme; options to preserve the site's cultural and palaeontological features; and a human resources policy for the staff working at the site.
- To provide to the World Heritage Centre a copy of the Federal Decree approving protection of the marine zone surrounding Wrangel Island beyond the 12 nautical miles limit.
- To prepare and implement a plan to remove unwanted debris from Doubtful Village.

IUCN also recommends that the Committee encourage the State Party to submit, if it wishes to do so, an international technical assistance request to help undertake the actions proposed above. The Committee is advised to request the State Party to invite a mission in 2-3 years time to report on the status of the management plan and to review its implementation.

MONTE SAN GIORGIO

SWITZERLAND



WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

MONTE SAN GIORGIO (SWITZERLAND) ID N°1090

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 8 references
- ii) **Additional Literature Consulted:** Hauschke, N. & Wilde, V. (ed.) 1999. **Trias - Eine ganz andere Welt. Mitteleuropa im frühen Erdmittelalter.** Verlag Dr.F.Pfeil, München, 636pp; IUCN (2002). **A global strategy for geological world heritage.** Gland, 51 pp; Sill, W. 2000. **Comparison of the world's Triassic vertebrate localities - a synopsis.** Unpublished Ms., 2pp; Felber M., Tintori A., Lombardo C., Furrer H., and Rieppel O. (2002) **Comparative Analysis** (Unpublished); Weidert, W.K.(ed.) 1995. **Klassische Fundstellen der Paläontologie - Band III.** Goldschneck Verlag, Korb, 70-75pp; Wells, R.T. (1996). **Earth's geological history - A contextual framework for assessment of world heritage fossil site nominations .** IUCN, Gland, 43 pp; Etter, W. 2001. **Monte San Giorgio: Remarkable Triassic Marine Vertebrates,** in Bottjer *et al.* (ed.) 2001 **Exceptional Fossil Preservations,** Columbia University press.
- iii) **Consultations:** 9 external reviewers. The mission also met with specialists from the Paläontologisches Institut der Universität Zürich, Università degli Studi di Milano/Dipartimento di Scienze della Terra, Museo naturale del Cantone di Ticino, and local and national authorities.
- iv) **Field Visit:** Tim Badman and Gerhard Heiss. July 2002.

2. SUMMARY OF NATURAL VALUES

Monte San Giorgio (MSG) is a pyramid-shaped, wooded mountain (peak 1,096 metres above sea level), which lies to the south of Lake Lugano in Canton Ticino, Switzerland. The natural values proposed for inscription on the World Heritage List arise because of its internationally important fossil remains from the Mid Triassic Period (245-230 million years ago). The nominated Site lies within an area identified as a Landscape Protection Zone (LPZ) under Swiss law, and comprises the part of this protected Zone that contains the main fossiliferous deposits. The total area of the nominated Site is 849 ha, lying within the Communes (or communities) of Meride, Riva San Vitale and Brusino Arsizio. The remaining parts of the LPZ are identified as the buffer zone for the nominated Site, comprising a further 1,389 ha of land, and territory within a further six communities

The Mid Triassic rock succession proposed for inscription rests unconformably on older, Permian volcanic rocks exposed on the north face of MSG, and is overlain by Upper Triassic, and Lower Jurassic rocks. The Mid Triassic sequence consists of approximately 1,000 metres of reef limestones, dolomites and bituminous shales which formed in marine conditions on the margins of the Triassic 'Tethys' Ocean. The exceptional fossil interest within the sequence arises because of the presence of five distinct, fossiliferous formations, the 'Grenzbitumenzone', the Cava Inferiore, Cava Superiore, Cassina Beds and the 'Kalkschieferzone'. The sequence records life in a tropical lagoon environment, sheltered and partially separated from the open sea by an offshore reef. Diverse marine life flourished

within this lagoon, including reptiles, fish, bivalves, ammonites, echinoderms and crustaceans. A stagnant and undisturbed seabed provided the conditions necessary for the preservation of these animals, when they died and fell to the sea-floor, to accumulate as abundant and exceptionally detailed fossils. Because the lagoon was near to land, the fossil remains also include some land-based fossils including reptiles, insects and plants. The fossiliferous rock succession is exposed in Switzerland on MSG, and also in the immediately adjacent area of Italy, in the area around Besano.

The result is a fossil resource of great richness. Fossils from MSG have been known to science for over 150 years. The resource is finite, and stable, so that excavation is necessary to produce fossil finds. Historically many finds were brought to light through commercial extraction of the carbon-rich layers to produce oil; however there is also a long history of scientific excavations dating from 1863 on the Italian deposits, and 1924 on the Swiss side. In summary, the current extent of discoveries includes more than 10,000 fossil specimens, representing 30 species of reptiles, 80 species of fish, c.100 macro-invertebrates, and 3 plant species, in addition to microfossil material which includes spores, pollen and marine micro-organisms.

The distribution and abundance of different fossil groups in the five different levels is variable, with the greatest diversity of material having been found within the Grenzbitumenzone. The vertebrate material includes particularly spectacular specimens, including large, articulated skeletons up to 6 metres in length. Complete skeletons include ichthyosaurs, nothosaurs, placodonts, and the remarkable 'giraffe necked' saurian, *Tanystropheus*. The land-based fauna is more restricted, but includes a significant and unique complete skeleton of the archosaur, *Ticinosuchus*, the first complete skeleton from this group to be discovered in the northern hemisphere.

There are a number of additional features that render exceptional importance to the fossil resource of MSG. First, there is the exceptional quality of preservation of material, including both complete skeletons of marine and land reptiles, and the display of minute detail including internal features such as stomach contents and embryos. Second, there are a number of unique and 'first' discoveries of species that have been made at the Site. A third feature is the presence of five superimposed fossil layers, allowing evolutionary and comparative studies, and a number of features within the sedimentary sequence that allow precise dating. Finally, it is significant that the area has been the subject of detailed study for over 75 years (150 years in Italy), resulting in a rich scientific literature of over 800 papers reviewing the fossils and many aspects of the detailed geology of the deposits. During that time the research and collection activity has been conducted by the universities of Zürich and Milan and the Milan Museum of Natural History. As a result, the fossils that have been found form a unique, consolidated, well-preserved and catalogued resource.

Although it is the geological significance of MSG that is the basis for its nomination as a World Heritage Site, it also displays significant other natural values, as well as cultural links between the geology and the life of the local community. These include quarrying of building stones, past production of mineral oils, and the establishment of a local fossil museum in Meride. Noteworthy local features include dry meadows on limestone sub-soils which are home to plant populations not found elsewhere in Switzerland or in the entire southern-Alpine zone of Italy. The site is rich in fungi (554 species), including 30% of known European species of *Boletus*. 37 of the modern vertebrate species found within the nominated Site are on the national red list, and 21 are protected under the Berne Convention. Three spider and one fungus species, previously unknown to science, have also been found here.

3. COMPARISONS WITH OTHER AREAS

The nomination document contains only a superficial comparative analysis, which claims a 'unique' status for the nominated site. As a result, IUCN:

- 1) undertook a review of the comparative values of the nomination itself through a number of leading international experts, and
- 2) requested the State Party to provide a more detailed comparative analysis, which was received in February 2003.

These analyses record that two sites are already inscribed on the World Heritage list which contain notable aspects representative of the Triassic period: Ischigualasto-Talampaya (Argentina), and the Dorset and East Devon Coast (UK). Ischigualasto-Talampaya is inscribed expressly for its Triassic fossil values, and is regarded as the best fossil record of terrestrial life in Triassic times, displaying a complete Triassic section. However, the values of this Site do not provide any insight into the marine fauna of this period, and are therefore clearly differentiated from MSG, where the fossil record is primarily marine. Thus the two sites may be said to complement each other. The Dorset and East Devon Coast includes a Triassic succession as part of a full exposure of the Mesozoic period, and within a site with diverse geological and geomorphological values. Whilst the Triassic succession in this Site is more complete than Monte San Giorgio, the fossil record in terms of both quantity and quality is much lower and primarily restricted to terrestrial aspects.

Other significant Triassic fossil sites that are well known and studied world-wide are also primarily representative of terrestrial interests. Such sites include localities in Australia, the USA, the Karoo of South Africa, Russia, East and North Africa and Brazil. Elsewhere in the Alps, Spain and Central Europe there are important marine fossil deposits of the Triassic period, but it appears that the most significant Triassic marine fossil material, apart from that at MSG, is now being discovered in Guizhou, China. Whilst the total extent and quality of this new material is not yet known, it is apparent that the composition of fossils differs a great deal from the contemporary collection at MSG. Moreover, it is clear that MSG has a pre-eminent importance given its long history of study and exceptional, rich and diverse remains.

The fossil values of the Site are at least comparable with other fossil sites of different era on the World Heritage list in terms of the global representivity of the fossil remains, and the range of time represented. Indeed MSG is more globally representative and covers a longer period of time than the exceptional Eocene lagoon deposits at Messel in Germany. The nominated Site can be regarded as a Triassic equivalent of the Devonian fish site at Miguasha, Canada, in representing life in the marine realm, and complements the exceptional records of the Jurassic marine environments represented on the Dorset and East Devon Coast.

In summary, IUCN considers that MSG can be accepted as unique in the world as the best single fossil record of Triassic marine life. The strict, systematic and continuous scientific research that has been carried out for over 75 years in Switzerland, almost exclusively by the Universities of Zürich and Milan, have resulted in a remarkably complete and co-ordinated record of the Site. Despite the fact that the comparative analysis submitted by the State Party in February 2003 at the request of IUCN contains some gaps on information, it is considered by the majority of the independent experts that MSG has a clear and fully substantiated claim as the principal global reference site for marine palaeontological sciences of the Triassic period.

4. INTEGRITY

4.1 Boundaries

The nominated Site and its buffer zone together correspond to the area of the MSG Landscape Protection Zone, defined under Swiss Law and identified in the Cantonal Development Plan. The nomination document is ambiguous about the precise area to be nominated with contradictory statements in sections 1e and 1f. However, it was confirmed during the field inspection that the area to be nominated for inscription is solely that of the outcrop of the Mid Triassic rock formations, with the remainder of the Landscape Protection Zone forming the buffer zone for the Site. The buffer zone adjoins the Site on three sides; the fourth side of the Site is marked by the Swiss-Italian border.

This approach to definition of the Site boundary is supported in principle, and is appropriate in relation to the integrity criterion in the operational guidelines. In practice on the mountainous and wooded terrain of MSG, and given the discontinuous nature of the rock exposures, the boundary cannot be traced in the field, and the precise extent of the nominated Site is therefore not clearly defined at present. It should at least be clearly marked upon paths etc., and the overall boundary should correspond to identifiable landscape features that conform most closely to the limits of the Mid Triassic exposures.

The nomination document describes the Swiss and Italian deposits as a single entity, although only the Swiss exposures are proposed for inscription. Important elements of the 'story' of the discovery and study of fossil resource of MSG relate to the Italian exposures. The first scientific excavations were carried out in Italy, resulting in the first discoveries and descriptions of several species. However, the fossil material recovered from these early Italian studies was almost all destroyed when the Milan Museum of Natural History was bombed in 1943. Systematic fossil excavations began in Switzerland in 1924, and have continued to the present day with 17 sites having been excavated, in over 50 different campaigns. Most of the spectacular finds within the Mid Triassic rocks of the area have been made in Switzerland, although significant finds have also been made in Italy since excavations (involving a total of three sites) recommenced from the 1950s, including two spectacular skeletons of marine reptiles that are only known from Italy. A further Italian discovery of a partial Jurassic dinosaur at Saltrio, only 200m from the border and on the mountain adjacent to MSG is also noteworthy. The fossil remains in Italy have a high public profile, with a significant local museum at Besano, and a small museum at Induno Olona. Finally, there are equivalent scientific excavations underway in both Switzerland and Italy, and there has been considerable cross-border co-operation between research institutes. The prospects for further finds being made in either Switzerland or Italy depend on the future levels of excavation and study.

Ideally, then, the boundary for MSG should encompass the deposits in both Italy and Switzerland. It is accepted, however, that at present there is not the same level of public and community commitment to a nomination for Italian territory. It is also the case that the Swiss portion of the fossil resource provides an adequate representative sample of the fossil resource of MSG, and that activity in Switzerland has produced most of the discoveries. IUCN, therefore, considers that the nominated Site fulfils adequately, but not optimally, the condition of integrity for site boundaries. Nonetheless, there should be strong encouragement for future extension of the Site to cover the interests that lie in Italy. It is welcome that a Protocol on a possible extension of the Site to include the Italian part has recently been signed (5 February 2003) by representatives of local authorities and communes in Italy, declaring their intent to collaborate for the purposes of extending the boundaries of the Site across the border.

4.2. Legal Status

Although the nominated Site does not have a distinct legal status in its own right at present, both it and the buffer zone are treated as a single site under Swiss law, and receive identical protection. Thus at the federal level, MSG is defined and mapped in the 'Federal Inventory of Landscapes, Sites and Natural Monuments', declared and ratified in 1977. The protected area is in essence the same as the combined area of the nominated Site and buffer zone (the one minor exception is a proposal for an additional area of buffer zone at its extreme southern point). The inventory binds all federal authorities to respect the values for which the site is listed, and also applies to bodies to whom cantonal powers are delegated.

The Cantonal Development Plan (CDP) identifies this same area of land as a Landscape Protection Zone (LPZ). In such zones, the protection of natural landscape features has the highest priority amongst different human uses. The CDP sets out six general objectives for protection, promotion of research and preparation of management plans. The protected area is also translated into the Local Development Plans of the Communes, which include plans providing for different land uses. Within these plans, the significant natural areas within the LPZ are identified as nature reserves, although the detailed policies for protection in both the cantonal and local plans are not recorded in the nomination documentation.

All fossil remains in Canton Ticino are protected through the 'Cantonal Regulations for the Protection of Flora and Fauna' which were passed in 2002. These regulations include sections which replace a legislative decree passed in 1974, which protects fossil remains. Under the regulations, important fossil material throughout the Canton is identified as the property of the State. A cantonal permit is required for all fossil excavation and collection activities, providing a very strict regulatory system which has been applied to fossil excavations on MSG for many years – with permits only having been granted to universities with a proven research record (principally Zürich and Milan). It is difficult to conceive of a stricter regime of fossil protection, which is clearly challenging to implement on a widespread basis throughout the Canton. In relation to the very special and finite resources of MSG, which require excavation if they are to be realised, this level of protection provides an appropriate and workable legal solution to the protection of the resource.

4.3. Ownership

The nominated Site is in the ownership of three different local Communes. Around 10% is cultivated, privately-owned land, mostly near Meride and Riva San Vitale. Some private dwellings lie within the Site along the narrow road that connects Meride with Serpiano. The ownership position is not optimal; however the legislative umbrella of the Canton provides sufficient support for necessary management and protection of the fossil interests of the Site if required.

4.4. Management

Management responsibilities for the nominated Site are divided between the federal, canton and commune levels, with no single management authority. However management of the fossil resource is exclusively the task of the Canton Ticino, within the legal framework described in 4.2.

The site does not currently have a management plan, but a draft management plan was submitted subsequent to the submission of the nomination document. At this stage the draft plan sets out broad statements of intent, and details of current programmes that are being developed by the Canton, in some cases with the support of the Federal and local authorities, and partners in Italy. The plan is not yet at a sufficiently advanced stage to be able to identify the specific management requirements of the nominated Site, as distinct from the wider buffer

zone, nor to make links between management and the land use and regulatory aspects of the commune plans in particular.

As noted, the management of the fossil resource is based on a system of strict legal protection, with regulation of scientific excavation through permits, and strict conditions on the protection, preparation and curation of specimens found. Canton Ticino has shown determination in its management of excavations in the past, as is evident in the exceptional collection of fossils held principally in only three institutions. However, the nature of this management, and the future plans, are not set down in a clear written statement, and thus the expectations of the World Heritage Convention in relation to the conditions of integrity are not fully met on this point. IUCN recommends that the Canton, as the responsible management authority, should prepare a binding written statement to identify clearly to the World Heritage Committee the approach that will be taken to the management of palaeontological material and excavations from MSG. The State Party is requested to give particular attention to ensuring that this aspect continues to be fully supported in the future. These statements would form the first stage to the development of a wider management plan for the Site and the surrounding area. The State Party has indicated that the MSG management plan will include information on research campaigns, the conservation of fossil remains and their presentation.

Interpretation and presentation of the fossil material is particularly important to communicate the special interests to a widespread audience. There are currently good off-site displays of material from MSG at Zürich and Lugano (as well as at Besano and Induno Olona in Italy). Within the buffer zone, a small local museum has been established in Meride, and there are plans to restructure and increase this facility in view of the international interest in the area. A decision on funding for this project is awaited, and IUCN considers that this would be an important development in providing for the needs of visitors to the Site. It is noted in particular that there are no dedicated staff identified for managing MSG at present, and provision of permanent staff based at the museum would be of great benefit, in order to supervise the property, and relate to visitors. The State Party has since confirmed that the staff assigned to the museum at Meride will have a role in guiding visitors on-site.

A project to promote an integrated development plan for the MSG area has recently been agreed through the INTERREG IIIA programme (jointly funded by the EU and Swiss Government), which includes as partners not only the Swiss Communes and Canton partners, but also the equivalent bodies in Italy. The preparation of a management plan is one of the tasks of this project. CHF 100,000 has been identified for this work within Switzerland, with a matching amount in Italy. The plan should be completed by 2005. This is a welcome initiative, especially the cross-border nature of the partnership. It is hoped that this will encourage a common approach to the fossil resources of the Swiss and Italian parts of MSG. The recently-signed protocol amongst the Italian local authorities and communes suggests that progress is taking place.

4.5. Human Impact

At present there do not appear to be significant threats to the Site's natural values in general, and strict protection and regulation of the fossil resource is in place. In contrast to other forms of conservation, palaeontology is by its nature invasive, and in the case of MSG requires active programmes of excavation. These are well regulated at present, and have been so for many years. Extraction of fossil material for oil production has ceased, and whilst it presumably resulted in some losses, it was also the reason that the fossil remains were first recognised.

5. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

Monte San Giorgio is nominated for inscription under natural criterion (i).

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

MSG is the single best known record of marine life in the Triassic period, and records important remains of life on land as well. The Site has produced diverse and numerous fossils, many of which show exceptional completeness and detailed preservation. The long history of study of the Site, and the disciplined management of the resource have created a well documented and catalogued body of specimens of exceptional quality, and are the basis for a rich associated geological literature. As a result MSG provides the principal point of reference, relevant to future discoveries of marine Triassic remains throughout the world. Based on its own analysis and a supplementary comparative analysis by the State Party regarding the exceptional comparative value of the site, IUCN considers that the nominated site meets this criterion.

6. RECOMMENDATION

IUCN recommends that the Committee **inscribe** Monte San Giorgio on the World Heritage List under natural criterion (i).

In addition IUCN suggests that the State Party should be requested by the Committee to:

- continue its efforts to include the Italian part as an extension, to be added once satisfactory levels of political commitment have been attained and it is clear that the conditions of integrity can be met;
- ensure that the boundaries of the Site are marked clearly on the ground;
- develop on-site interpretation, so that visitors to the site can readily appreciate its significance, linking this interpretation to the development of the Meride museum.

IUCN would also like the Committee to remind and emphasise to State Parties that all sites nominated for inclusion on the World Heritage List on geological grounds should be accompanied by a thorough global comparative analysis.

APPENDIX 1: IUCN FOSSIL SITE EVALUATION CHECKLIST

Coverage of an extended time period

The site provides fossils of Mid Triassic age, from within a complete Mid Triassic succession covering a period of 15 million years. The presence of five distinct fossiliferous levels provides the opportunity for comparative and evolutionary studies through time.

Richness of species diversity

MSG is the richest known site for marine Triassic vertebrate fossils in the world, providing fossils of reptiles, fish, bivalves, ammonites, echinoderms and crustaceans. Around 110 species of marine reptiles and fish are known from the site, together with c.100 macro-invertebrates. Terrestrial vertebrate, insect and plant species are also known from the site, although in smaller quantities, but include a spectacular complete skeleton of an archosaur. There is an important microfossil fauna.

Uniquely representative of a geological time period

Amongst numerous Triassic fossil sites world wide, MSG has yielded a uniquely rich fauna of marine fossils, and is considered a pre-eminent 'type locality'. Other significant Triassic fossil sites of equivalent international importance provide evidence of terrestrial, rather than marine life.

Existence of other comparable sites

No sites of greater importance are known. Recent finds of marine Triassic fossils have been made in China but are yet to be properly studied, and MSG provides the major reference point for comparative assessment of the significant and interpretation of these and other sites. The nominated Site includes only the Swiss parts of MSG, whilst the deposits extend over the border into Italy. The majority of discoveries have been made within the Swiss area, although significant parts of the 'story' of MSG relate to the Italian part. The Swiss exposures therefore provide an adequate, but not optimal, sample of the scientific interests of MSG, and it is recommended that a future extension of the nominated Site into Italy should be sought.

Ischigualasto-Talampaya (Argentina) is inscribed on the World Heritage List and provides an exceptional record of terrestrial Triassic environments and fossils; MSG provides a complementary record of marine environments.

Contribution to the understanding of life on earth

MSG is the only site where Triassic marine deposits have been studied through continuous disciplined scientific excavation over a period of more than 75 years, and can be considered the main location where a complete, well-preserved record of Triassic marine life has been made. The quantity and quality of fossil biota enables interpretation of species evolution, palaeoenvironments and landforming processes that existed 200 million years ago. The site provides a record of marine life during a critical period in vertebrate evolution on earth, and has an importance that extends beyond representation of life in the Triassic 'Tethys' Ocean, to provide a global reference point for comparative studies of evolution.

Prospects for ongoing discoveries

More than 10,000 fossil specimens have been recovered from the nominated Site to date, and recent excavation campaigns have shown a continued pattern of new discoveries of fossil

material. Much material that has been collected awaits study. Prospects of new discoveries of spectacular reptiles appear to be greatest in the Grenzbitumenzone, but studies at all of the main levels are capable to producing new information. The depth of study of the deposits is capable of providing an increasingly precise and well understood document of Mid Triassic marine life. Recent discoveries of stratigraphic markers such as microfossils and datable volcanic clays are important in establishing the overall precision of the information being gathered from the Site.

International level of interest

MSG is of global importance for geology in general, and palaeontology and evolutionary biology in particular. Its geological interests are documented in over 800 scientific and popular publications. It is internationally renowned to geological science as a uniquely important occurrence of fossiliferous marine Triassic deposits, which has been the subject of focussed and disciplined scientific study and management.

Associated features of natural value

There are other features of natural value (e.g. the contemporary flora and fauna) associated with the nominated Site, which include three spider and one fungus species first discovered there. The nominated Site is an area of attractive landscape, with a range of natural, archaeological and historic features - particularly in the buffer zone. The landscape features and modern processes in an Alpine mountain setting do not relate to the marine environments recorded in the Triassic fossil record.

State of preservation of specimens

The specimens found in the nominated Site include many examples that are complete and fully articulated, ranging from large marine reptiles to insects. Generally the state of preservation of the specimens is outstanding.

Curation, study and display of fossils

Excavations of the nominated Site are carried out exclusively under the regulation of Canton Ticino, and all excavations have been made under the supervision of the University of Zürich, in cooperation with the Cantonal Museum of Natural History, Lugano and the University of Milan. Fossil finds are curated, catalogued and displayed in both Zürich and Lugano, to excellent standards. An additional exhibition is available immediately adjacent to the Site in Meride (within the buffer zone), which forms the main starting point for visitor excursions to MSG. This facility provides only for interpretation and has no permanent staff at present; however there are plans to develop it further in the future.

Local museums at Induno Olona and Besano in Italy also display finds and information about the fossils of the Monte San Giorgio area.

PHONG NHA-KE BANG NATIONAL PARK

VIETNAM



WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

PHONG NHA – KE BANG NATIONAL PARK (VIETNAM) – ID N° 951Rev

Background note: The Phong Nha Nature Reserve was first nominated as a World Heritage site in 1998 and IUCN carried out a field inspection in January/February 1999. The complete IUCN evaluation report is attached in annex A.

The following is the decision of the Bureau at its twenty-third ordinary session (July 1999):

“The Bureau noted that the nominated area has potential value as a World Heritage site under natural criteria (i) and (iv) on the condition that it was expanded to include the larger Phong Nha/Ke Bang National Park with an associated fully integrated management structure. The site is part of an extremely complex and ancient karst plateau with high geodiversity which also encompasses Ke Bang and Hin Namno karsts. The reserve is largely covered in tropical forest with a high level of biodiversity and endemic species. Lack of research means that the true significance of the biodiversity and geology of the area cannot be fully assessed. The area on its own is not considered to meet World Heritage criteria. However, if jointly nominated with the Hin Namno karst ecosystem in Lao PDR, the combined site would constitute the largest surviving area of karst forest in South-east Asia and may merit World Heritage status.

*The Bureau decided to **defer** a decision on the site, pending review of the possibility of expanding the boundaries of the site as proposed. It is also strongly recommended that there be discussions with the Lao PDR State Party with a view to further expanding the boundaries of the site, at a later stage, to include the Hin Namno Karst reserve of Lao PDR and any other relevant areas.”*

The site was thus subject to a revised nomination submitted in 2000 including a much larger area. At this time, however, the State Party also advised that it would be constructing the north-south Ho Chi Minh Highway and a link road between the Highway and Route 20 that bisects part of the core area of the Phong Nha Nature Reserve. When the Government of Vietnam made public its plans for road construction in the Reserve a number of organizations (e.g. IUCN, Flora and Fauna International) urged caution and advised the Government of the potential impact of roads on the conservation values of the area and, in particular, the potential loss of outstanding values. Consideration of the nomination, therefore, did not proceed further at that time.

Additional information was submitted in May 2002, announcing the decision of the Prime Minister of Vietnam (December, 2001) on the upgrading of the Phong Nha – Ke Bang Nature Reserve to the Phong Nha – Ke Bang National Park with a total area of 85,754 ha; providing information on projects for the conservation and development of the Park and revised maps. This revised nominated site has a much smaller area than the 2000 nomination, though still relatively larger than that of 1998. The size of the area proposed in each of the three nominations varies, as set out in Table 1 below.

1998	Phong Nha Nature Reserve	41,132 ha.
2000	Phong Nha – Ke Bang National Park	147,945 ha.
2002	Phong Nha – Ke Bang National Park	85,754 ha.

Table 1. Size of the area proposed in each new or revised nomination

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 13 references
- ii) **Additional Literature Consulted:** Many of the references cited in the 1999 evaluation remain relevant, but only those recently and directly utilized are repeated here. Wikramanayake, E.D. et al., 2002, **Terrestrial Ecoregions of the Indo-Pacific: A conservation Assessment**. Island Press; Cao Van Sung & Le Quy An (eds.) . 1998. **Environment and Bioresources of Vietnam**, Gioi Publishers; WWF, *LINC*. 1998. **Linking Hin Namno and Phong Nha through Parallel Conservation**; Timmins, R.J., Do Tuoc & Trinh Viet Cuong. 1999 **A preliminary assessment of the conservation importance and conservation priorities of the Phong Nha - Ke Bang proposed national park, Quang Binh Province, Vietnam**. Flora and Fauna International. Hanoi; Meijboom, M. & Ho Thi Ngoc Lanh. 2002. **He Dong – Thuc Vat / O Phong Nha – Ke Bang Va Hin Namno**. Phong Nha-Ke Bang National Park with WWF; Gilmour, D.A. & Nguyen Van San. 1999. **Buffer Zone Management in Vietnam**. IUCN Vietnam; Pham Khang. 1985. The development of karst landscapes in Vietnam. *Acta Geologica Polonica* 35 (3-4). pp 305-319; Anon. 1999. Geology of the Phong Nha – Ke Bang Area. Unpublished Paper; Do Tuyet. 1998. Overview on Karst of Vietnam, in Daoxian, Y & Zaihua, L. (eds.) **Global Karst Correlation, Science Press, Beijing**. pp. 179-192; Drew, D. & Hotzl, H. (eds.) 1999. **Karst Hydrogeology and Human Activities: Impacts, Consequences and Implications**. Balkema; Nguyen Quang My & Limbert, Howard. 2002. **Ky Quan Hang Dong Vietnam (The Wonders of Vietnamese Caves)**. Trung Tam Ban Do Va tranh Anh Giao Duc.
- iii) **Consultations:** 5 external reviewers. Additional consultations were held with staff of Flora and Fauna International; many individual speleologists; Senior officials of the Department of Conservation and Museology (DOCAM), Vietnam; Geologists from the Karst Studies Group of the Research Institute of Geology and Mineral Resources; Park staff and senior officials from many branches of the Quang Binh Provincial People’s Committee; the Chairmen and others from the communes of Son Trach and Xuan Trach.
- iv) **Field Visit:** E. Hamilton-Smith, January 2003. E. Hamilton-Smith and H. Friederich, January-February 1999.

2. SUMMARY OF NATURAL VALUES

The Phong Nha – Ke Bang National Park (PNKB) covers a total area of 85,754 ha, including three zones:

Strictly protected zone	64,894 ha
Ecological recovery zone	17,449 ha
Administrative service zone	3,411 ha

It is bounded on the west by the Lao People’s Democratic Republic (PDR), and consists of a limestone plateau and hills. The limestone province extends to and adjoins the Hin Namno and Khammoune karst of Lao PDR. Both sectors are rich in large, often spectacular and scientifically significant caves.

The Phong Nha–Ke Bang karst has evolved since the Palaeozoic (some 400 million years ago) and so is the oldest major karst area in Asia. It has been subject to massive tectonic changes, and comprises a series of rock types that are interbedded in complex ways. Probably as many as seven different major levels of karst development have occurred as a result of tectonic uplift and changing sea levels, thus the karst landscape of PNKB is extremely complex with high geodiversity and many geomorphic features of considerable significance. Like much of Vietnam, it has been subject to extensive tectonic change, and so the limestones of Phong Nha are inter-bedded with a number of other rocks. There is also strong evidence that sulphurous solution and hydrothermal action have played an important role in shaping the broad-scale landscape and the caves, though this has not yet been properly assessed.

The incorporation of the Ke Bang forest into the park has added another very important dimension. This sector has many “fossil” caves at a high level, which occur when the groundwater and rivers move to a lower level. Like many such caves, they are probably repositories of a great deal of palaeontological and geomorphological scientific evidence. Only a very few have been visited to date and based on the limited information available it is possible to say that some of these caves have ancient deposits of geological importance, some have unusual calcite (and perhaps other) mineral displays, and some are home to bat populations and a diversity of cave-adapted invertebrates still to be properly studied.

Special problems arise in assessing the biodiversity of the site. It is a sample of the Northern Annamites eco-region, one of the most important eco-regions of the Indo-Pacific (Wikramanayake et al.). A large number of faunal (568 vertebrate) and floral (876 vascular plant) species, including some endemic to the site (13 species of plants and 7 species of primates), are listed in the 2000 nomination document. However, systematic assessment began only five years ago and collections have been limited. Statistical analyses of the rate at which new species have been added to the fauna indicate that many more will be discovered and identified. Field workers also report the collection of currently undescribed species. For example Timmins *et al.* and others have been locating new species on a virtually daily basis right up to the end of each period of fieldwork, suggesting that many species remain to be found. More importantly, many of the species that have been identified are considered to be extremely rare and little known.

It should be noted that knowledge of the PNKB is remarkably limited, and this has constrained both the preparation of the nomination document and the IUCN evaluation.

3. COMPARISON WITH OTHER AREAS

3.1. Karst Areas and Geomorphology

Most of the 41 existing World Heritage sites containing karst are in temperate regions and include Skocjan Caves (Slovenia); Caves of the Aggtelek Karst/Slovak Karst (Hungary/Slovakia); Plitvice Lakes National Park (Croatia); Canadian Rocky Mountain Parks and Nahanni National Park (Canada); Mammoth Cave National Park and Grand Canyon National Park (USA); Te Wahipounamu (New Zealand); Huanglong and Jiuzhaigou Valley (China); Tasmanian Wilderness and Fossil Mammal Sites (Australia); and East Rennell World Heritage site (Solomon Islands) which is an insular tropical site in the South Pacific. None of these can be compared with Phong Nha as they have very dissimilar geologic, geomorphic, climatic and biotic conditions.

However, comparison with the karsts of the wet tropics of South-east Asia is realistic. Many of these areas, like Phong Nha, are located within large and spectacular limestone plateaux, and the caves have often only been recognised and explored in recent years. Some have been the subject of considerable scientific research, and have been proven to be significant on a wide range of criteria. Three areas have recently been inscribed to the World Heritage List:

- Gunung Mulu National Park World Heritage site in Malaysia, has caves and underground river systems of greater international importance than those of PNKB. It has a rich biodiversity, but from a totally different faunal province to that at Phong Nha.
- St. Paul Subterranean Park on Palawan in the Philippines is again centred about a large underground river, but it is a relatively young (in geological terms) and simple system.
- The Massive Baliem River karst of the Lorentz National Park World Heritage site of West Irian in Indonesia is even less investigated than PNKB but is again totally different in character as it has been influenced by glaciers and it is combined with metamorphosed oceanic sediments of Cretaceous and Eocene origin.

Other Southeast Asian karst areas of note include large sites found in Vietnam and China; the Niah Caves and Gomantong of East Malaysia, each of great biodiversity and palaeontological / archaeological significance; many karst areas of Indonesia, including the famous Gunung Sewu of Java – one of the archetypal tropical karst landforms; Papua New Guinea, with extensive cave systems and underground rivers such as those of Atea Kanada, Mamo Kanada, Selminum Tem and the Nakanai mountains of New Britain; many of Thailand's National Parks and major areas of largely unexplored karst in Lao PDR.

However, many of these are both younger and much less complex areas, which do not rival PNKB in their contribution to understanding the geological history of the region. Of these areas, the only one that is of very similar character to PNKB is the adjacent Hin Namno and Khammoune karst of Lao PDR.

On broad criteria that take into account the totality of the karst system, PNKB must be seen as one of the most significant karst sites in south-east Asia. As in many other aspects of the site, there is, however, a lack of knowledge and previous research, so the significance of the site will only be fully identified and demonstrated when the site has been researched as thoroughly as many others have been.

3.2 Biodiversity

There are three other forest protected areas in South-east Asia which have World Heritage status: the Thungyai-Huai Kha Kheng Wildlife Sanctuaries in Thailand (Tropical Dry Forest); the Ujung Kulon National Park in Indonesia (Tropical Moist Forest); and the 3.5 million ha Lorentz National Park in Indonesia (West Papua province). This latter is the largest protected area in South-east Asia and includes one of the largest expanses of tropical forest in that region. The forest biodiversity values of PNKB as currently known are probably less rich than these three sites. However, if the nominated area were expanded, especially by linking it with the Hin Namno and Khammoune karst ecosystems of Lao PDR (both existing protected areas), then this would constitute an area of extremely high significance for forest biodiversity conservation. Adjoining forests in Lao PDR have been identified as priority areas for conservation and protect forest ecosystems, and exhibit high levels of species endemism. Such a transboundary protected area system would constitute one of the largest surviving areas of karst forest in South-east Asia, totalling 317,754 ha.

4. INTEGRITY

4.1 Site Integrity

Although considerable progress has been made in protection of the surface environment, the rugged nature of the country, difficulty of control, low income of many local families and relative shortage of resources for control purposes mean that wildlife poaching and illegal timber gathering are difficult to eliminate. Staff have been making great efforts to improve the protection regime, but this remains a challenging issue, particularly considering the demand associated to the growing 'wild meat' market.

4.2 Road Construction

In the 1999 evaluation report of the site (annex A), IUCN noted serious integrity concerns with the proposed road construction project. The project includes two different elements: the Ho Chi Minh Highway and the connection road between the Highway and the Route 20 (see attached map).

- The Ho Chi Minh Highway is clearly justifiable, appropriately located, outside and to the north of the nominated area, and has been constructed with a high level of environmental responsibility. It will provide an important benefit to the National Park in opening up views of and access to the Ke Bang forest area. It also greatly enhances year-round traffic flow from North to South of the country as a whole, with related benefits.
- Regrettably, the road that provides a link between the highway and Route 20 is a very different matter. The road is likely to carry little traffic and is used mainly for the movement of cattle and other domesticated animals, which raises the question of its necessity. It is most unlikely that any benefits will affect the immense economic and environmental costs of its construction. Its location, crossing through core natural areas of the site, is environmentally insensitive and inappropriate, running along the Chay River valley and destroying strategic wildlife habitats, then cutting across and through dominant geomorphic landforms of the park. Also, given the well documented negative impacts of new roads in protected areas (encroachment, removal of timber and non-timber forest products, increased wildlife hunting and trade), the task of park management and monitoring will be substantially increased.

The construction of this connecting road has inevitably faced considerable difficulties and this is reflected in the severe environmental impacts of the construction. It is a striking contrast with the care exercised along the main highway. Major impacts include:

- important faunal habitats have been destroyed, and there is an extensive swathe of vegetation destruction;
- enormous cuttings impact upon the landforms and geomorphic quality of the route (in a letter to UNESCO dated 15 December 2000, Fauna and Flora International advised that 4.5 tonnes of explosives per kilometre would be needed for construction);
- aesthetic considerations have been ignored; and
- the large-scale soil erosion along the route has led to sedimentation of the groundwater system and the surface streams which emerge from the plateau, e.g. through the Phong Nha Cave. This is not only likely to alter patterns of groundwater movement and the continuing evolution of the cave system, but in particular will have major impacts upon the biodiversity of the groundwater and in turn that of the emergent streams.

4.3 Boundaries

The watershed is not fully included in the nomination, and as the integrity of any karst area is dependent upon the quality and quantity of the water input, this is a matter of concern. Moreover, the current boundary appears to be arbitrary and needs to be further reviewed and expanded to ensure it can more effectively protect natural values, including large areas to maintain viable populations of species such as the tiger and the Asiatic Black Bear.

It is emphasized that both the 2000 and 2002 nomination dossiers have given due attention to the identification of a properly delineated buffer zone. However, IUCN is not aware of any documentation of the regulations and managerial procedures for these buffer zones.

IUCN would recommend the State Party to consider two strategies to address these serious issues:

- Extending the boundaries to those proposed in the 2000 nomination, returning the park to the 147,945 ha as proposed by the State Party at that time.
- Promoting a transboundary agreement with the Lao PDR that would integrate PNKB and Hin Namno, either as two parks operating on agreed and equivalent management protocols or with fully integrated management. It is recognized that this will be a long process and will demand further resource inputs. This is particularly true in Lao PDR as on-ground management is still at the early stages of development. But should such integration take place it would result in the most important karst protected area of Southern Asia.

4.4 Visitor management

A visitor management plan does not exist for the site but information made available during the field inspection is cause for some concern. It suggests a more-or-less opportunistic development of attractions scattered throughout the park as opposed to systematic planning for current and future sites for recreation and visitation. Clearly Phong Nha Cave already offers a major opportunity for visitation. The strikingly beautiful Hang Vom probably provides the best (and only viable) basis for another cave-based visitor's experience foreseen

for the site. The very different character of the Ke Bang area provides a valuable opportunity for a soundly based ecotourism programme, yet this is not considered in the current plan.

It is also proposed by the Provincial authorities that a series of associated and complementary attractions should be developed at the Phong Nha park entrance. While these may be economically viable, it is not at all clear how they would forward the objective of experiencing the values of the park itself. A botanic garden, for instance, might be much better located in Dong Hoi, on the North-eastern border of the Park, while the park budget might be better spent on the development of boardwalks and focal points within the park itself.

5. ADDITIONAL COMMENTS

The broad and specific conservation values of PNKB have been recognized for many years and, as indicated above, ongoing research has confirmed the regional and global importance of the area. Acknowledgement of the high value of the area has led the State Party to submit the area for World Heritage nomination. However, as noted above, the link road between the Ho Chi Minh Highway and Route 20 has been constructed and appears to have resulted in substantial damage to key values of PNKB, damage that – in the view of the current evaluation – would be difficult to repair in order to return the area to its original ecological and geomorphological condition. The fact that this happened during the period of re-nomination and review of the PNKB nomination unfortunately brings into question the State Party's commitment to maintaining the World Heritage values should the site be listed.

6. APPLICATION OF WORLD HERITAGE CRITERIA

PNKB has been nominated under natural criteria (i) and (iv).

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

IUCN reiterates its recommendation from the 1999 evaluation report (see Annex A) that “the nominated site has potential to meet criterion (i), however the potential value for World Heritage would be greater under criterion (i) if the nominated area was linked to the Hin Namno karst reserve in Lao PDR”.

Criterion (iv): Biodiversity and threatened species

As noted in Section 2, information arising from research on flora and fauna that is occurring within the site highlights its importance for biodiversity conservation. However, the nominated site, despite it being larger than that nominated in 1998, is still too small to provide adequate protection for threatened species such as the tiger and the Asiatic Black Bear. Thus IUCN does not consider that the nominated site by itself meets this criterion. However, if the site is expanded the revised area may have potential to meet this criterion. The further consideration of a transboundary site with Hin Namno and Khaummoune protected areas in Lao PDR would considerably enhance the potential of the site to meet criterion (iv).

As noted in Sections 4 and 5 the nominated site does not meet the Conditions of Integrity.

7. RECOMMENDATIONS

7.1 The impact of the link road construction through Phong Nha - Ke Bang National Park is a major new factor in the evaluation of the site since it was nominated in 1998 and re-

nominated in 2000. IUCN, therefore, recommends that the World Heritage Committee **defer** the decision on Phong Nha - Ke Bang National Park.

IUCN recommends the Committee to urge the State Party to undertake an independent assessment of the impacts of the road construction so as to:

- determine the precise nature and scope of the impacts of the link road construction on the biodiversity, landscape and karst geomorphological values of the site;
- determine whether and how identified impacts can be mitigated and the site's values restored; and
- assess if exclusion of the area impacted by the link road construction from the Phong Nha - Ke Bang National Park is a feasible option for the viability and integrity of the World Heritage nomination, should restoration / mitigation not be possible.

7.2 IUCN also recommends that the Committee reiterates the request made to the State Party in the 1999 evaluation of this site, to review the boundaries of the nomination, as noted in point 4.3 above, so as to provide more complete coverage of natural values and karst geomorphological processes.

7.3 IUCN recommends that the Committee request the State Party to prepare and submit:

- a visitors management plan for the site;
- information on the regulations that apply to the management of the buffer zone, and
- information on enforcement measures and other actions that will be taken to control illegal poaching.

7.4 IUCN recommends that the Committee reiterates the request made in 1999 to the State Party to continue dialogue on a transboundary agreement with the State Party of Lao PDR that would integrate Phong Nha–Ke Bang and Hin Namno National Conservation Area, either as two parks operating on agreed and equivalent management protocols or with integrated management. This might form the basis of a potential transboundary World Heritage site.

Annex A – IUCN evaluation report 1999

**IUCN TECHNICAL EVALUATION REPORT FROM 1999
PHONG NHA CAVE (VIETNAM)**

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet** (13 references)
- ii) **Additional Literature Consulted:** Deharveng, L. 1999. **Phong Nha Cave Biodiversity**. Unpublished Report. 3p; Government of the Socialist Republic of Vietnam and Global Environment Facility. 1994. **Biodiversity Action Plan for Vietnam**. Hanoi; Dillon, T.C. & Wikramanayake, E.D. 1997. **A Forum for Trans-boundary Conservation in Cambodia, Laos and Vietnam**. WWF, Hanoi and Washington. Project VIE/91/G31-1994; Limbert, H. 1992. The caves of Phong Nha and Hang Toi, Quang Binh Province, Vietnam. **The International Cave**. Vol. 2. pp 4-9; Limbert, H. 1992. Vietnam 1992, Return to the river caves of Quang Binh. **The International Caver** Vol. 5. pp 19-25; Limbert, H. 1994. **Vietnam 1994**. The 1994 British/Vietnamese Speleological Expedition Report. Privately published; Limbert, H. 1994. Vietnam: A Caver's Paradise. **The International Caver**. Vol. 12. pp 39; Limbert, H. 1997. Vietnam '97. **The International Caver**. Vol. 20. pp 11-18; WWF, *LINC*. 1998. **Linking Hin Namno and Phong Nha through Parallel Conservation**. WWF Indochina Programme. Hanoi; Nguyen Quang My & Vu Van Phai. n.d. **Cavern Tourism in Vietnam**; Pham Khang. 1985. The development of karst landscapes in Vietnam. *Acta Geologica Polonica*. 35 (3-4). pp 305-319; Nguyen Van Thang. ed. 1997. **Danh gia hien trang moi trong khu bao ton thien Phong Nha nam 1996-1997**; Multiple Authors. 1997. **Report of Field surveys on biodiversity in Phong Nha - Ke Bang Forest**. Mimeo Report. Hanoi. 84 p; Quang Binh Peoples Committee. 1998. **Investment Project: Establishment National Park Phong Nha-Ke Bang, Quang Binh**. Mimeo report; Timmins, R.J., Do Tuoc & Trinh Viet Cuong. in prep. **A preliminary assessment of the conservation importance and conservation priorities of the Phong Nha - Ke Bang proposed national park, Quang Binh Province, Vietnam**. Draft Report only, to be published by Flora and Fauna International. Hanoi; Vermeulen, J. & T. Whitten. eds. in prep. **Impacts of industrial use of limestone resources on biodiversity and cultural heritage (in East Asia)**. Draft Report only of the joint World Bank-IUCN project, together with various background papers; Watson, J. *et al.* 1997. **Guidelines for Cave and Karst Protection**. IUCN.
- iii) **Consultations:** 5 external reviewers. Staff of: CNRS, France; Gunung Mulu Caves, Malaysia; WWF Vietnam; University of Sydney; Nottingham Technological University; and the Geological Society of Australia. Individual speleologists and historians. Senior officials of the Department of Conservation and Museology (DOCAM), Vietnam. Park staff and senior officials from: Quang Binh Provincial People's Committee; Department of Science, Technology and Environment; Phong Nha / Ke Bang Program; Phong Nha Forest Protection Division; Relics and Landscape Management Board within Department of Culture and Information; Provincial International Relations Department; and the Department of Science, Technology and Environment.

- iv) **Field Visit:** January-February 1999. Elery Hamilton-Smith, and Hans Friederich.

2. SUMMARY OF NATURAL VALUES

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

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

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

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

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

3. COMPARISON WITH OTHER AREAS

3.1. Karst Areas and Geodiversity

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

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

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

Turning to the karsts of the wet tropics in the South-east Asian region, one can much more justly make comparisons. Many of these areas, like Phong Nha, are located within large and spectacular limestone plateaux, and the caves have often only been recognised and explored in recent years. However, many have been the subject of considerable scientific research, and have been proven to be significant on a wide range of criteria. Three areas are currently in the process of consideration for World Heritage status:

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

Other Asian karst areas of note include:

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

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

3.2. Forest Biodiversity

There are two other forest protected areas in South-east Asia which have World Heritage Status: the Thungyai-Huai Kha Kheng Wildlife Sanctuaries in Thailand (Tropical Dry Forest) and the Ujung Kulon National Park in Indonesia (Tropical Moist Forest). The 3.5 million ha.

Lorentz National Park has been nominated as World Heritage this year. This is the largest protected area in South-east Asia and includes one of the largest expanses of tropical forest in South-east Asia. The forest biodiversity values of Phong Nha, on its own, does not compare favourably with these existing and proposed sites. However, if the nominated area were linked with the Hin Namno karst ecosystem of Lao PDR, then this would constitute an area of high significance for forest biodiversity conservation. Adjoining forests in Lao PDR have been identified as priority areas for conservation and protect forest ecosystems, which exhibit high levels of species endemism. Such a trans-boundary protected area system would constitute the largest surviving area of karst forest in South-east Asia. It is thus recommended that such an expansion should be considered by the State Party in conjunction with the government of the Lao PDR.

4. INTEGRITY

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

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

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

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

5. ADDITIONAL COMMENTS

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

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

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

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

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

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

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

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

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

Thus, there is, in brief, a large and unexpected amount of evidence of earth's history. Without further research, the significance of the site to science cannot be properly assessed. However,

it is potentially a site of very great importance for increasing our understanding of the geologic, geomorphic and geo-chronological history of the region. This is the highest priority for further research. IUCN considers this site has potential to meet criterion (i), however the potential value for World Heritage would be greater under criterion (i) if the nominated area was linked with the Hin Namno karst reserve in Lao PDR.

Criterion (ii): Ecological processes

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

Criterion (iii): Superlative natural phenomena, scenic beauty

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

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

Criterion (iv): Biodiversity and threatened species

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

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

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

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

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

IUCN considers that the nominated area does not by itself meet World Heritage criterion (iv). However, if the area were to include the larger Phong Nha/Ke Bang National Park then this revised area would have strong potential for World Heritage under criterion (iv). The further addition of the Hin Namno Karst reserve, and other significant areas, in Lao PDR would also considerably enhance the status of this area as World Heritage.

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

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

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

A. Nominations of Natural Properties to the World
Heritage List

A2 Deferred Nominations for which additional
information has been received

UVS NUUR BASIN

MONGOLIA / RUSSIAN FEDERATION



WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

UVS NUUR BASIN (MONGOLIA / RUSSIAN FEDERATION) ID N° 769 REV

Background note: The IUCN technical evaluation of the Uvs Nuur Basin, nominated jointly by Mongolia and the Russian Federation in 1999, was presented to the 23rd extraordinary session of the Bureau in November 1999 (see Annex A). IUCN's evaluation noted that the site had the potential to meet natural criteria (ii) and (iv) but that the authorities should be requested to revise the boundaries from the 7.5 million hectares so as to exclude the 90% of the basin which currently has no protective status. IUCN also noted that *"the existing 9 strictly protected areas (SPAs) do not adequately cover the wide range of ecosystems within this large site. In particular, the wetlands in the lower 60km of the Tes-Khem need to be part of a protected area which can extend northwards across the border to Tuva, incorporating semi-desert, steppe and the slopes of the Vostochnyi Tannu Ola range (mixed forest/steppe, taiga and tundra)."* The Bureau decided to **defer** the nomination back to the States Parties to revise the boundaries and to prepare a joint management plan in a framework of transboundary cooperation.

On 13 November 2001, the Mongolian and Russian Federation State Parties submitted additional information to the World Heritage Centre. This information included a map of the revised boundaries of the nominated area showing a serial site with 11 separate clusters encompassing 971,165ha. All of the nominated area had protected status, made up of two protected area groupings: (i) The Ubsunur Hollow State Biosphere Nature Preserve (Russian Federation) which is comprised of seven core areas totalling 258,620ha; and (ii) The Uvs Nuur State Nature Preserve (Mongolia) made up of four discrete sites covering 712,545ha.

The State Parties also submitted at that time:

- Two management plans -- one for the Mongolian side and one for the Russian part;
- A Protocol of Co-operation between the Russian State Biosphere Nature Preserve and the Mongolian State Nature Preserve;
- A Treaty of scientific cooperation between the Republic of Tuva, of the Russian Federation and the Uvs Aimag of Mongolia; and
- Resolution on the expansion of the Russian Ubsunur Hollow State Biosphere Nature Preserve.

At its 26th session (Paris, 2002) the Bureau *"referred the nomination back to the State Party of Mongolia with the request that the nominated 'Uvs Lake' protected area cluster be enlarged to include more of the wetlands on the Mongolian side of the Tes-Khem delta (in the vicinity of the new 'Ubsu-Nur' and 'Oroko-Shinaa' clusters added by the Russian State Party and that the buffer zones be excluded from the nominated area. The Bureau commended the State Parties for the development of the two management plans, the signing of transboundary cooperation agreements on scientific research and management, and the steps taken by the Russian authorities to expand the nominated area."* (see Annex B for full IUCN report)

ADDITIONAL INFORMATION

Additional information was submitted by the State Party of Mongolia on the 31 January 2003 and 14 March 2003. This included:

- a letter from the Ministry of Nature and Environment of Mongolia noting that the Tes River Specially Protected Area (SPA) was established on 10 January 2003 by Resolution of Presidium of the Citizen's Representative Hural of the Uvs Aimag (Province), and a copy of this resolution;
- a copy of the Conservation regime of the Tes River SPA, also approved on 10 January 2003; and
- maps of the new area.

The Resolution (10 January 2003) to establish the Tes River SPA places the area under Provincial level legislation and protection, and requests that a proposal be prepared and submitted to the Ministry of Nature and Environment requesting its upgrading to a SPA under State legislation. The newly protected area covers a total of 97,688 ha.

EVALUATION OF ADDITIONAL INFORMATION

This extension of the nominated area to include the Tes River delta is in line with the recommendation of IUCN and the World Heritage Bureau (Paris, 2002). The revised nomination for the Uvs Nuur Basin now includes:

- The Ubsunur Hollow State Biosphere Nature Preserve (Russian Federation) which is comprised of seven areas totalling 258,620ha; and
- The Uvs Nuur State Nature Preserve (Mongolia) made up of five discrete sites covering 810,233ha.

In relation to the buffer zones, all buffer zones have been excluded from the Mongolian clusters. Buffer zones, however, of five of the seven clusters on the Russian side are still included in the nomination. The most important of these is the buffer to cluster 1 ('Mongun Taiga'), an area of 84,510ha. This area remains in a very natural state, consisting of high altitude tundra and meadows, and is an integral part of the whole mountain ecosystem around this glaciated massif. Similarly, the 50,000 ha buffer zone around cluster 6 ('Tsuger els'), an area of desert/desert steppe, is indistinguishable in quality from the small core area of 4900 ha. There are no problems relating to the quality of management of buffer zones around clusters 4, 5 and 7 (as shown on attached map) and these should be kept within the nominated area.

APPLICATION OF WORLD HERITAGE CRITERIA

The Uvs Nuur basin was nominated under all four natural criteria (as described in 1999).

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

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

Criterion (ii): Ecological processes

The closed salt lake system of Uvs Nuur is of international scientific importance because of its climatic and hydrological regimes. Because of the unchanging nature of the nomadic pastoral use of the grasslands within the basin over thousands of years, current research

programmes should be able to unravel the rate at which Uvs Nuur (and other smaller lakes within the basin) have become saline (and eutrophic). These processes are on-going and because of its unique geophysical and biological characteristics, the basin has been chosen as an IGBP site for monitoring global warming. IUCN considers that the nominated site meets criterion (ii).

Criterion (iii): Superlative natural phenomena, scenic beauty

The diversity of landscapes within Uvs Nuur basin, and especially the uncluttered horizons of the steppes broken only by colourful ribs of weathered rocks ('skerries'), have their own subtle aesthetic appeal. Overall, however, they are not superlative in character, thus IUCN does not consider that the nominated site meets criterion (iii).

Criterion (iv): Biodiversity and threatened species

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

RECOMMENDATION

IUCN recommends that the Committee **inscribe** the Uvs Nuur Basin on the World Heritage List under natural criteria (ii) and (iv). IUCN also recommends that the Committee:

- urge the State Party of Mongolia to place priority on upgrading the Tes River Specially Protected Area, currently protected at a provincial level, to a Specially Protected Area under State legislation; and
- encourage both States Parties to ensure that adequate resources are made available quickly and maintained for the effective implementation of the management plans.

The Committee may wish to commend the Mongolian State Party for steps taken to expand the nominated area, and both States Parties for their efforts to date in developing transboundary cooperation for the conservation of the site. The consolidation of such collaboration should be encouraged and maintained.

ANNEX A

The IUCN Technical Evaluation report, October 1999

1. DOCUMENTATION

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

2. SUMMARY OF NATURAL VALUES

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

At the bottom of the basin lies Uvs Nuur (759m a.s.l), the large, roughly-circular lake (60-70km in diameter) from which the site takes its name. The main feeder to Uvs Nuur is the Tes-Khem River, which has its source in a fresh-water lake, Sangyn Dalai Nuur, in the alpine meadows and larch forests of the Sangilen uplands at the eastern extremity of the basin (in Mongolia). The Tes-Khem then flows 500km westwards, through steppe and desert, into southern Tuva, and then back into Mongolia, before emptying into Uvs Nuur. For its last 100km, the river meanders through an extensive wetland complex, a green swathe in an

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

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

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

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

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

3. COMPARISONS WITH OTHER AREAS

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

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

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

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

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

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

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

In conclusion, Uvs Nuur basin contains an outstanding diversity of ecosystems and spans one of the major geoclimatic boundaries of Asia, that between Central Asia and Siberia. No existing World Heritage sites within this bio-geographic region contain this diversity. In addition, Uvs Nuur contains one of the best remaining natural steppe landscapes of Eurasia.

4. INTEGRITY

4.1. Legal Status and Scientific Research

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

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

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

4.2. Management

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

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

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

4.3. Other Human Uses

There is a small open-cast coal mine near Ureg Nuur but at present it only has a very local impact. The lack of any controls over rural road development within the basin is another localised detrimental human impact that can probably only be improved through environmental education. The opportunities for large-scale tourism in the basin are very limited compared with more popular natural attractions like Khovsgol National Park. Small-scale cultural/eco-tourism will develop naturally but any tourism strategy is a very low priority at this stage of Uvs Nuur's development.

4.4. Other Threats

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

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

5. CULTURAL LANDSCAPE VALUES

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

- Historically, a large proportion of the Eurasian steppe would have undergone a vegetation succession to forest as the post-glacial climate became warmer – had wild herbivores and humans (as they domesticated wild grazing animals) not worked to maintain the grassland environment.
- There is a close relationship between the domesticated grazing animals (traditionally sheep, cattle, goats and horses) and the grassland plants of the steppes, a relationship which has moulded this landscape over thousands of years. To an extent the increasing domestication of livestock supplemented (and supplanted) the wild grazing animals of the steppe – such as Przewalski's horse, the Saiga Antelope and the wild Bactrian camel. Over the millennia, the nomadic seasonal herding patterns transferred plants and nutrients

spatially within the steppe ecosystems. Some grasses and herbs will have been eliminated; others will have thrived. Soil organic matter (humus) gradually accumulated as plant leaf litter, dead roots and animal excreta were decomposed and their constituent nutrients recycled back into new plant growth. To a large extent, it can be argued that the great soils of the steppes – the chernozems and chestnut soils – are partly cultural by-products. They are indeed zonal soils but the domesticated herbivores (as well as wild ones) of the steppes have contributed to their development. In fact, some soil ecologists would argue that domesticated herbivores have been essential to the development of the steppe soil landscape.

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

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

6. APPLICATION OF WORLD HERITAGE CRITERIA

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

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

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

Criterion (ii): Ecological processes

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

Criterion (iii): Superlative natural phenomena, scenic beauty

The diversity of landscapes within Uvs Nuur basin, and especially the uncluttered horizons of the steppes broken only by colourful ribs of weathered rocks (‘skerries’), have their own

subtle aesthetic appeal. Overall, however, they are not superlative in character and the site is not considered to meet criterion (iii).

Criterion (iv): Biodiversity and threatened species

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

7. RECOMMENDATIONS

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

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

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

ANNEX B

The IUCN Technical Evaluation Report, May 2002

Background note: The IUCN technical evaluation of the Uvs Nuur Basin, nominated jointly by Mongolia and the Russian Federation in 1999, was presented to the twenty-third extraordinary session of the Bureau in November 1999. IUCN's evaluation noted that the site had the potential to meet natural criteria (ii) and (iv) but that the authorities should be requested to revise the boundaries from the 7.5 million hectares so as to exclude the 90% of the basin which currently has no protective status. IUCN also noted that "the existing 9 strictly protected areas (SPAs) do not adequately cover the wide range of ecosystems within this large site. In particular, the wetlands in the lower 60km of the Tes-Khem need to be part of a protected area which can extend northwards across the border to Tuva, incorporating semi-desert, steppe and the slopes of the Vostochnyi Tannu Ola range (mixed forest/steppe, taiga and tundra)." The Bureau decided to defer the nomination back to the States Parties to revise the boundaries and to prepare a joint management plan in a framework of transboundary cooperation.

ADDITIONAL INFORMATION

On 13 November 2001, the Mongolian and Russian Federation State Parties submitted the additional information to the World Heritage Centre. This information included a map of the revised boundary (see Map 1). The site now encompasses 971,165ha and is a serial nomination with 11 clusters. All the nominated area now has protected status and is made up of two protected area groupings:

1. The Ubsunur Hollow State Biosphere Nature Preserve (Russian Federation) which is comprised of seven core areas totalling 258,620ha; and
2. The Uvs Nuur State Nature Preserve (Mongolia) made up of four discrete sites covering 712,545ha.

The State Parties also submitted:

- Two management plans -- one for the Mongolian side and one for the Russian part;
- A Protocol of Co-operation between the Russian State Biosphere Nature Preserve and the Mongolian State Nature Preserve;
- A Treaty of scientific cooperation between the Republic of Tuva, of the Russian Federation and the Uvs Aimag of Mongolia; and
- Resolution on the expansion of the Russian Ubsunur Hollow State Biosphere Nature Preserve.

EVALUATION OF ADDITIONAL INFORMATION

Management

Separate management plans for the Russian and Mongolian parts of the nominated area have been prepared and these are considered to be adequate, along with the transboundary agreements, for the future management of the site.

Transboundary Cooperation

The protocol of co-operation between the reserves on both sides of the border, as well as the treaty of scientific cooperation between the Republic of Tuva, of the Russian Federation and

the Uvs Aimag of Mongolia, provides a solid foundation for trans-boundary cooperation on the management and protection of the site.

Boundaries

The current nomination contains 11 separate protected areas - seven on the Russian side and four in Mongolia.

On the Russian side, the resolution on the expansion of the Russian Ubsnuur Hollow State Biosphere Nature Preserve signed on 21 April 2000 expands the Nature Preserves in Tuva by 283,558 ha with the establishment of five new special protected areas. However, only two of these new protected areas are included within the nomination. IUCN has asked the State Party for clarification on why three of the new protected areas have not been included in the nomination. It appears that the other three protected areas only have protection at the Tuvan (not federal) government level as yet. The two new nominated protected areas ('Ubsu-Nur' and 'Oroku-Shinaa') are located on the northern side of the Tes delta/floodplain, along the border with Mongolia. The inclusion of these sites within the nomination partly responds to IUCN's 1999 request to include the wetlands in the lower 60km of the Tes-Khem and the semi-desert, steppe and the slopes of the Vostochnyi Tannu Ola range within the nominated area (see Background Note above). Coupled with the existing nominated 'Aryskannyg' cluster, the three protected areas also appear to satisfy IUCN's 1999 request to see a representative sequence of ecosystems, from the floodplain of the Tes to the crest of the Tannu-Ola Range, included in the nomination. The core area of one of the Russian SPAs -- 'Mongun Taiga' - has also been expanded from 940ha to 15,890ha (by decreasing the buffer zone). This is a satisfactory response to a recommendation made by IUCN during the 1999 field mission. Consequently, IUCN accepts that the Russian Federation State Party has adequately responded to the Bureau's request in the 1999 deferment.

On the Mongolian side, however, the four sites proposed as part of the nomination are still the same sites which were nominated in 1999. There has been no expansion of the 1999 nominated 'Uvs Lake' protected area cluster to include more of the wetlands on the Mongolian side of the Tes-Khem delta as recommended. The new nomination makes no mention of why the Mongolian partner has not responded – whether they consider that the narrow protected zone around Uvs Lake near the Tes-Khem delta is adequate, or whether the Mongolian State party is still working on a proposal to match the Russian response.

Buffer Zones

The buffer zones of the eleven clusters of the nominated site have been included in the nominated area. IUCN considers that these buffer areas are not adequately protected to merit inclusion in the nominated area. This would reduce the nominated 11 areas to a 'pristine zone' core of 483,530 ha (395,750ha in Mongolia, and 87,830ha in the Tuvan Republic of the Russian Federation).

Serial Site

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

- a) **What is the justification for the serial approach?** The Uvs Nuur Basin is a naturally enclosed basin and the 11 clusters are representative of the main ecosystem types of the basin. Most of them are also large enough if their buffer zones are well managed. IUCN, however, remains concerned that there has been no response to its request, accepted by the Bureau in 1999, to include the wetlands in the lower 60km of the Tes-Khem and the semi-desert, steppe and the slopes of the Vostochnyi Tannu Ola range on the Mongolian side.
- b) **Are the separate elements of the site functionally linked?** IUCN notes that the sites are partially linked on functional terms.

- c) **Is there an overall management framework for all the units?** As noted above, IUCN considers the management plans and transboundary agreements to be adequate for the management of the site.

RECOMMENDATION

The Bureau **referred** the nomination back to the Mongolian State Party with the request that:

- 1) The nominated 'Uvs Lake' protected area cluster be enlarged to include more of the wetlands on the Mongolian side of the Tes-Khem delta (in the vicinity of the new 'Ubsu-Nur' and 'Oroko-Shinaa' clusters added by the Russian state party ;
- 2) The buffer zones be excluded from the nominated area; and

The Bureau commended the State Parties for the development of the two management plans, the signing of transboundary cooperation agreements on science and management, and the steps taken by the Russian authorities to expand the nominated area.

A. Nominations of Natural Properties to the World Heritage List

A3 Extensions of Properties on the World Heritage List

GOUGH ISLAND WILDLIFE RESERVE
EXTENSION

UNITED KINGDOM



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

GOUGH ISLAND WILDLIFE RESERVE – EXTENSION (UNITED KINGDOM) ID N° 740 BIS

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

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

IUCN also noted that:

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

ADDITIONAL INFORMATION

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

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

By letter to the World Heritage Centre dated 20 January 2003, the State Party officially requested that the boundaries of the World Heritage site be extended to include the neighbouring Inaccessible Island. However, the State Party did not request an extension of the marine limit around Gough Island from 3 nautical miles to 12 nautical miles.

BRIEF DESCRIPTION OF NOMINATED EXTENSION: INACCESSIBLE ISLAND

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

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

The island remains in a largely pristine condition and is one of the few temperate oceanic islands free of introduced mammals. It is home to some 300 native plants and animals, including 2 birds, 8 plants and at least 10 invertebrates endemic to the island. The island also supports more than 70 other plant and animal species restricted to the Tristan-Gough island group. More than 250 species have been recorded from the marine environment, including 60 species endemic to Tristan-Gough. The island's natural history nonetheless remains little studied due to the difficult access and the lack of systematic research by any single agency.

Waters within 200 nautical miles (370km) of the islands are protected by the Tristan da Cunha Fishery Limits of Ordinance of 1983 (amended 1991, 1992, 1997). This area was declared a whale sanctuary in March 2001. Fishing rights within 50 nautical miles of the coastline currently are restricted to one concession holder, subject to quota controls, a size limit and a closed season for main target species, the Tristan Rock Lobster. The presence of a fisheries patrol vessel based at Tristan and the initiation of observer programmes aboard licensed vessels help to control fishing practices. However, it is noted that some illegal, unreported and unregulated fishing activities still take place within the 200 nautical mile zone, as highlighted in the IUCN State of Conservation report in October 1999.

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

RECOMMENDATION

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

However, at the time of writing this report IUCN and the World Heritage Centre are waiting a response from the State Party in order to clarify a number of issues relating to this extension. In particular, the State Party needs to clarify if it wishes to extend the marine zone around Gough Island to bring the boundaries of the World Heritage site in line with those of the Nature Reserve. Also, now that the name of the Reserve has changed to a 'Nature Reserve', and Inaccessible Island nominated as an extension, IUCN recommends that the State Party consider changing the name of the World Heritage site accordingly.

IUCN is also seeking confirmation from the State Party on the following issues in particular:

- What policies are in place to monitor and ensure the sustainability of the surrounding fisheries?
- What is the current status of the whale population in the marine zone?
- Are albatross populations being monitored?

IUCN, therefore, recommends that the Committee **refer** a decision on the extension of Gough Island Wildlife Reserve, pending a response from the State Party on the above-mentioned issues.

B. Nominations of Mixed Properties to the World Heritage List

B1 New Nominations

PURNULULU NATIONAL PARK

AUSTRALIA



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

PURNULULU NATIONAL PARK (AUSTRALIA) - ID N° 1094

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 5 references
- ii) **Additional Literature Consulted:** State Party nomination document **Nomination of Purnululu National Park**, Environment Australia 2002, plus a September 2002 supplementary information document and attachments; **Bungle Bungle Range, Purnululu National Park, East Kimberley, Western Australia: a guide to rocks, landforms, plants, animals and human impacts**, D. Hoatson et. al. Commonwealth of Australia 1997; **Watching the grass grow (vegetation regeneration Purnululu NP) CALM Landscape 13 (2): 23-27**, Behn, G. et. al., 1997; **Assessment of the vertebrate fauna of the Bradshaw (Juliki) Field Training Area, Northern Territory**, Fisher, A. & Woinarski, J., 2002, Northern Territory Parks and Wildlife Commission; **Karst Geomorphology and Hydrology**, Ford, D. and Williams, P. 1989; **Purnululu National Park World Heritage Cultural Values**, Kirkby, I & Williams N. 2001, Unpublished report to Environment Australia; **Dictionary of Karst and Caves**, Lowe, D. and Waltham, T. 2002, British Cave Research Association; **Geology and landforms of the Kimberley**, Tyler, Ian 2000, CALM 2000; **Quartzite Karst in southeastern Venezuela, International Journal of Speleology, 2: 309-314**, White, W.B., Jefferson, G.L. and Haman, J.F. 1966; **A survey of the wildlife and vegetation of Purnululu (Bungle Bungle) National Park and adjacent area**, Woinarski, J.C.Z. 1992, CALM, Research Bulletin 6; **Proceedings of the Asia-Pacific Forum on Karst Ecosystems and World Heritage**, Wong, T. et al. 2001, UNESCO/IUCN Miscell. Pub; **A global review of solutional weathering forms on quartz sandstones**, Earth-Science Reviews 42:137-160. Wray, R.A.L. 1997; **Tower karst in sandstone: Bungle Bungle massif, Northwestern Australia**, Young, R.W. 1986. *Z. Geomorph. N.F.* 30(2):189-202; **Sandstone landforms of the tropical East Kimberley region. Northwestern Australia**, *J. Geology* 95: 205-18. 1987; **Quartz etching and sandstone karst: examples from the east Kimberleys, Northwestern Australia**. *Z. Geomorph. N.F.* 32(4): 409-23, 1988.
- iii) **Consultations:** 5 external reviewers. On site consultations with Environment Australia; CALM; CSIRO; Traditional Aboriginal Owners, Purnululu Aboriginal Corporation (PAC) and the Council's anthropologist. Pre- and post-visit consultations with IUCN/WCPA experts; Melbourne University; CALM; Kimberley Land Council, Broome; CALM anthropologist; Shire of Hall's Creek; Ord-Bonapart Program, Kununurra; and Aboriginal & Torres Strait Islanders Council.
- iv) **Field Visit:** Paul Dingwall (IUCN), Kevin Jones (ICOMOS), August 2002.

2. SUMMARY OF NATURAL VALUES

The nominated property is the 239,723 ha Purnululu National Park (PNP) (IUCN Category II), located some 300 km south of Kununurra in the East Kimberley region of the State of Western Australia. Together with the adjacent 79,602 ha Purnululu Conservation Reserve (PCR), the park was created in 1987 out of the Ord River Regeneration Reserve, established in 1967 to overcome the effects of land degradation following more than 50 years of pastoral farming. The park comprises four ecosystems:

- The deeply dissected Bungle Bungle Range composed of Devonian-age quartz sandstone eroded over a period of 20 million years into a series of beehive-shaped towers or cones, whose steeply sloping surfaces are distinctly marked by regular horizontal bands of dark-grey cyanobacterial crust (single-celled photosynthetic organisms). The towers, many of which are remarkably symmetrical, are most numerous and impressive on the eastern and southern flanks of the massif. They also occur as small isolated clusters arising from the surrounding plain and studding the eastern summit of the massif, the latter possibly relict from an earlier tower-forming period. On the southern flanks, the towers are cut by a labyrinthine system of very narrow gullies separated by flat-floored, mainly streamless, depressions opening out on to the plain.
- The grassy Ord River valley system on the eastern and southern border regions of the park, draining two tributaries from the south and three from the north of the uplands.
- The broad sand plains extending between the uplands and the river, composed of infertile black soils with open woodland and grasses.
- The more extensively wooded limestone ridges to the west, and neighbouring Osmond Range to the north.

The region experiences a dry monsoonal climate characterised by two contrasting seasons: a very hot, wet summer (November-March) which receives all the annual rainfall (600 mm) usually as erratic, intense and localised thunderstorms, and a warm, dry winter (April-October). There is little dry season stream flow or permanent water except for pools in the main river and well-sheltered gorges, or at springs in permeable rocks.

The park's vegetation reflects its transitional location between the northern tropical savannah (Torresian) and inland arid desert (Eyrean) biogeographical regions. Some 17 vegetation communities are recognised according to moisture availability, ranging from closed forests in the gorges and valleys, through open forests in riparian areas and open woodlands of drier areas to stunted shrublands and grasses in the driest uplands and surrounding plains. The dominant vegetation is open woodland and spinifex (spiny hummock grass) grassland with many eucalypts, acacias and grevilleas, notably silver leaf bloodwood, and rough leaf range gum. The closed forest communities, which are extensions of northern monsoonal forests, include palms, ferns and orchids. In all, 653 plant species are recorded from the Purnululu area, including 628 higher plants (of which 597 are native), 17 ferns and fern allies and 8 species of lower plants.

The diversity of animals in PNP also reflects the mixing of tropical and desert species. The recorded fauna of the park and surrounds totals 298 species of vertebrates, including 149 birds, 81 reptiles, 41 mammals, 15 fish and 12 frogs. Among the arid land animals are skinks, monitor lizard and short-eared wallaby, while the wet area representatives are varieties of frog, the pale field rat and large-footed mouse-eared bat. The last of these exemplifies species at the southernmost (inland) limit of their range, while others such as the desert mouse and

nocturnal burrowing skink reach their northern limit in Purnululu. The park also harbours rare animals such as the grey falcon, and seasonally migrating birds.

3. COMPARISONS WITH OTHER AREAS

The term *karst* is used in the nomination document and some of the supporting references to describe the erosional sandstone features found in PNP. At least one other reference, Hoatson *et al.*, refutes the karst description, and one reviewer has referred to the “somewhat confused” scientific discussion on the issue of sandstone karst. It is therefore worth briefly reviewing the issue. The term *karst*, and the phenomenon to which it refers, has a very long and complex history extending over many centuries and many cultures. Essentially, *karst is a land system that has been shaped, at least largely, by chemical solution* (Ford and Williams 1989: 1, 29, 43; Lowe and Waltham, 2002: 22-23, 33). But as in virtually all geomorphic processes, solution rarely occurs in isolation from other processes. Thus, other forms of erosion including mechanical removal of particles often accompany it, and usually the two or more processes involved are well integrated. Much of the confusion arises from the fact that many textbook discussions, and even some definitions of the term link it with limestone – the most frequent occurrences are in limestone or other carbonate rocks (indeed the word ‘karst’ derives from the limestone regions of the Balkans). It is also common to emphasise the place of caves, even though there are many occurrences of karst in a wide range of rocks that do not include caves.

White *et al.* (1966) first demonstrated the occurrence of karst in quartzites and quartzitic sandstones. It is now widely recognised that both quartz and amorphous silica are soluble in water, particularly at high temperatures. However, solution is much slower than in many other rocks such as the carbonates, gypsum and salt. Amorphous silica, which often forms the ‘cement’ in siliceous sandstones, is more soluble than crystalline quartz, and it is the amorphous form that has been dissolved at PNP and so liberated the sand grains for mechanical erosion.

A global review of 26 quartz sandstone landscapes (Wray 1997) reveals many karst features such as tower fields, especially in tropical regions. The best-documented and most spectacular tower karst is found on the surface of the flat-topped table mountains (or tapuis) of the Canaima National Park World Heritage site in Venezuela. While this is the most imposing cavernous sandstone region in the world, including the presence of 10 of the 12 deepest caves, the karst features are confined to solution on joints and fissures, producing deep, vertical shafts. Similar sandstone karst 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 karst with towers and caves is also found in the immense tablelands of the Central African Republic; the Tibetsi region of Chad; in S. Nigeria, in the Saharan region of E. Niger and in South Africa’s Cape Peninsula. None of these are currently within strictly protected areas or World Heritage sites. The Wulingyuan Scenic & Historic Interest Area of China, a World Heritage site, has spectacular sandstone karst features but these form a so-called “ruiniform” relief, comprising angular pillars and pinnacles in vertically-jointed terrain, unlike the cone-shaped towers of PNP. Similar landscapes also exist in the nominated Three Parallel Rivers of Yunnan Protected Areas in China, also being considered by the Committee at its 27th session. Another area of eroded sandstone, of much greater extent and variety, exists in the National Parks of the Canyonlands of Arizona and Utah, USA. However, this is a “high desert,” with elevations ranging from 1,000 metres to over 2,000 metres above sea level.

Within Australia itself, particularly in the north, there is also a large area of sandstone tower karst including the:

- flat-topped, ruiniform relief of the Arnhem Land Plateau, Northern Territories;
- irregular towers in the Burt Ranges, Spirit Hill, Elephant Hill and Hidden valley, northeast of Kununurra, Western Australia;
- symmetrical hills of Watarrka National Park and Keep River National Park, Northern Territories;
- small (6 m high) towers in horizontally bedded quartz sandstones of North Queensland; and
- towers (or “pagodas”) in Monolith Valley south of Sydney, New South Wales.

However, in the above cases the tower karst is smaller in scale and different in terms of geological make-up and landform evolution from that in PNP. PNP owes its distinctive character to the great age and continuing stability of the Western Australian shield and to the character of the lithology. The dominant rounded hill landforms, often described slightly inaccurately as tower-karst, but better termed cone-karst, are in fact at a relatively mature stage of the karst cycle and are by far the best example of this landform in quartzitic sandstone, virtually to the point of being unique. They are present probably because (a) they have been formed over a period of 20 million years (or perhaps longer) and (b) the liberation of sand grains by solution of the amorphous silica, followed by the removal of the sand by monsoonal rains, has accelerated the process of erosion. Further, the stabilising effects of the cyanobacterial crusts have probably supported and maintained the shape of the hills, and this also appears to be a unique feature amongst quartzitic karsts.

Topographically, quartzitic karst landscapes are very similar to those in carbonate rocks, though a systematic comparison has not been made. Thus, the Bungle Bungle topography is similar to the limestone tower karst of Australia’s West Kimberley region. Although karst landscapes are represented in 41 existing World Heritage natural, cultural and mixed sites (Wong et al. 2001), with only two exceptions (Canaima and Wulingyuan) they are developed in carbonate rocks. Although the Bungle Bungle Range has features similar to many other areas of the world, its distinctiveness derives from its scale and the specificity of its geomorphic evolution. It is this that justifies its claim to outstanding universal geological and conservation value.

4. INTEGRITY

4.1. Site integrity

The nominated property includes the full extent of the Bungle Bungle massif, the park’s predominant natural feature. The massif is also well-buffered by protected land on all sides, including sand plains within the park, and extensive riverine country and ranges of the Purnululu Conservation Reserve (PCR) to the west. The PCR is reported as having natural and cultural values of national importance, and it is managed consistently with the national park. In fact, it includes a greater diversity of landforms and vegetation than the park, with more permanent water, and is likely to have significant prehistoric settlement sites. The long-term objective of incorporating the PCR into the park should be pursued to completion. Priority should also be given to expanding the park into the surrounding pastoral country to add important natural and cultural assets, such as the historic Ord River Station to the east, and to provide better buffering and boundary delimitation.

The existing park boundaries are not ideal, being mainly water courses rather than watershed boundaries. This potentially allows incursion of undesirable impacts from neighbouring areas in catchments upstream of the park, such as waste effluent from mining activities. Regional environmental and land use regulations, and Australia's *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), appear to be capable of minimising these impacts. As fencing of the property is not feasible, there is an on-going problem in controlling wandering stock and other pests that relies heavily on co-operation of neighbouring landowners. The forthcoming renewal of pastoral leases in 2015 presents an opportunity to add pastoral lands to the park or buffer zones. Leaseholders and the Hall's Creek Shire authorities are sympathetic to this, and the park authorities should undertake surveys and planning, and complete the land transfer negotiations, as soon as possible.

There are no permanent inhabitants in the PNP. Seasonal occupation of special Living Lease Areas by traditional owners is commencing and will expand in the future.

4.2. Management

The nominated property is public land with strong legal security of protection. PNP and the adjacent PCR are owned and administered by the State Government of Western Australia under the 1984 Conservation and Land Management Act. Legally the nominated property is a Class A Reserve for the purpose of national park, vested in the Conservation Commission of Western Australia. The legally complex and highly litigious issues surrounding native title to land and joint management are evolving rapidly. Despite a recent ruling effectively extinguishing native title to land comprising PNP, the State Government has signaled an intention to amend the legislation in order to secure traditional ownership of land and establish full joint management arrangements under a Park Council representative of traditional owners and the Department of Conservation and Land Management. Living Area leases in the park for some traditional owners have recently been signed with the Purnululu Aboriginal Corporation (an incorporation giving legal identity to indigenous communities and eligibility to receive government funds). The authorities intend to establish more of these leases and extend the same ownership and management arrangements to the adjacent conservation reserve. The Purnululu traditional owners actively support the World Heritage nomination for the park. Recent correspondence from the State Party (letter dated 13 February 2003) advises that a Deed of Agreement has been signed between the Western Australian Minister for the Environment and Heritage and the Purnululu Aboriginal Corporation. The Deed relates to the involvement of the Purnululu Aboriginal Corporation in the management of the Park and brings forward the introduction of effective joint management arrangements.

Federal legislation also applies in the case of Australian World Heritage properties. The EPBC Act, parts of which apply immediately upon nomination, can prohibit actions having significant impact on World Heritage values, and has oversight of management plan preparation and implementation. A legally binding management plan exists for the nominated property, and is currently undergoing mid-term review, particularly to improve the provisions for management of cultural heritage.

Several additional issues require management attention as outlined in the following paragraphs.

4.3. Access, roads and aircraft movements

Land-based public access to PNP is problematic, requiring a three hour drive via a single, privately owned 4WD track that is closed during the four-month wet season. Upgrading the track is required to reduce difficulties and hazards. Negotiations are currently underway with local authorities and pastoral leasees to provide a legally gazetted road. The 50km of internal vehicle tracks in the park are rough and dusty and require sealing. Upgrading is also required

for the seven walking tracks and associated parking areas at the most popular tourist attractions, to improve ease of access, visitor safety and interpretation facilities. Rockfalls, treefall, flooding and heat exposure present varying degrees of risk to visitor safety and require more management intervention. Management of aircraft movements is a significant issue. The majority of day-visitors enter the park by air through a single airstrip and associated helipad, and many others experience the park by aerial overflights. Existing rules relating to flight paths and times appear to be containing problems at current demand levels but, as visitor numbers rise, ensuring public safety and retaining noise levels within tolerable limits will require vigilance, monitoring and research.

4.4 Visitor numbers and impacts

Although visitor numbers have risen steadily in the 15 years since the park was established, they remain low at around 20,000 per year, and are not likely to increase dramatically in the short term, given the remoteness and land access difficulties. The high proportion of aerial access and use keeps environmental and social impacts to a minimum, and the long wet season allows recovery of sites impacted during the short (2-month) peak visitor season. The current management policy of “hardening” existing visitor facilities, with a low-key approach to scale and design standards, should avoid increased impacts. Pressure from tourist operators to open new visitor sites is appropriately resisted at present but it will inevitably increase, and will require care to avoid undesirable impact on natural and cultural values and sites.

4.5 Staffing, funding and facilities

Staffing and funding are barely adequate for current operations and well short of levels required under World Heritage standing. However, the nomination document indicates that there will be a substantial increase in staff and finance if the site is inscribed. The present complement of one ranger-in-charge, an assistant ranger and a (seasonal) visitor centre manager would need to be increased by at least four fully trained rangers plus several maintenance staff, and aboriginal officers to service an expanded cultural heritage management and interpretation programme. Longer-term consideration is also required to supplementing, or replacing, the rudimentary visitor centre and ranger station with an improved facility, preferably sited at the main park access point on the Great Northern Highway. Significant increases would be required to park budgets, which currently rely heavily on revenues from entrance fees and aircraft and tourist safari concessions. Park authorities estimate that upgrading facilities such as staff accommodation would require some AUD \$3 million per year for three years, plus an annual operating grant of about AUD \$400,000.

4.6 Wild animal and pest control

Control of animal pests remains a major park management problem. A principal reason for establishing the park was to halt the effects of vegetation depletion, weed invasion, accelerated soil erosion, and river siltation and flooding due to overgrazing by cattle and feral animals. Removal of some 25,000 cattle and 4,000 donkeys since 1985 has made improvements, and a monitoring and assessment programme is underway. However, stock from neighbouring pastoral stations still gain access, with consequent impacts on boundary riverbeds and riparian vegetation, and on water quality especially at waterholes in the dry season. In the absence of fences, regular mustering and removal of animals are required and there are provisions for prosecuting owners of straying cattle and for the destruction of unbranded stock. The park boundaries need to be re-set to include a substantial buffer into pastoral leases on all sides of the park, particularly in the south and east to better protect the Ord River. More effort is required to the limited amount of weed control and mechanical treatment of soil, to promote regeneration of native grasses and shrubs. Native birds,

mammals and reptiles are directly impacted by feral cats, and current research and control plans must be resolutely continued to minimise this threat.

4.7 Mining

Mineral exploration and mining are prohibited in the PNP, but operations in neighbouring catchments create potential problems. In the PCR, abutting the park, current prospecting (mainly for copper) indicates the absence of economic deposits. However, unless strictly controlled, waste water from mining the Panton deposit (mainly platinum) in the Ord River catchment upstream from the park could affect water quality in the park. The nomination document also notes that the *Mining Act of Western Australia* provides for the excision of conservation areas for mining with agreement of both Houses of Parliament, and the nomination document notes that this has happened five times in 10 years.

However, existing Commonwealth legislation appears adequate to prevent serious impacts from occurring, through provisions of the EPBC Act which can over-ride State legislation and invoke review by Commonwealth ministers and a Commonwealth-initiated environmental impact assessment process where World Heritage values are threatened. This has been confirmed in a letter to IUCN from the State Party subsequent to the field inspection. The State Party also advises that the application of the EPBC Act to areas outside the boundaries of the World Heritage property “obviates the need to establish formal buffer zones around the entire boundary of each of Australia’s World Heritage properties” (letter dated 13 February 2003).

4.8 Fire management

Fire is a natural phenomenon in the Purnululu landscape and a major management issue of regional importance. Prolific vegetation regrowth following removal of grazing pressure, coupled with the demise of aboriginal patch burning, has increased the incidence and destructive influence of large-scale wildfires (a major wildfire in September 2002 burned some 100,000ha, including half the area of the Bungle Bungle range, resulting in the temporary closure of the park to visitors). The current review of fire management to replace fire reduction policies with a strategic fire protection programme, including traditional patch burning, is commendable and should be implemented.

5. ADDITIONAL COMMENTS

Aboriginal Australians have occupied the Ord River region for some 40,000 years, concentrating along rivers and gorges affording permanent food and water resources. Rock shelters beneath cliffs were other important living areas for people moving seasonally between the plains and uplands. This is a hunter-gatherer culture, with two main tribal groupings and their economic networks, and four main languages, mixing in the area. The people, referred to as traditional owners, have a strong attachment to land and natural resources, expressed through religious philosophy (Narrangkarni or “the Law”); the use of shared names linking individuals to geographical features (narraku), a detailed system of ecological knowledge and use of plants and animals; and the material evidence from hundreds of archaeological sites including rock art sites, stone quarries, burial sites and artefact scatter. Attachment to land has enabled the aboriginal people to survive the impact of colonisation by pastoralists.

The Kimberley region was one of the last parts of Australia occupied by non-aborigines who began arriving in the mid-1880s, taking up 50,000 to 300,000 ha leases on native lands. To retain connection to their land the aborigines became a pastoral labour force, and by the beginning of the 20th century there were some 50,000 head of cattle on the Ord River

grasslands. The influx of miners following the 1885 Hall's Creek gold rush brought profound social changes with the introduction of diseases and violence, and destruction of traditionally occupied land through overgrazing and soil and river erosion. Cultural dispossession continued when aborigines were compelled to leave the cattle stations from 1968 and settle in camps on the fringes of towns.

PNP no longer exhibits traditional settlement and use. There has been serious disruption and dislocation of the aborigine community, and some reduction in their knowledge of the land. However, clear evidence of a continuing association with their native country is manifest in:

- Schooling of young people in language and traditional knowledge.
- Community-initiated surveys of archaeological and cultural resources, and associated mapping and database development.
- Negotiation of living lease areas in the park for seasonal occupation.

The new joint management arrangements, guided by the Purnululu Aboriginal Corporation, will provide for an improved cultural management programme staffed by traditional owners, and negotiated agreements for continuance of extraction and use of natural resources. In turn, improved cultural heritage management will contribute to enhanced biodiversity protection.

6. APPLICATION OF WORLD HERITAGE CRITERIA

PNP has been nominated under natural criteria (i), (ii) and (iii).

Criterion (i) Earth's history and geological features

The claim to outstanding universal geological value is made for the Bungle Bungle Range. The Bungle Bungles are, by far, the most outstanding example of cone karst in sandstones anywhere in the world and owe their existence and uniqueness to several interacting geological, biological, erosional and climatic phenomena.

The sandstone karst of PNP is of great scientific importance in demonstrating so clearly the process of cone karst formation on sandstone - a phenomenon recognised by geomorphologists only over the past 25 years and still incompletely understood, despite recently renewed interest and research. The Bungle Bungle Ranges of PNP also display to an exceptional degree evidence of geomorphic processes of dissolution, weathering and erosion in the evolution of landforms under a savannah climatic regime within an ancient, stable sedimentary landscape. IUCN considers that the nominated site meets this criterion.

Criterion (ii): Ecological processes

The outstanding biodiversity value of PNP is claimed on three principal grounds: representation of the diversity of Australian biota, an unusual combination of tropical and desert biota, and evidence of adaptation and evolution in Australian biota. The Purnululu region contains an interesting representation of biota within the transition zone between northern (monsoonal) and central (arid) biogeographical realms of Australia.

However, with the incompleteness of biological surveys in PNP (especially for reptiles and invertebrates) and the absence of any rigorous national or international comparative analysis, the overall significance of PNP species and ecosystems is difficult to determine. Rather than outstanding, the biota appear to be no more than typical and representative of a broad zonal biogeographical transition between arid and monsoonal Australia extending continent wide.

Many of the key elements of this are likely to be also protected in existing World Heritage sites such as Kakadu National Park and Uluru-Kata Tjuta National Park. The claim to outstanding universal biological value cannot, therefore, be substantiated at this time. IUCN does not consider that the nominated site meets this criterion.

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

Although PNP has been widely known in Australia only during the past 20 years and it remains relatively inaccessible, it has become recognised internationally for its exceptional natural beauty. The prime scenic attraction is the extraordinary array of banded, beehive-shaped cone towers comprising the Bungle Bungle Range. These have become emblematic of the park and are internationally renowned among Australia's natural attractions. The dramatically sculptured structures, unrivalled in their scale, extent, grandeur and diversity of forms anywhere in the world, undergo remarkable seasonal variation in appearance, including striking colour transition following rain. The intricate maze of towers is accentuated by sinuous, narrow, sheer-sided gorges lined with majestic *Livistona* fan palms. These and the soaring cliffs up to 250 m high are cut by seasonal waterfalls and pools, creating the major tourist attractions in the park, with evocative names such as Echidna Chasm, and Frog Hole, Piccaninny and Cathedral Gorges. The diversity of landforms and ecosystems elsewhere in the park are representative of the larger region, and lack a unique aesthetic quality, but provide a sympathetic visual buffer for the massif.

The powerful aesthetic experience of the Bungle Bungles has aroused huge interest among the public, and the ranges figure prominently in national and international advertising of Australia's tourist attractions, matching the prominence of the Uluru-Kata Tjuta National Park. Photographers and travel writers include the Bungle Bungles among the world's natural wonders, some describing them as Australia's equivalent of the Grand Canyon. IUCN considers that the nominated site meets this criterion.

7. RECOMMENDATIONS

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

Furthermore, IUCN recommends that the Committee request the State Party:

- i. to ensure that any mining activities outside or adjacent to the World Heritage site, including within catchments that flow into the World Heritage site, would be subject to the application of the *Environmental Protection and Biodiversity Conservation Act* and the highest standards of environmental assessment, planning, management and monitoring;
- ii. to give priority to incorporating the Purnululu Conservation Reserve into the park and expanding the park into the surrounding pastoral country to add important natural and cultural assets, and to provide better buffering and boundary delimitation;
- iii. to significantly increase funding and staffing for the site, in order to improve natural and cultural heritage management; to minimize the impacts of grazing animals and invasive species; to upgrade staff and visitor facilities; and to continue negotiations that will lead to improved access to the park, while taking great care to avoid undesirable impacts from increased visitation on the natural and cultural values of the site; and
- iv. to provide a detailed report on progress with these issues in two years time.

RIO DE JANEIRO:
SUGAR LOAF, TIJUCA FOREST, AND THE
BOTANICAL GARDENS
BRAZIL



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

RIO DE JANEIRO: SUGAR LOAF, TIJUCA FOREST, AND THE BOTANICAL GARDENS (BRAZIL) ID N° 1100

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 3 references
- ii) **Additional Literature Consulted:** Fundacao SOS Mata Atlantica, 1992, **Dossie Mata Atlantica**, Sao Paulo: Fundacao SOS Mata Atlantica; Fundacao SOS Mata Atlantica and Instituto Nacional de Pesquisas Espaciais, 1993, **Atlas da Evolucao dos remanescentes florestias e ecossistemas associados do Domimo da Mata Atlantica no periodo 1985 – 1990.** ; Padua, Maria Thereza Jorge, 1998, **The Atlantic Forest in Brazil**; Prance, 1987, **Biogeography of Neotropical Plants**, in Biogeography and Quaternary-History in Tropical America; Ministério da Viação e Obras Públicas, 1922, **Relatório da Comissão do Patrimonio (1822-1922)**, Rio de Janeiro, Empreza Brasil Editora; John Luccock, 1975, **Notas sobre o Rio de Janeiro e partes meridionais do Brasil**, Universidade de Sao Paulo; Mauricio de A. Abreu, 1986, **Da habitação ao habitat: a questão da habitação popular no Rio de Janeiro e sua evolução**, Revista do Rio de Janeiro, 2; Perrota, Isabella 1998, **O perfil do Rio: grafismos de representação de uma cidade naturalmente gráfica**, GTM Editores; Ferrez Gilberto, 1973, **Parecer de tombamento do Pão de Açúcar**, IPHAN; Tosatto, Pierluigi, 1997, **Um palácio na história geológica brasileira**, 2nd ed. DNPM.
- iii) **Consultations:** 5 external reviewers. Meetings and field visits were held with the Secretary for Biodiversity and Forests, Ministry of the Environment; and with representatives from the Ministry of Culture, staff of IPHAN (Instituto do Patrimonio Historico e Artístico Nacional) of the Ministry of Culture that oversees the Rio region, IBAMA (Brazilian Institute of the Environment and Renewable Natural Resources), Prefecture of Rio de Janeiro, and staff from the national park, botanical garden, and Pao de Acucar and Trem de Corcovado companies, and the Friends Associations for the National Park and Botanical Garden.
- iv) **Field Visit:** Jim Barborak (IUCN) and Nora Mitchell (ICOMOS), September 2002

2. SUMMARY OF NATURAL VALUES

The nomination includes three separate areas, totalling 3,600 ha, surrounded by a buffer zone of 1,903 ha. It is this ensemble that has been nominated as a mixed site, and as a cultural landscape with important natural values. The three areas are:

(1) **Tijuca National Park (TNP)** (itself in three sectors totalling 3,358 ha) includes a section of the Atlantic Forest, some of which was reforested through innovative restoration efforts in the mid 19th century. The park, which rises to 1021m, also contains important historical

elements representing the early history of coffee and sugar plantations and 19th and early 20th century park development.

(2) **Rio de Janeiro Botanical Gardens Research Institute (RJBG)** (137 ha) is an historic and renowned scientific institution, which includes a forest reserve (83 ha) and - adjacent to TNP - is a garden (54 ha) that is open to the public and provides educational programmes for all ages. The garden, which was established in 1809 by the Portuguese Court, then resident in Brazil, contains an arboretum with a large collection of Amazonian trees, and internationally significant collections of several plant families, particularly palms. It also includes a national herbarium, a research library, and an ongoing research programme on the Atlantic forest.

(3) **Sugar Loaf, Urca and Cara de Cao** (105 ha) are a dramatic series of isolated hills linked to the Tijuca massif. The city of Rio de Janeiro was founded in 1565 at the base of the Sugar Loaf.

Together, these areas form the dramatic setting for Rio de Janeiro and reflect the cultural history and relationship over time between the forested landscape, the mountains and the city. The city is cradled between these hills and mountains of the nominated site and Guanabara Bay, creating an urban landscape setting of great beauty that has been shaped by significant historical events, influenced by a diversity of cultures and celebrated in the arts, through painting and poetry in particular. This landscape first encouraged tourism in the 19th century, and is now widely regarded as one of the most scenic natural backdrops to any major metropolis in the world. TNP, particularly Corcovado and its Christ statue, and Sugarloaf, are among the most widely depicted icons of South America, recognized universally.

The rounded rocky peaks that are commonly called “sugar loaves” are distinctive morphological features of the Rio landscape, known as inselbergs. They include the mountain peaks of the Tijuca sierra (Tijuca, Papagaio, Pedra do Conde, Archer, and Pedra do Andaari). Corcovado, Pao de Acucar and Pontal da Urca are “isolated fragments of the Tijuca sierra” with a common geological-geomorphologic origin and evolution.

Originally, the Tijuca coastal mountain range supported an example of the Atlantic forest, classified as “tropical hillside rain forest” or “submontane and montane umbriferous forest” by the Brazilian Institute of Geography and Statistics. Often referred to as the Atlantic forest ecosystem, it is a biome peculiar to the Brazilian coastal zone and embraces forest formations, sandbanks and mangrove swamps.

There have been, however, considerable human impacts on the forests of the TNP over several centuries. Between the middle of the 18th and 19th centuries, the more accessible sectors of the original forest were partially deforested for coffee and sugar plantations, a change which adversely impacted the springs and watersheds that supplied water for the city of Rio de Janeiro. The historical reforestation effort beginning in the 1860s was the first “heterogeneous reforestation in Latin America” and possibly in the hemisphere. Though this scheme successfully re-established a forest habitat, there are some continuing problems with introduced species.

A number of endemic and threatened species inhabit the TNP, which is also the seasonal home to some migratory species. Only 7.3% (approximately 9400 km²) of the overall extent of the Atlantic Forest Ecosystem in Brazil remains, mostly in small patches. Thus, Tijuca represents an important fragment for the conservation of biodiversity, despite its altered composition. However, its greatest importance lies in the strategic role it plays in educating the Brazilian public about the values of and threats to the Atlantic Forest.

The botanical garden is a renowned scientific institution, and is particularly noted for its Atlantic Forest research programme, its herbarium, and its arboretum. It is directly linked by

history and by current research programmes to the knowledge, understanding, and documentation of the Atlantic Forest within the garden and in the adjacent national park.

3. COMPARISONS WITH OTHER AREAS

Obviously, this nomination is for an area that is much smaller, less diverse, and more impacted by human activities over several centuries than most natural World Heritage (WH) sites, at least in the Western Hemisphere. However, TNP is the most visited national park in Latin America, and when its visitation is combined with that of the Sugarloaf and the Botanical Garden, it far exceeds the number of visitors to any other natural area complex in Latin America and approaches those of some of the most visited parks in North America and Europe. The presence of the site in the heart of a metropolis with a population of approximately 10 million people and millions of national and international visitors a year is what sets it apart from many other natural areas. In particular whilst two larger regional assemblages of Brazilian Atlantic rain forest are already on the WH List, no part of these sites enjoys the globally recognized beauty and unique standing of one of the world's great urban forests, or the accessible scenic beauty, cultural, recreational, and iconic importance which TNP and the Sugarloaf provide.

In addition, the massif and the isolated “sugar loaf” (inselberg) mountains represent very well the unusual geology of coastal Brazil. While this collection of “sugar loaf” formations is not unique, it is certainly among the most well-known in the world and contributes significantly to the dramatic beauty of the landscape of Rio de Janeiro.

There is some similarity between the role of the Kirstenbosch Botanic Gardens outside Cape Town in South Africa, which has been nominated as part of the Cape Floristic Province WH site. Moreover, the similarity between the Rio nomination and that of the Cape Province goes further: in both cases there are botanic gardens that are linked to threatened biomes which form an instantly recognized backdrop to a major world city. However, the natural values contained in the Table Mountain National Park far exceed those of TNP.

4. INTEGRITY

4.1. Condition of the site

The dramatic setting of the nominated area depends on the topography, the height of the massif and the isolated peaks, and the forest backdrop to the city of Rio. The scale of this setting is large; however the nomination includes all the essential natural features required to maintain it.

While the integrity of the forest as a natural ecosystem has been seriously affected over the years, there are areas of primary forest representative of the Atlantic Forest ecosystem, as well as restored forest. Moreover, the research team of Professor Coelho Neto (Federal University of Rio de Janeiro) has found that the restored forest “presents a full functional structure in regulating hydrological and mechanical processes, thus contributing to the stabilization of the hillsides.” Maintaining a naturally regenerating forest cover is essential since serious landslides can occur without adequate stabilization, even though it is not possible to regard TNP as a truly “natural forest”.

In recent years, the City has undertaken a reforestation project in the secondary forest on the Sugar Loaf and Urca Hill, planting more than 20,000 seedlings of native ornamental and fruit-bearing species from the Rio Botanical Garden. This forest, and also the one on Cara de Cao Hill, contains many plant species, including some that are endangered.

Researchers in Rio University state that "...the Tijuca mountain range still houses extensive patches of forest and possesses a large genetic stock of native species...that are essential to the process of succession and future recuperation of the forest." During the evaluation, discussions were held with local and national authorities about several potential "ecological corridors" between the remaining forested areas in the sections of TNP. These corridors would allow movement of key species and provide an enlarged forest habitat. Obviously, land prices and the highly developed nature of the landscape make physical linking of the three separated segments of TNP extremely difficult, but extension efforts with private landowners in the narrow strips separating the three park segments, plus the use of wildlife 'overpasses' and 'underpasses', could over time improve connectivity.

4.2. Threats

The park faces a number of serious challenges, including forest fires with the resulting risk of landslides, housing incursions into the national park, visual intrusion from communication towers and transmission lines, safety/security for park visitors, illegal harvesting of park resources (wood and wildlife), use of the park as a hiding place by urban thieves and drug dealers, and visitation pressure. All of these threaten the park's integrity and undermine its natural qualities.

The fires that occur in the park have many causes: grass and rubbish burnt near inhabited areas, falling fire-powered balloons, and candles lit in religious ceremonies. Recurrent fires will alter the vegetation, with the forest being replaced with grass. This is a challenge for forest regeneration and can increase the danger of landslides. Education campaigns are underway to increase public understanding of the hazards, and a recent effort by the municipality to replant degraded areas has had some success.

A continuing challenge is the pressure for urban expansion onto the hillsides. Despite planning regulations, the risk of expansion from illegal inhabitation of shantytowns (favelas) remains. There are no less than 46 favelas with a population of nearly 200,000 in the vicinity of the TNP. Monitoring and inspection, coupled with education and improvement of living conditions in the favelas is the approach being used to contain this threat, and it seems to be reducing the danger that new settlements will spring up on the edge of the park.

There are a number of radio-transmission antennas, generators and transmitters within the nominated site, which are incompatible with the scenic quality of the national park, particularly those that are visible from the Christ statue. The park administration does not allow the installation of towers, and any new ones are permitted only with the agreement of the Ministry of the Environment through Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA). Efforts are being made to reduce the number of towers by combining existing ones, to improve their design and to re-site them. Transmission lines also adversely affect the visual quality of the park in places.

There are continuing problems of threats to visitor safety (thefts and assaults) and illegal activities, particularly those of drug dealers and gangs who take refuge in the park. However, it is sadly the case that drug runners, drug production, guerrillas and armed bands are to be found in a number of WH sites, in both urban and remote settings. Considering its location at the heart of a great city, it is perhaps more surprising that the TNP still functions well and is visited and enjoyed by millions each year.

4.3. Legislation and legal protection

The management of the nominated site is under public (federal or municipal) authority. Its legal protection appears adequate. In particular, the following measures are in place:

- i) Protection as a national park: The park boundaries were set in 1961 and 1967. In 1967 the park was declared a national monument (see below); in 1976, a Rio Prefecture law regulated urban occupation above the 100-metre zone.
- ii) Federal protection as historical, artistic and national heritage: The National Park was declared a national monument in 1967. This listing includes the areas of the Tijuca massif above the 100-metre mark and the protected forest between 80 to 100-metre elevation, thus creating a protective wooded area acting as a transition zone between the park and the urban area. In 1976, the mayor's office banned all construction above the 100-metre level. The Botanical Gardens of Rio, Sugar Loaf, Urca, Cara de Cao and Corcovado cliff are also protected under this federal law. National cultural heritage legislation allows the National Institute of Historical and Artistic Heritage (IPHAN) to review and if necessary to stop projects that would be detrimental to heritage values, however, they generally use mitigation.
- iii) Area of Environmental Protection and Urban Renewal Area (APARU): The APARU of the Alto da Boa Vista (the zone between the three sectors of the park) includes a large part of the Tijuca National Park (70% of the area overlaps with the park). The creation of the APARU was the result of a citizens' initiative by the Alto da Boa Vista Residents Association, who saw the measure as a way to make urban development compatible with environmental protection.
- iv) Environmental Protection Area (APA): Based on the Master Plan created by the city in 1992, eight APAs were created "to protect and renew the environmental heritage of the area around the Park" by regulating development on hillsides.
- v) UNESCO Biosphere Reserve: In 1992, the Tijuca Forest was incorporated by the Ministry of the Environment in a large UNESCO Biosphere Reserve, as an important remaining fragment of the Atlantic forest.

These laws and decrees are enforced and implemented by the Ministry of Culture through the IPHAN, by the Ministry of the Environment through IBAMA, and by the City Council of Rio through the Secretariat for the Environment.

4.4. Management and conservation

There are several management agencies involved in the different component landscapes as described below.

4.4.1 Tijuca National Park

TNP is a conservation unit established by the Brazilian federal government. It has several million visitors every year, which makes it by far the most visited national park in all Latin America. Park administration is the responsibility of the federal Ministry of the Environment, through IBAMA. In 1999, an agreement was reached for co-management of the park between IBAMA and the City Council of Rio de Janeiro. Through this unique mechanism, increased resources have been made available for park management, including a staff of about 200 from both levels of government; also conflicts between the two authorities are now largely a thing of the past.

A serious windstorm occurred during the evaluation mission, felling many trees and blocking most of the access roads to the park. The park staff response was immediate and professional. Staff and equipment were quickly mobilized to attend to the roads and other damage caused by tree falls.

4.4.2. Botanical Gardens Research Institute

The Botanical Gardens Research Institute is an autonomous public body linked to the Ministry of the Environment. A “friends” group, started ten years ago, now has 5000 members and raises 30% of the annual budget through membership fees, operating stores, and donations for projects. Approximately 500,000 people visit the garden per year.

There is some pressure on the gardens, especially air pollution, but overall the management of the gardens appears to be very good. One concern is that new buildings could compromise the historical character of the garden unless care is taken with siting and design.

4.4.3. Sugar Loaf (Pao de Acucar), Urca and Cara de Cao

The Sugar Loaf and Urca complex is administered by the City Council of Rio de Janeiro. A private company, Companhia Caminho Aereo do Pao de Acucar (CCAPA) operates the tourist facilities including the cable car. Cara de Cao is administered and funded by the Ministry of the Army.

The Sugar Loaf and Urca complex has about 1 million visitors per year. Cara de Cao is closed to public visitation. Overall, the operation of the Sugar Loaf and Urca complex is very professional and well financed by the private operation.

There is no management plan for the Sugar Loaf and Urca complex nor for the Cara de Cao Hill, nor at present are they a part of the national park. However, since these areas are listed as national monuments, activities and proposals for activities are reviewed by the City of Rio and IPHAN.

4.5 Boundaries

With the exception of Cara de Cao, the boundaries for the nominated site seem appropriate to the values described. However, IUCN notes that the Cara de Cao is under military control and is not open to public visitation. Moreover, the Sugar Loaf and Urca complex, while protected by some national and local legislation, is not part of the national park. A unified management structure, strategy and administrative framework for the entire nominated area, though excluding the botanical garden, would assist co-ordinated site management and restoration programmes.

It is unfortunate that the boundaries of the APARU and APAs do not coincide with those of the national park and the three outlying headlands (Cara de Cao, Sugar Loaf and Urca), as these designations appear to be a good means to control urban encroachment. Also, only a small part of the botanical garden is included in the APARU. As a result, on paper at least, some parts of the park and the botanical garden are less well protected against urban encroachment.

The division of the national park into three sectors makes it vulnerable to pressures upon its biodiversity. Though some mitigation may be secured through the development of biological corridors, the area is unlikely ever to be suitable for viable populations of space-dependent species such as mobile predators.

5. APPLICATION OF WORLD HERITAGE CRITERIA

Rio de Janeiro: Sugar Loaf, Tijuca Forest, and the Botanical Gardens have been nominated under natural criterion (iii).

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

As described in earlier sections of this report, the nominated site is very beautiful. The surrounding ridge of mountains and isolated peaks of the coastal Tijuca massif, as well as the Sugarloaf and Urca massifs and Tijuca National Park, along with the sea, create the dramatic landscape setting for the City of Rio de Janeiro. The botanical gardens also contribute to this landscape setting, adding both cultural and historic value to the scenic value.

IUCN also recognises the great iconic value of the landscape features represented in the nominated site, and that these provide a splendid setting for the city of Rio de Janeiro, with whose history they have been entwined for hundreds of years. It also recognises the excellent innovation represented by the federal-municipal partnership for the management of Tijuca, and commends the State Party for this.

However, IUCN considers that the beauty of the site arises out of the contrast between the isolated hills and the forests on the one hand and the vibrant city of Rio de Janeiro on the other, rather than from the natural elements themselves. Indeed the qualities of naturalness are seriously compromised by a long history of intervention, while the individual areas that make up the site are so isolated from each other and under such pressure that they do not offer a realistic opportunity to restore their natural quality to anything approaching that found in other parts of the two WH sites which cover the remaining fragments of the Atlantic Forest. IUCN, therefore, does not consider that the nominated site meets natural criterion (iii).

Should ICOMOS recommend inscription of the site as a cultural landscape, (possibly without Cara de Cao) IUCN would have a number of suggestions to make to the State Party on the management of the site, which would help to enhance its natural values. These are as follows:

- to consider the feasibility of expanding the TNP so that it includes the rest of the proposed WH site (or at least Sugar Loaf and Urca) so as to bring the entire area under one management regime and authority,
- to consider the establishment of an oversight committee representative of all stakeholders to help co-ordinate planning and management of the entire site, possibly based upon the existing co-management group,
- to develop a financing plan and to consider the establishment of a management endowment fund to help finance management initiatives,
- to review the boundaries of the APARU and APAs so as to include the entire buffer zone proposed for the nominated area,
- to maintain and expand the education and reforestation programmes within the favelas,
- to take forward the programs for the development of ecological corridors between the three parts of the national park,
- to continue programmes for relocation of residents currently living within the park in a socially-sensitive way,
- to take all available measures to reduce or remove the visual intrusion caused by transmission lines, radio towers etc.,
- to develop an interpretive plan, to help improve the interpretation of the site, giving priority to the Sugar Loaf and Urca, and promoting messages on the significance of the TNP and the importance of conserving the Atlantic Forest.

7. RECOMMENDATION

While IUCN agrees that the site has played a central role in the history and culture of Rio de Janeiro, and is **the** factor which makes the setting of the city so beautiful, IUCN does not consider that the nominated Site meets natural criterion (iii) for the reasons set out above.

IUCN, therefore, recommends to the World Heritage Committee **not to inscribe** Rio de Janeiro: Sugar Loaf, Tijuca Forest, and the Botanical Gardens on the World Heritage List under natural criteria.

Should the site be inscribed as a Cultural Landscape, IUCN would offer a number of recommendations to the State Party as indicated in Section 5 above.

PARQUE NACIONAL DEL ESTE
AND ITS BUFFER ZONE
DOMINICAN REPUBLIC



WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

PARQUE NACIONAL DEL ESTE AND ITS BUFFER ZONE (DOMINICAN REPUBLIC) ID N° 1080

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 6 references
- ii) **Additional Literature Consulted:** Abreu, Domingo and Kelvin Guerrero, Editors, 1997. **Evaluación Ecológica Integral del Parque Nacional del Este, República Dominicana. Tomo 1: Recursos Terrestres.** The Nature Conservancy. Media Publishing, Nassau; Dirección Nacional de Parques, 1979. **Plan de Manejo, Parque Nacional del Este.** Secretariado Técnico de la Presidencia. Santo Domingo; Programa de Conservación de Parques, 1999. **Revista Parque Nacional del Este: Isla Saona.** Dirección Nacional de Parques. Santo Domingo; Troncoso, Bolivar and José Ottenwalder, 1995. **Propuesta de Plan de Manejo Ecoturístico para Parque Nacional del Este, Documento para Discusión.** The Nature Conservancy. Santo Domingo; Vega, Paula and Georgina Bustamente, Editors, 1997. **Evaluación Ecológica Integral del Parque Nacional del Este, República Dominicana. Tomo 2: Recursos Marinos.** The Nature Conservancy. Media Publishing. Nassau; **Una Evaluación del Estado de Conservación de las Eco-regiones Terrestres de América Latina y el Caribe.** The World Bank. Eric Dinnerstein, et al, Washinton, D.C.; **Decree No. 722**, declaration of public utility for properties to be included in Parque Nacional del Este, 4.4.75; **Decree No. 1311**, creating Parque Nacional del Este, 16.9.75; **Decree No. 895**, modifying the boundaries of Parque Nacional del Este, 21.5.75; **Resolution No. 18-2000 of the State Secretariat for the Environment and Natural Resources**, including the “Padre Nuestro” polygon within the Parque Nacional del Este, 21.12.75; **General Law on the Environment and Natural Resources 64-100, Articles 33 and 34-6**, which ratifies the establishment of Parque Nacional del Este. **Nomination of the system of Marine Terraces of Cabo-Cruz and Maisí for inscription in the WH List.** Ministry of the Environment of Cuba. 1998. **A global overview of forest protected areas on the World Heritage List.** IUCN; Thorsell, J., R. Ferster-Levy & T. Sigaty. 1997. **A global overview of wetland and marine protected areas on the World Heritage List.** IUCN.
- iii) **Consultations:** 4 external reviewers. National Government officials, park staff, scientists, local NGOs and community representatives.
- iv) **Field Visit:** Allen D. Putney. May, 2002.

2. SUMMARY OF NATURAL VALUES

The Parque Nacional Del Este (PNDE) contains a large (42,000 ha.) and best-preserved example of semi-humid tropical forest on young karst formations in the Caribbean. The Park

is composed of a series of relatively flat and stepped marine terraces that reach a maximum altitude of 40 m and the satellite island of Saona. As is typical of karst formations, sink holes, caves, and underground rivers are numerous, but no surface water is normally found. In terms of species richness, the following has been reported for PNDE to date: 572 spp. of flora, of which 441 are native, and 50 are endemics of Hispaniola; 144 birds; 17 mammals; 7 amphibians; 26 reptiles; more than 200 spp. of insects; and 62 arachnids.

Most of the tropical forest (66%) is of median height, because of the scant development of humus on the limestone base, though small areas of high forest and dwarf forest are also found. The relatively undisturbed nature of the forest has enabled the survival of several endangered species of fauna, such as the hutia and solenodon, and of many endemics of the island of Hispaniola. Terrestrial diversity is complemented by much smaller vegetation types, which include salt marshes, brush formations on rocky substrate, and mangrove forests.

The marine portion of the Park's buffer zone with its reefs, seagrass beds and mangroves adds considerably to the biological diversity of the site. The following numbers of marine species have been identified to date: 122 fish, 146 mollusks, 7 crustaceans, 75 corals, 61 macro algae, and 63 sponges. The marine area is also of great importance as a nursery for species found along the entire southern coast of the Island of Hispaniola, and as a refuge for endangered species such as the manatee, leatherback turtle, and whale shark.

A major nesting site of the American frigate bird is well protected and is of Caribbean-wide significance. The beaches, clear waters, and coral reefs of the coastal zone are a major attraction for visitors. Because of the lack of surface rivers or coastal settlements, there are no immediate sources of land-based pollution affecting the marine portion of the park.

3. COMPARISON WITH OTHER AREAS

Currently, there are three natural World Heritage Sites listed in the insular Caribbean: Morne Trois Pitons National Park on the Lesser Antillean Island of Dominica, and two sites in Cuba: the Alejandro de Humboldt National Park, and Desembarco del Granma National Park.

As a higher altitude site (500 – 1220 m.), Morne Trois Pitons National Park (MTPNP) is quite different from PNDE, which is relatively low (0-40m.) and flat. MTPNP is extremely wet with over 7,000 mm of annual rainfall, while rainfall in the PNDE averages less than 1,350 mm. per year. The flora and fauna of MTPNP is representative of the interior mountain environments of the Windward Island Humid Forest Ecoregion, while PNDE is representative of the low coastal habitats of the Hispaniolan Humid Forest Ecoregion. The soils of the MTPNP have developed on recent volcanic substrata, while the thin soils of the PNDE have developed on karstic substrata.

The Alejandro de Humboldt National Park (AHNP) is the most diverse of the insular Caribbean sites, but is representative of an ecoregion, the Cuban Humid Forest Ecoregion, that is different from that of the PNDE. The AHNP includes marine, coastal, and mountain ecosystems with peaks over 1,200 m. while the PNDE includes only marine and coastal ecosystems. This variety of landforms in the AHNP is complemented by a variety of geological formations, including serpentine, peridotite, karst and pseudokarst substrata, while the PNDE includes only karst formations.

Desembarco del Granma National Park and World Heritage site (DGNP) is the more comparable site with PNDE. DGNP is located within the western part of the mountainous massifs of Sierra Maestra and comprises a series of elevated limestone marine terraces extending from 360m above sea level to 180m below, making this site one of the most outstanding examples of marine terraces in the world. Another protected area in Cuba

contains the system of Marine Terraces of Maisí which reaches an altitude over 400m above sea level and where over 21 different levels have been identified and subject of geomorphological studies. DGNP also contains a variety of karst features including caves, canyons, and sinkholes (up to 77m deep). Geomorphologically these two Cuban sites are more complex and of higher values than PNDE. In addition there are 41 sites on the World Heritage list with outstanding karst features, almost all of them in the tropics and sub-tropics, including Gunung Mulu National Park (Malaysia), Ha Long Bay (Vietnam) and Puerto Princesa National Park (The Philippines). PNDE does not rank highly in relation to any of these World Heritage sites.

DGNP, like the nominated site, contains areas of extremely well preserved tropical forest associated to karst formations but it also contains 5 other vegetation types including mangrove forest, deciduous and semi-deciduous forest, and semi-desert vegetation, making it of higher diversity than PNDE where 66% of the site is covered by only one vegetation type. While the number of flora and fauna species – both terrestrial and marine - is quite similar between DGNP and PNDE, the level of endemism for terrestrial species is higher in DGNP for vascular plants and vertebrates, reaching over 90% in reptiles and amphibians. DGNP is also considered one of the most important centres of floral endemism within Cuba and the Insular Caribbean. Marine endangered species such as the manatee are also present in DGNP which, according to some experts, contain one of the most important manatee populations in the Caribbean.

In relation to other continental World Heritage sites, Sian Ka'an in Mexico is the most similar. Yet the terrestrial habitats of Sian Ka'an are more humid and experience flooding during portions of the year. Given that Sian Ka'an is a continental area, the fauna is totally different than PNDE. Also, the marine habitats of the insular Caribbean are quite different from the continental habitats of Sian Ka'an. The reef system of Sian Ka'an is a mostly continuous and highly diverse barrier reef compared to the existing reef of PNDE. There are other important barrier reefs in the Insular Caribbean, mostly in the Cuban Archipelago which are by far more biologically diverse and in a better state of conservation than that of PNDE, thus the marine component of the nomination is not outstanding even at a regional scale.

4. INTEGRITY

4.1 Boundaries

The nominated site includes the Del Este National Park (41,894 ha.), a buffer zone (approximately 12,000 ha.) for a total area of approximately 53,900 ha., and a marine area of 6 nautical miles from the coastal portions of the Park, thus it contains most key and interrelated natural elements present in the region where the park is located.

A protected area of almost 54,000 ha is a relatively large area by general Caribbean island standards, yet is a medium-sized area in the context of the Dominican Republic, which has the largest system of protected areas in the Caribbean. Relatively speaking, the diversity of the terrestrial habitats is low, with 66% of the area in only one vegetation type. The highest terrestrial biological diversity in the Dominican Republic and perhaps in the insular Caribbean in general, is along the border with Haiti.

4.2 Management Plan

The nominated site has a Management Plan that was approved in 1980, and an Ecotourism Management Plan that was proposed in 1995 by The Nature Conservancy. Many of the protection goals outlined in the 1980 Plan, such as the elimination of agricultural plots and domestic animals, have been generally achieved. However, neither plan has been reviewed

since adoption, nor are they used to guide management today. In fact, during the field mission it was noted that the Park Manager was not familiar with either document or the management concepts they contain. The day-to-day management of the site is mainly “reactive”, just responding to requests from the tourism industry for the use of beaches and dive sites.

4.3 Staffing and Budget

The staff of PNDE consists of a Park Manager, 26 Park Guards, and 9 other assorted personnel. This level of staffing is insufficient even for minimal protection of the Park, especially the remote areas along the northern boundary. While a buffer zone has been legally established it only exists on paper, and there is no attempt to manage this area on the ground. In general, the Park’s staff lacks basic training on protected area management.

PNDE is the most visited park in the Dominican Republic. With about 300,000 visitors per year, most of whom are foreign, and an entrance fee of about US\$2, the Park generates about US\$600,000 in entrance fees and another unspecified amount in tourist concessions. PNDE does not have its own budget, but receives funding from Headquarters for specific items as they are requested. On-site observations during the evaluation mission would seem to indicate that the Park receives perhaps US\$60,000 to US\$80,000 in this way annually, including both recurrent and capital expenditures, which represents only 10-12% of the income generated by the Park. A number of reviewers noted that financial support provided to PNDE is insufficient to cope with the management challenges of the area.

4.4 Human Use

Extractive uses of the Park (timber harvest, agriculture, livestock grazing, hunting, crab harvest) have been reduced to minimal levels, though occasional illegal incursions persist. Coconut plantations that occupy 3 km² along the west coast of the Park remain in use as a backdrop for beach tourism, and are also harvested. The 350 inhabitants that remain within the Park on Saona Island exist almost entirely on tourism and fishing. Though they are lacking in most basic services, this population tends to remain steady. The Park buffer zone has four villages. From West to East these include Bayahibe, with 800 inhabitants, Benedicto with 600 inhabitants, San Rafael de Yuma with 2,000 inhabitants, and Boca de Yuma with 1,200 inhabitants. Another 1,900 inhabitants are scattered throughout the buffer zone, which creates additional pressures towards the use of Park’s resources. The area around Bayahibe, outside the northwest entrance to the Park and within the buffer zone, has undergone phenomenal growth in recent years because of a boom in tourism. There are now about 2,500 four or five star hotel rooms in this area, and many small hotels and residences. One reviewer reported that the marine area shows evidence of over fishing as only small fishes can be found in the reefs during diving. There are also small areas in the coral reefs that have been affected by extraction presumably by irresponsible divers.

4.5 Visitation

Public use consists almost entirely of one-day visits by boat from Bayahibe to the beaches of the west coast and island of Saona, and diving on the reefs off the west coast. There are no roads within the Park, and trails to the caves on the west coast are poorly maintained. Permission to enter the caves with a guide must be sought in Santo Domingo, which helps to reduce non-controlled visits to the caves.

4.6 Legal and Institutional Framework

The legal and institutional framework for the National Park is clear. The Park was established by Presidential Decree in 1975. This decree was further ratified as part of the

Environment and Natural Resources Law of 2000, which further stipulates that national parks are managed by the Protected Areas and Biodiversity Sub-Secretariat (PABS) of the State Secretariat for Environment and Natural Resources. The legal and institutional framework for the buffer zone is less clear. The nomination proposes that in the event of the site's inscription in the World Heritage List it would be managed exclusively by the PABS, but since the nominated site includes both the National Park and its buffer zone, this is a matter of particular concern. A marine buffer zone, which is essential for integral management of the nominated site, could be managed through specific laws pertaining to the coastal zone and fisheries management. This would mean, however, that the institutional framework for management of the nominated site would have to include the Coastal and Marine Resources Sub-Secretariat of the State Secretariat for the Environment and Natural Resources, as well as the PABS.

4.7 Land Tenure

The nomination documentation indicates that the lands included in the Park are currently in the process of being expropriated, and that these lands are no longer occupied. While this is true for the mainland (Hispañola Island) portion of the park, this is not the case for Saona Island where the 350 inhabitants own parcels of land. Although sale of these lands has apparently been frozen, it is not clear what the final decision will be. This is obviously a matter of great concern to Saona's inhabitants.

4.8 Research

Basic research, consisting mainly of inventories of the park's natural and cultural resources, has been carried out by a number of local and foreign universities and non-governmental organizations. Monitoring of the condition of coral reefs, the status of queen conch populations, and beach dynamics is on-going, but does not feed back into the management of the marine area. While the PABS has knowledge of these monitoring and research activities, it was not possible during the evaluation mission to locate or review any reports or publications resulting from this work.

4.9 Threats

Perhaps the most serious and irreversible threat to the natural heritage of the Park overall is the latent threat of hotel construction. Past efforts to sell portions of the Park for hotel development have been defeated by environmentalists. However, the pressure for appropriation of the best beaches within the Park for the tourism industry remains strong. While the sale of lands within the Park is less likely, there is still the possibility that permission could be given for hotel construction on Park lands, or on the lands owned by the inhabitants of Saona Island. As noted under point 4.4 above, another major and immediate threat is over fishing in the marine buffer zone off the west coast of the Park and around Saona Island. Studies carried out in the marine environment all point to serious over fishing, which has resulted in marine algae covering a large percentage of all of the benthic communities. Fire is another major continuing threat, and little has been done in developing an effective fire control program. Other traditional threats continue to exist at lower levels, including the impacts of public use, livestock grazing, slash and burn agriculture, hunting, and garbage disposal.

5. ADDITIONAL COMMENTS

While current Park management is deficient in all areas, available information pointed out that the previous arrangement, whereby management of the Park was contracted to a non-governmental organization (Patronato del Parque Nacional del Este), functioned extremely

well. There is evidence that the current administration of the Park is benefiting from many of the management successes of the past.

Based on this positive management experience, and noting the IUCN publication “Financing Protected Areas: Guidelines for Protected Area Managers” (Cardiff University and IUCN, 2000), the State Party may wish to consider a redesign for the management of this site that might include the following elements:

1. Contract management services with the Patronato del Parque Nacional del Este or some other non-governmental organization.
2. Establish a Trust Fund for the management of the site which may consider an increase to US\$4/person in the entrance fee to the site. The current US\$2/person entrance fee would continue to be sent to the PABS for use in the management of other protected areas, and the additional US\$2/person would go directly to PNDE.
3. The proposed Trust Fund could be administered by the Patronato, or other non-governmental organization that is selected, but would have government nominated members on the Board of Directors.
4. Development of an Education and Awareness Programme to enhance the support of the Dominican Republic society to the conservation of PNDE by providing and promoting well managed, carefully controlled, and high quality opportunities for local ecotourism, interpretation, environmental education, and research.
5. Develop a Management Plan based on a model that (1) maintains and strengthens government oversight, (2) contracts out day-to-day management to a non-governmental organization, and (3) directly links management programs to projected income.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

PNDE has been nominated based on natural criteria (ii), (iii), and (iv).

Criterion (ii): Ecological processes

The geological and ecological processes, which are linked to the successive uplifts of the marine terraces, occur in a much more complete and complex way in a number of other sites than in PNDE. Thus, while the park is an important regional example of the evolution and development of species and ecosystems on recently uplifted marine terraces and resultant karst, it is not considered to have the universal or truly exceptional value. IUCN does not consider that the site meets this criterion.

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

While the beaches of the Park are a major attraction for tourism, they are set in a rather monotonous landscape. It is the introduced coconut plantations that tend to add to the tourism attraction, not the native vegetation. Thus, in terms of natural beauty, the site is not particularly outstanding or significant in terms of the Dominican Republic, and certainly not in terms of the Caribbean. IUCN does not consider that the site meets this criterion.

Criterion (iv): Biodiversity and threatened species

There are a number of sites in the Caribbean with greater biodiversity values. Even in the Dominican Republic the greatest biodiversity values are associated with the border with Haiti. IUCN does not consider that the site meets this criterion.

7. RECOMMENDATION

IUCN recommends to the World Heritage Committee **not to inscribe** the Parque Nacional del Este and its buffer zone on the World Heritage List under natural criteria.

LANDSCAPE OF THE
PICO ISLAND VINEYARD CULTURE
PORTUGAL



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

LANDSCAPE OF THE PICO ISLAND VINEYARD CULTURE (PORTUGAL) ID N° 1117

1. DOCUMENTATION

- (i) **UNEP/WCMC data sheet:** 17 references
- (ii) **Additional Literature consulted:** Borges P.A.V., Silva A., and Pereira F. 1992: **Caves and Pits from the Azores with some Comments on their Geological Distribution, Origin and Fauna** in International Symposium on Vulcanospeleology; Bruno J.P. (co-ord). 2001: **Madalena do Pico – Inventaria do Património Imóvel dos Açores**, DRAC, EAC, Madalena do Pico; Bruno J.P. (co-ord). 1999: **São Roque do Pico – Inventaria do Património Imóvel dos Açores**, DRAC, EAC, Madalena do Pico; Costa, Susana Goulart 1997: **Pico. Seculos XV-XVIII**, Assoc. de Municípios de Ilha do Pico, Madalena; European Commission: **Commission Decision of 28 December 2001 adopting sites of Community Importance for the Macronesian Biogeographical Region**; Heath M., and Evans M. 2000: **Important Bird Areas in Europe, Priority Sites for Conservation: Volume 2 - Southern Europe ; Pico, Açores: Guia do Património Cultural**, Atlantic View, 2002; Scarth A., and Tanguy J-C. 2001: **Volcanoes of Europe** (Chapter 5: Portugal – the Azores Islands); Sjögren E. 2001: **Plants and Flowers of the Azores**.
- (iii) **Consultations:** Five external reviewers. Meetings were held with the Secretary, Director and staff of the Environment Department of the Autonomous Regional Government of the Azores, local authority officials in Pico, the Chair of ICOMOS-Portugal, local farmers, landowners and other stakeholders.
- (iv) **Field Visit:** A. Phillips (IUCN) and P. Fowler (ICOMOS), July, 2002

2 SUMMARY OF NATURAL VALUES

The archipelago of the Azores is situated in the mid-Atlantic, 1,500km west of Portugal. Pico, the second largest (447 km²) of the nine islands, is centred on 38°28'N, 28°18'W. Pico Mountain (a stratovolcano) dominates the island. It reaches a height of 2,351m above sea level, the highest point in the Azores and Portugal. Settlement of Pico by the Portuguese occurred during the second half of the 15th century.

The nominated area comprises two separate areas of “lajidos”, or coastal lava plain. Both have been significantly modified for agricultural use, and lie in the north western quarter of the island. One is an actively-farmed viticulture area on the west coast, **Criação Velha (100.9 ha)**, immediately south of the island’s main town, Madalena; the other, on the north coast near **Santa Luzia (89.3 ha)**, was formerly used for growing vines and figs but has since been abandoned. Immediately below the farmed zone, but still within the core areas, are narrow strips of lava coastline, roughly 50-100 metres deep and too exposed to wind and salt spray to be used for crops of any kind. Together these core zones cover 190.2 ha, and are surrounded by a significant buffer zone of 2,445.2 ha.

The Azores are volcanic islands, located upon the mid-Atlantic Ridge. Pico is the youngest of the islands, its oldest rocks being less than 37,000 years of age. Its volcano has erupted on several occasions within historic times. The magnificent mountain, and its lava outpourings – the most recent being that of 1720 – visually dominate the landscape, influence vegetation and help determine land use.

The boundaries of the two small core zones of the nominated site have been selected using cultural factors, not natural ones. The natural interest which is to be found within the core zones is of three kinds:

- the geological features of the lava coast, below the farmed areas. These display both ‘aa’ (rough) and ‘pahoehoe’ (smooth) forms of lava. At Criação Velha, the lava flows are from about 5,000 years old, but there is a prominent lava flow at Santa Luzia which dates from 1718;
- the natural processes of colonisation, mainly by endemic plant species, which are taking place upon the lava plains of the coast; and
- the re-colonisation by endemic species of plants and birds of the abandoned farm land.

Since the site has been nominated as a mixed World Heritage (WH) site, IUCN’s assessment must primarily address the natural values from this limited perspective: i.e. whether the natural features of the nominated site have Outstanding Universal Value in their own right. However, IUCN has also considered the importance of the natural values of the proposed cultural landscape.

3 COMPARISONS WITH OTHER AREAS

The lava features displayed in the nominated area, especially that of Santa Luzia, are locally good examples of ‘aa’ and ofropy and tongued ‘pahoehoe’ types, with pressure ridges and tumuli, caverns and lava tubes. These are not, however, necessarily the best areas even within Pico for such volcanic features, and there are clearly many other places around the world where they are far better displayed, occur in more varied form and cover far larger areas. The nominated site cannot be compared with such WH sites as the Hawaii Volcanoes National Park, the Volcanoes of Kamchatka and the Aeolian Islands.

Although it has some distinguishing features, the natural vegetation of the Azores is considered to form a part of the Macronesian biogeographical realm, which also includes the Canaries and Madeira archipelagos. Two WH sites already occur within this realm:

- Garajonay National Park (La Gomera, Canaries, Spain), which is a laurel forest covering some 70% of the park located in the centre of La Gomera (inscribed under Natural Criteria (ii) and (iii)).
- Laurisilva of Madeira (Madeira, Portugal), which is the largest surviving area of laurel forest and is believed to be 90% primary forest, with many endemic plants and animals (inscribed under Natural Criteria (ii) and (iv)).

There are some 59 endemic plants in the Azores, though only a few of these occur within the nominated site. In general, natural vegetation in the islands has been even more heavily modified than in the other parts of Macronesia. But, while only 5% of the original Azorean

forest remains and more than 50% of all plants are introduced, some important areas of remnant forest survive, especially in the middle of Pico.

As to fauna, the Azores has 36 breeding species of bird. A few of these, notably Cory's Shearwater, nest in abandoned farmland in the Santa Luzia area of the nominated site. Several endemic bird sub-species are to be found in the Azores and one of 15 Important Bird Areas (IBAs) in the islands is that of the eastern coast of Pico. There are also several endemic invertebrate species to be found in lava tube caves on the islands. The seas around the islands are notably rich in cetaceans, 24 species having been observed. But again comparisons with other areas are of limited value as the best terrestrial and marine sites are outside the nominated area.

In conclusion, it cannot be said that the natural values of the nominated site are in any way exceptional. Furthermore, there are better places both within the Azores as a whole, and indeed within Pico itself, to illustrate volcanic landforms and endemic Azorean vegetation and fauna.

4 INTEGRITY

4.1 Site Integrity

From a natural perspective the site is incomplete. For example, the nomination stresses the significance of lava flows, but omits the volcano from where they came. It refers to the natural beauty of the site, but excludes the dramatic volcanic peak, which is so obviously the dominant feature of the island. It describes the importance of endemic flora but leaves out of the nomination that part of the island (the inland plateau) where there is the greatest concentration of rare plant species and unique habitats.

There are some potential threats to the integrity of the site. Pico airport, just to the west of Santa Luzia, is soon to undergo some expansion to take direct flights from Lisbon. However, the Protected Landscape team has been closely involved in assessing the impact of this scheme and has secured modifications to the design to their satisfaction, so that it has no direct physical impact on the core area (though there is an intermittent aural impact). Though there may be a marginal increase in noise disturbance, the expanded airport will still be handling only a few flights a day.

The presence of new housing south of Madalena and Criação Velha is potentially more serious. It requires effective controls to ensure that the setting of the site, and in particular the views from it towards the summit of Pico, are not degraded. Finally there needs to be strict control over the quarrying of volcanic materials for construction purposes, though this does not directly affect either part of the nominated site. The Protected Landscapes zones (see Section 4.3 below) appear to provide that degree of protection.

4.2 Boundaries

The nomination lacks a good map or maps showing the boundaries in detail, but ground inspection of the boundaries of the two nominated areas, and much of the boundary of the buffer zone, showed them to be generally sensible. However, they relate to cultural rather than natural considerations. In fact they are based on the boundaries for certain zones within a more extensive, pre-existing Protected Landscape (see Section 4.3 below), which was chosen mainly to safeguard traditional farmed landscape features. This larger area is managed as an IUCN Category V Protected Area. As a result, the proposed core area and buffer zone boundaries exclude, for example, much of the 1718 lava flow at Santa Luzia, they do not use

coastal features to determine coastal or seaward limits, nor are they based on vegetation mapping. Furthermore, there is no overlap between international conservation designations (e.g. Natura 2000 and IBAs) and the nominated site. Thus the nominated site does not make a logical unit for the conservation of natural features.

4.3 Legislation

Nearly all decisions affecting the area, including the discharge of international obligations, are the responsibility of the Autonomous Regional Government of the Azores. Government revival of the wine industry started in 1980 with the creation of the Vitivinicultural Region of the *Verdelho* of Pico (Regional Decree 25/80/A). Subsequent laws to protect the standards of wine production were passed in 1988 and 1994. In 1986, the area was classified as a Protected Landscape, banning mechanical farming within the *lajido* zones, and protecting the traditional architecture of the area. In 1994, the Regional Directorate for the Environment established directing and consultative committees for the Protected Landscape of Regional Interest of the Viniculture of the Island of Pico. Eight areas were defined, three on the north coast, two each on the west and south coasts, and one small area at the east end of the island. In the Regional Act of Law 10 of 2002, four levels of protection were set out for these areas, including two zones of reticulated vineyards or currais – the small *lajidos* of Criação Velha and Santa Luzia – which were to be strictly protected for high quality wine production. These zones correspond to the nominated core areas. The buffer zones are covered by other protective policies within the Protected Landscape, though the Protected Landscape also includes some other areas which are outside the buffer zone altogether.

Several plans apply to the area of the Protected Landscape. For example, a detailed four volume “Safeguard Plan” for the Protected Landscape was prepared in 1993 as a basis for the 1994 legislation, but is now considered out of date. More recently, an action plan (“dynamizing plan”) was adopted by the Regional Secretariat; this is a programme to be undertaken over the period 2001-2006 so as to co-ordinate the activities of vine growers and agencies responsible for environment, roads, ports, water and public lands, waste disposal, buildings, culture, tourism, licensing and funding. A management plan for the nominated site was received from the State Party following the field evaluation and is discussed below in Section 4.4.

EU Directives on the protection of birds and habitats were incorporated into law in 1991 and 1997. Sites defined under these Directives, which form part of Natura 2000 network, have also been identified in Pico, but these are outside the core and buffer zones of the proposed WH site.

4.4 Management

The whole area of core and buffer zones is, at least on paper, very well-managed. It all falls within a Category V Protected Area carefully zoned in a hierarchy of planning control (see Section 4.3 above). At one extreme, there is a complete ban on any new building and the use of mechanical equipment in the Criação Velha nominated area; at the other, although there are planning constraints on buildings, normal village life is lived in Lajido. Moreover, there is an active programme to reinforce the economic base of the *lajido* landscape by promoting the sales of Verdelho wine. The management objectives as described in print were captured by a senior official who described some working plots as ‘the future’ – that is not only an historical pattern of working the land but a successful way of gaining a livelihood which should be encouraged so as both to support more people and restore the landscape.

Management is at the regional, island, municipality and protected landscape levels. A Management Committee, appointed by the Regional Secretary (i.e. Minister) for the Environment, is responsible for the Protected Landscape of Regional Interest of the

Viniculture of the Island of Pico, which includes the nominated area. An executive Technical Department for the Protected Landscape area (and so for the nominated site) is based in Madalena. It receives support (e.g. in a public awareness campaign) from other regional services. The Pico Island Department of the Environment provides in particular scientific expertise. The municipalities of La Madelena (Criacao Velha) and San Roque (Santa Luzia) exercise planning control.

Regarding local management responsibilities:

- The vineyard plots and private buildings are the responsibility of the many private owners, though their actions and methods are tightly constrained by tradition, law and regulation (see above);
- The local roads are the responsibility of the Regional and local authorities;
- Small ports are administered by the Regional Secretary for Agriculture and Fishery;
- Other Public Property is the responsibility of the Regional Directorate for Territory Ordinance and Hydraulic Resources.

The Technical Department is currently preparing a detailed data-base for the Protected Landscape, including a Sites and Monuments Record. This is very important for management (and of considerable academic interest too), as it will revolutionise management of the heritage landscape and appreciation of what needs to be managed. This is particularly so in the nominated areas, where large-scale prints of recent vertical air photography are being digitised. The early stages of detailed archaeological mapping of the reticulation were already demonstrating some interesting morphological and chronological points, e.g. that D-shaped enclosures near Lajido were later than the cellular pattern of small plots within the reticulation.

Following the evaluation, the State Party provided a management plan for the nominated site. IUCN is grateful for this and welcomes many aspects of the document, especially the inclusion of maps of the nominated site (at scale 1:30,000) and detailed plans of the relevant parts of the field systems and village.

However, a more detailed plan would have been welcome, covering such matters as staff, finance, public awareness and interpretive policy, policy towards endemic fauna and flora, and monitoring. These and other matters are treated – if at all – only in the most general terms and lack substance. In effect, consideration seems to be largely deferred for later work as part of a set of action plans. While it makes good sense to develop such detailed action plans, it is normal good practice for the management plan to set out the specific aims in each sector in sufficient detail as to provide clear guidance to those preparing the action plans.

IUCN believes that a revised management plan should be prepared within say four years, to provide the greater detail which is required.

5 ADDITIONAL COMMENTS

IUCN's assessment of the application of WH values (see below) is necessarily confined to the significance of the nominated site only. However, should the State Party wish to revise its Tentative List, IUCN would be willing to assist in identifying experts who could offer technical advice on other possible natural WH sites in the Azores archipelago. Such advice of

course would be provided without prejudice to IUCN's eventual role as an expert Advisory Body to the Committee.

6 APPLICATION OF WORLD HERITAGE VALUES

The Landscape of the Pico Island Vineyard Culture was nominated under all four Natural Criteria (i), (ii), (iii) and (iv).

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

The nominated site displays a number of interesting geological and physiographical features, including a good array of lava formations of recent date. However, they are neither exceptional nor complete. Moreover, several superior volcanic sites already exist on the World Heritage list. IUCN does not consider that the nominated site meets this criterion.

Criterion (ii): Ecological processes

The nominated site is interesting in that endemic species are the principal pioneer species in the process of colonisation, re-colonisation and ecological succession on both the natural areas of lava and the abandoned fields. But considering the very small areas involved and the relatively common occurrence of such phenomena, this cannot be considered either exceptional or internationally significant. IUCN does not consider that the nominated site meets this criterion.

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

The claim of exceptional natural beauty and aesthetic importance is made for the combination of the stone walls of the site, the proximity of the sea and the backcloth of the volcano. However, the walls are not really a natural feature; there is no special reason to identify the seas immediately off-shore; and while Pico volcano is indeed a spectacular mountain of great beauty, it is outside the nominated area. IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

The nomination claims that the site is important for its "countless coastal and terrestrial natural habitats" and for its rare and endemic species of fauna and flora (including cave fauna). But again it is impossible to sustain that claim for the nominated site, especially as there are better sites from the biodiversity standpoint elsewhere in the island. IUCN does not consider that the nominated site meets this criterion.

7 RECOMMENDATION

IUCN recommends the World Heritage Committee **not to inscribe** the Landscape of the Pico Island Vineyard Culture on the World Heritage list under natural criteria.

B. Nominations of Mixed Properties to the World Heritage List

B2 Extensions of Properties inscribed on the World Heritage List

JAÚ NATIONAL PARK
(EXTENSION TO FORM THE
CENTRAL AMAZON PROTECTED AREAS)
BRAZIL



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

JAÚ NATIONAL PARK (EXTENSION TO FORM THE CENTRAL AMAZON PROTECTED AREAS) (BRAZIL) ID N° 998 Bis

1. DOCUMENTATION

- (i) **IUCN/WCMC Data Sheet:** (10 references)
- (ii) **Additional literature consulted:** IUCN, 2000. **IUCN Technical Evaluation, Jaú National Park (Brazil)**. SCM/CNPQ/MCT/IPAAM. 1996. **Mamirauá: Plano de Manejo**. Manaus: IPAAM. Queiroz, H., and M. E. B. Fernandes. 2001. **A Regional Analysis of Geographic Priorities for Biodiversity Conservation in Latin America and the Caribbean**. Washington, DC; Davis, S. D. *et. al.* **Centres of Plant Diversity**. Vol. 3. IUCN; Thorsell, J. and T. Sigaty, 1997. **A global overview of forest protected areas on the World Heritage List (Draft)**. IUCN; Gillet, H. *et. al.*, 1998. **A global overview of protected areas on the World Heritage List of particular importance for biodiversity**. UNESCO/WCMC/IUCN; Rylands, A. B., 1991. **The status of conservation areas in the Brazilian Amazon**. WWF, Washington DC; Rojas, M. and C. Castaño, 1990. **Áreas protegidas de la cuenca del Amazonas**. Bogotá, Colombia; Castaño, C., 1993. **Situación general de la conservación de la biodiversidad en la región Amazónica: Evaluación de las áreas protegidas propuestas y estrategias**. FAO/CEE/IUCN, Ecuador; Henrique Borges, S and Carvalho, A., 2000. Bird species of black water inundation forest in the Jaú National Park: their contribution to regional species richness. **In Biodiversity and Conservation**, Vol. 9, No. 2, pp 201-214.
- (iii) **Consultations:** 5 external reviewers, representatives from the Ministry of Environment, Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), environmental authorities, from the States of Brasilia and Manaus, local staff of the protected areas from IBAMA and the Mamirauá Institute, and researchers from the University of Florida and the Amazon Research Institute (INPE).
- (iv) **Field Visit:** Jim Barborak, August 2002.

2. SUMMARY OF NATURAL VALUES

The nomination proposes the expansion of the existing Jaú National Park and World Heritage site (2,272,000 ha) and the change of name to the “Central Amazon Protected Areas”, with a total area of over 6,000,000 ha, through the inclusion of three additional protected areas that form part of the Central Amazon Biosphere Reserve and Corridor:

- Mamirauá Sustainable Development Reserve (1,124,000 ha);
- Amana Sustainable Development Reserve (2,350,000 ha); and
- Anavilhanas Ecological Station (350,018 ha).

Jaú National Park and the three additional reserves proposed for inclusion in the expanded World Heritage site are located west-northwest of Manaus, the capital of Amazonas state, Brazil. They lie between the Solimoes and Negro Rivers, two of the major tributaries of the Amazon watershed.

The Mamirauá and Amana reserves are protected under Amazonas state legislation and Anavilhanas is a federally created and managed protected area. Mamirauá and the adjacent sector of Amana are particularly noted for their conservation of a representative sample of *varzea* forest, which is seasonally flooded by fertile “whitewater” rivers flowing from the Andes region. The *varzea* is characterized by high productivity and biomass and the presence of unique and endemic species adapted to the dramatic seasonal variations in river levels; these are often associated with vast floating vegetation mats. Here it is easy to see spectacular wildlife, including river dolphins, monkeys, manatees, and aquatic birds in impressive numbers. Anavilhanas protects a considerable extension of *terra firme* forest, plus seasonally inundated *igapó* forests, and also includes one of the two largest archipelagos of islands in the basin, which have a unique origin and shape derived from flocculation and settling of sediments.

The Mamirauá and Amana reserves represent one of the most diverse areas in the ‘New World’ with respect to primates, with 7 species in Mamirauá, 11 in Amana, and 15 between the two areas. The water bodies existing in these reserves contain 64 species of electric fishes in seven families, including 3 species new to science, which represent the highest known diversity of this unique group of organisms in the world, with a level of radiation and adaptation akin to that of cichlids in the Rift Valley of Africa.

3. COMPARISONS WITH OTHER AREAS

The original IUCN Technical Evaluation of the Jaú National Park (2000) nomination provided a good comparison of that area with other World Heritage sites located totally or partially within the Amazon basin, such as Sangay National Park in Ecuador, Manu National Park in Peru, and the Central Suriname Nature Reserve in Suriname. Manu and Sangay National Parks protect altitudinal transects of which lowland Amazonian tropical forests are just one of the ecosystems protected. The same can be said of the Río Abiseo National Park in Peru. The Central Suriname Nature Reserve is located in the Pre-Cambrian shield area of the Guyanas and has different watershed characteristics and a quite distinct flora. Noel Kempff Mercado National Park in Bolivia, far to the south, was inscribed because of the importance of its much drier cerrado ecosystems. The vast new Tumucumaque National Park in northeastern Brazil also contains important biodiversity values but it protects different flora and fauna communities from those found in the Central Amazon.

No other protected area complex in the lowlands of the Amazon basin protects such a diverse array of terrestrial and aquatic ecosystems and special habitats. In fact, the nominated reserve complex constitutes one of the largest contiguous complexes of protected areas anywhere in the tropics; it is larger than more than 40 sovereign states. The addition of the Mamirauá, Amana and Anavilhanas to the Jaú National Park would expand this World Heritage site to include an array of other ecosystems and geomorphological features absent from, or not well protected in either Jaú or any of the other above-mentioned existing World Heritage sites. Expansion of the World Heritage site would also improve and expand protection of the ecosystems found within Jaú. Because much of Amana is *terra firme* (non-flooded) forest contiguous to Jaú, it increases the prospects for the maintenance of genetically viable populations of fauna and flora populations within the World Heritage site.

4. INTEGRITY

4.1 Boundaries

The boundaries of the proposed site coincide with the limits of existing state and federal protected areas and include sufficient area to protect the site's heritage values from most direct effects of human encroachment and commercial resource extraction. The terra firme forests, which make up most of Jaú and Amana, are virtually untouched wilderness areas covering millions of hectares. Jaú, Amana and Mamirauá are contiguous but Anavilhanas, located along the Rio Negro, is separated from Jaú by a predominantly forested corridor consisting of state extractive reserves and an indigenous reserve, where management and protection need to be improved (see recommendations section below). Most of the outer limits of the reserves consist of stream or river channels. This reduces maintenance costs and makes regular monitoring of encroachment easier.

However, a large part of the Mamirauá reserve, proposed for inclusion in the World Heritage site (the subsidiary area), does not currently have active protection or management and has a few thousand inhabitants who depend on resource extraction. Until such time as there is active protection and management of this area, and until the inhabitants formally accept the increased restrictions on resource use needed to ensure conservation of the outstanding ecosystems of the area and sustainability of resource utilization, that area would be more properly seen as a buffer zone to the World Heritage site.

The nomination mentions the creation of a 20 km buffer zone surrounding the entire area. However, this buffer zone does not have legal protection at present. The size of the protected area complex is so great as to make buffer zone management much less of an issue than proper zoning, protection and management of the reserve complex itself. The Brazilian authorities should be informed that while legal creation and effective land use regulation within an exterior buffer zone surrounding the perimeter of the area would be welcome, the buffer zone is not part of the expanded World Heritage site. They should also be urged to improve protection and management of the state extractive reserves and indigenous reserve that lie between Jaú National Park and Anavilhanas, and as noted above, establish adequate on-site management and protection programmes in the subsidiary area of Mamirauá, and reach written agreement with communities regarding World Heritage listing of that area, prior to listing that portion of the proposed site on the World Heritage List.

4.2 Legislation and Legal Protection

Anavilhanas Ecological Station was created under federal decree 8606 in June 1998. While part of Mamirauá was also originally created as a federal ecological station, since 1996 the entire area has been protected, through an act of the Amazonas State Legislature, as a Sustainable Development Reserve, a protected area category that has as its objective the conservation of biological diversity with strong local participation, and which allows for limited resource extraction by traditional communities in some management zones (IUCN, Category VI). Amana Sustainable Development Reserve was also created through an Amazonas State government decree.

4.3 Management and conservation

Amana and Mamirauá reserves (IUCN, Category VI), are managed through a unique cooperative agreement between the Amazonas State Institute for Environmental Protection (IPAAM), with 4 federal agencies - the Brazilian Institute of the Environment and Renewable Natural Resources, the Ministry of the Environment, the National Council for Scientific and Technological Development, and the Ministry of Science and Technology (MST) – and with the Sociedade Civil Mamirauá, an NGO that also supports management of these reserves.

Anavilhanas is managed directly by IBAMA, the environmental federal agency, with some support from collaborating NGOs.

It is probable that no other protected area in the Amazon basin has enjoyed the level of staff or funding of Mamirauá over the past decade; approximately \$15 million has been invested in research, protection, management, and outreach activities in the reserve over that period. In the past several years, with the creation of the Amana reserve and the establishment of a co-management agreement for its administration, the level of management there has improved substantially as well. More than 100 employees are assigned to these areas, and they are well trained and equipped.

The investment at Mamirauá has, however, been spent within what is referred to as the focal (demonstration) area of 260,000 ha where almost all research, protection and community development activities have been centered. There has been almost no physical presence or investment in the so-called “subsidiary area” of the reserve of 864,000ha. While the human population of that large area is quite low and concentrated along major rivers, extractive activities by both local inhabitants, by fishermen and by timber interests from outside, have not received the same level of scrutiny and control as in the demonstration area, which represents a long-term threat to the integrity of the “subsidiary area”. This problem was carefully assessed and discussed with the Brazilian authorities during the evaluation mission to the site in order to evaluate the possibility of excluding this area to ensure management consistency of the nomination.

Anavilhanas Ecological Station (IUCN, Category Ia) has not benefited from the flows of international assistance or strong cooperation by NGO partners found at Mamirauá--at present there are only six staff members, very modest infrastructure, and a very limited operational budget, thus having a level of management and protection that is less than adequate. This area is by far the most accessible of the Central Amazon Reserves, since roads extend from Manaus to Novo Airao on the far edge of the river that forms one boundary of the area, which could lead to uncontrolled visitation and to impacts associated with poaching and illegal fisheries. Unlike the other nominated areas, Anavilhanas is physically separated from Jaú National Park by a series of state extractive reserves and an indigenous reserve which in the long-term can add pressures to the use of its natural resources.

4.4 Threats

In general, the *terra firme* forests of the Central Amazon, which are located far from navigable rivers or highways, are faced with few major threats. Much of Amana (the vast *terra firme* portion) shares similar ecosystems and integrity to adjacent portions of Jaú: the areas are inaccessible, remote, have almost intact natural ecosystems, and therefore, virtually protect themselves. The situation within the *varzea* forests, which characterize much of Mamirauá and adjacent portions of Amana, is quite distinct. Along the length of the Amazon, these ecosystems were the most utilized by human inhabitants even before Europeans arrived in South America, and over the past three hundred years a distinctive culture of riverside mestizo inhabitants has evolved in the *varzea*. However, human population density remains low and impacts are limited to narrow bands of higher land on natural levees along stream courses, and to the effects of traditional harvest of fish and other aquatic organisms. Seasonal flooding also temporarily limits the human footprint on the terrestrial portions of the site.

While the traditional inhabitants practice subsistence agriculture, fish, hunt and harvest timber and some other forest products, their population density is so low in Amana and the demonstration zone of Mamirauá as to not pose any major threat to the overall integrity of the reserve, as long as conservation agencies have a physical presence in the areas and local residents are directly involved in and benefit from management regimes. Previously

unsustainable harvest levels for some fish and wildlife species have been dramatically reduced through enforcement, research and education programs.

In Anavilhanas, while the area is uninhabited and in general encroachment levels by neighbours and illegal activities are not as yet factors of great concern, the area is separated from the rest of the proposed World Heritage site by poorly protected state extractive reserves and an indigenous reserve. Anavilhanas also lies along a navigable river with regular transit of large ships carrying, among other things, petroleum products. There are no buoys or any other system in place to reduce the danger of a ship going aground in the archipelago: an oil spill upstream could do great damage to the fragile resources of the area. Increased management presence, outreach programmes, and marking of navigable river channels are needed to reduce threats to Anavilhanas.

5. ADDITIONAL COMMENTS

Because of the high productivity of the *varzea* ecosystems found in much of Mamirauá and part of Amana, and their relative accessibility by water routes, this area is where most human habitation and resource use occurs in the Central Amazon. Some reviewers questioned the sustainability of the extractive reserve management regime applied to these areas. In the entire Amazon basin, the “mestizo” riverside communities and smaller numbers of indigenous inhabitants have used the *varzea* for hundreds of years with relatively limited environmental impact. Finding a large intact piece of *varzea* without low levels of human population and resource utilization is probably impossible. Also, because of the seasonal nature of floods, the human footprint is restricted to narrow areas along river channels and adjacent levees; in many cases it nearly disappears with the onset of annual floods. For these reasons, the low levels of human habitation and resource use found in Mamirauá and Amana do not justify the exclusion of these areas from the nomination. However, existence of adequate on-site management and protection programmes, and clear, written documents regarding rights and responsibilities of inhabitants, should be precursors to inscription of these areas on the World Heritage List; they have already been obtained for the inhabited portion of Amana and the focal area of Mamirauá.

6. APPLICATION OF WORLD HERITAGE CRITERIA

The “Central Amazon Protected Areas” have been nominated as an extension to Jaú National Park and World Heritage site under the 4 natural criteria.

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

The original evaluation of the Jaú nomination indicated that Jaú does not rank highly compared to other existing World Heritage sites that demonstrate a much longer period of the Earth’s evolution. The geological formations typical of the adjacent Mamirauá and Amana reserves and nearby Anavilhanas also consist largely of sedimentary deposits from the Palaeocene and Pleistocene. While the addition of Anavilhanas and its unique archipelago of constantly changing islands add to the diversity of the geologic features of the site, these islands are constantly changing and are somewhat ephemeral in nature. IUCN does not consider that the nominated site meets this criterion.

Criterion (ii): Ecological processes

The *varzea* and *igapó* forests, lakes, rivers, and islands of the proposed site together constitute physical and biological formations and demonstrate ongoing ecological processes in the development of terrestrial and freshwater ecosystems. They include a constantly changing and

evolving mosaic of river channels, lakes, and landforms. The floating (and constantly moving and changing) mats of vegetation typical of the *varzea* watercourses include a significant number of endemic species, including the largest array of electric fishes in the world. Anavilhanas contains the second largest archipelago of river islands in the Brazilian Amazon and this group of islands is much better preserved than the somewhat larger Maricua archipelago and demonstrates processes of colonization and vegetative evolution on new landforms. IUCN considers that the nominated site meets this criterion.

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

As for the case of Jaú National Park the nominated extension includes a landscape of white-sand beaches during the dry season and flooded forest during the wet season, as well as secondary streambeds of distinct sizes, channels, and lakes. The Anavilhanas archipelago and Amana Lake add some natural features that are not present in Jaú. However all of these natural features are also found in other large rivers in the Amazon basin. IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

The expanded nomination substantially increases the already impressive protection offered by Jaú National Park to the biological diversity, habitats, and endangered species found in the Central Amazon region. The nominated area is one of the Endemic Bird Areas of the World, is considered as one of WWF's 200 Priority Ecoregion for Conservation, and it is also a Centre of Plant Diversity. The expansion of Jaú National Park to include an important sample of *Varzea* ecosystems, *igapó* forests, lakes and channels significantly increases the representation of the aquatic biodiversity of the Central Amazon region. Expansion of the site also enhance the protection of key threatened species including giant arapaima fish, the Amazonian manatee, the black caiman, and two species of river dolphin. IUCN considers that the nominated site meets this criterion.

The nominated area of Anavilhanas Ecological Station and the “subsidiary area” of the Mamirauá Sustainable Development Reserve, however, do not meet the conditions of integrity as provided in the Operational Guidelines paragraph 44b.

7. RECOMMENDATIONS

IUCN recommends that the World Heritage Committee:

- (a) **inscribe** Amana Sustainable Development Reserve and the demonstration area of Mamirauá Sustainable Development Reserve as an extension of Jaú National Park under natural criteria (ii) and (iv).
- (b) **does not inscribe** Anavilhanas Ecological Station and the subsidiary area of Mamirauá Sustainable Development Reserve.

The extended site would therefore consist of the following components:

- Jaú National Park (2,272,000ha)
- Amana Sustainable Development Reserve (2,350,000ha)
- Demonstration area of Mamirauá Sustainable Development Reserve (260,000ha)
- TOTAL AREA: 4,882,000ha.

This extended site should thus be inscribed under the name “Central Amazon Conservation Complex”.

The Committee may also wish to note that IUCN believes that the area of Anavilhanas Ecological Station and the subsidiary area of Mamirauá Sustainable Development Reserve of also meet natural criteria (ii) and (iv) but that IUCN considers that their inscription at this time is premature. The State Party may wish to re-nominate these areas once they fully meet the conditions of integrity. The State Party may wish to consider as guidance for meeting the conditions of integrity in future the following management recommendations:

- The State Party should consider strengthening management and protection of the subsidiary area of Mamirauá Sustainable Development Reserve and the Anavilhanas Ecological Station. In the case of Anavilhanas this should include the placement of buoys to direct commercial boat traffic away from the protected islands in the archipelago.
- While Mamirauá, Jaú and Anavilhanas all have recently prepared and published management plans, completion of a compatible plan for Amana, and an overall management strategy for the entire Central Amazon Conservation Complex, is recommended as early as possible.
- The State Party may wish to consider changing the management category of Anavilhanas to National Park to allow for careful development of the ecotourism potential of the area, or to modify the zoning scheme to allow limited and carefully controlled ecotourism and environmental education activities in a very limited sector of the reserve. This will also serve to promote public support for the conservation of this area.
- The State Party should explore options, as part of the Central Amazon Ecological Corridor Initiative, to link the terra firme upland forests of Anavilhanas with those of Jaú National Park, through stricter zoning, protection, the potential re-categorisation of the extractive reserves linking these two core conservation areas, and through cooperative efforts with the indigenous reserve located within this corridor to ensure sustainable land use patterns on tribal lands.
- The State Party may also consider the feasibility of creating a coordination mechanism, such as a management council of some type, to coordinate management and protection of the entire Central Amazon Conservation Complex. Such mechanisms may develop an early warning system for threats, discuss potential joint funding opportunities, and share research and monitoring results. The development of such a council, as well as a funding strategy for the Central Amazon Conservation Complex, may merit support through the joint United Nations Foundation-UNESCO project to support natural World Heritage sites in Brazil.

B. Nominations of Mixed Properties to the World Heritage List

B3 Extensions of Properties to include Natural Criteria

SERRA DA CAPIVARA NATIONAL PARK
BRAZIL



WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

SERRA DA CAPIVARA NATIONAL PARK (BRAZIL) ID N° 606 Bis

Background Information: Serra da Capivara National Park (SdCNP) was nominated by Brazil in 1991 under natural criteria (iii) and (iv) (according to 1991 Operational Guidelines) and cultural criteria. In its 1991 Evaluation Report IUCN noted that “*Capivara is a valuable representative area of caatinga vegetation in Brazil, a unique biogeographical province of very restricted distribution and which includes a number of endemic species. It is not possible to determine if Capivara is the single most important area for caatinga or how it compares to other caatinga reserves*”. Furthermore IUCN recommended to the 1991 World Heritage Bureau that “*IUCN reserves a recommendation on Serra da Capivara until the cultural resources are assessed by ICOMOS and until more detailed information on the natural features and the management regime is available*” (emphasis added).

1. DOCUMENTATION

- (i) **IUCN/WCMC Data Sheet:** (4 references)
- (ii) **Additional literature consulted: IUCN Technical Evaluation** (of initial nomination of Capivara as a natural World Heritage Site), 1991, 6 pp. FUMDHAM, 1996, **Proceedings of the International Meeting on the Peopling of the Americas**, 435 pp. FUMDHAM, 2001, **Parque Nacional Serra da Capivara Trilha Interpretativa Hombu**, 49 pp. FUMDHAM, 1998, 500 **Seculos de Cultura: O Museu do Homem Americano**. 40 pp. Fare, Martine, C. Guerin and Fabio Parenti. 1999. **The Holocene megafauna from the Toca do Serote do Artur, Sao Raimundo Nonato archaeological area, Piaui, Brazil**, pages 443-448 in C.R. Acad. Sci. Paris, Earth and Planetary Sciences, 329. FUMDHAM, 1998. **Parque Nacional Serra da Capivara**. 94 pp. FUMDHAM/IBAMA, **Serra da Capivara National Park** (brochure). IBAMA/Horizonte Geografico. 2000. **Parque Nacional Serra da Capivara**. (brochure). **Assessment of biodiversity conservation priorities in the Caatinga ecoregion**. IBAMA, Conservation International et al., 2001, 45pp.
- (iii) **Consultations:** 7 external reviewers. Meetings were held with representatives from the Ministry of Environment, Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), and with staff of the Museum for American Man Foundation (FUMDHAM).
- (iv) **Field Visit:** Jim Barborak, September 2002.

2. SUMMARY OF NATURAL VALUES

Serra da Capivara National Park (SdCNP), 129,000 ha, is one of the largest protected natural areas in all of northeastern Brazil, and protects an important area of relatively undisturbed Caatinga vegetation. The Caatinga biome, characterized by low, thorny, deciduous broadleaf vegetation, is thought to have originally covered approximately 1 million km² in northeastern Brazil. Today only between three and five percent of that area still maintains any vestige of

its original forest cover in the face of intense colonisation, farming, livestock grazing pressure, and fires for several centuries.

Over 630 of the approximately 2000 vascular plant species known for the entire Caatinga and over 200 species of birds have already been identified in the park. The park is located in the upper watershed of the Piauí River along a geological boundary between the Precambrian Brazilian Shield and a sedimentary basin of Silurian-Devonian age. Three geomorphologic formations dominate the park: sandstone highlands, called chapadas, on the western side of the park; cuestras, or higher terrain, in the middle of the park; and a large erosion plain to the east. Water and wind erosion over time have carved beautiful narrow canyons, cliffs, numerous caverns and rock shelters, known for the spectacular collection of prehistoric rock art they conserve which supported its inscription as a cultural World Heritage site in 1991.

Palaeontological research has also identified an abundant fossil fauna, including mastodons, sloths, llamas and giant armadillos, which only disappeared some 12,000 years ago due to climate change and perhaps, hunting by early man. The park still contains a number of springs, seasonal streams, and shaded, more humid and cooler canyons which contain relict patches of wetter habitat types that would have been more typical before the climate began to get progressively dryer some 10-12,000 years ago.

While the larger vertebrate fauna has been affected by hunting for a long period of time, poaching has been dramatically reduced in recent years and populations of species such as peccaries, the jaguar, other felids, and deer have rebounded in recent years.

3. COMPARISONS WITH OTHER AREAS

There are no other World Heritage sites in the Caatinga biome which is only present in Brazil. However, there are a number of other scattered federal and state protected areas in this biome, including the recently created, larger and nearby Serra das Confusões National Park. In a recent conservation priority setting exercise for the entire Caatinga region (IBAMA/CI, 2001), Serra das Confusões is the largest area of “highest priority” identified for Caatinga conservation, and the largest single block of proposed protected areas and corridors for Caatinga includes SdCNP, Confusões National Park, and the corridor linking them. The creation of a large corridor linking these areas is particularly important as SdCNP is too small to maintain viable populations of some of the widest ranging endangered species found in the area (e.g. large cats like the jaguar). Thus the creation of a biological corridor to the southwest will facilitate recovery and maintenance of viable populations of these species.

While the geology and geomorphology of the site shows the climatic evolution that occurred at the end of the Pleistocene and beginning of the Holocene there are other sites already inscribed in the World Heritage List that represent longer periods of Earth’s evolution.

SdCNP has a number of beautiful features such as those associated with the existing narrow canyons and cliffs. There are a number of other sites in South America, such as Canaima National Park (Venezuela) and Iguazu National Park (Brazil), which are of superior quality in showing superlative natural phenomena and exceptional beauty. While because of the relatively open vegetation existing in SdCNP, wildlife is also easy to observe at the park, this characteristic is of greater significance in Emas National Park, inscribed in the World Heritage List in 2001 as part of the Cerrado Conservation Complex of Brazil, which shares with SdCNP a number of charismatic species of fauna and which is recognised as the best National Park in South America for the observation of large mammals and other species.

4. INTEGRITY

4.1 Size and Boundaries

While SdCNP is one of the largest protected natural areas in all of northeastern Brazil, its size, as noted above, is too small to maintain viable populations of some of the widest ranging endangered species such as the jaguar.

The current park perimeter is just over 200 km in length. The limits correspond in part to the 400-meter contour line, which in many areas roughly follows the dividing point between sedimentary mesas and the adjacent Precambrian plain. The rugged terrain and steep cliffs that form part of the park boundary form a natural protection feature. Ranger posts at key entry points provide an additional level of boundary protection. Human population around the perimeter of the park is in general quite low as the park is located in a remote, impoverished area that is not a major population magnet in Brazil.

4.2 Legislation and Legal Protection

SdCNP was created by decree 83548 on June 5, 1979. In 1990, through a presidential decree, three additional smaller protected areas were created around the outer flanks of the park: the Serra Vermelha/Angical protection area (8,500 ha); the Serra do Cumbre/Chapa da Pedra Hume protection area (18,500 ha), and the Serra da Capivara/Baixao das Andorinhas protection area (8000 ha). Since that time, other lands have been progressively acquired from private owners around SdCNP perimeter to take them out of grazing, eliminate the use of fire, and permit their gradual natural restoration. All of these measures have contributed to the fact that much of the interior of the park has not been affected by human impacts occurring around its boundaries.

4.3 Management and conservation

Since 1994, the park has benefited from an innovative administrative arrangement—a co-management accord, through which the Brazilian federal government and its environmental institute (IBAMA) share management responsibilities with the NGO long responsible for promoting research and management in the area—the Fundacao Museu do Homem Americano—the Museum of American Man Foundation, known by its Portuguese acronym FUMDHAM. Most of the park personnel hired by IBAMA, which takes charge of the resource and fire protection programs and controls entry to the area, are through outsourcing and institutional contracts with for-profit companies that in turn hire the park rangers and fire control crews. FUMDHAM takes direct responsibility for research, interpretation, and environmental education, and contributes to overall park management. FUMDHAM has also aggressively raised funds nationally and internationally for research and conservation programs at the park.

The joint work between IBAMA and FUMDHAM for over a decade have resulted in turning SdCNP from a “paper park” into one of Brazil’s model protected areas. It has exemplary fire, poaching control, environmental education and interpretation programs, and natural resource research programs. Considerable investments have been made in promoting tourism and artisanry development, and in supporting formal education in the park buffer zone. Much effort has gone into demonstrating the importance of the ecosystems, fossil record, and geological features of the park, and in highlighting the role of Capivara in documenting associated changes in climate, vegetation and wildlife over the past 20,000 years. The park has a permanent ranger corps, operating from a series of permanent and temporary ranger posts around the park perimeter, and a seasonal fire control corps.

SdCNP also boasts an excellent interpretive, educational and recreational infrastructure (trails, signage, visitor centre, overlooks, camping areas, and a museum in the buffer zone that is remarkable in its size and quality for an area with such limited visitation). It also has a research facility as well as communication and transportation equipment that is well above the norm for most Latin American parks and reserves, particularly for areas as remote and little visited as Serra da Capivara.

While occasional fires and roaming livestock still penetrate the park perimeter, the elimination of human habitation and grazing and crop production within the park, the creation of additional protection zones around the park perimeter, the aggressive campaign to acquire lands in the buffer zone to eliminate grazing, agriculture and fire around the park perimeter, and strong education and enforcement programs, have combined to reduce threats to the area and consolidate management and protection of the site over time.

5. APPLICATION OF WORLD HERITAGE CRITERIA

SdCNP has been nominated under natural criteria (i) (iii) and (iv).

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

While SdCNP contains features that demonstrate the transformation from a humid tropical climate to a semi-arid one, which occurred at the end of the Pleistocene and beginning of the Holocene periods, there are other World Heritage sites within Brazil and elsewhere that show these stages of earth's history in a more substantive way and through a much more complete geological series. IUCN does not consider that the nominated site meets this criterion.

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

SdCNP contains areas of natural beauty. However, these are not as significant as those existing in other sites within Brazil and elsewhere already inscribed on the World Heritage List under this criterion. The importance of the site for the observation of wildlife is also lower when compared to other sites within Brazil, such as Emas National Park and World Heritage site. IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

In a recent conservation priority setting exercise for the entire Caatinga region, the recently created Serra das Confusoes National Park was identified as the area of "highest priority" for the conservation of Caatinga's biodiversity. In addition, other protected areas of Brazil contain important populations of a number of the threatened species that occur in SdCNP. IUCN does not consider that the nominated site meets this criterion.

6. RECOMMENDATIONS

That the World Heritage Committee does **not inscribe** SdCNP on the World Heritage List. IUCN would like to note that this is consistent with the 1991's recommendation to the Committee (as noted in the background information) as recent studies on the natural and biodiversity values of the Caatinga ecoregion has shown that there are other sites of greater significance than the nominated site.

IUCN would also like to recommend that the Committee recommend to the State Party, if it wishes to do so, to:

- Prepare, if it wishes to do so, a serial nomination including Serra das Confusoes National Park, SdCNP, and other relevant protected areas that can better ensure biodiversity conservation of the Caatinga biome.
- Request international assistance if required for the preparation of this serial nomination.
- Promote the use of the best practice experience that has contributed to the effective management of SdCNP to enhance the planning and management of the recently created Serra das Confusoes National Park, so as to ensure that it fully meets the conditions of integrity if a serial nomination is prepared by the State Party as recommended above.

IUCN also recommends that the Committee acknowledge the efforts of the State Party, through the commitment and work of IBAMA and FUMDHAM, which have contributed to transforming SdCNP over a decade from a “paper park” into one of the best managed protected areas in Latin America.

Map 2: Detailed Map of Site



SAINT CATHERINE AREA

EGYPT



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ST. CATHERINE AREA (EGYPT) ID N° 954 Bis

Note: This site was inscribed by the World Heritage Committee in June 2002 under Cultural criteria (i), (iii), (iv) and (vi). This evaluation is based on a revised “consolidated file” submitted to the World Heritage Centre by the Egypt National UNESCO Commission in January 2002.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** 16 References
- ii) **Additional Literature Consulted:** IUCN/WWF. 1994. **Centres of Plant Diversity.** Vol 1; Egypt Environmental Affairs Agency. 2002. **Draft Management and Development Plan: St. Catherine Protectorate;** Ayyad, Mohamed. 1999. **Identification of Potential Natural Heritage Sites in Arab Countries.** Report to World Heritage Centre; Hobbs, J.J. 1996. **Mount Sinai.** American University in Cairo Press; ICOMOS. 2001. Technical Evaluation of the St. Catherine Area.
- iii) **Consultations:** 5 external reviewers contacted. Various government officials in the St. Catherine Protectorate in Sinai and staff of the Environmental Affairs Agency. Archbishop of St. Catherine Monastery.
- iv) **Field Visit:** Jim Thorsell, December 2002

2. SUMMARY OF NATURAL VALUES

The St. Catherine Area (SCA) (also spelled Katharine) is a 598 km² segment of the 4350 km². St. Catherine Protectorate (SCP) located in the south-central Sinai Peninsula. The site is centered around the Monastery of St. Catherine and associated religious monuments. Its boundaries are defined by a natural topographical feature called a “ring complex” or “pluton”, (a body of igneous rock that has been formed beneath the earth’s surface) a circular black volcanic ring dyke formation enclosing an area of reddish igneous crystalline pre-Cambrian rock. The landscape is characterised by a collection of Egypt’s highest peaks rising to 2841m at the Gebel Catherine and the well-known sacred Mt. Sinai or Gebel Musa. Radiating from the high peaks is a network of wadis (dry valleys) which drain to the west into the Gulf of Suez and east to the Gulf of Aqaba. Geologically the mountains are an isolated block of the African tectonic plate on the edge of the continental rift with Arabia. Climate is high altitude Saharan-Mediterranean desert with temperature ranges between a summer mean maximum of 36 degrees to below freezing at the summits of the high peaks. Rainfall is 50-70 mm annually with twice this amount on the summits which receive snow in winter. The area is highly susceptible to flash floods. Aquifers in wadi alluvium are used by local Bedouin for wells and garden irrigation.

Eight habitat types, each with distinctive soils, climate and species make-up have been identified: mountains, wadi-beds, terraces, gorges, slopes, alluvial ridges, springs and plains. The dominant flora is montane vegetation thinly scattered over the better-watered high peaks

and largely made up of Irano-Turanian elements. 12 plant communities have been identified. Of an estimated 1285 species of higher plants in Sinai, 420 exist in the mountains around SCA with the highest number (144) recorded on Gebel Catherine. Within the entire SCP, 19 plant species are endemics but it is not known how many of these occur within the nominated site. *Acacia* are considered the keystone species of wadi-beds but are now considered threatened due to over-grazing and cutting for firewood. Bedouin use some 170 plant species for medicinal purposes.

Though the natural fauna is relatively species poor, particularly for large mammals, the nominated area harbours several small species which are endangered in Egypt. Rodents are the most common species followed by fox. A number of species which were formerly widely distributed are now rare or extirpated including gazelle, ibex, hyrax, leopard and wolf. Avifauna is modest with about 50 resident breeding species with the whole SCP. Raptor populations have been in decline for the past two decades but can still be seen while migrating through the area. Herpetofauna includes 18 species of snake and 18 lizards many of which are rare and localised. For the whole Sinai region a total of 44 species of butterfly are found including the rare Sinai Baton blue which may be the world's smallest.

Approximately 7000 people (mostly Bedouin) inhabit the total SCP, half of whom reside in the SCA in and around the city of St. Catherine. Pastoralism, subsistence agriculture and tourism (200,000 visitors per year) are the main economic activities.

3. COMPARISONS WITH OTHER AREAS

In the Arabian Desert Biogeographical Province (which extends over much of Egypt, Jordan, Israel, Yemen and Saudi Arabia) 260 protected areas are listed in the database of the UNEP-World Conservation Monitoring Centre. Many of these have not been formally assigned an IUCN category but most of them are Category IV and V (in which SCA is classified). Natural WH sites in the Arab region are limited to the Arabian Oryx Sanctuary (Oman), Tassili n'Ajjer (Algeria), Ichkuel (Tunisia), Air-Ténéré (Niger) and Banc d'Arguin (Mauritania). The desert landscape of SCA has a number of similarities with all but Ichkuel but is much smaller in size than the other four. It is difficult to make comparisons on aesthetic appeal but a number of other wadi/mountain/desert landscapes in the region (eg. Gebel Elba (Egypt), Wadi Rum (Jordan), Wadi Howar (Sudan) and Dhofar (Oman) would likely surpass SCA on this measure.

The southern Sinai is one of 21 centres of plant diversity in the Middle East region but it is also noted that the diversity of species and proportion of endemism found in Sinai is much lower than in most of the other 20 centres (see Table 40 in IUCN/WWF, 1994). Nevertheless, the floral diversity of the SCA is significant at the national level, particularly with its affinities to both Asia and Africa along with some Mediterranean elements. Faunistically the SCA does not stand out as important as does its flora.

Geologically, the SCA is distinctive for the occurrence of the pluton which defines the boundary, the existence of its ancient rocks and its location adjacent to the rift valley. These features, however, are equally well-displayed in other WH sites (e.g. Suriname Nature Reserve, Shark Bay and Lake Turkana Parks) and no exceptional geological features in SCA stand out at the international level.

The nomination document as submitted by the Egyptian authorities does not provide data to allow comparison of the natural values of the site but, as suggested in the above three paragraphs, the distinctiveness of the SCA at the global level is not clearly evident. This is in contrast to the evident outstanding cultural values which have been well documented in the ICOMOS evaluation and led to inscription in 2002. IUCN thus concludes that, for its natural

values, the site is important at the national and perhaps regional level but its predominant values at the global level are cultural.

4. INTEGRITY

The physical boundary used to delineate the SCA is not a legally defined one but is informally regarded as the “core” zone of the entire SCP. The question as to whether the entire Protectorate should be nominated was raised but much of the remainder of the SCP is used for quarries, refuse dumps and other extractive uses. IUCN concluded that the boundaries chosen capture the main natural values of the SCP.

IUCN shares similar concerns regarding control of tourism as set out in the ICOMOS technical evaluation of 2001 and the attendant recommendations relating to the implementation of the management plan (now in draft form). Without repeating these here they concern the impacts of the many pilgrims and tourists who walk to the peak of Mt. Sinai. Other than this pressure point (up to 1000 visitors per day), the management regime for the area as put in place over the past 5 years (with supplementary assistance from the EU) is exemplary and indeed a model for other areas where local people and sacred sites are present.

As eloquently written in J. Hobb’s book on the area, the local Bedouin have themselves a particular reverence for the area and a strong respect for its natural features. The human population increase over the past 50 years from 400 to 7000, however, has placed unprecedented pressures on the limited natural resources of the site. Shortages of water, forage and fuel wood are now common, exacerbated by an increasingly dry climate. The reduction in wild flora and fauna during this time has accompanied these trends and has resulted in major reductions of the natural integrity of the region.

5. ADDITIONAL COMMENTS

The revised documentation for the site (January 2002) contains a section suggesting it be considered as a cultural landscape. Several of IUCN’s external reviewers also suggested the justification for additional criteria but this appeared to have been overlooked. SCA is managed also as a *de facto* biosphere reserve and would also merit consideration for this status.

Egypt has recently submitted a revised Tentative List for natural and mixed sites which did not include St. Catherine as a mixed site but did include another desert site that would have more diverse values than those found in SCA. A related activity which would assist in determining the relative importance of the site is the expert workshop scheduled for Feb. 2003 on the topic of harmonising the Tentative Lists for natural sites in the Arab region (54 potential sites including SCP were identified in the 1999 Ayyad report).

6. APPLICATION OF WORLD HERITAGE CRITERIA

The SCA was inscribed as a WH site under cultural criteria in 2002 and has also been nominated under natural criteria (i), (iii), and (iv).

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

The landscape of the site is composed of dissected Precambrian plutonic and volcanic rocks fissured and enclosed by a black volcanic ring-dyke formation. The area is also located on the margin of the African Rift valley at the margin of two tectonic plates. It also contains the

highest peaks in Egypt. Geologically the nominated area is representative of the region and is considered to be at the national level of significance for these features. *IUCN does not consider that the nominated site meets this criterion.*

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

The mix of rugged mountains and dry wadis combine to offer a landscape of significant natural beauty. Similar features, however, occur throughout the wider region and the area is seen as a typical representation of these and is not distinctive at the global level. *IUCN does not consider that the nominated site meets this criterion.*

Criterion (iv): Biodiversity and threatened species

The SCA is located in a region that contains a blend of species from various biogeographic realms and is particularly noted for its floral diversity which stands out at the national level. A relatively small number of endemics and relics occur but other larger protected sites in the region display higher levels of diversity. *IUCN does not consider that the nominated site meets this criterion.*

In conclusion, IUCN recognises the natural values contained in the SCA. These are indeed supportive of, but secondary in importance to, the cultural and historical aspects of the area.

7. RECOMMENDATIONS

IUCN recommends to the Committee **not to inscribe** the St. Catherine Area on the World Heritage List under natural criteria. Additional consideration could be given to its potential values as a cultural landscape as well as a UNESCO biosphere reserve.

C. Comments on Cultural Landscapes Nominations

THE VALLEY OF THE PRADNIK RIVER
IN THE OJCOWSKI NATIONAL PARK
POLAND



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

THE VALLEY OF THE PRADNIK RIVER IN THE OJCOWSKI NATIONAL PARK (POLAND) ID N° 1085

The Valley of the Pradnik River in the Ojcowski National Park is nominated as a “Cultural Landscape”.

1. **FIELD VISIT:** Katri Lisitzin (ICOMOS) and Peter Skoberne (IUCN), August 2002
2. **CONSULTATIONS:** 4 external reviewers. The mission also met with the Director of Landscape Architecture Institute, Vice Director of State Center of Documentation of Monuments in Warsaw, the Director and Vice Director of Ojcowski National Park.
3. **SUMMARY OF NATURAL VALUES**

The valley of the Pradnik River is about 17 km long and cuts deep through the upper Jurassic limestone deposits within the Ojcowski National Park (ONP), which are about 200m thick. The valley comprises the small Pradnik stream, rich forest cover, small agriculture areas and settlements at the bottom of the valley. The eastern slopes contain exposed rocky walls and solitary rocks, formed by selective erosion. There are more than 100 recorded caves in the area, the longest being 270m (Lokietka), which are important mainly for bats (15 species recorded) and troglodyllic fauna. The mixture of habitat types is responsible for a remarkably rich flora and fauna. The area is a natural/semi-natural island in the middle of a rather intensive agricultural landscape, which functions not only as a refuge for many of species but also as a biological corridor. The variety of the landscape is expressed in the exceptional assemblage and richness of cultural and natural forms and their concentration into a small area.

4. COMPARISON WITH OTHER AREAS

The Pradnik valley is the most visually attractive and best known of the many Jurassic valleys in Poland. A comparable landscape is found at Slovesky Kras, which together with the Caves of the Aggtelek karst in Hungary are on the World Heritage List. Other sites with the principal value of karst geomorphology, caves, valleys, or similar fauna and flora include the Pirin National Park in Bulgaria, Mont Perdu on the French-Spanish border in the Pyrenees, the Plitvice Lakes National Park in Croatia, and the Skocjan caves in Slovenia. However, all of these and other similar sites in Central, Northern and Western Europe are mainly mountainous landscapes while the valley of the Pradnik represents an upland valley with an interesting mix of cultural and natural landscapes. Nonetheless, in comparison with them and the already listed sites it would not stand out as being of outstanding universal value.

5. MANAGEMENT ISSUES

5.1 Legal Protection

The area is fully protected by the national (National Park since 1956, and renewed in 1997) and regional legislation (Network of Jurassic Landscape Parks, 1981). All around the ONP there is a legally designated buffer zone of about 7,350 ha.

5.2 Boundaries

The boundaries are well delineated and mostly follow natural features. Integrity of the site boundaries is assured by the surrounding protected area, which is further reinforced by the buffer zone. In addition, there are several “landscape parks of the Jurassic limestone uplands” around the proposed site. The boundaries are demarcated on the ground by sign-posts. In recent years the protected area was enlarged, which can be seen as a sign of growing acceptance of the park.

5.3 Management

There are 3 zones in the protected area of the national park: strict protection, forested areas and non-forest areas. This zonation seems to be sufficient as the area is not very large and complex. General objectives are defined in the master management plan separately for each of the park zones. The management plan is approved for a period of 20 years (from 1998) with yearly action plans where concrete objectives are set out and regularly monitored. The area is managed on the basis of overall natural values and genetic resources are not given any special attention. Basic information on vertebrates, some invertebrate groups (especially beetles, butterflies) and plants exists, as well as a vegetation map, a geological map and hydrological data. The National Park is financed by state budget and revenues from park activities (parking, entrance fees, and education centre). Funding is adequate for core management activities prescribed by the management plan. There are 33 staff employed directly by the ONP budget, and a further 24 are for associated services. All are highly motivated, technically trained and efficient. Scientists from outside (mostly Krakow University) are engaged for additional research work.

The rather sophisticated legal system enables representatives of local communities to participate in management planning and there is growing co-operation and mutual understanding, with communities recognising the benefits of the protected area in their sustainable development. Most of the expectations of the local people are related to tourism and agriculture.

5.4 Threats

Changes in water level:

A large portion of the watershed is inside the protected area or its buffer zone and water is used for local needs only. However, the ground water level of Pradnik is reportedly dropping due to mining in Silesia. In addition, an important part of the Pradnik stream is captured at the source for Suloszowa water supply, which adversely affects water regime in the valley.

Air pollution:

Due to proximity of the site to the Silesia industrial zone there has been a problem with air pollution. Although the situation has improved it is still a cause for concern as not many lichens are seen in the forest and there is damage to coniferous trees in exposed locations. Damage to vegetation and heavy metal poisoning can have serious consequences for organic farming.

Tourism:

The ONP receives some 350,000 visitors annually, mostly concentrated in weekends. During peak visitation times parking is a problem, which causes negative impacts along the main road. 60% of visitors are from Krakow and the Silesia region, 30% from other parts of Poland and about 10% are foreign visitors. Visits to the ONP are a regular activity in the curricula of Krakow schools, which is a good example of creating awareness and appreciation for nature

conservation among the younger generation. The paths are well maintained and marked, but some unregulated use by mountain bikes is reported. Increase in the numbers of visitors can create more problems with parking and management problems.

Socio-economic changes:

Recent socio-economic changes are reflected in the landscape quality. All river mills except one are abandoned, agricultural activity is decreasing, leading to increase in natural succession, which in turn requires active management to maintain some grassland, rocky habitats and preserve some traditional landscape values. Local people are looking for new opportunities (mostly tourism), which is causing changes in architecture (although management policies and regulatory systems of ONP are quite strict in this respect) and the landscape as a whole. There is growing influx of people to the area and that can potentially influence landscape patterns in future.

6. IUCN SUMMARY

Viewed from the perspective of conserving natural and semi natural ecosystems, and wild species of fauna and flora the nominated site does not contain any species of global concern or local endemics. In comparison with the broader landscape surrounding Pradnik Valley it is very rich in species and ecosystem composition but it does not go beyond national or maybe regional level importance. It is also not significant for conserving biodiversity within farming systems, as the nature of agricultural practices is too small, scattered and not of outstanding value. Similarly, although there are several examples of inter-relationships between people and nature none can be identified as being of outstanding value. There are also no historically-significant discoveries in the natural sciences except that the area is the type locality for the Ojcowski Birch (*Betula ojcoviensis*).

7. CONCLUSION

IUCN has advised ICOMOS that this site does not merit inscription based in particular on IUCN's assessment of its natural values. Although Pradnik Valley does not quite match up to World Heritage standards there is no doubt that it is of great national significance with a high standard of management and protection. Hence, IUCN recommends that the State Party consider using other mechanisms to draw attention to the important values of the site, including the following:

- European Diploma (Council of Europe);
- UNESCO Man and Biosphere Programme; and
- Potential Site of Community Interest (pSCI) according to the EC Habitats Directive, which would make it eligible for LIFE Nature funds (potential Natura 2000 site).

ROYAL BOTANIC GARDENS, KEW
UNITED KINGDOM



WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ROYAL BOTANIC GARDENS, KEW (UK) ID N° 1084

The Royal Botanic Gardens, Kew, are nominated as a “Cultural Landscape” under the category of “designed landscape”. (check with ICOMOS)

1. **FIELD VISIT:** Dr Géza Hajós (ICOMOS) and Hugh Synge (IUCN), July 2002
2. **CONSULTATIONS:** In addition to the field mission during which national and local authorities were consulted, IUCN also consulted with 4 external reviewers.
3. **IUCN ASSESSMENT**

The value of the Royal Botanic Gardens of Kew to the heritage of the world goes far beyond an appreciation of its 18th and 19th Century garden landscapes and its historic buildings. Indeed, the 19th Century avenues at Kew that are at the heart of the present application have not been seen until now as one of Kew's most notable features. The renewed focus on the 19th Century landscape is valuable, but should not detract from Kew's fundamental mission of plant research and its historic and ongoing contribution to the conservation of the plant kingdom worldwide.

Contribution to *science* is not a criterion for a cultural landscape, but it is undeniable that Kew's scientific work has had a great *cultural* effect on the world, as knowledge and expertise on plants acquired at Kew has been dispersed around the globe. During the time of the British Empire, Kew took economic plants from one region to another, such as rubber from Brazil to SE Asia. Many botanic gardens around the world were constructed on the Kew model, such as at Calcutta and Peradeniya.

In recent years, Kew's work on conservation has continued to be internationally focused, notably in relation to the implementation of the Convention on the International Trade of Endangered Species (CITES) and the Convention on Biological Diversity (CBD). This involvement brings with it new opportunities but also responsibilities, especially with regard to genetic resource issues and obligations under the CBD. This has at times brought them controversy in terms of trade in genetic resources.

Then and now, students trained at Kew work in and manage botanic gardens around the world, creating a sort of Kew “botanical diaspora”. On any day, some 100 or so botanists from a great many countries may be found working in Kew, in the herbarium, library, laboratories and gardens. No other botanical institute has had such a marked role outside its own country - and Kew has never been focused on the flora of the United Kingdom - nor commands such respect and affection as a sort of “mother institute” for its subject.

It is worth noting that Kew has played a great role in the development of the conservation of wild plants around the world, a goal reflected in the inscription of many plant-rich natural sites on the World Heritage list. It was a retired botanist working at Kew who prepared the first plant Red Data Book of threatened species. His work led to a close partnership between Kew and IUCN from 1973 to the late 1980s, under which IUCN staff based at Kew created the database on the world's threatened plants, and developed the first global programme for plant conservation, funded by IUCN and WWF. Moreover in 1975, Kew called the first ever conference of botanic gardens to discuss how they could contribute to conservation and it is fitting that Botanic Gardens Conservation International, the global body that promotes the

conservation role of botanic gardens, is based at Kew. This is no ordinary botanic garden but one that has genuinely led the way in creating a global movement for conservation of the world's flora.

4. COMPARISION WITH OTHER AREAS

The nomination document makes a strong case for Kew being considered as the world's premier botanical garden. It is incontrovertible that Kew:

- has the largest and richest set of plant collections living and dead of any botanic garden or museum;
- has had a greater historical impact on the world than any other botanic garden; and
- has more resources for its staff and visitors than any other botanical establishment in the world at present.

Kew is not of course the oldest botanic garden in the world - that status goes to Padua in Italy, already a World Heritage Site - and other gardens may be larger or have larger areas of natural vegetation. But in terms of its contribution to botany and the comprehensiveness of its collections, it is hard to consider any other botanical institute matching Kew.

5. MANAGEMENT ISSUES

During the evaluation mission, the ICOMOS expert rightly drew attention to the need to balance conservation of the historic landscapes at Kew with the need to continue and develop further its scientific role and its contribution to plant conservation worldwide. Thus any changes to the garden landscape, and restoration of earlier garden features, need to be weighed carefully with their impact on Kew's other roles, notably in science, education and, not least, providing a place of quiet enjoyment for the public. Balancing these needs is best left to the discretion of the Director and his senior staff.

6. CONCLUSION

IUCN has advised ICOMOS that it considers this site to have potential merit as a Cultural Landscape, particularly taking into account its natural values and associations.