

Convention Concerning the Protection of the World Cultural and Natural Heritage

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



Report to the World Heritage Committee
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Prepared by IUCN – The World Conservation Union
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Cover photograph: Dorset and East Devon Coast (United Kingdom)

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THE WORLD HERITAGE CONVENTION

IUCN TECHNICAL EVALUATION REPORTS

20 October 2001

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 are comprehensively reviewed by a working session of the IUCN World Heritage Panel at IUCN Headquarters held in April. PPA then prepares the final technical evaluation reports for the June/July session of the Bureau. Any new information submitted by State Parties in response to the requests of the June/July Bureau is reviewed by a second meeting of the IUCN World Heritage Panel in September. PPA then prepares the final evaluation reports for the Committee which are outlined in this document.

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

The WCPA membership network now totals over 1300 protected area managers and specialists from 120 countries. This network has provided much of the basis for conducting the IUCN technical evaluations. In addition, the Protected Areas Programme has been able to call on experts from IUCN's other five Commissions (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 Bureau. Standardised data sheets, prepared for each nomination by UNEP-The World Conservation Monitoring Centre (UNEP-WCMC), are available in a separate document.

3. SITES REVIEWED

IUCN received twenty-three files for review in 2001. It was not possible to evaluate two of these sites – the evaluation of one site was postponed by the State Party and another mission was cancelled due to visa difficulties. Twenty-one evaluation reports were prepared by IUCN in 2001. This report includes nineteen of these evaluations as one site was withdrawn and another was deferred by the Bureau. The nineteen reports include: :

- Fifteen (15) natural sites nominations (including three deferred sites for which additional information has been received and three extensions); and
- Four (4) mixed sites (including two deferred sites for which additional information has been received);

It was not possible to review one site for presentation to the June Bureau meeting due to climatic reasons. The delayed evaluation date was at the request of the State Party. This site will be presented to the December Bureau meeting. Two further sites – deferred sites for which additional information was received – were not presented to the June Bureau because the new information presented by the State Parties was not received until after the Bureau meeting.

The files received by IUCN are as follows (* denotes technical evaluation reports which do not appear in this document):

Identification Number	Nominated Property	State Party	Recommendation of the June Bureau
B.	Nominations of mixed properties to the World Heritage List		
B.1	Palaeartic Realm		
N/C 772 Rev	Cultural Landscape of Fertö-Neusiedler Lake	Austria / Hungary	Not to inscribe
N/C 1040	Masada National Park	Israel	Not to inscribe
N/C 766 Rev	Natural Complex “Central Sikhote-Alin”	Russian Federation	-
N/C 766 Rev	Karain Caves	Turkey	Not to inscribe
C	Nominations of natural properties to the World Heritage List		
C.1	Palaeartic Realm		
N 1045	Group of Caves containing Speleotherms in Southern France*	France	Withdrawn
N 1041	The Makhteshim Country*	Israel	Deferred
N 1023	Natural System of “Wrangel Island” Sanctuary*	Russian Federation	Mission cancelled
N 765 Bis	Volcanoes of Kamchatka, Extension to include Kluchevskoy Nature Park	Russian Federation	Inscribe
N 1037	Jungfrau-Aletsch –Bietschhorn	Switzerland	Inscribe
N 1047	Holy Tops (Svyati Gory)	Ukraine	Not to inscribe
N 1048	Polissian Swamps and Slovechno-Ovruch Ridge	Ukraine	Not to inscribe

N 1049	Kaniv's Hills (Kanivski Gory)	Ukraine	Not to inscribe
N 1050	Karadag	Ukraine	Not to inscribe
N 1051	Podilliam Ridge	Ukraine	Not to inscribe
N 1029	Dorset and East Devon Coast	United Kingdom	Inscribe
C.2	Afrotropical Realm		
N 1060 Rev	Rift Valley Lake Reserves	Kenya	Inscribe
N 801 Bis	Sibilo/Central Island National Park, Extension to include South Island National Park	Kenya	Inscribe
C.3	Indomalayan Realm		
N951 Rev	Phong Nha – Ke Bang National Park*	Vietnam	'Postponed'
C.4	Neotropical Realm		
N 1035	Cerrado Protected Areas: Chapada dos Veadeiros and Emas National Parks	Brazil	Referred
N 1000 Rev	Fernando de Noronha Archipelago/Rocas Atoll Tropical Insular Complex	Brazil	-
N 839 Rev	Alejandro de Humboldt National Park	Cuba	-
N	Galapagos Marine Reserve, Extension to Galapagos National Park	Ecuador	Inscribe conditionally
N 1057	Kaieteur National Park	Guyana	Not to inscribe

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-The World Conservation Monitoring Centre (UNEP-WCMC);
2. **External Review.** The nomination is sent to experts knowledgeable about the site and/or other features for which the site was nominated, primarily consisting of members of IUCN specialist commissions and networks and contacts from the region;
3. **Field Inspection.** Missions are sent to evaluate the site on the ground and to discuss the nomination with relevant authorities and stakeholders;
4. **IUCN World Heritage Operational Panel Review.** The IUCN World Heritage Operational Panel intensively reviews all field inspection reports and associated background material and agrees a final text and recommendation for each nomination; and
5. **Final Recommendations.** After the World Heritage Bureau has reviewed the evaluations, clarifications are often sought. Changes based on the Bureau's recommendations and on any further information from State Parties are incorporated into the final IUCN evaluation report which is sent to the World Heritage Centre eight weeks prior to the December Bureau and Committee meeting.

In the evaluations, use of the Biogeographic Province concept is used for comparison of nominations with other similar sites. This method makes comparisons of natural sites more objective and provides a practical means of

assessing similarity. At the same time, World Heritage sites are expected to contain special features, habitats and faunistic or floristic features 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.

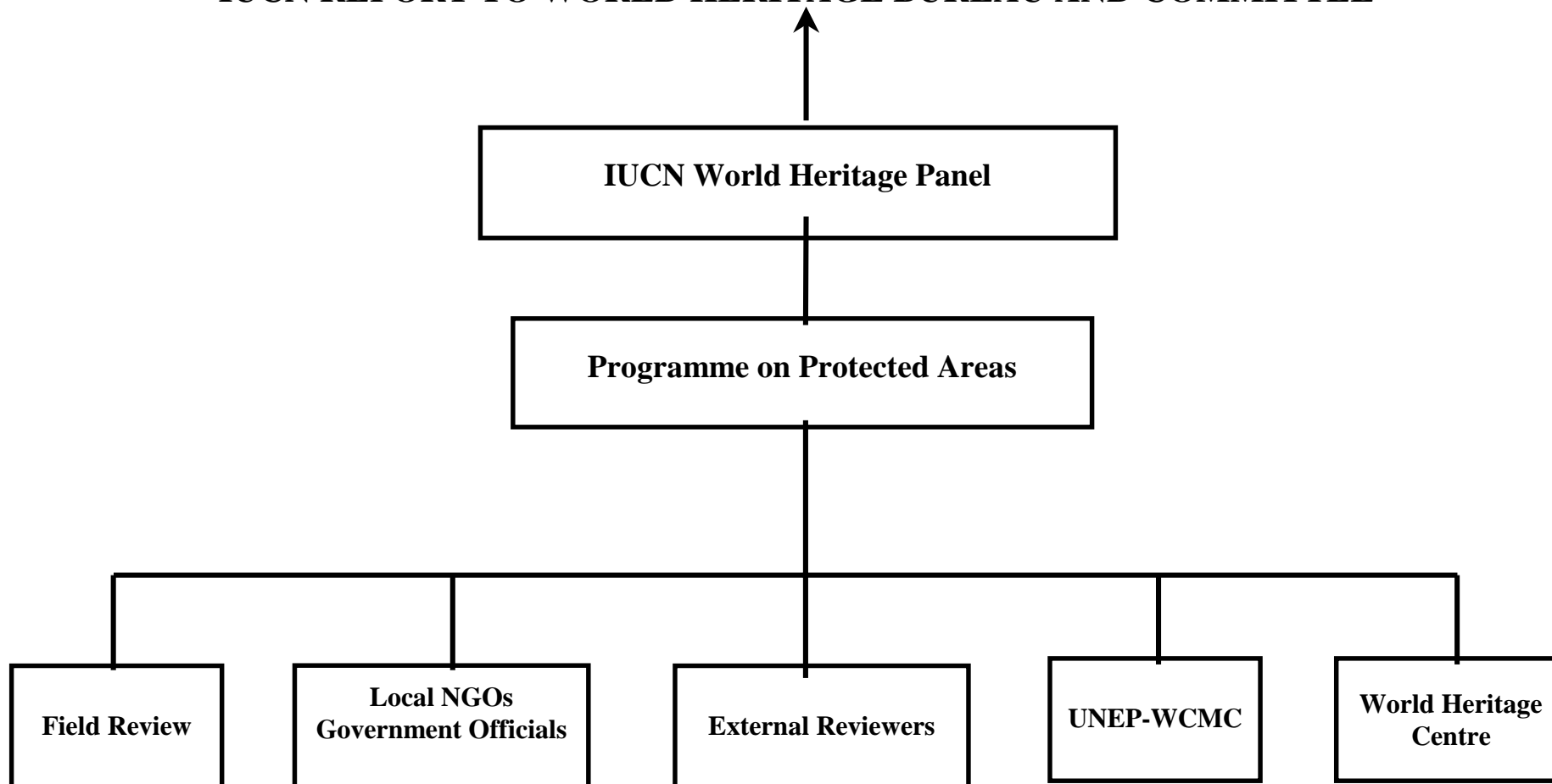
Finally, it is noted that the evaluation process is aided by the publication of some 20 reference volumes on the world's protected areas published by IUCN, UNEP, WCMC and others. These include (1) Reviews of Protected Area Systems in Oceania, Africa, and Asia; (2) the four volume directory of Protected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



TECHNICAL EVALUATION REPORTS

B. Nominations of mixed properties to the World Heritage List

B.1. Palaeartic Realm

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

CULTURAL LANDSCAPE OF FERTÖ-NEUSIEDLER LAKE (AUSTRIA AND HUNGARY)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (7 references)
- ii) **Additional Literature Consulted:** BirdLife International 2001, **Data Base for Important Bird Areas**, Wageningen, Netherlands; Grimmett R.F.A. and Jones T.A., 1989, **Important Bird Areas in Europe** ICBP, Cambridge, UK; Heath M. and Evans J (eds.) 2000, **Important Bird Areas in Europe - Priority Sites for Conservation, (vols. 1 and 2)**, BirdLife International, Cambridge, UK; Patten B. (ed.), 1994, **Wetlands and Shallow Continental Water Bodies Vol. 2**, SPB Academic Publishing; Province of Burgenland 1995, **Nomination of the Neusiedler See/Seewinkel as a Natural World Heritage Site**, Eisenstadt, Austria; Ramsar Secretariat 2001, **Annotated Ramsar List**, Gland, Switzerland; Thielcke G. and Resch J. 2000, **Living Lakes**, Stadler Verlag, Constanz, Germany; Thorsell J., Levy R.F. and Sigaty T. 1997, **A Global Overview of Wetland and Marine Protected Areas on the World Heritage List**, IUCN, Gland, Switzerland; Tucker G. and Evans M. 1997, **Habitats for Birds in Europe**, BirdLife International, Cambridge, UK; UNESCO MAB Programme 2001, **UNESCO MAB Biosphere Reserve Directory**, Paris;
- iii) **Consultations:** 8 external reviewers contacted. Relevant officials from Austrian and Hungarian park authorities.
- iv) **Field Visit:** A. Phillips (IUCN) with A. Michalowski and B. Werner. M. Rymkiewicz, (ICOMOS) March 2001.

2. SUMMARY OF NATURAL VALUES

The Fertö-Neusiedler Lake area is located on the Austrian-Hungarian border. It is an unusual and diverse ecosystem, affected by a long period of interaction between people and nature. The shallow, steppe lake (on average only 50-60cm in depth) is the largest saline water body in Europe (about 309km²), and the most westerly in Eurasia. It is about 20,000 years old, at a late stage of succession. Its water level is now subject to artificial control. The reeds that cover between half and two-thirds of the lake provide a crucial habitat for many nesting birds, such as the great white egret (over 1000 pairs) and bittern. The lake is internationally important for migratory birds, and many bird species rest and feed here at the base of the Alps. To the east of the lake is the important Seewinkel area, with some 80 shallow saline ponds and remnant salt meadows where thousands of geese arrive in the late autumn. The basic fauna of the lakeshore is of European or Central European origin with a few endemic species and a specifically prairie type fauna.

The flora of the nominated site is strongly affected by the convergence of four climatic zones resulting in some unique assemblages of species from different bio-geographic regions, and several rare endemics. There are various natural habitats including saline grassland and marshlands, steppe-relicts, bogs, and drought tolerant oak stands. Around the lake, viticulture is the most important land use, but there are other man-made or semi-natural habitats of ecological and landscape importance which along with some attractive villages, help to create a landscape of great appeal. Some of these surrounding lands are also included in the nomination and the rest is in the buffer zone. The landscape setting of the lake, the bird populations and the existence of so many biotopes in a relatively small area are the most important natural values of the site.

3. COMPARISONS WITH OTHER AREAS

From the standpoint of physical geography, the Fertö-Neusiedler Lake ecosystem is the most westerly of a string of saline steppe-lakes across Eurasia. It is important because of its special climatic and other conditions. However, it needs to be compared with other similar if distant lakes.

A tabular comparison may be made with several saline lakes elsewhere in the world in Central Asia, the Middle East, North America and Argentina (see table 1 below). This shows that many of these lakes are substantially larger and likely to be in a less modified condition than the nominated site. Whilst the salinity level (1700 mg/litre on average) of the nominated site is quite low, at less than half that in the oceans, the particular saline biotope complex found at Fertö-Neusiedler Lake is a unique assemblage.

Table 1 : Some features of saline lakes: nominated site and other lakes

Saline Lake (source: Thielcke and Retsch, 2000)	<i>Area km²</i>	<i>Catchment km²</i>	<i>Age (in 000 yrs.)</i>	<i>Sea level m.</i>	<i>Salinity (gm/l)</i>	<i>Human population nearby</i>
Neusiedlersee/ Fertö, Austria/Hungary	309	1,230	20	115	17	68,000
Lake Tengiz /Kurgald Shin, Kazakhstan	1920	94,900	?	304	30-40	20,000
Lake Mono, USA	182	1,800	176	1947	29-275	?
Dead Sea, Israel/Jordan/ Palestine	1050	42,000	12	-316	340	30,000
Mar Chiquita, Argentina	ranges 1969-5770	37,570	30	62-71	75	?

The nominated site is located within two “Udvardy” Biogeographical Provinces, Middle European Forest and Pannonian. There is no existing natural World Heritage site in these provinces. Although it occurs in a different Biogeographical Province (the Pontian Steppe), comparison with the World Heritage Site of the Danube Delta Biosphere Reserve provides a measure of the relative importance of the nominated site for species conservation. The Danube Delta is about six times larger, and it contains the only reedbed which exceeds that of Fertö-Neusiedler Lake, though it is not a saline environment. The delta contains the largest continuous marshland in Europe. The bird species list of the two sites is somewhat similar, but for many species the Danube Delta is frequented in far greater numbers. For example Purple Heron (500 in Fertö-Neusiedlersee Lake, 1,500 in Danube Delta) and Teal (20,000, and 150,000); on the other hand there are more Great White Egret at the nominated site and impressively large numbers of geese species (bean, white-fronted and greylag) migrate to it annually.

In its detailed site by site comparison of European Important Bird Areas (IBAs), BirdLife International notes that the IBA on the Hungarian side (Lake Fertö, covering 12,542ha) is "an important breeding and staging post in Europe". It describes the two Austrian IBAs within the nominated site, Neusiedler See (23,272ha) and Southern Seewinkel (14,000ha), in similar terms. Generally, using the IBA criteria, it appears that the Austrian part of the nominated site is the most important wetland area in that country; whereas the Hungarian part is among the top five such sites in Hungary. The IBA analysis identifies one species of global concern as resident at the nominated site in significant numbers, the Ferruginous Duck. This compares with the number of species of global concern found at other European wetland World Heritage sites: ten in the Danube Delta, six in Donana (Spain), and three at the Srebarna (Bulgaria). Comparison may also be made with the Hortobágy National Park/Ramsar Site, a World Heritage cultural landscape in the Pannonian Biogeographical Province in Hungary. This has a diverse range of wetland habitat types, including saline marshes. BirdLife International has described Hortobágy, which has significant numbers of eight globally threatened species, as "the most important site in Hungary for steppic birds and waterfowl" (BirdLife International, 2000).

Table 2 compares the IBA information for the nominated site and other World Heritage Sites in Europe.

Table 2 : Important Bird Areas: comparative significance of nominated site within Europe

Important Bird Area (IBA) (source: BirdLife International 2000)	<i>A1 criterion bird spp.</i>	<i>A4 Criterion bird spp.</i>	<i>regionally important congregations of</i>	<i>Congregations of bird spp. of importance to the</i>

			<i>bird spp.</i>	<i>EU</i>
Neusiedlersee, Austria	1	3	9	13
Seewinkel, Austria		4	6	15
Ferto, Hungary	-	5	11	n.a.
<i>Total nominated site</i>	<i>1</i>	<i>8</i>	<i>13</i>	<i>24</i>
Hortobagy, Hungary	8	13	29	n.a.
Donana (Guadalquivir Marshes), Spain	6	22	33	39
Danube Delta, Romania	10	30	54	n.a.
Srebarna, Bulgaria	3	2	11	n.a.

A1 criterion = the site regularly holds significant numbers of globally threatened species. A4 criterion = site holds globally important congregations (in most cases the site is known to hold, on a regular basis, 1% or more of a bio-geographic population of a congregatory waterbird species).

Note that many birds occur under several criteria.

Finally it should be noted that in the publication *A Global Overview of Wetland and Marine Protected Areas on the World Heritage List*, (1997) IUCN identifies only two wetland sites which appear to merit consideration for inclusion on the World Heritage gaps in the Western Palearctic Region: the Wadden Sea and the Volga Delta.

4. INTEGRITY

4.1 Boundaries

The rationale used for the boundaries of the nominated site and the buffer zone is different in Austria and in Hungary.

In Austria, the nominated site is in general aligned with the boundaries of the Ramsar site. It includes many of the vineyards and other farmed areas around the eastern part of the lake, but is generally bounded by the reedbelt on west and north; it includes the nature and protection zones of the Neusiedler See-Seewinkel National Park. Also included is the historic centre of the town of Rust. The buffer zone is identical with the Neusiedler See-Seewinkel nature and landscape reserve.

In Hungary, where the Ramsar boundaries were drawn more tightly, the nominated site is essentially that of the Fertő (western) part of the larger Fertő-Hanság National Park, including both the nature area and the protection zone of the park. To this has been added the Nagycenk and Fertő palaces and a part of village of Fertorakos.

4.2. Legal Protection and Transboundary Co-operation

National measures for conservation began in the 1920's on the Austrian side when small areas of land were taken on lease by organisations for nature protection. In the 1930s, there was a movement to create a national park. Landscape and nature protection regulations began in 1962 with the Neusiedlersee Nature Reserve. Protection was progressively strengthened until the Neusiedler See-Seewinkel National Park was gazetted in 1993.

In Hungary, the Fertő Landscape Protection Area (created in 1977) became the Fertő National Park in 1991, renamed Fertő-Hanság National Park in 1994.

In 1987, the Austro-Hungarian National Park Commission was established to oversee transboundary co-operation in the management of the two national parks. There is also an international commission dealing with the water level of the lake. Credit is due to the authorities of both countries for the excellent work now being done for conservation and for the degree of co-operation that has occurred across the international border.

As to international protection, UNESCO designated the Neusiedler See - Österreichischer Teil Biosphere Reserve in 1977, and the Lake Fertő Biosphere Reserve on the Hungarian side of the border in 1979. The Neusiedler See, Seewinkel and Hanság Ramsar Site was established in 1982 on the Austrian side, and the Lake Fertő Ramsar Site in 1989 on the Hungarian side. The lake and its surroundings are also designated as a Council of Europe biogenetic reserve (the area is almost identical to the hydrographic catchment of the lake). The Austrian side is

designated as a Special Protection Area (SPA) under the EU Birds Directive of 1979 and a Special Area of Conservation (SAC) under the EU Habitats Directive of 1992. The Austrian part of the area proposed for World Heritage listing has been accepted as a Natura 2000 site, a development that will require the preparation of a management plan; the Hungarian part will be added to the Natura 2000 site when Hungary joins the EU.

4.3 Threats

As a potential *natural* World Heritage Site, the nomination of the Cultural Landscape of Fertő-Neusiedler Lake raises some serious integrity questions. These include:

- The presence of several small towns (notably Apelton, Illmitz, and the tourist resort of Podersdorf) within the Austrian part of the nominated area. The combined population of these and other settlements is 3,200; over 60,000 more live in the buffer zone;
- Some prominent tourist developments are to be found, all on the Austrian side. There is an "esplanade" at Podersdorf (the only lakeside shore free of reeds), a large hotel at the water's edge at Rust, an operetta stage on an island near Morbisch, and a number of medium-sized ferries that run between several Austrian resorts across the northern part of the lake;
- There is also an intrusive high voltage power line that crosses several kilometres of the reed beds in the north west part of the site;
- There are numerous vineyards within the nominated site, some of them planted quite recently on what were formerly floristically-important meadows. Even though wine growing has occurred here since Roman times, modern methods of viticulture are intensive, with regular use of chemicals and intrusive techniques such as the use of low flying aircraft to scare off starlings.
- Introduced fish (e.g. eels, carp) affect all parts of the nomination including the core Nature Zone within the two national parks.
- Water quality remains another concern. Despite successful strategies to reduce run-off entering the lake, the waters are still eutrophied.

More far reaching are the effects of drainage modification. The water level of the lake varied greatly in the past. Naturally it was a markedly "astatic" lake, drying out on a number of occasions (the last in 1868) - but also with floods when it was twice its present size. In times of flood, it would drain away through the Hanság Marshes to the south east, and thence, eventually, to the Danube. In order to control flooding and assist in reclamation of land for farming canals and bunds have been constructed within the nominated site. The water level is now maintained under an international agreement through an international commission.

4.4. Management

There is currently no joint management plan for the nominated site and management varies according to the protection zone involved in each country. Thus, in the core nature zone of the two national parks, there are strict controls over public access. Fishing or hunting other than for conservation purposes (e.g. control of wild boar) are forbidden. The spread of reeds is controlled so as to keep open water areas.

In the protection zone, a more active management regime is in place. For example, traditional grazing systems are being restored so as to recreate puszta (steppe) grasslands, using native Hungarian long-horned grey cattle, water buffalo, racka (long horned) sheep, Przewalskii's horse and mangaliza (hairy) pigs. Traditional methods of reed cutting are also encouraged in this zone, some of which is used to roof local buildings in the traditional style. Wetland habitats are being carefully managed and, especially on the Hungarian side, restored. The opportunity is also being taken to acquire additional areas to add to land in the management of the national parks. The positive effects of such actions on species and habitats have been observed in recent research work (e.g. recovery of rare orchid populations).

The management of the wider landscape beyond the national parks follows generally similar lines, with emphasis on supporting traditional land use and maintaining traditional village form to safeguard the integrity of the landscape setting of the lake.

Much attention is given to visitor management, with excellent visitor centres at Sarrod (Hungary) and Illmitz (Austria). The Austrian national park annually attracts some 700,000 visitors. The management of the parks in both countries emphasises eco-tourism and visitor education.

Under the auspices of the joint commission, there is considerable collaboration in the management of the two national parks (e.g. in monitoring, scientific research and visitor services). The parks use the same symbol and the two staffs wear the same uniform. The forthcoming preparation of a management plan for the Natura 2000 site should be used to consolidate the Austrian management regime and link it still more closely to that on the Hungarian side.

A further challenge to transboundary co-operation relates to the different regimes for nature and culture protection within the two neighbouring countries. This is further complicated in the case of Austria where responsibilities for nature and landscape protection lie essentially at the provincial level, whilst the Federal Government has many responsibilities for conservation of the cultural heritage. Finally there are a large number of existing national and international protection designations (on the natural side), with overlapping boundaries and some duplication of function.

5. ADDITIONAL COMMENTS

None.

6. APPLICATION OF CRITERIA

The Cultural Landscape of Fertő-Neusiedler Lake was nominated as a mixed site, and IUCN and ICOMOS therefore fielded a joint mission. The site was nominated under natural criteria (ii), (iii) and (iv). IUCN concludes as follows:

Criterion (ii): Ecological processes

The Fertő-Neusiedler Lake does display a number of unusual ecological and biological processes, many of which are rare, if not unique, in Europe. Overall, however, the site cannot claim to be so globally unique that it can satisfy this criterion. Other saline lakes elsewhere in the world better exemplify the bio-physical processes associated with closed lake systems. This is especially so, since the controls over the lake levels and the impact of eutrophication etc., mean that those bio-physical processes are no longer able to follow their natural course, and cannot therefore be said to be "on-going". Despite commendable efforts to restore the natural situation, the lake regime remains to some extent artificial. IUCN does not consider that the nominated site meets this criterion.

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

The natural beauty of the lake is very evident, however, its greatest appeal arises from the proximity of the reedbeds to the nearby meadows and vineyards, and the way in which the lake is overlooked by a number of attractive historic villages. It is the juxtaposition of natural and cultural values that makes for the exceptional beauty of the nominated site – but these are qualities of a cultural landscape rather than a natural site. IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

Criterion (iv) is most relevant to the site's importance for bird conservation. Fertő-Neusiedler Lake is undoubtedly one of Europe's premier sites for birds, as the Ramsar, SPA and other international designations confirm. The nominated site is a key location for many birds on the major flyways for migratory birds seeking to fly around the Alpine barrier but whether it is of global significance is another question. When set alongside the Danube Delta or Donana, it is not of quite the same order, as BirdLife's detailed IBA analysis demonstrates. It has neither the numbers nor the rarities to justify inclusion among the premier wetland sites in the world. The site has also many different kinds of increasingly rare biotopes occurring in a small area, but this is not so unusual that it can be said to be of outstanding universal value. IUCN does not consider that the nominated site meets this criterion.

The evaluation also raises a number of significant integrity questions as described above.

7. RECOMMENDATION

The Bureau did not recommend the inscription of the Cultural Landscape of Fertő-Neusiedler Lake on the World Heritage list under natural criteria.

The Bureau congratulated the Austrian and Hungarian authorities for the collaborative work that they have already undertaken in setting up and managing the adjoining national parks, and in preparing this joint nomination. The Bureau recommended that the Committee should encourage this collaboration to continue in future, particularly through the framework of the requirements of Natura 2000.

Map 1

Map 2

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

MASADA NATIONAL PARK (ISRAEL)

1. DOCUMENTATION

- i) **IUCN/WCMC Data sheet:** (4 references).
- ii) **Additional literature consulted:** Mazor, E. 2001. **Masada - Geology and Interrelated Heritage.** Report to Israel Committee for UNESCO and World Heritage Committee; **Masada Management Plan** (summary outline), Israel Nature and National Parks Protection Authority (January 2001); Israel N&NPPA , 1997. **Masada - King's Stronghold, Zealots' Refuge.** 32pp. (National Park interpretation book). Israel N&NPPA. **Masada - the Northern Palace.** 15pp. (Promotional and fundraising document). Yadin, Y. 1966. **Masada - Herod's Fortress and Zealots' Last Stand.** Weidenfeld & Nicolson, London. (Principal archaeological reference based on 1963-5 excavations).
- iii) **Consultations:** 4 external reviewers contacted. Onsite consultations with national park director, senior members of park management team and professional advisers.
- iv) **Field Visits:** March 2001 . Paul Dingwall and an ICOMOS representative.

2. SUMMARY OF NATURAL VALUES

The nominated property is the 276ha Masada National Park (IUCN Management Category II National Park, with elements of Category V Protected Landscape), located in southern Israel, approximately 18km south of En Gedi, on the eastern fringe of the Judean Desert. Adjacent to the park is the Judean Desert Nature Reserve (IUCN Category I), 28,956ha in extent, considered as a buffer zone for the nominated site.

The national park is dominated by Mount Masada, a partially isolated massif overlooking the Dead Sea. Masada is a fault-bounded uplifted block of the earth's crust (in geological terms a horst) associated with a down-thrusted rift valley (graben), occupied here by the Dead Sea. This rift valley is the landward extension of the huge Syrian-African Rift Valley System, formed along a tectonic plate boundary zone that stretches from the Indian Ocean, through the Red Sea and the Gulf of Eliat.

Rhomboid-shaped, with a flat top some 8ha in extent, Masada stands 100-400m above the surrounding terrain. It is separated from a large fault escarpment by steep canyons cut by rivers that descend from the Judean plateau to the Dead Sea. The rocks forming Masada include massive dolomites and limestones of marine origin, forming near-vertical cliffs, overlying less resistant limestones and chalk. Palaeokarst features occur in the nearby escarpment walls. West of Masada, is a landscape of hills, terraces and wadis forming the Judean Plateau. To the east, Masada is bounded by 18-80,000 year-old lacustrine silts, gravels, sandstones and conglomerates of the Lissan Formation, deposited in a huge lake that existed prior to formation of the Dead Sea.

Towering over the surrounding terrain, Masada is a landscape feature of great scenic attraction. From its summit, unhindered vistas of largely natural rural landscapes in the surrounding nature reserve, and of the Dead Sea, also have high scenic value. Although essentially an arid site, the region is a climatic and biogeographic transition zone, intermixing desert, steppe and Mediterranean elements.

A natural fortress (its name is the Hebrew term for fortress), Masada is the site of fortified palaces built in the 1st Century BC by the Judean King Herod, and it was the scene of the last stand made by some 1,000 Jewish zealots in their revolt against Roman rule in the period AD 66-73. The ingenious use of location, topography and geology, which transformed the site into both an opulent royal palace and a zealots' fortress, captures the spirit of the people of Israel who have come to regard Masada as a national shrine. Similarly, it is the uniqueness with which Masada intimately entwines cultural legacy and its special natural features that captures the imagination of the modern-day tourists who visit the site.

3. COMPARISON WITH OTHER SITES

The nomination document provides no information comparing Masada to other geological sites. Tectonic plate boundaries, rift valleys and horst-and-graben systems are common geological phenomena in global terms. Among existing World Heritage sites, rift valley systems are prominent in Lake Malawi National Park (Malawi) and the Kahuzi-Biega National Park (Democratic Republic of Congo); Gros Morne National Park (Canada) reveals plate boundary tectonics in a much more outstanding way, in fact this has been referred to as "a Galapagos for Plate Tectonics"; Macquarie Island (Australia) is a horst block on the boundary of the Indo-Australian and Pacific tectonic plates (two of the seven large tectonic plates of the Earth) in the southern ocean; and Tassili n'Ajjer (Algeria), Air and Ténéré Natural Reserves (Niger), and Uluru-Kata Tjuta National Park (Australia) all display eroded plateaux and escarpments in arid environments. IUCN concludes that Masada is an important geological site but is not of outstanding universal value. IUCN also notes that the geological values of the site are already well represented in other World Heritage sites.

4. INTEGRITY

Size and Boundaries

The boundaries of the nominated property, though somewhat arbitrary, are defined according to cultural rather than natural values. They are drawn to encompass the mountain and the entire surrounding Roman siege system, comprising eight campsites, a siege-wall and towers, and a large wood and earthen ramp. For purposes of historic authenticity, the visual integrity of the surrounding terrain in the nature reserve and the rural land is maintained by prohibiting under State law any construction within view of the mountain summit.

Management

The nominated site is a national park, protected under national conservation and antiquities statutes. Management responsibility is exercised principally by the Israel Nature and National Parks Protection Authority (NPA). That agency has planning committees and independent experts to assist in implementing management and development plans, while matters of national and international interest are subject to public hearings. The legal and administrative basis for managing the adjacent nature reserve is the same as for the national park. The area between Masada and the Dead Sea is managed as open space and agricultural land according to a masterplan under national planning legislation, administered by the regional council.

A park management plan is currently being prepared. A summary outline of the plan reveals it to be comprehensive in its coverage of management policies and operational plans, with strong underpinning support from planning, forecasting and research. A conservation development project, begun in 1995, is nearing completion. This is intended to promote the conservation and enhancement of cultural assets, guide the implementation of a park interpretation plan, and determine proper levels of visitor services and infrastructure needs. This project incorporates an impressive series of resource assessments, condition reports, research investigations, and forecast surveys. The park is well funded through the NPA, with supplementary funding for visitor services facilities from the Ministry of Tourism. A well-trained staff of 50 is employed, under a park director and senior management team.

The site is well buffered from external development pressures, and there are currently no activities that are incompatible with park objectives or that threaten park values. There are no permanent residents in the park or in the adjacent nature reserve, and the gateway city of Arad (population 25,000) is located 22km away. Pressure from tourism is considerable, but the capacity to handle current and projected visitor levels appears adequate. Masada is one of Israel's most popular tourist venues, receiving about 700,000 visitors per annum. Numbers are forecast to increase to 1.2 million per annum by 2010. The new visitor centre complex and cable car transport system are designed to cope with this level of use without compromising park values or the visitor experience. There is little management intrusion on the site. Rock walls are monitored, and pinned in places, to ensure public safety in the event of earthquake and rockfall.

5. ADDITIONAL COMMENTS

The nomination document is primarily devoted to exposition of Masada's outstanding cultural heritage values, and it gives far less attention to its natural geological character and landforms.

6. APPLICATION OF CRITERIA

Masada has been nominated as a mixed (cultural and natural) World Heritage site. Its natural values have been nominated under natural criteria (i) and (iii).

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

Mount Masada is an impressive landform, but it is neither unique nor outstanding in geological terms. It is a very small structural feature - a horst block, isolated by secondary faulting and stream erosion from its parent fault scarp. This huge escarpment, with a local relief of some 1,400m from the plateau summit to the shoreline of the Dead Sea (400m below sea level) is part of a truly global scale geological phenomenon - a rift valley system on a tectonic plate boundary extending from Israel for thousands of kilometers to the Indian Ocean and beyond. With summit dimensions of only 600m x 300m, Mount Masada is but an extremely tiny representation of this geological system. As such, Masada is of local significance only, and it fails to qualify as being of outstanding universal value either in geological evolutionary terms or as a geomorphological feature.

However, if Mount Masada is considered together with the surrounding buffer zone the picture changes somewhat. The adjacent nature reserve to the west incorporates a much larger representation of the uplifted component (horst) of the rift valley system, while the protected lands east of Masada National Park cover a large area of the downthrown block (graben). Beyond is the drowned portion of the graben - the Dead Sea. A huge lake that was the forerunner to the Dead Sea is evidenced by an extensive deposit of lacustrine sediments in the area between Masada and the Dead Sea. Consideration could, therefore, be given to incorporating the nature reserve and relevant parts of the open rural lands into the nomination, thereby providing a much more extensive and holistic geological representation of the rift valley system. This would impart greater geological significance to the nominated property. However, IUCN considers that such an expanded nomination would still not meet the criteria or outstanding universal value, for geological features. IUCN also notes that there would be questions of integrity associated with the incorporation of the open rural lands into any revised nomination. IUCN considers that the nominated site does not meet this criterion.

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

Physiographically, Masada is a small and indistinguishable component of a much more prominent landform feature - a mountainous chain forming the eastern edge of the Judean Desert plateau. This upland is brought into even sharper focus by being set abruptly against the flat expanse of the Jordan Rift Valley floor. Its setting within the context of a much grander regional-scale landscape gives Masada special scenic values. Despite being physically isolated on the escarpment, what really sets Masada apart, and gives it an outstanding aesthetic quality, is the presence of ancient ruins.

Viewed either from below Mount Masada is an awesome sight. Its summit, affords spectacular vistas of the surrounding landscape. But its scenic qualities derive from an intimate combination of its physical attributes and the material remains of human occupation. Masada's aesthetic appeal, therefore, is the culmination of its natural character and associated cultural legacy.

Given that Masada is a well-displayed example of past successive human settlement intimately interrelated with the natural environment, there could be real merit in considering the site as a relict landscape within the World Heritage category of cultural landscape. IUCN considers that the nominated site does not meet this criterion.

7. RECOMMENDATION

The Bureau did not recommend the inscription of Masada National Park on the World Heritage List under natural criteria.

The Bureau discussed the possibility of a larger natural site, potentially involving other countries, which would have to be presented as a new natural nomination.

Map 1

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

CENTRAL SIKHOTE – ALIN (RUSSIAN FEDERATION)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (4 references)
- ii) **Additional literature consulted:** Newell, J. & Wilson, E., 1996. **The Russian Far East: Forests, Biodiversity hotspots, and Industrial developments.** FOE, 200pp.; Bocharnikov, V.N., 1996. **The Sikhote-Alin Nature Complex as an object of the World Heritage list.** *Vestnik DVO RAN* (5), 43-53.; Zhuravlev, Yu.N., (Ed.) 2000. **A Biodiversity Conservation Strategy for the Sikhote-Alin.** Russian Academy of Sciences (Far Eastern Branch), Vladivostok, 135pp.; Matthiessen, P., 2000. **Tigers in the Snow.** Harvill Press, London. 185pp.
- iii) **Consultations:** 8 external reviewers contacted. Local experts; officials from the Russian Ministry of Natural Resources, the Committee on Natural Resources of Primorskii Krai, and the local administrations of Terney and Bikin; Udege leaders in Krasny Yar.
- iv) **Field visits:** J.Thorsell and J.Cassils in September 1996; L.F.Molloy and R.Hogan in July 2001.

2. SUMMARY OF NATURAL VALUES

The nominated site lies within the Sikhote-Alin mountain range in the extreme south-eastern corner of the Russian Federation, a region with a climate and biodiversity entirely different from the rest of Russia. The Sikhote-Alin is not a major mountain range (1,100km in length and up to 1830m in altitude) but a vast unmodified temperate forest wilderness lying within northern latitudes (44-49° N). Elsewhere, at these latitudes, the mixed coniferous/deciduous forests of western Europe and North America have largely been removed or severely modified. Lying between the coastline of the Sea of Japan in the east and the valleys of the Amur and Ussuri rivers in the west, the Sikhote-Alin is subject to both maritime and continental climatic extremes. Summers are warm and wet because of the rain-bearing south-eastern monsoon winds (up to 85% of precipitation can fall in summer); in winter, the icy north-westerly Siberian winds bring snow to the mountains and temperatures can drop as low as -50° C in the Bikin valley (with less than 100 frost-free days per annum in the western valleys). The large Bikin River freezes over from October until March.

The nominated Central Sikhote-Alin site in Primorskii Krai consists of two units separated along the crest of the range by a distance of 70km (see Map 2):

- The southern unit consists of two protected areas separated from each other by the town of Terney:
 - 1) **Sikhote-Alin Nature Preserve** (401,428ha) on the eastern maritime slopes near the town of Terney (including a marine protected zone of 2,900ha, extending 1km out from the coastline); This is a 'Zapovednik' or IUCN Category 1a (Strict Nature Reserve) and has also been designated a UNESCO Man and the Biosphere Reserve; and
 - 2) **Goralij Zoological Preserve** (4,749ha) an IUCN Category IV (Habitat/Species Management Area) is a coastal zone north of Terney.
- The second, or northern unit, consists of two contiguous areas located on the **Bikin River** catchment upstream of the town of Krasny Yar:
 - 1) **Bikin Territory of Traditional Nature Use (TTNU)** (407,764ha) for the Udege people in the middle Bikin, this area has no IUCN designation; and the

- 2) **Verkhnebikinski zakaznik** (746,482ha) covering the entire upper Bikin catchment above the river junction at Ushaia). This is an IUCN Category IV protected area (Habitat/Species Management Area).

The total area of the nominated site is approximately 1,560,000ha.

The Sikhote-Alin protected areas are considered to contain the greatest plant and animal diversity on the north-western coastline of the Pacific Ocean. The region lies at the junction of the Eurasian continent and the Pacific plate, a biogeographic 'mixing zone' which largely escaped the rejuvenating impacts of the last glaciation and allowed the development of the ancient '*Turgai*' biota during the Tertiary and early Quaternary periods. This unique assemblage of biota contains elements from Manchuria, Okhotsk-Kamchatka (Bering), eastern Siberia and Dauria-Mongolia. The unique combination of its severe climatic characteristics, physical isolation, and traditional resource use by the Udege and other indigenous peoples, has meant that 80-90% of the region's vegetation still remains as dense temperate forest and taiga.

The site lies within the 'Primorye' Centre of Plant Diversity identified by IUCN and WWF; it also lies partly within WWF's 'Russian Far East temperate broadleaf and mixed forest' ecoregion 71 (Global 200). Forests cover 95% of the site, with alpine tundra, coastal shrublands, meadows and bogs accounting for the rest of the area. More than 180 tree and woody shrub species occur in these forests; the most characteristic large trees are: Korean pine, Jeddo spruce, needle fir, several species of larch, Manchurian ash, white-barked elm and Mongolian oak. At higher altitudes, the forests have a higher proportion of conifers and small-leaved deciduous trees, typically birches, Koyama spruce and Siberian larch. Along the banks of the Bikin River, there is a preponderance of white-barked elm, Korean pine and Maximovitch poplar. Korean pine is a prolific 'nut' (seed) producer, essential to the survival of at least 30 mammal species, and important as a food source (rich in edible oils) for the indigenous people. In total, almost 1200 vascular plant species are present, including many of medicinal value and importance to the indigenous people; the best-known plants in this category are ginseng and Siberian ginseng.

More than 400 vertebrates have been recorded, including 241 bird species, 65 mammals, seven amphibians, 10 reptiles and 51 fish. The site is renowned in international conservation circles as the largest intact habitat for the extremely rare Siberian (or Amur, or Ussuri) tiger. In addition, it is the habitat of brown bear, Himalayan black bear, lynx, goral, sika deer, yellow-throated marten, Manchurian hare, scaly-sided merganser and other endemic and/or endangered species. Seals are a feature of the Sikhote-Alin coastline.

3. COMPARISON WITH OTHER AREAS

The region of Ussuriland in which the nominated area occurs is one of the world's most distinctive natural regions. Ussuriland extends southwards from the mouth of the River Amur to the border with China and Korea. It is bounded on the west by the Ussuri River and on the east by the Sea of Japan. No other area has this particular mix of flora and fauna and, combined with glacial history, this has helped to make the Ussuri region a priority for conservation in Russia. For example, the WWF report by Krever *et. al.* (1994) for the World Bank states that "the bioregion is critical to global biodiversity conservation because it contains some of the richest and most unusual temperate forests anywhere in the world. Compared to other temperate ecosystems, the level of endemic plants and invertebrates present in the region is extraordinarily high which, together with the region's unique biogeographic history, has resulted in unusual assemblages of plants and animals."

The Sikhote-Alin nomination lies within Udvardy's '*Manchu-Japanese Mixed Forest*' biogeographic province. There are currently no other natural World Heritage sites listed within this province. The Russian Federation has nine other protected areas within this biogeographic province (including the Lazovsky zapovednik, 120,000ha, which is also Amur tiger habitat) but Sikhote-Alin is by far the largest and most important. Within the Sikhote-Alin Range, the Bikin cluster of the nomination is considered to be the only intact large-scale watershed on the western slopes of the Sikhote-Alin. A report by the Russian Academy of Sciences notes that the Bikin is "one of the last intact, large scale watersheds not only in the Russian Far East but also in the Northern Hemisphere." The Bikin catchment also includes one of the most expansive mountain plateau systems of the Sikhote-Alin range.

The biogeographic province extends across Heilongjiang and Jilin provinces of north-eastern China, but the only protected area approaching Sikhote-Alin in significance is the Changbai Mountain Nature Reserve of 190,582ha (originally established as a category IV protected area in 1961 but re-classified by IUCN as category Ia in 1986). Like Sikhote-Alin, Changbai is a Biosphere Reserve of long-standing. Although the Changbai Mountains are

higher (2,691m), they lack any lowland forest (below 300m) or any coastal landforms and biota. The Changbai Mountain protected area, and the adjacent Tumen and Yalu rivers forming the border with North Korea, were Amur tiger habitat in the 19th Century but relentless forest clearance and tiger hunting has eliminated the last populations.

Hokkaido, the northernmost of Japan's main islands, also lies within the Manchu-Japanese Mixed Forest province. However, there are no sites equivalent to Sikhote-Alin in Hokkaido: the two IUCN category Ia protected areas in Hokkaido are very small (674ha and 1,895ha) and the two main forested national parks (Daisetsuzan and Shiretoko) are IUCN category IV and extensively developed. Shiretoko does have many of the maritime forest characteristics of Sikhote-Alin and it has the advantage of being among the most natural of Japan's 28 national parks. However, the combined area of Shiretoko 'Special Protected Area' and adjacent Mount Onnebetsu Wilderness Area is 25,460ha – only about 1.6% of the area of the Sikhote-Alin nomination.

There are two comparable large continental/maritime natural World Heritage sites at these latitudes in North America – Olympic National Park bordering the Pacific Ocean in Washington state and Gros Morne National Park on the western Atlantic seaboard in Newfoundland & Labrador province of Canada. Olympic National Park (Oregonian biogeographic province) is an outstanding temperate rainforest but its climate is very different (much wetter and warmer) than Sikhote-Alin and its forest is more coniferous. Olympic is not listed for its biodiversity value or endangered species (criterion iv). Gros Morne National Park, likewise, is not listed under criterion (iv); it is wetter and cooler (in summer) than Sikhote-Alin and it lacks the latter's forest community diversity. Gros Morne is listed primarily for its geological history (especially glaciation in an island setting).

The sites of Giants Causeway (UK) and Miguasha (Canada) are not comparable because of their very small size and specialist geological character. Two other maritime sites are also not comparable with Sikhote-Alin – Redwood National Park on the Pacific slopes of the Coast Range in northern California (lower latitude and fragmented protected area units) and the island of St Kilda in the Atlantic Ocean off the western coast of Scotland (small size and higher latitudes). The Redwoods site is not listed under criterion (iv). There is no forest on St Kilda but it is listed under criterion (iv) because of its outstanding sea bird populations. Sikhote-Alin also has a number of species in common with Shirakami-Sanchi in Japan which was inscribed for the importance of its cool-temperate ecological processes. However, the beech forest is considered to be low in species diversity and endemics. For example, it has approximately 500 plant species compared to the 1,200 species found in the nominated area. The Western Caucasus is at similar latitude to Sikhote-Alin but shows a much greater variation in altitude. Though this site has a higher diversity of plants (almost 1,600 species) it has a lower diversity of vertebrates than Sikhote-Alin.

Two Pacific coastal World Heritage sites are found further north: Russia's Volcanoes of Kamchatka and Tatshenshini-Elsek/Kluane National Park/Wrangell-Saint Elias National Park and Reserve and Glacier Bay National Park. Both of these sites include important glacial and volcanic features which are not present in Sikhote-Alin. Both sites also have biodiversity values. In the case of the 3.7 million hectare Kamchatka site, biodiversity is high relative to other areas at the same latitude and includes the world's greatest diversity of salmonoid fish as well as important populations of seabirds and marine mammals. The Tatshenshini-Glacier Bay complex covers some 10 million hectares and includes tundra and Sitka spruce forests. It is important for natural processes such as glacial activity, plant succession and animal migration. The area is also important for wildlife, including endangered species such as the humpback whale. While the nominated area is smaller in area it is clearly richer in biodiversity.

4. INTEGRITY

4.1. Boundaries

When Sikhote-Alin zapovednik was established in 1935 it comprised 1,800,000ha, and was at that time the largest zapovednik in Russia and one of the largest strictly protected areas in the world. In 1951 it was reduced to about one sixth of its original size, although subsequent additions have increased it to its present size of 405,000ha. When the Sikhote-Alin site was first nominated for World Heritage in 1996, it then comprised 2,680,000ha but, in its evaluation, IUCN pointed out that only 14% of the nomination had a legal status as protected area. The nomination was subsequently deferred, with a recommendation that it be resubmitted once:

- protected status was conferred on the Bikin catchment and the Sikhote-Alin zapovednik was extended to the north, and

- consultation was undertaken with the government of Primorskii Krai and the local indigenous people (in the Bikin and Iman valleys).

The present nomination has made significant progress in fulfilling the 1996 recommendations, in that:

- the entire middle and upper catchments of the Bikin River (a vast area of more than 1,154,000ha) is now protected from the exploitative commercial forestry and mining which has depleted the natural resources of much of the Sikhote-Alin region (especially the coastal slopes), and
- the government of the Primorskii Krai and the Udege people have expressed their support for the nomination and for continued protection of the landscapes and biota contained within the two main areas.

However, there are still some outstanding integrity issues which need to be addressed. The first is the need for a protected area along the 70km of the crest of the Sikhote-Alin Range, linking the zapovednik with the Bikin catchment. The second is the desirability of linking the headwaters of the Bikin with the coast around the town of Svetlaya, to give a contiguous west-east corridor of largely unmodified forest. An aerial inspection of this watershed between the upper Bikin and the coastal slopes above Svetlaya revealed the unsustainable nature of the forest clear-cutting carried out by a joint Russian/South Korean forestry venture. A major logging road is currently being built from Svetlaya to Khabarovskii Krai through this forested upland around the head of the Bikin watershed, so there is an urgent need to develop a network of protected areas and sustainably-managed forests (which are still suitable as wildlife habitat) to buffer the Bikin and provide a forest corridor to the coast.

There is a sound strategic framework for the entire nominated area (and surrounding forest 'buffers') in the prescriptions (until 2005) contained in "A Biodiversity Conservation Strategy for the Sikhote-Alin" (Zhuravlev et al), published in 2000 and approved by a decree from the Governor of Primorskii Krai. The strategy sets out a plan for "A System of Territories to Conserve the Amur Tiger Population" along the length of the Sikhote-Alin Range in Primorskii and Khabarovskii Krai. The plan is comprised of existing and proposed protected areas and traditional/multiple use zones linked by ecological corridors. This system of territories would conserve the territory's biodiversity and provide the minimum essential area for the short-term conservation for the Amur tiger (conserving the territories of 50 mature females). However, for the long-term conservation of the Amur tiger population, habitat must be secured for a further 250 females. The plan proposes the development of a zoning process and special management regimes for the most important habitat outside of protected areas.

Despite the size of the Bikin, the management of surrounding areas has an impact on the population of mammals within it. An adequate buffer zone or regulation of activities in these areas is essential to the long-term protection of the site. The northern boundary of the nominated area coincides with the administrative boundary between Primorskii and Khabarovskii Krai but logging activities have been approved in some of the adjacent lands in Khabarovskii.

4.2. Management

The management plan for the Sikhote-Alin zapovednik expired in 2000 and a revised plan is currently being prepared. There is no management plan for the Bikin TTNU or Verkhnebikinskiy zakaznik and this is a planning challenge for the government of Primorskii Krai.

The Bikin TTNU is an area of traditional use set up to maintain the way of life of the Udege indigenous people. The sustainable use of the area's natural resources is permitted under the responsibility of the Primorskii Krai Department of Wildlife Resources. Economic activities include hunting, the collection of NTFP's and some timber harvesting. The commercial rights to the areas are currently leased to the '*AO Bikin*' enterprise which is responsible for the management of the NTFP resources. In the past there were hunting and fishing inspectors to monitor use of the area but there is no longer any effective field monitoring. A report from the 'Bikin Project' (see below) notes that 'official data and expert opinion conclude that the harvest of wild game is already near its maximum, and for the majority of species current harvest rates are not sustainable. And in view of an absence of data on illegal take of these species, especially poaching from surrounding regions, there is little doubt that there has been a dramatic reduction in the population numbers of native animal species.'

In the Bikin TTNU the Udege have the right of veto on activities if the community considers them to be detrimental to their traditional values. During the field mission the Bikin residents noted that they were not involved adequately in the management of the area and that their access to their traditional hunting lands is

subject to a complex licensing system. The designation of the Verkhnebikinskiy zakaznik on the Upper Bikin which was formerly an Ethnic Territory of the Bikin residents has also caused insecurity about future access to this land by the Udege for commercial and subsistence use.

The management of the Verkhnebikinskiy zakaznik is under the responsibility of the “Maritime Wood Department” which is a regional branch of the Federal department of forestry. The Zakaznik has a set of regulations which outlines activities which are prohibited or sanctioned in the area. The regulations allow for “commercial logging of secondary forest resources” as well as hunting and collection of NTFPs.

In conclusion the management regime in the Bikin is far from satisfactory. The Udege have few rights on commercial harvest of NTFPs and feel that they do not have adequate control over their own resources. The Udege are also under pressure from illegal hunting which is contributing to the unsustainable harvest of many animal species - especially ungulates. In addition, there is a problem with the unsustainable use of areas adjacent to the Bikin which are important for maintaining the populations of animal species hunted in the Bikin. IUCN is also concerned about the impact of small-scale logging on the ecology of the area.

4.3. Threats

Poaching and illegal logging currently threaten the ecology of the entire Sikhote-Alin range and are the main threats to the integrity of the nominated site. Logging and hunting in adjacent lands can impact heavily on protected areas – reducing animal populations and severing important biological corridors. A major international research and management programme is attempting to secure the future integrity of the population of Amur tiger, in particular, its protection from poaching and careful regulation of the hunting of its ungulate prey species. Sikhote-Alin zapovednik benefits from an enforcement programme which has received financial assistance from WWF and has proved to be quite effective.

5. ADDITIONAL COMMENTS

The Sikhote-Alin site has been nominated under both natural and cultural criteria. IUCN believes that there is a very close relationship between the natural ecosystems of the Sikhote-Alin and the hunting culture of the Udege indigenous people. The protection of the natural landscape is an essential pre-requisite for the continuation of the Udege culture.

In the 1990s the US State Department and US Forest Service funded the “Bikin Project” which carried out extensive socio-economic and biodiversity research in the Bikin watershed and developed proposals for biodiversity conservation and local economic development of the Bikin. However, the project was not continued and many of these proposals have not been implemented.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

The site has been nominated for consideration under natural criteria (ii), (iii) and (iv).

Criterion (ii): Ecological processes

The site is a large temperate forest wilderness, with very little human habitation or disturbance. However, no convincing evidence was presented to establish that there were on-going ecological processes of “outstanding universal value” within the site. Central Sikhote-Alin is primarily climax forest, with little evidence of natural perturbation, except for occasional fires from lightning strikes and the inundation of the floodplain of the Bikin River. The Sikhote-Alin zapovednik coastline shows geomorphological evidence of progressively uplifted marine terraces but these are not considered to be linked to outstanding ecological processes. IUCN does not consider that the site meets this criterion.

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

Although the expanse of wilderness in the nominated area is impressive, the landscapes and scenery of the site are not exceptional. The forest is very difficult to penetrate on foot, the topography is subdued and the natural waterways intricate and subtle, and insect pests are aggressive and ubiquitous during spring and summer (constituting a major disincentive to human settlement and tourism development). IUCN does not consider that

the site meets this criterion.

Criterion (iv): Biodiversity and threatened species

The nominated area is representative of one of the world's most distinctive natural regions. The combination of glacial history, climate and relief has allowed the development of the richest and most unusual temperate forests in the world. Compared to other temperate ecosystems, the level of endemic plants and invertebrates present in the region is extraordinarily high which has resulted in unusual assemblages of plants and animals. For example, subtropical species such as tiger and Himalayan bear share the same habitat with species typical of northern taiga such as brown bear and reindeer. The site is also important for the survival of endangered species such as the scaly-sided (Chinese) merganser, Blakiston's fish-owl and the Amur tiger. IUCN considers that the site meets this criterion.

7. RECOMMENDATION

That the Bureau note that Central Sikhote-Alin is considered by IUCN to meet natural criterion (iv) but that the management of the Bikin River protected areas (Bikin Territory of Traditional Nature Use and Verkhnebikinski zakaznik) need to be improved before this area is inscribed on the World Heritage List. Therefore the Bureau should recommend the **inscription** of the Sikhote-Alin Nature Preserve and Goralij Zoological Preserve but **defer** the inscription of the Bikin River protected areas and request that the State Party:

- develop an effective and integrated collaborative management regime for the entire Bikin catchment with the full involvement of indigenous peoples in this process;
- regulate activities in areas adjacent to the Bikin catchment in both Primorskii and Khabarovskii Krai; and
- improve the physical linkages between the Bikin and the Sikhote-Alin Nature Preserve by urgently developing a comprehensive network of protected areas which can both link the Bikin to the Sikhote-Alin zapovednik and provide a natural corridor to the coastal regions near Svetlaya. This should be carried out within the framework of the system of interlinking protected areas proposed by the '*Biodiversity Conservation Strategy for the Sikhote-Alin*' and fully involve indigenous people in this process.

Once these activities have been completed, the State Party may wish to submit the Bikin protected areas for consideration as a second phase of the nomination.

The Bureau may wish to commend the State Party for responding to the request of the 1996 Bureau and encourage the State Party to request International Assistance from the Committee to fund the necessary technical work to fulfil the above request.

Map 1

Map 2

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

KARAIN CAVE (TURKEY)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (1 reference).
- ii) **Additional Literature Consulted:** **International Research and Application Centre For Karst Water Resources (UKAM)**, 1994, ISSN 1300 – 5359; International symposium and field seminar on Karst waters – environmental impacts, Beldibi, Antalya, Turkey, September 10 – 20, 1995 UKAM; Cave and Karst Science, The Transactions of the British Cave Research Association (BCRA) – Alpine karst speleogenesis in (F) and (A) **Caver in the Taurus Mountains**, Turkey, volume 21, Number 3, June 1995; **UKAM Present State of Karst groundwater pollution and its future trend in Antalya travertine plateau**, Cost project 65 (UKAM), May 1993, Ankara; **Expedition speleologique en Turquie**, Manaugat 92, Federation Francaise de Speleologie, Celadon; **Expedition speleologique en Turquie**, Yorük 91, Federation Francaise de Speleologie, Celadon; Krška hidrologija u osam zemalja na obodu Sredozemlja, Zavod za hidrotehniku gradevinskog fakulteta u Sarajevu, Sarajevo, januar 1975, H (TURSKA); Cografya DERGISI, Darkotim, B. Tarik Öncesi yerlesme yerleri olarak Antalya magaralarinin jeomorfolojik özellikleri, Izmir – 1990, N.5, Geomorphologic Characteristics of the Antalya Caves as Dwelling Sites of the Prehistoric Man.
- iii) **Consultations:** three external reviewers contacted; representatives of Government Departments, conservation agencies, research institutes and museums in Ankara and Antalya; Universities in Ankara, Antalya and Istanbul.
- iv) **Field Visits:** February 2001, Albin Debevec – IUCN, Giora Solar – ICOMOS.

2. SUMMARY OF NATURAL VALUES

Karain Cave and Surroundings are located about 30kms. north-west of Antalya, in southern Turkey. It comprises a core area of 254ha, with a buffer zone of some 503ha. The Karain cave consists of several small halls separated by flowstone walls. These smaller halls are 12-15m wide, and up to 5m high near the relatively wide entrance. Larger halls, from 25 to 30m wide are situated further in, with a height of no more than 8m. The cave floor is covered with soil and small stones, and in some places by guano (animal waste). There are also two other smaller caves within the nominated site.

The Cave also contains a range of stalactites, stalagmites, cave pearls and crystals, and other typical karstic phenomena.

The property has a continuous stratigraphy from the Lower Palaeolithic to late Roman times. Whereas a sequence of 1 to 5m of stratigraphy is common in caves, Karain has more than 11m of profile. Extensive sub-fossil faunal remains and palaeo-botanical evidence from the Karain Cave have contributed substantially to understanding the palaeo-ecology of the Eastern Mediterranean.

However, its primary importance is from an archaeological point of view, with human finds dating to at least 50,000 B.P. Scientific work, based on finds made in the caves over 54 years of excavations, has thrown light on the prehistoric links between Europe and the Near East, including those concerning Neanderthal man and ancient migration routes.

The shape of the cave entrance, the walls and ceiling show that the cave developed by corrosion processes in a water filled passage. This is evidenced by smaller corrosion features in the cave, for example solution pockets, scallops, corrosion knives (up to 40cm) and solution roof flutes of 30 to 100cm in diameter. The ceiling shows younger processes due to condensation corrosion (mineral veins in relief and deepened fissures). Visually

corroded flowstone indicates that the Karain cave developed in several phases. The flowstone looks relatively old. The cave is mostly dry, well aerated and relatively open, which is why the flowstone gives a degraded appearance due to prevailing weathering processes. There are no specially important natural features in the cave which merit special safeguarding.

The area surrounding the caves is of interest from a biodiversity perspective. This arises from the contrast between two adjoining habitats: a dry karst region and a lower lying wetland area. In the karst area, there are rock goats, boars, hares, wild cats, lynx, and several species of rodents and reptiles. The wetlands contain a range of fish species, terrapins, waterbirds, and birds of prey.

3. COMPARISONS WITH OTHER AREAS

Karst landscapes, with characteristic natural features associated with limestone or other highly soluble rock, are distributed widely throughout the world. Landforms are predominantly solution in origin, and drainage is usually underground. Some of the world's most famous karst phenomena are already listed on the World Heritage List (see table below). In addition there are at least another 24 natural sites with very important karstic features. There are also ten cultural World Heritage sites with important karstic features.

While Karain is certainly a significant site when viewed from a cultural perspective, its claim to outstanding universal value from a natural point of view is much more questionable. A quick review of the main karstic World Heritage sites shows that it cannot compare in terms of size or variety of phenomena with the globally important sites listed in the table below, which summarises key features of the main cave and karst World Heritage sites:

World Heritage Site	Main karstic feature(s)
Cabo Cruz, Cuba	Uplifted karst and stair-terraces in coastal site
Plitvice, Croatia	Travertine lakes and barriers, producing spectacular scenery
Caves of Aggtelek & Slovak Karst, Hungary/Croatia	712 caves, including world's highest stalagmite
Gunung Mulu, Malaysia	295kms of explored caves, numerous bat and swiftlet nests
Puerto Princesa, Philippines	Underground river, spectacular scenery
Skocjan Caves, Slovenia	Dramatic underground canyon and river
Carlsbad Caverns, USA	81 caves with dramatic mineral features
Mammoth Cave, USA	World's longest cave system (306 km)
Ha Long Bay, Vietnam	Best example of marine invaded tower karst

The Karain cave and nearby smaller caves are essentially typical of many cave complexes in Turkey, where more than 600 caves are known. Most of them developed in carbonate rocks bounded by conglomerate and travertine structures, at the junction of which karst springs are usually found. The Antalya region is well known internationally for its karst and caves, and contains some of Turkey's longest and best decorated caves. The Karain cave and surrounding rockshelters are relatively small karst cavities in a semi-arid karst and as such cannot be easily compared with the major cave and karst sites already inscribed. All of the features at Karain are readily seen elsewhere, even in Turkey. The nominated area is important because of its archaeological value, and the long history of settlement of the area. It is in this essentially cultural context that the outstanding characteristics of the Karain cave are most apparent.

4. INTEGRITY

Boundaries

The area of the Karain cave itself, together with two smaller caves, is located on a steep south-east facing karst slope and is naturally well protected. The site is protected against urbanisation by a buffer zone set aside for farming. It would appear therefore that there is no special threat to the location itself.

Human Impact

There are no permanent settlements in the nominated site. The Yagca village in the buffer area has 584 inhabitants. There do not appear to be any activities that could be harmful to the protected area within this village. There is, however, a medium-sized lime plant which obtains raw material from outside the nominated site.

From all the caves in the system, only Karain cave itself is open to tourists. In 2000, the cave was visited by 19,985 domestic visitors, and 2,010 foreign tourists. Considering that the site is only 30km from Antalya, a large city and a significant tourist location, the number of visitors may be expected to increase.

The existing infrastructure in front of the cave is modest: a small information centre, a smaller museum, lavatories and limited car parking space. The access road to the entrance is 300m long. The cave entrance is suitably protected by an iron gate to control access. The cave tour is conducted by two guides. The entrance fee is 2 million Turkish liras (about US\$3).

Threats

Even though tours are supervised by guides, some of the surfaces of cave walls have been damaged by signatures etc. and the archaeological excavations in the caves have somewhat altered the natural aspects of the caves. Finally, this whole area is known to be geologically unstable but this has not been addressed in this report.

Management

There is no special management plan for the protected area. Conservation is carried out on the basis of a State law and decrees adopted by Antalya Regional Council for conservation of natural and cultural heritage. A Regional Development Plan, approved by the Ministry of Planning and Reconstruction exists. This protects the landscape and regulates access to Karain caves. This plan was approved by Antalya Regional Council on 28 March 1990. A special annex of 19 December 1990 Regional Council designated Karain cave as an archaeological site. Land in the nominated site is owned by the State, while that in the buffer area belongs to private owners. The management of the cave and infrastructure is undertaken directly by the Antalya Museum. The Museum takes part in all the archaeological excavations and employs the cave guides. In view of growing tourist pressures, a management plan for the site is desirable.

5. ADDITIONAL COMMENTS

From an archaeological point of view, the Karain cave system is an important location, since it covers the entire Palaeolithic. As noted above, the site displays an exceptional vertical range of accumulated materials from over 50,000 years of continuous occupation.

There are archaeological excavations near the entrance to the cave, and two additional archaeological trenches within it. This location has revealed a rich archaeological excavation history since 1946, when the cave was discovered. All the excavations have been carried out under the direction of Ankara and other universities.

IUCN has reviewed this site in terms of its suitability as a natural site, and in this respect it is clear that it does not satisfy World Heritage criteria. However, IUCN believes that there may be a number of potential World Heritage natural sites in Turkey.

6. APPLICATION OF CRITERIA

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

The Karain Cave and Surroundings were nominated under natural criterion (i). As is evident from a comparative analysis, the site does not match up to the standards of those karstic sites already on the World Heritage list. IUCN does not consider that the nominated site meets this criterion.

7. RECOMMENDATION

The Bureau did not recommend the inscription of Karain Cave and Surroundings on the World Heritage list under natural criterion (i). The Bureau recommended that the Turkish Government review their Tentative List with a view to identifying alternative natural sites, which could eventually be brought forward for nomination.

Map 1

Map 2

C. Nominations of natural properties to the World Heritage List

C.1. Palaeartic Realm

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

**NATURAL SYSTEM OF “WRANGEL ISLAND” SANCTUARY (RUSSIAN
FEDERATION)**

Due to climatic reasons a mission to the site is only feasible in July/August. Difficulties in obtaining permission to travel to the site were encountered which meant that a mission could not take place in July/August 2001. The State Party has thus proposed that a mission be carried out in July/August 2002 so that a report can be presented to the 2003 Bureau.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

VOLCANOES OF KAMCHATKA (RUSSIAN FEDERATION) EXTENSION TO INCLUDE KLUCHEVSKOY NATURE PARK

Background Note: The "Volcanoes of Kamchatka" (VK) were inscribed on the World Heritage List in 1996 under natural criteria (i) (ii) and (iii). Five separate protected areas make up a serial site, which extends over a distance of 600km along the Kamchatka Peninsula and amounts to 7% of the total land area of the Peninsula. In the 1996 IUCN technical evaluation, the Kluchevskoy area was identified as a major natural feature that would significantly contribute to the rationale for the site. The local government of Kamchatka Oblast has acted to establish a Nature Park in the area and has documented its values in the extension proposal. This evaluation also addresses the request by the State Committee for Environmental Protection to list the site under an additional natural criterion (iv).

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (3 references)
- ii) **Additional Literature Consulted:** Simkin T. et. al. 1981. **Volcanoes of the World**, Smithsonian; Decker R. and B. **Volcanoes** Freeman; Francis P. 1993. **Volcanoes: A Planetary Perspective**. OUP; Bullard, F.M. 1973. **Volcanoes**. University Texas; Decker R. and B. 1991. **Mountains of Fire**. CUP; Krever V. et. al. 1994. **Conserving Russia's Biodiversity**. WWF; Stewart J.M. 1992. **The Nature of Russia**. Boxtree; Kirby E.S. 1971. **The Soviet Far East**. Macmillan; Berg L.S. 1950. **Natural Regions of Russia**. Macmillan; Newell J. and E. Wilson. 1996. **The Russian Far East**. FoE-Japan; Nechayev A. 1995. **Kamchatka**. Disentis; Morrow P. and B. 1994. **Playing with Fire**. **Equinox**. February; State of the Russian Federation for Environmental Protection, Memorandum on **Proposed addenda to Volcanoes of Kamchatka World Heritage Site**, 24 May, 2000; Satellite Atlas of the World (1998) Russian Volcanoes 1994 SIR-C radar image Published by National Geographic Society.
- iii) **Consultations:** 8 external reviewers contacted. Regional Administration officials, Kamchatka Association of Greens, Institute of Volcanology, Institute of Ecology and Nature Management, Tourism and Park Development Project staff, WWF and GEF/UNDP officials.
- iv) **Field Visits:** September, 1996. Jim Thorsell, J. Cassils.

2. SUMMARY OF NATURAL VALUES

Kluchevskoy Nature Park (KNP) was established in 1999 to protect and give recognition to conservation values of the Kluchevskaya group of volcanoes. This cluster of 12 volcanoes is located on the east-central part of the Kamchatka peninsula between the Bystrinsky Nature Park and Kronotsky National Park. The area of KNP is 376,000ha and it extends from 300m to 4,813m, the highest point in eastern Eurasia. Diverse volcanic features occur with many craters, lava fields and steam vents. Kluchevskoy is a classic "strato-volcano" and is one of the most active in the region exuding a flow of magma of 60 million tons/year. Over the past 300 years it has erupted explosively 73 times, most recently in 1976.

The KNP is the main centre of glaciation in Kamchatka with 47 glaciers covering 269km². Despite global trends of glacial retreat, several of these glaciers are advancing and interactions between glacial and volcanic activity are of high scientific interest.

The proposed addition to the existing VK site also has typical flora and fauna of the region. Vegetation is primarily rock birch, alder and larch on the lower slopes with sub-alpine meadows extending above 1,000m. Faunal diversity is not high but brown bear, marmots, reindeer, snow buntings and crows all occur and are representative of the sub-arctic region.

With a rigorous climate, lack of road access, steep and unstable terrain, the landscape of KNP displays high scenic value and exists in an unmodified natural state. It is the dominant physical feature of the Peninsula.

Should the extension be approved, the total size of the site would increase by 10% to 3.67 mil.ha.

3. COMPARISONS WITH OTHER AREAS

The IUCN technical evaluation of VK in 1996 noted the eight World Heritage natural volcano sites that had been inscribed at that time and that over 1,300 active volcanoes existed on earth with a particular concentration around the "Pacific Rim of Fire". Since then an additional four sites have been added to the World Heritage List partially for their outstanding volcanic features (Aeolian Islands, Heard and MacDonald Islands, Morne Trois Pitons and Mount Kenya) which brings to 13 the total number of such sites.

The 1996 evaluation demonstrated that VK stand out more than any other existing World Heritage site as having the greatest variety of volcano types and set of associated volcanic phenomena. They also offered the most undisturbed and spectacular scenic features (lakes, coastline, wild rivers) and were some of the most thoroughly researched in the world. Additionally, the site contains a range of other biological values (see section 5 below). These combine to give this area a bio-geodiversity found in only a select few places in the world.

The proposal to add the KNP as the sixth unit in this serial nomination further strengthens and reinforces the outstanding universal value of this property by including the highest and most active volcanic and glacial features on the Peninsula. Its biological values are not as significant as several of the other components of the site as it does not contain salmon spawning rivers, lakes or coastline features. However, its geological features are more dramatic than those of the other five sites.

4. INTEGRITY

The 1996 technical evaluation of IUCN and subsequent monitoring reports on the site have outlined a number of threats facing different components of this serial site. These include the prospects of mining and road construction in the Bystrinsky park, a proposal for a geothermal facility near the Nalychevo park and poaching in the Southern Kamchatka reserves. Secondary issues of concern relating to the lack of management resources, staff and management plans were also outlined.

Although the threat of industrial developments and poaching still persists in parts of VK, the nominated KNP extension is not facing similar pressures. There are no settlements in the park and the regional population density is low. On the periphery of the park there has been some forest clearance and cutting of hay but these activities are very restricted in area and do not appear to affect its integrity. Tourism levels are very low (250 – 300 visitors/year).

The entire site is benefiting from several assistance projects through the European Union and the GEF. As KNP has only recently been created, it does not yet have a management plan nor any on-site visitor facilities. It does have a network of seismic stations and geological monitoring sites but because of its remoteness, inaccessibility and lack of any human pressure, it does not have resident park staff.

In summary, the proposed extension has several integrity problems in common with the other five units of the existing site. Nature conservation in the region is not a high priority for government at this point in time and management resources are very limited. On the positive side, there are no current threats to KNP and external assistance for conservation work is beginning to have effects.

5. ADDITIONAL COMMENTS

A parallel issue relating to the entire VK site is a request from the State Committee of the Russian Federation for Environmental Protection (memorandum of 24 May, 2000) for consideration of an additional criterion for the site (criterion iv). The request is accompanied by considerable documentation supporting the case. This is a separate issue to the KNP extension proposal but it is timely to consider it at the same time and this is covered in section 6 below.

The Bureau should also note that a 'state of conservation' report for VK, as requested from the Russian authorities by the December 2000 Committee, has not yet been received.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

6.1 Extension of VK to include KNP

The Kamchatka Volcanoes are one of the most outstanding volcanic regions in the world with both a high density of active volcanoes, a variety of types (Strombolian, Hawaiian, Pelean, Vesuvian and Plinian) as well as a full diversity of related volcanic features (geysers, mud pools, hot springs, calderas, mineralisation). The five sites that make up the original serial nomination collectively bring together many of the major volcanic features of the Peninsula. With the proposed extension of VK to include KNP as the sixth unit in the site, the highest and most active volcano is incorporated.

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

The proposed addition of KNP as the sixth component of the site further adds to the overall coverage of the range of Kamchatka's natural features. The nominated addition to the site clearly meets criterion (i) in its own right as an outstanding example of geological processes and landforms and therefore contributes in a very significant way to the expanded site as a whole meeting criterion (i).

Criterion (ii): Ecological processes

The proposed expanded site is also biologically analogous to six islands and its geographic location between a large continental landmass and the Pacific Ocean has given it unique characteristics. Natural processes continue with on-going volcanic activity and colonisation. The proposed KNP addition contributes significantly to the expanded site as a whole meeting criterion (ii).

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

The Kamchatka Volcanoes is a landscape of exceptional natural beauty with its large symmetrical volcanoes, lakes, wild rivers and spectacular coastline. It also contains superlative natural phenomena in the form of salmon spawning areas and major concentrations of wildlife (e.g. seabird colonies) along the coastal zone of the Bering Sea. The proposed KNP addition contributes very significantly to the site as a whole meeting criterion (iii).

6.2 Request for inscription of the VK under natural criterion (iv)

Criterion (iv): Biodiversity and threatened species

VK was inscribed in 1996 under natural criteria (i), (ii) and (iii). The case for the site also meeting criterion (iv) was not presented at the time. Further information relating to justification under criterion (iv) are as follows:

- The VK contains an especially diverse range of palearctic flora (including a number of nationally threatened species and at least 16 endemics).
- Although VK records only 33 mammal species, in the context of the northern palearctic biogeographic realm, this is high. A number of these are notable on the global level for the remarkable size of their populations. For instance, all species of sea mammals in the northern Pacific Ocean are found in the marine coastal component of the site including internationally significant populations of sea lions and sea otter (estimated number: 3,500 – 4,000). Kamchatka has a thriving population of brown bear (5,000+) of which over one-fifth live within VK. There are also good numbers of snow ram, sable and wolverine.

- 145 bird species have been recorded in the site, nine of which are globally threatened. Included are major birds of prey species such as the Stellar's Sea Eagle (50% of world population), white-tailed eagle, gyrfalcon and peregrine falcon which are attracted to the availability of spawning salmon. Large seabird colonies exist along the coast including over half the world population of Aleutian tern. Parts of VK also function as major migration staging areas for eastern palearctic migrants.
- The rivers inside and adjacent to VK contain the world's greatest known diversity of salmonid fish. All 11 species of Pacific salmon coexist in several of Kamchatka's rivers. Indeed, Kamchatka is the world's most important stronghold for native salmonid fish. With wild salmon declining rapidly throughout the Pacific Rim, the salmon runs in Kamchatka's wild rivers become especially important. The role that salmon play in the health of terrestrial and aquatic ecosystems is particularly well illustrated in Kurilsky Lake in VK.

For all of the above reasons, VK with its six separate components totalling 3.67 mil.ha. also merits inscription under natural criterion (iv).

7. RECOMMENDATION

The Bureau recommend to the Committee that Kluchevskoy Nature Park be added as the sixth component of the Volcanoes of Kamchatka's World Heritage site. In addition to the 1996 inscription under criteria (i), (ii), and (iii), the expanded site also qualifies under criterion (iv).

The Bureau also recommended that authorities in Kamchatka be commended for their efforts to compile management plans and to implement them with assistance from donors. UNDP/GEF should also be recognised for providing material support to the site.

Map 1

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

JUNGFRAU–ALETSCH–BIETSCHHORN (SWITZERLAND)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (12 references)
- ii) **Additional Literature Consulted:** Chevallet, M.P. and K. Dullnig. 1991. *Les Espaces Protégés de L'Arc Alpin*. International Centre for Alpine Environments; Stone, P. 1992. **The State of The World's Mountains**. Zed Books; Reynolds K. ed. 1990. **The Mountains of Europe**. Oxford University Press; Price, M. 1995. **Mountain Research in Europe**. MAB Series, Vol. 14. Parthenon; Lieberman, M.. 1991. **The Alps**. Steward, Tabori and Chang; Esping, L.E. 1998. *Potential Natural World Heritage Sites in Europe*. Parks for Life Report; Hsu, K.J. 1995. **The Geology of Switzerland**. Princeton University Press; Messerli, B. & J. Ives. 1997. **Mountains of the World**. Parthenon; CIPRA. 1998. **Rapport sur l'état des Alpes**.
- iii) **Consultations:** Meetings with Canton of Valais JAB Committee including mayors of communes, tourism representatives, NGOs and Minister of the Valais Cantonal Government; and Canton of Bern JAB Committee including commune mayors, tourism representatives, NGOs and Minister of Bern Cantonal Government; President – Patrons Committee.
- iv) **Field Visit:** J. Thorsell and M. Price. March 2001

2. SUMMARY OF NATURAL VALUES

The Jungfrau-Aletsch-Bietschorn (JAB) region is located in the south central Swiss Alps midway between the cities of Brig and Interlaken. The site covers 54,000ha, 77% in the Canton of Valais and 23% in the Canton of Berne. Elevation ranges from 900m on the southern slopes to 4,274m on the summit of the Finsteraarhorn. Nine peaks in the site are higher than 4,000m.

The geology of the site derives from the "Helvetic nappe" (a large body of rock that was thrust over younger rock in Europe during the Miocene period). The folding and overthrusting of rock layers during the formation of the Alps, 20 – 40 million years ago, have produced very complex rock formations that have since been exposed by glacial activity. The summits of the Mönch and the Jungfrau, for example, consist of core crystalline rock that was overthrust on top of younger sedimentary limestone. In contrast, the Eiger, the peak located adjacent to the Jungfrau and the Mönch, is almost totally limestone. The physiography of the area is characterised by steep north-facing slopes and relatively gentle southern ones. The alpine crest acts as the watershed divide between the Rhine and Rhône rivers which respectively flow into the North Sea and the Mediterranean.

Classic examples of glacial phenomena occur in the site, such as U-shaped valleys, valley glaciers, cirques, horn peaks, and moraines. Of particular note is the Aletsch Glacier, the largest (128km²), the longest (23km) and deepest (900m) in Europe. The Fiesch glacier is the third largest and second in length in Europe. The retreat of both has been carefully measured since 1892. A related feature is the Trummelbach canyon and waterfall where glacial runoff has formed a spectacular gorge.

Climate is strongly influenced by the dominant winds and orientation of the ranges. On the Bernese side, the climate is sub-oceanic, with higher annual precipitation (1,420mm at Grindelwald). The Valais side is sub-continental with annual precipitation of 758mm at Brig.

Vegetation and fauna are representative of the Alps and vary by slope, aspect and elevation. There is a marked difference in vegetation between the northern and southern slopes. On the north side, forests at lower elevations consist of broad-leaved species such as beech, ash, alder, elm and birch. The south side is too dry for beech, which is replaced by Scots pine. On the northern side, the subalpine zone is dominated by Norway spruce with

mountain ash, silver birch, and stone pine and, on the southern side, by more continental species, such as European larch on young soils. An especially interesting area of stone pine forest is found adjacent to the snout of the Aletsch glacier, where plant succession from the receding glacier has been studied for over 100 years. Above the treeline are extensive areas of rhododendron scrub, alpine grassland, and tundra vegetation and, on the xeric southern slopes, steppe grassland.

Fauna in the JAB region is typical of the Alps, with a wide variety of species including ibex, lynx, and red deer (all reintroduced), roe deer, chamois and marmot as well as several reptiles and amphibians (e.g. the Alpine salamander). A representative range of Alpine birds also occur, including Golden Eagle, Kestrel, Chough, Ptarmigan, Black Grouse, Snow Finch, Wallcreeper, Lammergeier, Pygmy Owl and various woodpecker species.

The Bernese and Valais Alps have been an international centre for alpine tourism and mountaineering since the 18th century. In contrast to its surroundings, the nominated area is accessible by road and cable lifts only up to its perimeter. The exception is the Jungfrau railway which was completed in 1912 and brings over 600,000 visitors annually to a confined viewpoint 4km inside the northern boundary of the site. A very small proportion of these enter the site by ski or foot, often using one or more of the 23 alpine huts in the area. There are no permanent human residents in the site except for maintenance staff at the Atmospheric Research Station located near the terminus of the Jungfrau railway. Some seasonally-occupied farms exist along the southern perimeter and in the Stechelberg valley in the north-west border of the site. Small numbers of sheep and cattle graze these alpine pastures in summer. Over 95% of the area exists in a natural state with no facilities except foot/ski trails and mountaineering huts.

3. COMPARISONS WITH OTHER AREAS

There are 46 areas inscribed on the World Heritage List in the various mountain ranges of the world. These include Huascarán National Park (Peru) which is generally accepted to encompass the most outstanding group of peaks in the Andes, and Sagarmatha National Park (Nepal) which represents "the best" of the Himalayan range. Similarly, the most outstanding portions of many other mountain ranges have been given World Heritage status (for example there is one site each in the Caucasus, Altai, Urals, Pyrenées, New Zealand Alps, St Elias Mountains and the Pacific Coast range). Three natural World Heritage sites are found in the Rocky Mountains of North America, a region larger than Europe which extends over 40 degrees of latitude.

Within the Alps, a region spanning 1,100km and seven countries, no natural World Heritage site has yet been inscribed. The Network of Alpine Protected Areas identifies over 300 protected areas within the Alpine Arc. Most of these are small nature reserves and regional parks (IUCN category V), which may have cultural landscape values but would not appear as likely candidates under World Heritage natural criteria. In the 1997 UN List of Protected Areas (IUCN/WCMC), there are seven areas listed in the Alps under IUCN categories I and II. The JAB region stands out from all of these and other mountains in the High Alps in having the following four qualities:

- The scenic and aesthetic appeal of the JAB region is one of the most dramatic of the Alps, as evidenced by the long history of international visitation to the area. The impressive northern wall of the site with the panorama of the Eiger, Mönch and Jungfrau mountains provides a 25km long signature classic view of the north face of the High Alps. There are a number of other impressive peaks such as the Finsteraarhorn, Aletschhorn, Breithorn and Bietschorn, as well as the extensive views of the Aletsch glacier basin from the Eggishorn ridge. The only other areas in the Alps that rivals the JAB region for sheer scenic splendour are in the Pennine Alps around the Matterhorn/Monte Rosa and Mont Blanc. Both these areas have been much altered by human activity and are not under protective status. High natural scenic values exist throughout the Alps but are most dramatically expressed in the JAB region.
- Glaciation within the JAB region is the most extensive in the Alps. The Aletsch is the largest glacier in Europe in terms of area (128km²), length (23km), and depth (900m). For comparison, the longest glaciers on Mont-Blanc are less than 10km in length. The study of the Aletsch glacier began early in the 20th century and precise mass balance and runoff studies are on-going. Comparative studies on the fast-reacting small glaciers on the northern exposure have provided further indications of climatic change. Along with the extensive glacial cover of the area, an exceptionally wide suite of glacial features also occurs.
- The extensive glaciation and rugged topography found in the JAB region as well as protection measures which date back to 1933 have resulted in it being one of the most (if not the most) undisturbed natural areas

in the Alps. The intact status of such a relatively large area within a long-occupied and intensively-used economic region is another distinctive feature of the site.

- For its record of productive scientific research on geology, geomorphology, climatic change, biology and atmospheric physics, the JAB region is unsurpassed in the Alps and, in certain fields, at the global level. Observations on some of the glaciers go back to the 12th century and have allowed reconstructions of historical fluctuations, particularly of the highly sensitive glaciers on the northern slopes of the site. The scientific importance of the area is also indicated by the selection of the Grindelwald and Aletsch areas as two of four study sites in the Swiss Alps for MAB programme studies in the period 1977 – 1989. As noted in a review of Mountain Research in Europe (Price, 1995), this programme was most productive and generated a substantial quantity of data with practical planning applications. The research station at the Jungfraujoch is one of a network of global sites studying astronomy, high-altitude atmospheric phenomena, radiation and air quality. The Centre for Nature Protection at Riederalp also has facilitated natural history research in the region. While other areas in the Alps and Pyrenées have been important areas for research, scientific activity in the JAB region has been particularly impressive, with a particular emphasis on monitoring and understanding glaciological, geomorphological, and ecological processes (criteria i and ii).

Although the site has not been nominated for its biological values (criterion iv) it does contain a wide range of species typical of the Alps. However, floral diversity is higher in the calcareous massifs of the western and Southern Alps where Mediterranean affinities are stronger. It is important to note, however, that the nominated area is much more than just glaciers and rocks. Almost 20% of the area is in the forest zone and these lower altitudinal belts contribute to the overall natural features of the site.

Global comparisons are difficult and would be most relevant with other sites in temperate glaciated high mountain systems. The closest comparison would be with the Western Caucasus World Heritage site which, although much larger, contains peaks of lesser elevation (3,360m at the highest) and a much lesser extent of glaciation (18sq.km). A comparison of the JAB region with the Khumbu-Everest region in the Himalaya helps illustrate the uniqueness of this much smaller region of the High Alps. The relative altitudinal difference from the last village at the boundary of the JAB region (Stechelberg) to the top of the Jungfrau is 3,000m over a distance of 5km. In the Everest region, the elevation difference between the last village Dingboche (4,358m) to Ama Dablam (6,828m) is about 2,500m. Dingboche's relative relief with Mt. Everest is 4,500m but this is over a distance of 14km. The relative elevation differences and gradients in the JAB region thus are quite substantial even compared with the highest range on Earth. Similarly, the 23km length of the Aletsch glacier is longer than the ice streams flowing from the Everest/Lhotse massif with its 17km Khumbu glacier, 16km Rongpu glacier and 8km long Lhotse glacier. Another comparison can be made with the Canadian Rockies World Heritage site where the relative relief of Mt. Robson to its base, 6km distant, is also about 3,000m. While there are other longer glaciers in temperate mountain regions, e.g., Karakorum, Pamirs, Rocky Mountains, the Aletsch rates high even on a world scale.

4. INTEGRITY

Although portions of the site have been under conservation management since 1933, the JAB region, as now defined, is a collection of different designations combined to form a single contiguous unit. Much work has been undertaken to develop a management structure since the World Heritage nomination document was submitted in July, 2000. This work is on-going but as of the field inspection in March, the early concerns of IUCN on management issues have been addressed as follows:

4.1. Legal Status

The legal basis for the JAB region is a heterogeneous mix of designations from all three levels of government. The communes, which own most of the land in the site, have various contracts and ordinances that provide strong guidelines on construction of roads and buildings and modification to the landscape. The two Cantons also have various ordinances that apply to portions of the site. At the national level, the entire site falls within the Federal Inventory of Sites of National Importance which requires that the Cantons and Communes give special attention to any development within the area. Additionally, the conservation NGO ProNatura is responsible for two portions of the site under lease agreements with the communes.

The end result of these various overlapping legal mechanisms is that the site has a range of measures that have kept it as an intact natural area to date. Recognising, however, that the various designations are complex and

could benefit from a more coordinated approach, a process is now underway to prepare an integrated management plan. This will review the most effective options for protection legislation and suggest how the different jurisdictional responsibilities could best be harmonised. This process is expected to take 2-3 years and may also benefit from a review of protected area policy in Switzerland being conducted by the Swiss Academy of Natural Sciences. In the meantime, IUCN concludes that the existing legal basis is adequate to ensure that the site will not be affected by any activity inconsistent with its potential World Heritage status.

4.2. Management

Although the site is covered as part of regional plans by both Cantons, it does not have an integrated management plan but a working committee is now developing one. The committee has developed a “Mission Statement” that sets out principles and guidelines for the management of the site and which will be elaborated in the management plan. The preparation of the plan will take 2-3 years due to the intensive consultation process.

The current administrative structure which oversees and coordinates all the stakeholders in the area is given below (see Figure 1). This structure includes a Committee made up of representatives from NGOs, business, science, media, the tourism sector and regional planning authorities. All have contributed to the budget for current activities. There is also a “Network of Communes” committee which includes the presidents of all 14 communes.

4.3. Boundaries

The current delineation of the extent of the site was arrived at after intensive consultations, including formal voting procedures, with the 14 local communities and other stakeholders. While encompassing the main features of this portion of the high Alps, several adjoining areas of high associated natural values were not included. These occur along the northeast, eastern and western boundary as well as adjacent to Riederalp. IUCN is aware that discussions over possible extensions to the site are being held and that these will take some time to mature. IUCN concludes that the current boundaries adequately cover the highlights of the area. However, further discussions during the management planning process will likely lead to some refinements.

4.4. Other Threats

The JAB region is little impacted by human use inside its boundaries except for some declining grazing and forestry activity along the southwest and northwest margins. Adjacent to parts of the site are tourist developments that, if expanded, could affect its aesthetic values. The nomination notes that an official buffer zone is not feasible or necessary as much of the site is bordered by steep topography, glaciers, or seasonally-used pastoral landscapes. While these reasons are evident, IUCN would suggest that the “pressure points” associated with downhill skiing facilities near or adjacent to parts of the site should be given particular attention in the management plan.

At a global level, climate change is certainly affecting the site as evidenced in the steady retreat of glaciers over the past century. As in all glaciated areas, this will have inevitable effects on glacial volumes and scenic attractions. This should be recognised as an ongoing geomorphological process (criterion i) of which the site provides an outstanding example.

5. ADDITIONAL COMMENTS

5.1. The preparation of this nomination is a model case study in the “bottom-up” approach. Due to the structure of the Swiss system in which most responsibility over land use is in the hands of local authorities (communes), decision-making begins at that level and then proceeds up through the Cantonal and then Federal levels. Support for the nomination at the local level was first registered in community votes in favour of proceeding with the nomination, followed by approvals by the Cantons before reaching the Federal authorities. The major benefit of such an approach is that local support for the site is assured.

5.2. Throughout the Alps there is a strong historical and cultural presence. The JAB region, while predominantly natural, is surrounded by outstanding historical monuments and a harmonious cultural landscape. Indeed, where the site is not bordered by uninhabited precipitous topography, it abuts a landscape with a harmonious blend of pastoral uses, historical routes and small villages. The immediate regional land uses are carefully regulated and serve a *de facto* buffer function to the site.

5.3. The JAB region was one of two sites proposed as possible World Heritage natural nominations in the Alps at the June 2000 regional thematic expert meeting on potential natural sites in the Alps, held in Austria (the second being the Mont Blanc). This meeting noted the potential of cultural landscapes and generated a number of suggestions including the possibility of a serial site in the Alps. These discussions are evolving, but it is IUCN's view that the JAB nomination is clearly justified on its own merits as having the most outstanding combination of universally outstanding natural features in the region.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

The JAB has been nominated under natural criteria (i), (ii) and (iii). The rationale for inscription of each is as follows:

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

The JAB region provides an outstanding example of the formation of the High Alps which resulted from uplift and compression during the Tertiary geological period 20-40 million years ago. Within an altitude range from 900m to 4,274m, the region displays 400 million year old crystalline rocks thrust over the younger autochthonous (rocks formed *in situ*) calcareous sediments due to the northward drift of the African tectonic plate. Added to the dramatic record of the processes of mountain building is the great variety of geomorphic and glaciological features found in the site. Classic examples of U-shaped glacial valleys, cirques, horn peaks, valley glaciers and moraines are found in abundance. The JAB region is the most glaciated area in the Alps and incorporates the Aletsch glacier, the largest and longest in western Eurasia. It is thus of significant scientific interest in the context of glacial history and ongoing processes, particularly related to climate change. IUCN considers that the site meets criterion (i).

Criterion (ii): Ecological processes

Within its altitudinal range and its dry southern/wet northern exposures, the JAB region provides a wide range of alpine and sub-alpine habitats. On the two main substrates of crystalline and carbonate rocks, a variety of ecosystems have evolved in the absence of significant human intervention. Superb examples of ecological succession exist, including the distinctive upper and lower treeline of the Aletsch forest. The global phenomenon of climatic change is particularly well-illustrated in the region, as reflected in the varying rates of retreat of the different glaciers, in turn providing new substrates for ongoing ecological succession. IUCN considers that the site meets criterion (ii).

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

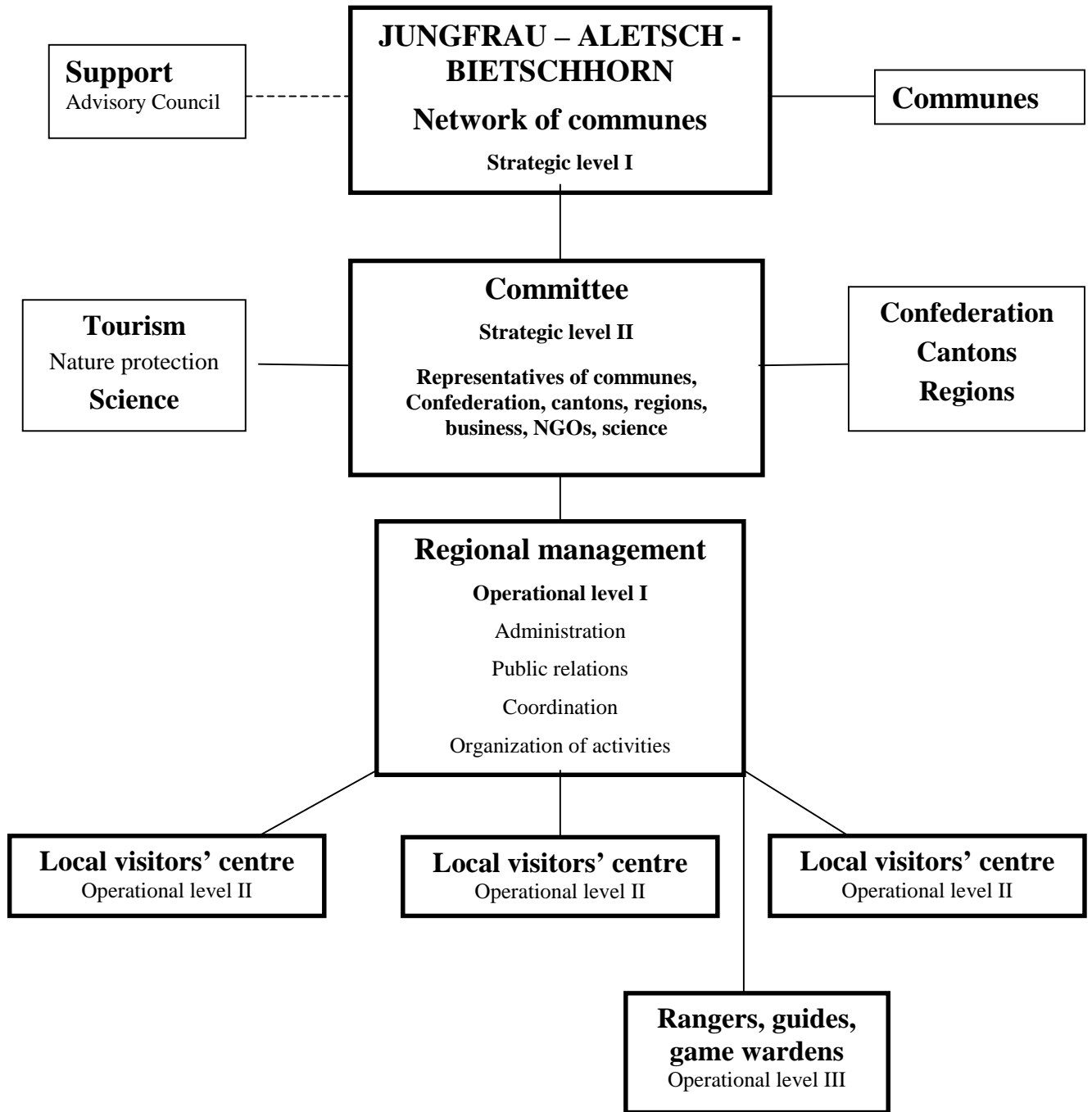
The impressive landscape of the JAB region has played an important role in European literature, art, mountaineering and alpine tourism. The aesthetics of the area have attracted an international clientele and it is globally recognised as one of the most spectacular mountain regions to visit. The impressive north wall of the High Alps, centred around the Eiger/Mönch/Jungfrau and extending 20km in length, is a superlative scenic feature. On the southern side of the alpine divide, tectonic forces and glacial erosion have resulted in a collection of spectacular peaks and a valley system which supports the two longest glaciers in western Eurasia. IUCN considers that the site meets criterion (iii).

7. RECOMMENDATION

The Bureau recommended to the Committee that the Jungfrau-Aletsch-Bietschorn be inscribed on the World Heritage List under natural criteria i, ii, and iii.

IUCN recommends that the Committee also encourage the Swiss authorities in their preparation of a management plan which, when completed, may also lead to modifications and extension to the boundaries. A mission to report on the status of the plan and to review any boundary changes should be undertaken in two years time.

FIGURE 1: STRUCTURE OF THE COMMUNITY OF INTEREST



From "Jungfrau - Aletsch - Bietschhorn UNESCO World Natural Heritage (candidate) Mission Statement (Draft, 07.06.01)" [The statement forms the basis and guidelines for the future management plan.]

Map 1

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATIONS

IUCN NOTE ON UKRAINIAN NOMINATIONS

During April 2001, IUCN undertook evaluations of five nominations for World Heritage natural sites in Ukraine, as follows:

- 1) Holy Tops (Svyati Gory);
- 2) Polissian Swamps and Slovechno-Ovruch Ridge;
- 3) Kaniv's Hills (Kanivski Gory);
- 4) Karadag; and
- 5) Podillian Ridge.

The individual reports on these evaluations are appended.

The Bureau did not recommend the inscription of any of the sites as they do not meet World Heritage natural criteria or Conditions of Integrity as laid out in the Operational Guidelines.

Following the review of the five nominations from Ukraine, the Bureau noted that IUCN indicated that other sites in Ukraine, including sites shared by Ukraine and neighbouring State Parties, may have greater potential to meet natural criteria than the five sites reviewed by the Bureau. The Bureau noted that potential sites for nomination could be identified by means of a World Heritage expert workshop, organised by the World Heritage Centre and the Ukrainian authorities. Such a workshop could develop an understanding of World Heritage requirements, help in the selection of appropriate sites and set the required standards for their management. Ideally, the workshop would involve natural heritage specialists from neighbouring countries as well as Ukrainian specialists. Cultural interests should also be involved, because several sites reviewed by IUCN have important cultural components. The Bureau noted that financial support for the organisation of such a workshop had already been offered by UNDP during the IUCN field mission.

The Bureau invited Ukraine to discuss this matter with the World Heritage Centre.

Map 1

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

HOLY TOPS (SVYATI GORY) (UKRAINE)

1. DOCUMENTATION

- i) IUCN/WCMC Data Sheet: **(1 reference)**.
- ii) Additional Literature Consulted: **Ministry of Environment and Natural Resources. 2000. National Report on the State of Environment in Ukraine 1999. Rayevsky Scientific Publishers. Kiev; Hilton-Taylor, C. (Compiler) 2000. Vegetationszonen und Klima. Ulmer Verlag, Stuttgart, Germany.**
- iii) Consultations: **5 reviewers contacted; Government of Ukraine officials and park staff.**
- iv) Field visit: **Gerhard Heiss and Yuri Badenkov, April 2001.**

2. SUMMARY OF NATURAL VALUES

The nominated site of Holy Tops (HT) is based upon the Svjati Gory National Nature Park in Donetska Oblast, eastern Ukraine. It covers a small part of the Seversky Donets River catchment. The site consists of a cluster of forest patches located on both sides of the Seversky Donets river, covering a total area of 40,589ha. HT contains three geomorphological features: the river valley with its floodplain and terraces (nearly 70% of the area); a hilly plateau, which is the northern branch of the Donets Heights, and which overlooks the river valley (nearly 30% of the nominated area); and, the steep slopes between the plateau and the floodplain into which a series of erosion gullies have been cut.

The site consists of magmatic and metamorphic rocks of the Precambrian era, and metamorphic and sedimentary complexes of the Palaeozoic. The upper strata are mainly made up of a deep layer of Cretaceous sediments. The Seversky Donets valley contains the present floodplain and several older floodplains (now marked by terraces) which are made up of sandy and sandy-clay alluvium, the oldest dating from the Cretaceous period. Only the first three of the eight terraces occur within the nominated site: the first and highest of these contains many natural ponds. A marked feature of the landscape is the chalky rock outcrops and cliffs on the right, southern riverbank, rising up to 100-120m above the base of the valley.

On the slopes there are relict stands of chalk pines (a variety of Scots pine), whilst floodplain forest remnants are found on the flat, left, northern bank of the river. Within the site, there are 943 vascular plant species, 49 of which are listed in the Red Data Book of Ukraine and 17 in the European Red Data Book. There are 43 mammal species, 197 birds, 10 reptiles, 9 amphibians, and 41 fish species. Notable animal species are wolf, otter, sea eagle, imperial eagle, peregrine falcon, corncrake and lesser kestrel.

3. COMPARISON WITH OTHER AREAS

The HT is part of the Pontian Steppe Biogeographic Province. This province has been seriously altered by human action in the past, and natural vegetation is now restricted to scarce remnants. The province is represented by one natural World Heritage site in Romania (the Danube Delta). However, the Danube Delta is a wetland and cannot be considered representative of a biogeographic province where steppe is the key feature. Nonetheless, the condition of the floodplain (alluvial) forests in the Danube Delta World Heritage site is of significantly higher value than the remnant floodplain forests in HT, which are a relatively minor part of the nominated area's forest cover. Although steppe elements occur within the nominated area, forest dominates, covering over 90% of the site, and represents the dominant natural vegetation cover.

The vegetation of HT has been much affected by human activities. About 200 exotic species of vascular plants have been introduced into the area. Some 8,000ha of coniferous plantations are found within HT, and old

growth stands are very scarce. While a proportion of oak forest stands in the northern part of the site contain individual trees 300 to 400 years old, these are few and scattered among younger forest stands.

Pontian Steppe elements are also important within the 33,308ha Askaniya Nova Biosphere Reserve in Ukraine, indeed, this may be the best steppe remnant of the biogeographic province. However, World Heritage quality is doubtful, both in terms of international significance and because of integrity problems (only 11,312ha are under state control; and exotic game (zebra) has been introduced to preserve the steppe vegetation). Another site within the Pontian Steppe Province is Karadag on the Crimean peninsula, (also nominated for World Heritage status in 2001). It should be noted that the southeastern part of the Crimean peninsula has been identified by IUCN/WWF as part of the South Crimean Mountains and Novorossia Centre of Plant Diversity. This area represents an enclave of Mediterranean vegetation in the Black Sea area but also contains some steppe elements.

In summary, all existing reserves of the Pontian Steppe Biogeographic Province represent either different features, such as steppe or coastal wetland, (e.g. Chemomorskiy Ukraine) than HT or are very limited in size. For example, the three Ukrainian Nature Zapovedniks (Category I, IUCN) of Luganskiy, Ukrainskiy Stepnoy and Elanetskaya Steppe are all less than 3,000ha in area.

The chalk cliffs, which rise over the flat valley bottom, represent the most impressive feature in HT, and these may be unique within the Pontian Steppe Province. However, this feature can be found in more impressive forms, for example, along the southern coast of the Baltic (e.g. Jasmund National Park, Germany; Wolinski National Park, Poland), in Northern France and Southern England.

While the diversity of plant and animal species within HT may be considered important on a national scale, it is not outstanding in a global context. Rare and threatened species of fauna and flora are mostly of national importance, though a few are regionally significant; they are not considered important at the international scale.

In conclusion, the nominated site is part of the largest forest area in the steppe region of Ukraine, which stretches along the river valley of Seversky Donets from Kharkov to the border of Russia. HT's conservation value is that it contains the last remnants of original vegetation in the highly industrialised and populated region of the Donets Basin. However, the nominated site has been significantly affected by human activities and very few areas are in a natural state.

4. INTEGRITY

4.1. Boundaries

The nominated site does not form a single unit but is made up of numerous individual units, some of which are only a few hectares in size (see Map 1). In general the boundaries of these units follow the boundaries of forest lands. The complex mosaic of forests, agricultural lands and settlements makes it impossible to form a natural unit based upon the river and its valley. Moreover, the individual units of the nomination are divided from each other by railways and roads. Though the Seversky Donets River is the focus around which these units are located, the river itself is mostly excluded from the nominated area. The exception is a 10km stretch of the river which is included within the eastern extremity of the nominated site.

4.2. Management

The Ministry of Environment and Natural Resources oversees National Nature Parks in Ukraine and is responsible for all regulations and activities affecting HT. However, the day to day management of the nominated site is carried out by seven different authorities: 25% of the area is under the direction of the national park administration; 72% is managed by two different state forest districts; and 3% belongs to local administrations (Slavyanogirs city council and Yariv village council) and organisations (Scientific Research Institute of Complex Mechanisms). Each authority has its own budget for the management of its territory and acts independently within the regulations and under the supervision of the national park administration. A council with representatives from all authorities and organisations has been established for the co-ordination of activities. However, the authorities, responsibilities and priorities within the co-ordination council are unclear.

A zoning plan has been elaborated, but not yet approved by the Cabinet of Ministers. According to the plan, HT will be subdivided in four zones. Forest management will be prohibited in the strict reserve zone (10% of the area). Sanitary cuttings (e.g. extraction of dying trees) will be permitted on 80% of the nominated site. The

remaining 10% will be reserved for buildings, infrastructure, and economic use.

A management plan does not yet exist, but is under preparation. A management plan for rare and threatened species was presented to the IUCN field mission. This plan lists the species but does not specify the activities required to manage them.

4.3. Threats

Although the nomination document claims that no people live within the nominated site, a village (Slawjanogorsk) is located within the northern boundary of HT. Other villages and settlements are excluded from HT, but many are found immediately outside the site boundaries, or are located as enclaves within the nominated area. All these settlements create minor pressures upon the protected area.

In 1999, there were 19 recorded cases of high level pollution recorded on the Seversky Donets River, and 70 cases on its tributaries. In particular, manganese compounds, oil products, and nitrite/nitrogen levels in Seversky Donets exceed the average levels of Ukraine's main rivers. The Krasnooskil reservoir, on a tributary river 16km upstream of the nominated site, shows the highest phenol concentrations of all main water reservoirs in Ukraine.

In the period 1995-1999, there was a registered decrease in the water level of the Seversky Donets Basin. If water levels continue to drop this will lead to the death of trees and the eventual deforestation of HT. HT is also proposed as a priority area for prospecting for the production of geothermal energy.

Recreation plays an important role within the park. The combination of a well-known monastery at Holy Tops and one of the last forest remnants in the region represents a big attraction for visitors. Medicinal water sources are the basis for several health resorts within the park's territory, with a capacity to accommodate 28,000 people and an annual visitation of 120,000 people. It is planned to double the areas designated for recreation within the Donetsk region, by 2026 (an increase of 170,000ha), and it is likely that many new recreation areas will be established within the boundaries of HT.

In summary, the reserve, and the nominated site, are so fragmented by infrastructure, settlements and agricultural lands that it is impossible to form a self-sustaining ecological unit. There are several different authorities with management responsibilities, and most parts of the reserve are dedicated to some kind of forest production. The environmental condition of water resources is poor but park management is not in a position to improve the situation as the river is mostly excluded from the park. Park management also lacks sufficient resources and equipment to secure needed environmental improvements in the reserve. Finally, recreation pressures seem likely to grow appreciably in future.

To conclude, it is clear that HT does not meet the conditions of integrity as laid out in the Operational Guidelines (paragraph 44 (b)).

5. ADDITIONAL COMMENTS

The nominated site has important cultural values. It is named after the monastery which is found on the slopes of the right bank of the Seversky Donets River where monks' cells and rooms for prayer have been hewn into the chalk cliffs. The hill tops are crowned with churches which overlook the extensive plains stretching along the left river bank; seen from below, they are an impressive feature. Several buildings are under restoration and the monastery is now inhabited once again by 70 monks.

6. APPLICATION OF CRITERIA

HT Park was nominated under criteria (i), (iii), and (iv). IUCN does not believe that the site meets any criteria nor the Conditions of Integrity as laid out in the Operational Guidelines (paragraph 44 (b)).

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

Geological features and processes may be important in a region dominated by plains and lacking in relief, but the geological and geomorphological features and processes of HT are clearly not of global importance. IUCN does not consider that the site meets criterion (i).

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

HT contains two dominant features: steep valley slopes with chalk cliffs, and forests. From a global perspective the chalk cliffs are not a unique feature and more impressive chalk cliffs are found, for example, along the coasts of the Baltic, France and the UK. The forests of the site have been heavily impacted by forest management, and anthropogenic influence will continue for the foreseeable future within most of the nominated area. Although the features of the site are nationally significant they are not of global significance. IUCN does not consider that the site meets criterion (iii).

Criterion (iv): Biodiversity and threatened species

The numbers of plant and animal species found in HT are not exceptional, and the rare and threatened species found in the nominated site can be found elsewhere in the region. IUCN does not consider that the site meets criterion (iv).

7. RECOMMENDATION

The Bureau did not recommend the inscription of Holy Tops (Svyati Gory) on the World Heritage List (see recommendation of the Bureau covering all five nominations from the Ukraine, page 61).

Map 1

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

POLISSIAN SWAMPS AND SLOVECHNO-OVRUCH RIDGE (UKRAINE)

1. DOCUMENTATION

- i) IUCN/WCMC Data Sheet: **(1 reference).**
- ii) Additional Literature Consulted: **Ministry of Environment and Natural Resources 2000. National Report on the state of environment in Ukraine 1999. Rayevsky Scientific Publishers, Kyiv.**
- iii) Consultations: **5 reviewers contacted; Government of Ukraine officials and park staff.**
- iv) Field Visit: **Yuri Badenkov, Gerhard Heiss, and Zbig Karpowicz, April, 2001**

2. SUMMARY OF NATURAL VALUES

The nominated site of the Polissian Swamps and Slovechno-Ovruch Ridge (PSSOR) is part of the catchment area of the Prypyat River. The Prypyat swamps are one of the most extensive wetland areas in Europe, stretching from the Polish border to the Dnjepr River (about 500 km), and enclosing more than two million hectares. An area of 37,110ha has been nominated for World Heritage status along the Belarus border. The site consists of four protected areas which encompass eight separate core areas covering in total 16,120 ha linked together by a buffer zone of 20,990 ha.

The most important landscape features of the nominated site are the open and forest-covered peatlands, and the glacially-formed sand ridges, dunes and low hills dominated by Scots pine. The site contains one small lake of about 10ha, which has been artificially enlarged by a dam. The deforested Slovechno-Ovruch Ridge (316m), which rises above the forested bogs, is included in the eastern-most part of the nominated site, covering about 5% of its total area.

PSSOR is located on the northern part of the Ukrainian crystalline shield. The crystalline base of the lower parts of Polissian swamps is formed from granites. Quartzites and shales dominate on the Slovechno-Ovruch Ridge, along with intrusions of granites and labradorite. These strata are covered by a 10 to 15m layer of loess which, when exposed to erosion, gives rise to a network of ravines.

The forests show boreal and boreonemoral characteristics, which reach their southern limit in northern Ukraine. The forests are mostly young in age (less than 100 years) and contain significant areas of artificial plantations which cause serious impacts on soil systems (i.e. through the operation of drainage ditches). Old trees are very scarce and survive only as single trees kept for bees' nests. Extensive drainage systems are found in most parts of the nominated sites altering the natural water systems of the reserve.

About 600 vascular plants are recorded from the site, which are characteristic of this forest type. The fauna are represented by 38 mammals, 180 birds, 7 reptiles, 11 amphibians, and 10 species of fish. Noteworthy species are moose, wolf, lynx, otter, imperial eagle, peregrine falcon, capercaillie, corncrake, and European bog turtle.

3. COMPARISONS WITH OTHER AREAS

The Boreonemoral Biogeographic Province is represented by one existing World Heritage site (Belovezhskaya Pushcha/Bialowieza Forest in Belarus/Poland). By comparison with PSSOR, Belovezhskaya Pushcha/Bialowieza Forest is larger (more than 90,000 ha) and better preserved. It also displays a more diverse range of forest types (in particular deciduous broadleaf types), and has more species of flora (over 900 vascular plants, 200 mosses) and fauna (55 mammals, 212 birds, 7 reptiles, 11 amphibians), including the European

bison.

There are also close similarities between PSSOR and other reserves in Poland, Belarus and the Russian Federation, most notably the Prypyatskiy Strict Nature Reserve (Category I, IUCN) in Belarus, some 40 km to the northeast of the nominated site. This reserve is larger (62,213ha), more diverse in landscape features, and its natural qualities are more intact. The Prypyatski reserve and the Belarus lands adjoining the Prypyat River, and the river itself, are areas of regional importance to conservation.

Other comparable areas are Berezinsky Strict Nature Reserve in Belarus (76,201ha), Mazurski Landscape Park in Poland (49,616ha), and the following protected areas in Russia: Samarskaya Luka National Park, (127,186ha); Marii Chodra National Park (36,593 ha); Smolny National Park (36,482 ha); Nizhnyaya Kama National Park (25,848 ha); Khvalynsky National Park (25,514 ha); and Chavash Varmane National Park (25,199 ha). Many of these sites are larger than the proposed PSSOR and with greater natural integrity. For example, Poland's Mazurski Landscape Park has suffered far less human impact than the nominated site. There are two other Ukrainian National Parks in Polissia: Shatsky (49,000ha, including a strict nature protection zone of 5,900 ha) and Desnyansko-Starogutsky (16,200 ha, with no strict nature protection zone).

To conclude, PSSOR is the best representation of the Boreonemoral biogeographical province in Ukraine but there are far more important sites with Boreonemoral characteristics in neighbouring countries. Moreover, the state of preservation of the forests in the nominated site is not satisfactory, and several other reserves within the biogeographical province have been better protected.

4. INTEGRITY

4.1. Boundaries

The nominated site forms a very small part of the catchment area of the Prypyat River and is divided into core areas and buffer zones. The core areas consist of eight separate units, the largest being approximately 10,000ha. The boundaries of the core areas enclose either the ecologically least altered areas, or particular features (e.g. the only lake of the area). The buffer zone functions as a link between the individual units of the protection zone and includes all the significant parts of the ridge. The ridge itself consists mostly of agricultural lands and settlements with about 5,000 inhabitants. Several public roads also fragment the buffer zone.

The boundaries of the nominated site do not enclose any of the major tributaries of Prypyat River, indeed they exclude most of the more important smaller streams.

In conclusion, the nominated site is not a complete ecological unit, and it omits certain key elements of the Prypyat ecosystem.

4.2. Management

A management plan does not exist. Furthermore there is no single administrative body with overall responsibility for the supervision and management of PSSOR. The state forest board based at Sjedjesowka has both planning and management responsibilities for the Polissian Nature Reserve (the largest reserve with 20,104ha). However, a separate forest board (based at Kovanka) is responsible for the overall supervision of the seven other core areas, and of the buffer zone. The day-to-day management of the nominated site is the responsibility of its owners, the state forest board and several agricultural enterprises. The actual management of the site is still strongly influenced by forestry. Fires, which play an important role in natural dynamics of this pine-dominated forest ecosystem, are consequently suppressed (though this may be justified from a conservation viewpoint because of the small size of the reserves). Sanitary cuttings are common; and no areas are entirely free from logging.

There are relatively large numbers of staff, but the budgets for managing the reserves are minimal. The prevailing economic difficulties affecting all sectors of life in Ukraine make it difficult to secure the resources and priority needed to undertake programmes of ecological restoration, and to achieve better levels of management of the protected areas system as a whole and the PSSOR area in particular.

4.3. Threats

The nuclear accident of Chernobyl has affected PSSOR with radioactive fallout. However, contamination is lower than might be expected in a site which is located only 160 km west of Chernobyl. After the accident, the average Caesium contamination in the region rose from 0,15 Curie per km² to 1 Curie per km² (max. levels 7 Curie). The pollution with isotopes of plutonium is only slightly above that in non-contaminated territory and levels of strontium-90 are in the lowest category on the national classification scale.

5. ADDITIONAL COMMENTS

Plans for a transboundary reserve with Belarus were mentioned during the site visit. While such cross border co-operation would be very welcome, the potential additional area in Belarus that might be added to the nominated site is, however, rather small (less than 10,000ha). The opportunity to link the Prypyatskiy Strict Nature Reserve in Belarus (40km northeast of PSSOR) with the PSSOR reserve, and so to establish an ecological unit of international significance, is restricted because of the extent of habitat fragmentation caused by settlements and intervening infrastructure.

6. APPLICATION OF CRITERIA

The PSSOR was nominated under all four natural criteria. IUCN does not consider that the site meets the criteria, for the reasons summarised below:

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

The PSSOR site includes only a very small part of the Prypyat River basin. It rises with gentle slopes to the Slovechno-Ovruch Ridge 150m above the lowest point. There are no impressive geomorphic and physiographic features, nor any on-going geological processes of outstanding global importance. IUCN does not consider that the site meets criterion (i).

Criterion (ii): Ecological processes

Terrestrial and fresh water ecosystems are seriously altered by human influence. The natural dynamics of forest ecosystems have been, and still are, suppressed. Forest ecosystems will need more than 100 years to regain their natural condition. While the precise scientific affects are as yet unclear, it is evident that drainage in the surroundings of the PSSOR has affected the natural processes of water and forest ecosystems within the site itself. Active intervention is desirable to help restore damaged ecosystems. IUCN does not consider that the site meets criterion (ii).

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

The flat basin area, gentle slopes of the ridge and rather monotonous forest ecosystems create a landscape which cannot be considered of outstanding natural beauty or of great aesthetic importance. IUCN does not consider that the site meets criterion (iii).

Criterion (iv): Biodiversity and threatened species

PSSOR is representative of the boreonemoral biogeographic province. Flora and fauna show average levels of diversity but do not reach outstanding levels for the province. Most threatened species are of national importance, only a few are of regional importance and even these are commonly found in many other reserves in the province. IUCN does not consider that the site meets criterion (iv).

Finally, the site does not meet the related conditions of integrity described in Operational Guidelines (paragraph 44 (b)).

7. RECOMMENDATION

The Bureau did not recommend the inscription of Polissian Swamps and Slovechno-Ovruch Ridge on the World Heritage List (see recommendation of the Bureau covering all five nominations from the Ukraine page 61).

Map 1

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

KANIV'S HILLS (KANIVSKI GORY) (UKRAINE)

1. DOCUMENTATION

- i) **IUCN/UNEP-WCMC Data Sheet:** (1 reference).
- ii) **Additional literature consulted:** Ministry of Environment and Natural Resources. 2000. **National Report on the State of Environment in Ukraine, 1999.** Raevsky Scientific Publications. Kiev. 184 pp; Hancock, P.L. *et al.* 2000. **The Oxford Companion to The Earth.** Oxford University Press.
- iii) **Consultations:** 6 external reviewers contacted; Government of Ukraine officials and park staff.
- iv) **Field visit:** April 2001. Gerhard Heiss, Yuri Badenkov and Zbigniew Karpowicz

2. SUMMARY OF NATURAL VALUES

Located on the banks of the River Dnieper in central Ukraine, Kaniv's Hills (KH) straddles the border of Cherkaska and Kyivska Oblasts. The nominated area of 14,230ha is essentially made up of two protected areas. There are also three historical-cultural reserves but these are located almost entirely within the boundaries of the protected areas (see Table 1). KH has five independent core areas, two of which are located on the east bank of the Dnieper River; the other three are islands on the river (see Map 1). The core areas are linked by a buffer zone. A small area of the buffer zone (2,000ha adjacent to Kanivskiyi Nature Reserve) is included within the nominated area.

Table 1. Protected Areas and Historical-Cultural Reserves of Kaniv's Hills

Protected Areas and Historical-Cultural Reserves	Area (ha).
Kanivskiyi Nature Reserve (including: buffer zone of approximately 2,000ha; Shevchenko's National Monument (27ha); and Tarasova Hill cultural reserve)	3,381
Trakhtemyrivsky Regional Landscape Park (including 309ha of Trakhtemyrivskiyi historical reserve)	10,711
Trakhtemyrivskiyi historical reserve (total area 447ha).	138
Total	14'230

KH is an area of low hills (80-255m) on the shores and islands of the Dnieper. The hills of the nominated area are derived from a terraced floodplain which was formed by the deposition of wind-blown loess and alluvial sediments during the last, or Mindelian, Ice Age (100,000-18,000 bp). After the retreat of the ice sheets the plateau was covered by forest until it was deforested during the 19th century. Exposed to the elements, the loess and sand plateau was extensively cut by erosion, forming a dense network of some 300 ravines. Reforestation during the 20th century stabilised the hills once more.

The nominated area includes elements of alluvial forest on the islands of the Dnieper and a mosaic of forest and steppe grasslands on the mainland. The varied topography and habitat has led to a diversity of plantlife, including almost 1,000 vascular plant species. Fauna are also relatively diverse with 51 species of mammals including beaver and wild boar. KH is a stopover for migrating waterfowl and some 226 bird species have been recorded including a range of raptors. However, all of KH has been altered to varying degrees by human activities and now contains large areas of forest plantations and agricultural land.

3. COMPARISON WITH OTHER AREAS

Loess is a type of terrestrial sediment formed by the accumulation of wind-blown dust. Loess has been accumulating on the land surface for several million years but accumulation increased notably at the beginning of the Quaternary period (2.6 mya) with the greatest accumulation rates coinciding with the cold and arid conditions of glacial periods. Loess deposits are light and porous in nature making them ideal for cultivation and loess is a major component of the soils of the world's 'breadbasket' regions. Its light and porous nature also make loess prone to erosion and large-scale landslides and mass flowage of loess is triggered by heavy rainfall. Loess is found in many parts of the globe, but the thickest and most extensive cover occurs in China, middle Asia (Tajikistan, Uzbekistan, Kazakhstan) central and western Europe, central north America, the *pampa* and sub-Andean basins of South America and New Zealand. The thickest deposits of loess occur in north-central China on the Loess Plateau, where it reaches a depth of 330m.

Like lake sediment, loess deposits act as a record of climate change. Steady deposition of loess on China's Loess Plateau has resulted in sequences that provide the most complete terrestrial record of climate change for the Quaternary period. Loess successions have also been studied in the 'Palouse' region of Eastern Washington, USA where sequences reach depths of 75m. The sequences in Europe, including KH, are discontinuous and fragmented and are therefore not considered valuable for study.

In conclusion loess deposits are found throughout the world and deposits in China and the USA are more valuable than those of KH in terms of their contribution to the study of Earth's history.

It is difficult to compare the ecological values of KH to other natural areas. It contains only fragments of two natural ecosystems: alluvial forest and steppe grassland, which occur in small patches within the nominated site. The site has been so substantially altered by human activities (see section 3) that comparison with other World Heritage sites is not really possible.

KH is part of the Middle European Forest Biogeographic Province which includes three natural World Heritage sites: the Srebarna Nature Reserve (Bulgaria); the Messil Fossil Pit (Germany); and the Caves of the Aggtelek Karst and Slovak Karst (Hungary/Slovakia). None of these sites has steppe or alluvial forest elements. However, Srebarna, as a wetland, is comparable to the shore and island portions of KH. Though Srebarna has less bird species (180) compared to KH (226), it contains important populations of globally endangered species such as the Dalmatian pelican. Except for the 'near-threatened' white-tailed eagle, there are no globally or regionally threatened bird species in KH. Srebarna is also a single, albeit small, natural area, whereas KH is made up of isolated elements of a highly altered waterbody i.e. reservoir shore and islands downstream from a large dam. The Danube Delta in the Pontian Steppe Biogeographic Province covers almost 680,000ha of wetlands, being far larger with far greater natural integrity than KH.

Compared to other areas in Ukraine, KH is not exceptional in terms of its importance for bird conservation. Of the 102 Important Bird Areas identified by Birdlife International in Ukraine, Sivash Bay on the Sea of Azov, incorporating elements of steppe, mire and coastal habitat, is considered to be the most important. Although the white-tailed eagle occurs in KH, the home range of these birds extends outside the nominated area, along the length of the river valley. There are other areas in Ukraine which are more important for this species: Dneprovsko-Teterevskoe Zakaznik [30,000 ha]; Kiev Reservoir [102,000ha]; and the Dnieper and Desna valley lowland forest [120,000ha].

In terms of habitat, steppe and alluvial forest cover very small areas of KH. The alluvial forest covers just 520ha of the 3,300ha Nature Reserve and steppe areas occur as patches of remnant grassland in the forest of the Nature Reserve. The forest is encroaching on the steppe areas, which can only be maintained by grazing domestic animals. These patches of steppe are not comparable with proper steppe reserves, such as Askaniya-Nova (33,000ha) and even the smaller but more natural Ukrainsky Stepnoy (2,756ha) and Elanetskaya Step' (1676ha). The most undisturbed steppe grasslands in Ukraine are found in the former military zones of the eastern Kerch Peninsula.

The nomination notes that the Nature Reserve has been the subject of extensive research and, in comparison with similar areas in the region, this is probably the site's most important attribute. However, there are several other sites in Ukraine (such as Askaniya Nova, the Crimea, and the Carpathians) which have been equally well researched and which continue to be used by universities.

4. INTEGRITY

4.1. Ecological Condition

Much of KH has been altered by human activity. For example, 96% of the Regional Landscape Park is used for agriculture and commercial forestry plantations and five large villages are located within the core area of the park. Although there are small areas in the nominated site in a more natural condition, these are largely artificial or secondary in origin and cannot be considered to represent true natural systems. The steppe areas, for example, are either being reforested by natural colonisation or are being artificially restored by grazing. This implies that forest, not steppe, is the natural ecosystem of the site. In some areas, the Nature Reserve has been artificially reforested to prevent erosion of the surface area. There are also sanitary cuttings in the nature reserve.

The Dnieper has been dammed in the vicinity of KH, which includes areas of the reservoir which were flooded in 1975. Much of the wetland areas of the nomination are therefore artificial. Some of the islands are also artificial. The northern and eastern boundaries of the KH are formed by the reservoir, which is severely eroded along its banks. Changes in the water level of the reservoir and discharges from the dam also have large impacts on the wetland areas of the nomination. For example, the river would naturally freeze in the winter but with the discharge of warm water from the power plant this is not now always the case. The management of the water level of the reservoir and the rate of discharge of water into the river is not controlled by the management bodies of KH.

4.2. Management and Land Tenure

Each of the units of the nomination has its own management plan, and staffing levels for each unit are considered to be adequate. However, there is no overall management plan for the site and the IUCN field mission noted that there is inadequate coordination of the management of the individual protected areas.

The Kanivskiy Nature Reserve and the Shevchenko's National Monument are managed by the Shevchenko University in Kiev while Trakhtemyrivskiy Regional Landscape Park and historical reserve are managed by a joint-stock company. The joint stock company rents park land from the state and private landowners. The management goals of the Regional Landscape Park are to create a 'past landscape' based on cultural and traditional practices. The aim is to attract tourism to the park for which a large modern 'park centre' has been constructed on the reservoir shore together with holiday chalets. A network of trails will be laid for visitors. In addition to tourism, the company also plans to profit from wheat farms, commercial forests and traditionally managed orchards and vineyards. Though this is an innovative approach to protected areas management, IUCN is concerned that, without some government control, the long-term security of the area cannot be guaranteed.

4.3. Boundaries

The nominated site is made up of five individual components. Although these areas are linked by the buffer zone, the nomination does not constitute a self-sustaining unit. Some key natural areas are also outside the boundaries of KH. For example, the Khmilnyanskyi Ravine, one of the largest in Europe, is not wholly included within the site's boundaries.

There are other problems with the boundaries of the nomination. For example, the Nature Reserve directly adjoins the city of Kaniv: there is no buffer zone between them. Within the Regional Landscape Park there are small strictly protected 'nature reserves' which amount to 4% of the park area. However, their management is a challenge as they are made up of some 69 individual parcels of land.

4.4. Threats

The aesthetic qualities of KH are threatened by industrial and residential developments immediately outside the park's boundaries. Housing has been developed on the east bank of the Dnieper, opposite the nominated area. These developments are within sight of the Nature Reserve and have destroyed the scenic views across the river to the east. It is likely that further areas on the east bank will be developed for housing, in particular 2000ha opposite the Nature Reserve, which is in private ownership. There are also industrial development proposals for areas adjacent to the nominated area. A proposal for an aluminium re-smelting plant on the shore of the Dnieper between the Nature Reserve and the Regional Park was however recently rejected.

5. ADDITIONAL COMMENTS

The nomination document describes prehistoric ‘mammoth bone dwellings’ but these are about 5km outside the site’s boundaries, on private land, and are therefore not directly linked to the nominated area.

6. APPLICATION OF CRITERIA

KH has been nominated under criteria (i), (iii) and (iv).

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

Although the geology of the ravines of the nominated area bears testament to the last glacial period. It represents one specific phenomenon of this period – the deposition of loess – which is common worldwide. Because erosion was first induced (by deforestation) and then halted (by reforestation) by human intervention within the site, the integrity of geological processes is not in evidence. IUCN does not consider that the site meets criterion (i).

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

The site consists of a Nature Reserve containing artificially planted forests and steppe fragments of a secondary character; a National Monument, which is a landscaped garden; and a Regional Landscape Park, which is a cultural landscape on the edge of a large, recently flooded, artificial reservoir. Though these features have aesthetic qualities in their own right, they cannot be considered to be superlative or aesthetic in a strictly natural sense. IUCN does not consider that the site meets criterion (iii).

Criterion (iv): Biodiversity and threatened species

The site has no endemics, total floral richness is well below that of many other areas in the region and the fauna present are well represented elsewhere. The fragmented structure of the nomination, and its overall artificial nature, mean that it does not contain ecosystems of sufficient size or integrity for the conservation of globally important biodiversity. IUCN does not consider that the site meets criterion (iv).

7. RECOMMENDATION

The Bureau did not recommend the inscription of Kaniv’s Hills (Kanivski Gory) on the World Heritage List (see recommendation of the Bureau covering all five nominations from the Ukraine page 61).

Map 1

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

KARADAG (UKRAINE)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (1 reference).
- ii) **Additional literature consulted:** Ministry of Environment and Natural Resources. 2000. **National Report on the State of Environment in Ukraine, 1999.** Raevsky Scientific Publications, Kiev; The Executive Committee of Feodosiya Municipal Council. 2001. **Territory of Priority Development “Feodosiya”.** Feodosiya; Svetov, A.P. & A.I. Golubev. 1966. Volcano apparatus of Central Kareliya *Yatuliisk* volcano complex. In **Dokladi Akademii Nauk SSSR**, vol.171, #1, pp 171-174. Embleton, C. (Ed) 1984. **Geomorphology of Europe.** Macmillan Publishers, London.
- iii) **Consultations:** 6 external reviewers contacted; Government of Ukraine officials and park staff; Geological Department of Moscow State University and Institute of Geology, Petrozavodsk, Kareliya.
- iv) **Field visit:** May 2001. Gerhard Heiss and Yuri Badenkov.

2. SUMMARY OF NATURAL VALUES

The nominated site of Karadag is a mountain massif on the southeastern Crimean coast of the Black Sea, within the Feodosiya district of the autonomous Republic of Crimea. The nominated site covers 3,835ha which is comprised of the 2,874ha Karadag Strict Nature Reserve and a buffer zone (960ha). The Strict Nature Reserve includes a coastal area on the Black Sea (810ha) and a core strictly protected zone of 440ha. The buffer zone includes Tepsen – a medieval settlement covering 20.9ha - and a marine area (940ha) stretching 1 mile out to sea.

Highlands form the southernmost part of the Crimean peninsula and cover about 6,000km². They consist of three parallel ridges separated by longitudinal depressions. The dominant rocks are limestones with volcanic intrusions. The mountains generally have gentle northern slopes, flat tops and steep southern cliffs falling into the sea. The highest point (1,545m) is in the western part of the southern or main ridge where high precipitation and anthropogenic deforestation has caused intensive karstification. In the lower eastern part (average altitude approximately 600m), rainfall is lower and arid landforms can be found.

Karadag forms the south-easternmost point of the southern or main ridge and is isolated from the rest of the ridge by a depression. The highest peaks in Karadag are Holy Mountain (586m), Magnetic Range (378m) and Karagach (333m). The nominated site is dominated by limestone in the north and massif of volcanic rocks along the coast which have been deformed by tectonic processes. The Karadag mountain massif represents the composite volcanic facility of the Jurassic period, formed at the base of the Carpathian-Crimean-Caucasus geosyncline. Karadag and adjacent areas are characterised by geosynclinal development processes combined with underwater volcanic. The combination of tectonic movements in sedimentary rocks transformed by magma intrusions has given rise to a large diversity of rock types and formations including almost all known types of magmatic rocks and lava flows (composite tuff-lava; necks, dykes and veins; and intrusive massifs).

Karadag has a relatively high number of plant species (2,658 species) including 1,169 species of vascular plants. Some 37 plant species are considered threatened on a European scale. The nominated site includes 42% of the Crimean peninsula's flora and 23% of Ukraine's flora. Approximately 40 species are considered Crimean endemics, and one species of hawthorn is only found in Karadag. Almost 3,500 animal species occur within Karadag, including 29 mammal and 210 bird species. Notable species are common porpoise, white-tailed eagle, black vulture, griffon vulture, peregrine falcon, hen harrier, great bustard, corncrake, Black Sea beluga, and Black Sea salmon.

3. COMPARISON WITH OTHER AREAS

The Karadag reserve is part of the Pontian Steppe Biogeographical Province. This Biogeographical Province is represented by the Danube Delta World Heritage site in Romania. The Danube Delta's main features are wetlands with alluvial forests which neither represent the characteristic feature (steppe) of the Biogeographical Province nor specific features of the proposed site. However, Mediterranean elements play a significant role on the southern ridge of the Crimean Mountains whereas steppe elements are mostly secondary (man-induced).

Karadag is located within the IUCN/WWF South Crimean Mountains and Novorossia Centre of Plant Diversity. This Centre covers much of southern Crimea and, in response to this floristic diversity, a number of reserves have been established on the peninsula. Most notable are the Yalta Mountain Forest Nature Reserve (14,523 ha) and the Crimean Nature Reserve (44,175 ha) in the western part of the highlands. Both sites offer similar but higher numbers of flora and fauna than Karadag. The Yalta Mountain Forest is home to: 1,363 species of vascular plants, 30 species of mammals and 113 bird species; Crimean NR: 1,180 species of vascular plants, 37 mammals and 256 birds. Additionally, the larger size of these areas means that they are able to protect higher numbers of each species. The Crimean Nature Reserve includes all three ridges (southern, inner, and outer ridge) of the range within its boundaries. Among Crimean reserves, however, only Karadag offers a spectacular coast.

At the beginning of the 20th century, the reserve's forests were cut down completely (except inaccessible slopes of the coast where old juniper trees have survived) and now a patch system of natural deciduous forest regrowth, artificial pine plantations and meadows has developed. Open meadows are very important for many of the rare species of the property and anthropogenic management is considered to be necessary for their preservation.

In conclusion, the plant and animal species diversity of this site cannot be considered outstanding, even on the regional scale. Vegetation has been seriously affected by former human activities and will need more than 100 years for full restoration.

The site has volcanic features. Reference sites for volcanism in Europe are: the Aeolian Islands World Heritage Site (Italy) which represents the original study site for two eruption types; Mount Etna (Italy), the highest volcano on the European mainland (3,323 m); Caldera di Taburiente in the Canary Islands with its 2,000m high caldera walls; Pico de Teide National Park (3,718 m) also in the Canary Islands; and several reserves (e.g. Myvatn-Laxa, Jökulsargljúfur, Skaftafell) on Iceland - the most active volcano zone in the world. Karadag offers significant features of volcanism from a specific period (Jurassic). However, the site shows neither volcanic features nor dimensions and landscape features which are not found elsewhere in the world or are of outstanding universal value.

4. INTEGRITY

4.1. Management

Karadag Nature Reserve is under the jurisdiction of the National Academy of Science (NAS) and management is carried out by a Directorate, appointed by of the NAS. There are currently 110 persons on the Reserve staff. There is no management plan for the site and one should be developed along with a clearly defined zoning plan for the reserve.

4.2. Human use of the area

Karadag receives 5,000-7,000 visitors per year, who mainly use the walking trails of the reserve, and 30-35,000 visitors to the Dolphinarium and Museum located in the Reserve Headquarters. There are also 16,500 tourists, mostly divers, to the coastal waters of Reserve. Haymaking is permitted for staff of the Reserve on 13ha of territory. A Russia Black Sea Fleet monitoring station covers 6ha at the centre of the reserve. This area is not managed by the reserve's administration and a road crosses the reserve to link the station with Planerscaya village, just outside the northern boundary of Karadag.

4.3. Threats

Karadag faces pressures from the adjacent settlements including illegal grazing, haymaking, and hunting. There is no buffer zone between the Reserve and neighbouring settlements, agriculture lands (vineyards) and roads. Coniferous plantations were established 30-40 years ago in the northern part of Reserve under State reforestation programmes.

In 2000, Ukraine passed a law concerning economic development in Crimea. One of the priority regions for development is Greater Feodosia, including Karadag Strict Nature Reserve. Under the new law, the priority industries are tourism, agriculture, manufacturing, and the conservation of natural and historical heritage. One of the priority investment projects concerns the Dolphinarium in Karadag and this will probably involve the development of visitor infrastructure. Other projects have been proposed for areas adjacent to the reserve. Given the limited territory of Karadag it is likely that these developments will have an impact on the reserve.

5. ADDITIONAL COMMENTS

Regional management context

The Crimean Mountains are part of the IUCN/WWF South Crimean Mountains and Novorossia Centre of Plant Diversity. The nominated property contains a significant part of Crimea's flora. However, the property's size is completely insufficient for long-term preservation of its flora under natural conditions. There are two other notable reserves of larger size, containing higher species numbers and enclosing parts of all three ridges of the Crimean highlands in the western part of the Centre of Plant Diversity. The two reserves are contiguous which offers a protection unit of approximately 60,000ha. Together with the Karadag reserve, a cluster site of the three sites may be able to protect all of the significant landscape features of the South Crimean Mountains. Such a nomination may meet World Heritage criteria. However, IUCN is uncertain of the integrity of these sites as external reviewers noted human pressures on these sites.

6. APPLICATION OF CRITERIA

The site has been nominated under all four criteria.

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

The nominated site represents the combination of volcanic and geosynclinal processes in the Black Sea area. It contains a very complex composition of rocks types and formations. However, Karadag is not outstanding when compared to other volcanic mountain massifs in Europe or globally. IUCN does not consider that the site meets this criterion.

Criterion (ii): Ecological processes

Karadag's size is insufficient for long term maintenance of ecological processes. Long-term preservation of plant diversity will require more effective management. Home range areas for many of the rare and threatened animals are insufficient and survival cannot be guaranteed within the protected area. IUCN does not consider that the site meets this criterion.

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

The nominated site includes a typical coastal mountain landscape. Though nationally important, it cannot be considered as being of universally outstanding character. IUCN does not consider that the site meets this criterion.

Criterion (iv): Biodiversity and threatened species

The biodiversity of flora and fauna is lower than other reserves in the area which probably contain the same endemic species as Karadag. On a regional scale many reserves show much greater floral diversity. For example, Mount Olympos National Park (Greece) 1,800 vascular plants; Cilento National Park (Italy) 3,200 vascular plants. The only endemic which can be found exclusively on Karadag cannot be considered of world-wide significance. The fauna is notable at the national scale only. IUCN does not consider that the site meets this criterion.

The site meets the condition of integrity described in the Operational Guidelines paragraph 44 (b) concerning criterion (i) but does not meet other conditions of integrity (v, vi, vii).

7. RECOMMENDATION

The Bureau did not recommend the inscription of Karadag on the World Heritage List (see recommendation of the Bureau covering all five nominations from the Ukraine page 61).

Map 1

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

PODILLIAN RIDGE (UKRAINE)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (1 reference).
- ii) **Additional literature consulted:** Ministry of Environment and Natural Resources. 2000. **National Report on the State of Environment in Ukraine, 1999.** Raevsky Scientific Publications. Kiev. 184 pp; Hancock, P.L. *et al.* 2000. **The Oxford Companion to The Earth.** Oxford University Press; Middleton, J and T. Waltham. 1986. **The Underground Atlas: A Gazetteer of the World's Cave Regions.** St. Martin's Press. New York.
- iii) **Consultations:** 6 external reviewers contacted; Ukrainian government officials; Geology Department, Moscow State University.
- iv) **Field visit:** April 2001. Gerhard Heiss and Yuri Badenkov.

2. SUMMARY OF NATURAL VALUES

Podillian Ridge (PR) is located in west Ukraine, adjacent to the historic town of Kamyanets-Podilsky in Khmelnytska Oblast. The nominated site covers an area of 87,105ha and is entirely located within the boundaries of the Podilski Tovtry National Nature Park (261,316ha).

The nominated site is part of the Podillian (Podilski) ridge which extends from western Ukraine to Romania, a distance of over 500km. This ridge rises 60m above the surrounding Podillian plateau and is 15-20km wide. It derives from a system of fossil barrier reefs which were laid down during the Miocene. Today it forms one of the world's most important areas of gypsum karst. The Podillian ridge is characterised by a concentration of karstic phenomena, such as sinks, depressions, springs and caves. There are many long cave systems, including two which contain more than 100km of mapped galleries: Optimisticheskaya (151km), and Ozernaya (105km). These caves are considered to be the longest gypsum caves in the world but they are not part of the nominated site.

The site is characterised by valleys, occupied by agricultural land and settlements, and by forested uplands, which together form a patchwork landscape. Forests of oak, hornbeam, beech and lime are dominant. No original forest remains; most forests are very young in age, and there are few stands older than 100 years. There are also 2,200ha of artificial pine plantations.

Some 1,700 species of vascular plants have been recorded from PR, which is considered the most important location for relict and endemic species in Ukraine. Many are endemic to the Podillian region. Wildlife is represented by 55 mammals, 140 birds, 12 amphibians, and 10 reptiles. Noteworthy species are European otter, black stork, grey crane, and osprey. The site contains a number of regionally threatened species. Seven plant species and 33 animals are included on the European Red List.

3. COMPARISON WITH OTHER AREAS

The Miocene period (23 – 5mya) is characterised as a period of climatic cooling with the expansion of glaciation and falling sea levels. The fossil record of this period is notable for the diversification of the primates and the appearance of elephants and cats. The spread of grasslands during the Miocene also lead to the development of new grazing mammal species. As PR does not represent any of these phenomena, it cannot be considered as representative of this stage in Earth's history.

As geological features, fossil reefs are common throughout the world. Some of the most well studied are the Permian reefs of west Texas, the Devonian reefs of western Canada, Europe and Australia and the Triassic reefs

of the European Alpine province. The Miocene reef in Sigatoka valley, Fiji has also been the subject of much research. The Carlsbad Caverns (USA) World Heritage site is based on the 560km long Permian fossil reef (Capitan Reef) which surrounds the Delaware Basin of western Texas and southeastern New Mexico. The site's extensive cavern system has developed within this 610m thick reef complex.

Nine sites have been inscribed on the World Heritage list on the basis of their karst features. A further 23 natural sites and nine cultural sites have secondary karst values. Within Europe the Caves of the Aggtelek Karst and Slovak Karst (Hungary/Slovakia) and Skocjan Caves (Slovenia) have both been inscribed on the World Heritage List for their karst features. The Aggtelek/Slovak site displays an array of typical temperate zone karst features and Skocjan is noted for its textbook portrayal of karst hydrogeology. The northern section of the Western Caucasus World Heritage site (Russian Federation) consists entirely of karst with some of the world's deepest and most extensive caves. Although PR is gypsum rather than limestone karst, it does not contain features which are not already present in Aggtelek/Slovak and Skocjan. Even if the nominated area were enlarged to include other caves on the Podillian Ridge it is unlikely that it would be comparable to the karst areas already on the World Heritage List.

PR is part of the Middle European Forest Province, which stretches from the southern Urals to the North Sea. It is a very diverse biogeographical province in Europe in terms of its landscapes. However, the province has been significantly altered by human activities and natural sites are now restricted to highland areas. The Eastern Carpathians area has the highest level of natural integrity within the province, and is therefore of greatest conservation importance. Shared by Slovakia, Poland and Ukraine, this area contains the most extensive primeval forests of common beech in the world. Protected areas in the Eastern Carpathians include: the Ukraine's Carpathian Biosphere Reserve (57,880ha), Poland's Bieszczady National Park (27,834ha) and Slovakia's Stuzica Regional Landscape Park (strict protection zone 1,708ha). The Carpathian Biosphere Reserve is more important than PR in terms of biodiversity but the landscape features of the Carpathians cannot be compared with those of the nominated site. The most similar area is the Medobory Nature Reserve (Ukraine), but with an area of 10,455ha, this is smaller than PR and shows a lower level of biodiversity: 1,120 vascular plants; 32 mammals; and 134 bird species.

In terms of natural World Heritage sites, Srebarna Nature Reserve (Bulgaria), the Messil Fossil Pit (Germany), and the Caves of the Aggtelek Karst and Slovak Karst (Hungary/Slovakia) also belong to the Middle European Forest Province. (The karst features of the Aggtelek/Slovak site are compared to PR above.) The Messil Fossil Pit is a fossil site and does not share any similarities with PR. Nor is it relevant to compare Srebarna to PR as the former is a wetland and the latter is predominantly a forest site.

4. INTEGRITY

4.1. Boundaries

The boundaries of the nominated area enclose the least disturbed and most valuable parts of the Podilski Tovtry National Nature Park. However, natural habitat exists in patches within agriculture and commercial forestry. This makes it impossible to form an ecological unit in which human impacts can be minimized. In several areas, the reserve is only several hundred meters wide. A cluster of many small patches of habitat cannot be effectively protected in the long-term.

4.2. Ownership and legal status

Although under the authority of the Ministry of the Environment and Natural Resources of Ukraine, only 3,015ha or 1.1% of Podilski Tovtry National Nature is owned and directly managed by the Directorate of National Park Owners. The rest of the Park territory is owned and run by commercial forestry, spa resorts, and private and collective farms.

4.3. Management

The Directorate of the Podilski Tovtry National Nature, assigned by the Ministry of the Environment and Natural Resources of Ukraine, is responsible for the management of the National Nature Park. The activities of the various enterprises and institutions located in the park are coordinated by the Technological Council of the National Nature Park, which is headed by the Park Director. The main management objective of the park is the preservation of present levels of biodiversity. Since current agricultural and forestry practices are needed to

maintain biodiversity in the site, it would seem that the park would need to be managed as a cultural landscape rather than as a natural area.

An integrated management plan for the site does not exist but plans which cover specific activities have been developed: a zoning plan for forests has been approved by state and private forest enterprises; a five-year scientific programme was adopted in 1999 by the Ministry of Environment; and a plan covering recreation is in development. However, these activity-specific plans do not substitute for an integrated management plan which would govern all activities within the nominated area and ensure effective long-term management of the site.

4.4. Threats

The main threats to the area are:

- Settlements. The number of people living within the nominated site is not given in the nomination document, but the IUCN field mission observed several settlements and noted that a few thousand people must live within PR's boundaries. However, given the complicated nature of the boundary of the site, it is difficult to establish precisely where it runs on the ground and so to know exactly how many people live within the site.
- Agriculture. Arable fields encircle the small patches of protected natural areas without buffer zones.
- Mining. There are a number of limestone quarries inside the National Nature Park, some of which are also inside the nominated site.
- Roads. There is a well-developed infrastructure within the National Nature Park with roads crossing parts of the nominated site.
- Hydropower Station. More than 150km of the Dniestr river shore have been affected by a hydropower installation established in 1984. The reservoir has caused shore erosion, landslides, and unseasonal water level fluctuations.
- Air pollution. Industry, such as cement and sugar factories adjacent to PR, causes atmospheric pollution in the area. .
- Tourism. Hundreds of thousands of tourists visit the National Nature Park each year. There is no tourism management plan for the Park . Many tourists visit the region to stay at health resorts, several of which are found within the nominated area. The IUCN mission observed significant local air pollution caused by furnaces at these resorts.

5. ADDITIONAL COMMENTS

The IUCN field mission was informed that there are plans to create a free economic development zone covering the National Natural Park. However, studies on the impact of this development on the nominated area have not been carried out.

The Historical-Culture Reserve 'Kamenets-Podilsk City', which is in the process of being nominated for inclusion in the World Heritage List under cultural criteria, is situated inside the boundaries of PR. However, there does not seem to be any coordination between the management of the cultural area and the proposed natural site.

6. APPLICATION OF CRITERIA

The site has been nominated under all four criteria.

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

The site has national geological significance, but it is not outstanding at the international level when compared to other areas containing similar features such as karst and fossil reefs. In terms of Earth's history, PR is not an outstanding representation of the Miocene period. IUCN does not consider that the site meets this criterion.

Criterion (ii): Ecological processes

PR has been heavily influenced by human activities and natural areas have been fragmented or are managed for their cultural landscape value rather than natural processes. The small pockets of natural areas are not of sufficient size for natural processes of international significance to take place. IUCN does not consider that the site meets this criterion.

Criterion (iii). Superlative natural phenomena, scenic beauty

The landscape of the nominated site has been much modified, and is now a cultural landscape, reflecting the region's long and often dramatic history. However, it cannot be considered to contain "superlative natural phenomena" nor to be an area of "exceptional natural beauty" as required to meet this criterion. Therefore IUCN does not consider that the site meets this criterion.

Criterion (iv). Biodiversity and threatened species.

Although PR contains a number of species considered threatened at the European level, the site suffers from problems of integrity. The boundaries do not allow for the establishment of a viable ecological unit, there are a number of diverse pressures upon the site and there are indications that these will increase in future. In addition the management framework is unreliable. IUCN does not consider that the site meets this criterion.

7. RECOMMENDATION

The Bureau did not recommend the inscription of Podillian Ridge on the World Heritage List (see recommendation of the Bureau covering all five nominations from the Ukraine page 61).

Map 1

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

DORSET AND EAST DEVON COAST (UNITED KINGDOM)

1. DOCUMENTATION

- i) **WCMC Data sheet:** (19 references)
- ii) **Additional literature consulted:** Goudie, A. and Brunsdon, D. 1997. **Classic Landforms of the East Dorset Coast.** The Geographical Association, Sheffield; and Ellis, N.V et al. (Eds.). 1996. **An Introduction to the Geological Conservation Review.** Joint Nature Conservation Committee, Peterborough.
- iii) **Consultations:** 2 external reviewers contacted; relevant officials from government, protected area agencies, and public institutions; private estate owners; geological associations; tourist operators; and other interest groups.
- iv) **Field visit:** February-March, 2001. Paul Dingwall,

2. SUMMARY OF NATURAL VALUES

Located on the south coast of Britain, the nominated property comprises eight sections along 155km of largely undeveloped coast and countryside between Orcombe Rocks, near Exmouth in east Devon in the west, and Studland Bay, Dorset, in the east. The total area of the site is 2,550ha, 80% of which is cliffed coastline. The property has a combination of internationally renowned geological features considered by both palaeontologists and geomorphologists to be one of the most significant research sites for their respective fields of study in the world. The nominated site includes a near-continuous sequence of Triassic, Jurassic and Cretaceous rock exposures, representing almost the entire Mesozoic Era (between 251 and 66 million years ago), or approximately 185 million years of Earth history. The Triassic succession of mudstones and sandstones is over 1,100m thick, representing 50 million years of deposition. The sequence of Jurassic strata exposed between Lyme Regis and Swanage is among the best sections of marine Jurassic-age rocks to be found anywhere in the world. All stages of the Cretaceous are represented with the exception of the very youngest.

The nominated site contains a range of internationally important Mesozoic fossil localities, including Lyme Regis, Kimmeridge Bay, the Isles of Portland and Purbeck, Durlston Bay, High Peak, Otter Point, Furzy Cliff (Weymouth), Charmouth and Axmouth. Great numbers of vertebrate, invertebrate and plant fossils have been discovered, along with fossil dinosaur footprints in quarries near Swanage. Examples of significant palaeontological discoveries not known from elsewhere include *Dimorphodon macronyx*, one of the earliest flying reptiles, and *Scelidosaurus harrisoni*, the “Charmouth dinosaur”. Important among the marine reptiles are *Temnodontosaurus*, ichthyosaurs, and *Metriacanthosaurus parkeri*. The area has yielded a rich source of ammonites such as *Asteroceras obtusum*, *Parkinsonia parkinsoni* and *Titanites anguiformis*, which have been used to zone the Jurassic. Well preserved remains of a late Jurassic fossil forest, estimated to be more than 140 million years old, are exposed on the Isle of Portland and the Purbeck coast: many trees are preserved *in situ* with their associated soils and pollen, a boon for palaeoecologists.

In terms of the site’s geomorphological significance, a great variety of landslides have formed, some of which, such as those at Bindon, Black Ven, Hooken, East Weares and Kings Pier, are scientifically important throughout Europe. The long history of scientific study of these mass-movement systems is such that these formations have become, literally and figuratively, ‘textbook’ examples. The site is also renowned for the study of beach formation and evolution on a retreating coastline. Chesil Beach, stretching from West Bay to Portland, is one of the best-studied beaches in the world. The beach is famous for the volume, type and grading of pebbles. The 480ha Fleet Lagoon, enclosed by Chesil Beach, is one of the most important saline lagoons in Europe, its sediments providing evidence of late Holocene beach evolution, and changes in sea level, climate and vegetation. Chesil Beach and the Fleet is an outstanding example of a barrier beach and lagoon system, protected by several national and European designations. The Isle of Purbeck is notable for its well developed

coastal landforms, including cave-bay sequences and textbook examples of bays, stacks, and rock arches at Lulworth Cove, Durdle Door and Old Harry Rocks.

In addition to the site's palaeontological and geomorphological significance, important coastal vegetation habitats occur in the nominated area, such as the landslipped cliffs and cliff-top grasslands of W. Dorset, that support several rare plant species of national and European importance and parts of the nominated coast are protected under international designation. The Exe Estuary Special Protection Area (SPA), a Ramsar wetland, supports over 20,000 migratory wildfowl, including internationally important populations of avocet, dark-bellied brent goose and slavonian grebe. The Sidmouth to Beer Coast SSSI (Site of Special Scientific Interest) protects the westernmost example of species-rich grassland in England, with a very diverse invertebrate fauna. The Lyme Bay reefs provide one of the most easterly locations for several Mediterranean-Atlantic plants species, such as the pink seafan *Eunicella verrucos*, and has rich epifauna, especially sponges.

3. COMPARISON WITH OTHER GEOLOGICAL SITES

The site is significant in terms of geological history, palaeontology, geomorphology and the history of geological and related sciences.

In terms of geology, the Dorset and East Devon Coast is one of Britain's most significant areas, and one of two mainland sites nominated for its geology on the U.K. World Heritage tentative list. The area includes 67 nationally and internationally recognised localities in the statutory Geological Conservation Review. While sites representing the same geological time period are found throughout the world, there is no better example anywhere of a complete succession through the Mesozoic Era, a period of 185 million years. Among prominent geological World Heritage sites, Istchigualasto-Talampaya in Argentina and Canada's Dinosaur Provincial Park represent the Triassic and late Cretaceous respectively, but no site currently on the World Heritage list contains the complete Mesozoic succession. The nominated site also represents an exceptionally well-documented sedimentary basin, now one of the best-known and oft-studied of its type in the world. Only Australia's Sydney and Gippsland Basins, and the western flank of the Basin and Range Province in North America, are similar, but none is extensively protected.

In terms of palaeontology, the nomination document includes a comprehensive comparative analysis in which 12 selected fossil sites or interests are rated against the IUCN criteria for establishing the outstanding universal value of fossil sites (pp. 36-37). The results clearly demonstrate the global significance of the Dorset and East Devon sites in all rated categories, particularly in terms of the long geological time period represented; the diversity of fossil assemblages; the international significance of sites (all 12 are assessed as internationally important); and the quality of preservation of specimens, with some complete and well-articulated skeletons, three-dimensional and soft-part preservation and the presence of finely detailed plants and wood structures. The Lyme Regis (Lower Jurassic) and Purbeck Group formations (Lower Cretaceous) are the most significant fossil sites; specimens from them are found throughout the world's museums.

In terms of geomorphology, the landslides here are internationally recognized, comparable with those of the Black Sea Coast and New Zealand, which are also internationally renowned. The Bindon landslide complex, protected in the Lyme Regis to Axmouth Undercliffs National Nature Reserve, was the first to be fully described in a scientific memoir. Black Ven is the largest mudslide complex in Europe. No beach in the world is known to have been as intensively studied as Chesil Beach, and there are few that exhibit the exceptional degree of grading of the size of its sediments along the shore. The juxtaposition of concordant and discordant coastlines (i.e. those aligned with and against the grain of the geological structure) within the same geological strata, as found on this coast, is rare on a global scale.

The nominated area also has an internationally unique status in the history of geological science. Regarded for more than 200 years as among the best available research sites anywhere for geological inquiry, the resulting prodigious output of research, published in thousands of scientific papers, has fundamentally shaped the development of geological thinking. Its role in this respect continues today.

4. INTEGRITY

4.1. Site integrity

The nominated site contains all the key, interdependent elements of geological succession exposed on the coastline. It has an almost complete representation of Triassic, Jurassic and Cretaceous rocks, all within a single sedimentary basin. Regional tilting of the structures to the east means that a walk from west to east along the coast is an almost unbroken “journey” through 185 million years of geological time. The stratigraphy represents a wide range of both marine and terrestrial depositional environments and a full range of sedimentary rock types. The array of fossil faunas and floras show interrelated elements of the prehistoric record of life and environments. The site includes a series of coastal landforms whose processes and evolutionary conditions are little impacted by human activity. The boundary of the site is defined by natural phenomena: on the seaward side the site extends to the mean low water mark and on the landward side to the cliff top or back of the beach. This is also in general consistent with the boundaries of the nationally designated areas that protect the site.

The high rate of erosion and mass movement in the area creates a very dynamic coastline; the boundaries of the site, therefore, may need periodic monitoring to ensure that significant changes to the shoreline are reflected in revised boundaries.

4.2. Management integrity

The nominated site lies almost entirely within two areas designated under national conservation legislation as Areas of Outstanding Natural Beauty (IUCN Category V Protected Landscape/Seascape). Also protected under national law are thirteen SSSIs, and a large National Nature Reserve (IUCN Category IV). The site also contains areas designated as being of international importance for wildlife, either as a Special Conservation Area or SPA under European Community Directories. Chesil Beach/the Fleet and Exe Estuary are designated as a Ramsar Wetland of International Importance.

An estimated 95km of the 155km of coastline in the nominated site are owned by public bodies, conservation agencies or large private estates. While most of the site is in private ownership, mainly within four large estates, the National Trust, a major U.K. conservation charity, owns about 35km of coastline. Smaller areas are owned by County and District Councils and by the Ministry of Defence, which uses 5km of coast as the Lulworth Gunnery Ranges: the Ministry’s management of this area is subject to conservation policies set out in a management plan. Privately owned SSSIs have management oversight from the English Nature agency. The bed of the Fleet lagoon and part of Chesil Beach are owned by the Ilchester Estates and managed as a local nature reserve. There are two commercially owned landholdings on the Isle of Portland.

The nominated property is currently extensively protected by a variety of designations and a range of land use and protected area management plans. A single management plan has been prepared for the nominated site, coordinated by the Dorset and Devon County Councils. The plan, which has undergone public consultation, has six prime objectives relating to the protection of the geology and landforms, conservation and enhancement of landscapes and seascapes, and visitor management and education. Significantly, emphasis is given to integrating World Heritage management with wider sustainable development objectives in the counties. Management plans for existing areas inside the nominated property: they include county development plans, local district plans, mineral and waste management plans, shoreline management plans and Environment Agency river catchment plans. The National Trust maintains plans for management of wildlife, landscape, and visitor use of its properties; all its sites are inalienably conserved for the benefit of the public. Wildlife Trust reserves, National Nature Reserve, and military lands all have management plans.

Many people are employed by landowners and agencies to undertake management operations in sites within the nominated area. More than 40 wardens and rangers are employed by the two county councils, the E. Devon and Purbeck District Councils, English Nature, the National Trust, Ilchester and Lulworth Estates and the Dorset Wildlife Trust. Two new positions - geological coordinator and tourism officer - are envisaged if World Heritage status is achieved. Management of the area is well funded on a partnership basis with more than £500,000 provided annually for staff budgets of current employees, excluding professional staff such as local government planners and tourism officers. There are many well developed and professionally managed information centres, museums, accommodation and transport facilities, and other services available to visitors. Public access to the beaches and cliff tops is available via public rights of way and permissive paths. The South-West Coastal path, one of 13 nationally designated trails, extends through part of the site. Excellent marine search and rescue facilities are located at several sites in the area. The research capacity underpinning protected area management, provided from regional and national scientific institutions, is substantial.

Only about ten people live permanently in the nominated site, though there are some seasonally occupied beach huts and holiday chalets. The population in gateway towns is estimated at less than 200,000. The area has been

a popular tourist destination since the 18th Century, and about 14 million people, mostly day-trippers, visit the nominated site and adjacent coastal areas annually. There are currently few significant threats to the site. A vigilant regime of active management will address important issues such as path erosion, and vegetation and wildlife disturbance. A voluntary code of conduct has been developed to help manage the collection of fossils by amateur and professional collectors. Two sites lie within areas where there are permissions for mineral extraction, but the local authorities believe neither will be reactivated. Coastal defence works are required in places but they are not overly intrusive on site values.

In summary, IUCN believes this nominated site has strong legal protection and is managed effectively for long-term preservation of its natural geological values. It thus meets the conditions of management integrity.

5. ADDITIONAL COMMENTS

None.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

Dorset and East Devon Coast is nominated in accordance with World Heritage natural criteria (i) and (iii).

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

In relation to this criterion, the site's claim to outstanding universal value is based on the following significant values:

- The coastal exposures within the site provide an almost continuous sequence of Triassic, Jurassic and Cretaceous rock formations spanning the Mesozoic Era and document approximately 185 million years of Earth history;
- The site includes a range of internationally important fossil localities – both vertebrate and invertebrate, marine and terrestrial - which have produced well preserved and diverse evidence of life during Mesozoic times;
- The site contains a range of textbook exemplars of coastal geomorphological features, landforms and processes;
- The site is renowned for its contribution to earth science investigations for over 300 years, and has helped foster major contributions to many aspects of geology, palaeontology and geomorphology; and
- The site has continuing significance for many aspects of earth science research and is a high quality teaching and training resource for the earth sciences.

Critical examination of these elements, complemented by field inspection, discussions with protected area managers and scientists, and consideration of the views of independent reviewers and prominent scientists who have written in support of the nomination, lead to the conclusion that these claims can be fully substantiated. The site is also unlike any other geological site currently accorded World Heritage status, and it has both a scientific and conservation significance ranking it among these existing sites. IUCN considers that the nominated site meets this criterion.

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

The nominated property is a substantially natural coastline in a setting of attractive rural landscapes and associated seascapes. Most of the site is designated as nationally significant in terms of its scenic qualities (e.g., as Areas of Outstanding Natural Beauty and Heritage Coasts). The attractiveness of the site derives in particular from the classically developed landforms, whose scenic qualities are enhanced by the close association of a great diversity of landforms in a relatively confined area. Component materials of the landforms also have aesthetic appeal: stone quarried from Purbeck, Portland and Beer has been used in the construction of many great buildings in Britain, some of which (e.g., the Tower of London) are themselves World Heritage cultural sites.

Moreover, the landscapes have inspired a number of authors, poets and artists of international renown, adding to the rich legacy of cultural associations with the site.

However, when compared to existing World Heritage sites fulfilling the criterion, IUCN considers that Dorset and East Devon Coast is of national importance rather than of outstanding universal value. IUCN considers that the nominated site does not meet this criterion.

7. RECOMMENDATION

The Bureau recommended to the Committee that the Dorset and East Devon Coast site be **inscribed** on the World Heritage List under natural criterion (i).

Map 1

C.2. Afrotropical Realm

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

RIFT VALLEY LAKE RESERVES (KENYA)

Background Note: The nomination being evaluated here is a reformulated version of the initial "Great Rift Valley Ecosystems" that Kenya submitted in July 2000. The original nomination was for a much larger area which was put forward under natural and cultural criteria. Subsequent to the IUCN field inspection, the Kenyan authorities decided to submit a revised nomination that focuses on three Rift Valley lakes (natural criteria) as well as an extension to the existing Sibiloi/Central Island site (letter to Director of the World Heritage Centre from Director of Kenya Wildlife Service, 25 March, 2001).

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (10 references).
- ii) **Additional Literature Consulted:** McClanahan, T.R. and T.P. Young. 1996. **East African Ecosystems and their Conservation**. OUP; Brown, L. 1971. **East African Mountains and Lakes**. EA Publishing. 122p; Brown, L. 1981. **Africa – A Natural History**; Howard G.W. (ed.) 1997. **Conservation of the Lesser Flamingo in E. Africa**. Workshop Proceedings. 120p; Engoke, J. 2000. **Proposed Integrated Conservation and Development Plan for Lake Bogoria**. 28p.; KWS. 2001. **Lake Nakuru National Park Integrated Management Plan**. Draft 68p.; Njuguna, S. 2000. **Conservation and Sustainable Use of Biodiversity in the East Rift Valley Lakes**. GEF Report.; Vaucher, C.A. 1973. **Nakuru – Lake of a Million Flamingos**. WWF.; Kear, J. and N. Duplaix-Hall. 1975 **Flamingos**. The Wildlife Trust; Makenzi, P et.al. 2000. **Impact of Human Activities on Landscapes and Natural Resources of the Great Rift Valley Lakes**. GEF report. 49p.; Myers, N. 1974. **The Ecologic/Socioeconomic Interface of Wildlife Conservation in Emergent Africa: Lakes Nakuru and Nawarla**. **J. Env. Econ. and Mangt.** + 319-334; Bishop, W.W. 1978. **Geological Background to Fossil Man**. Research in the Gregory Rift Valley. University of Toronto Press; Bennun, L & P. Njoroge. 1999. **Important Bird Areas of Kenya**. Birdlife International.
- iii) **Consultations:** 5 external reviewers contacted, Officials from Kenya Wildlife Service, resident park wardens, IUCN Eastern Africa office staff.
- iv) **Field Visit:** February, 2001, Jim Thorsell.

2. SUMMARY OF NATURAL VALUES

The nominated site consists of three separate reserves located in the floor of the Rift Valley: Lake Bogoria National Reserve (10,700ha.); Lake Nakuru National Park (18,800ha.) and Lake Elmenteita Reserve (6,300ha.). All three lakes are shallow, alkaline and endorheic (a lake with no surface outlet). All three lakes are included among the sixty "Important Bird Areas of Kenya" by Birdlife International.

Lake Bogoria National Reserve was gazetted in 1981 and includes the entire lake and its surroundings. The Siracho escarpment rises abruptly from the lakeshore, while on the relatively flat western shore is a series of hot springs and geysers. Terrestrial vegetation is primarily thorny bushland dominated by Acacia, figs, combretum thicket and alkaline-tolerant grasslands. The lake supports a dense growth of green algae (*Spirulina platensis*) which, in turn, is a key feeding ground for the itinerant Rift Valley population of Lesser Flamingos. Congregations of up to 2 million birds have been counted. Three hundred and fifty other bird species also occur as well as a range of typical savannah woodland fauna. The area is known especially for a healthy population of Greater Kudu and also as a staging area for Steppe Eagle as they prepare to migrate to northern Europe.

Lake Nakuru National Park is centred on a very shallow, strongly alkaline lake, with surrounding woodland and grassland. The lake catchment is bounded by Menengai Crater to the north, the Bahati Hills to the north-east, the Lion Hill ranges to the east, Eburu Crater to the south and the Mau escarpment to the west. Nakuru was first

gazetted as a bird sanctuary in 1960 and upgraded to National Park status in 1968. A northern extension to the park was added in 1974. The foundation of the lake's simple food chain is the cyanophyte *Spirulina platensis*, which often occurs as a unialgal bloom. At such times it can support huge numbers of Lesser Flamingos. A small introduced tilapia fish supports a number of secondary consumers. The lake shores are mainly open alkaline mud, with areas of sedge and marsh around the river inflows and springs, giving way to grassland and a belt of Acacia woodland. Rocky hillsides on the park's eastern perimeter area are covered with scrub and *Euphorbia* forest.

Nakuru is internationally famous for its populations of Lesser Flamingo; numbers can reach 1.5 million at times, though drastic and unpredictable fluctuations occur. Nakuru is a very important feeding site for this species but attempts by flamingos to breed here have not been successful. Other waterbirds have increased considerably in numbers and diversity since the introduction of fish in 1961. At times Nakuru is a major feeding ground for Great White Pelicans, which nest on rocky islets in nearby Lake Elmenteita and move to Nakuru daily to feed. Large numbers of Palearctic waders winter at Nakuru or use the site on passage, and Nakuru (at least in the past) has been a key site in the eastern Rift Valley flyway. Nakuru is rich in birds with 480 species recorded. The park is fenced completely and has a wide range of typical African species such as black rhino (50), white rhino (40), Rothschild's giraffe, lion, leopard, and large numbers of waterbuck, gazelles and Cape buffalo.

Elmenteita is a shallow alkaline lake (maximum depth 1.9m) on the Rift Valley floor some 20km south-east of Nakuru town. It is fed by hot springs at its southern end, and two small streams, the Mereroni and Kariandusi, flowing from the eastern plateau. The surrounding landscape is characterised by dramatic rocky faults, volcanic outcrops and cones. Rainfall is erratic and less than 600mm on average per year. To the east, the lake is flanked by small-scale agriculture, while several large ranches surround the remainder. The northern and south-eastern lakeshores are open and flat, a spectacular cliff rises to the north-east, and the western shores are broken and rocky. The natural vegetation is mainly Acacia bushland interspersed with *Themeda* grassland. Patches of *Acacia xanthophloea* woodland occur near the shore, and formerly covered a large area south of the lake. The lake consistently has internationally important populations of Greater and Lesser Flamingo and Pied Avocet (according to BirdLife International (1999)). At least 49 waterbird species are recorded, including 10 Palearctic migrants. Although it lacks fish, except in the peripheral hot springs, Elmenteita at times is also host to large numbers of Great White Pelicans. Up to 8,000 pairs have bred there when water levels are high and rocky outcrops in the eastern sector are flooded to form islets, on which the birds can safely nest. The pelicans move daily to Lake Nakuru to feed. Greater Flamingos have also bred at Elmenteita in the past, but have been displaced by pelicans in recent years. The adjacent woodland and bushland feature over 400 species of birds.

3. COMPARISONS WITH OTHER AREAS

Within the Great Rift Valley of eastern Africa there are over 300 protected areas (WCMC Database). A number of these centre around alkaline endorheic lakes such as Lake Manyara National Park in Tanzania. Existing World Heritage sites that are found in the Rift Valley (including both the eastern and western rifts) are: Lake Malawi, Virunga, and Sibiloi/Central Island National Parks. Others exist near the Rift but these are the only three within or partially within it. The lakes in Virunga and Malawi are freshwater while Sibiloi/Central Island National Parks are part of Lake Turkana, an alkaline but very deep lake in northern Kenya.

The soda (alkaline) lakes in the Rift Valley of eastern Africa are among the world's most productive natural ecosystems (McClanahan and Young, 1996). A conspicuous feature of these lakes are enormous flocks of lesser flamingos feeding on thick suspensions of blue-green algae. Flamingos exist elsewhere in Africa (Ethiopia, Namibia, South Africa, Uganda) but in nowhere near the concentrations found with the nominated sites, with the exception of Lake Natron in Tanzania during breeding season. The main soda lakes in the region are the three nominated sites as well as Magadi and Logipi in Kenya; Natron and Eyasi in Tanzania and Langano Awass and Abiata-Shala in Ethiopia. The three nominated lakes – Bogoria, Nakuru and Elmenteita are considered the most diverse and most natural and support the largest and most diverse bird populations.

In conclusion, the soda lakes (in contrast to saline lakes) of the Rift Valley of Africa "...are of extraordinary interest and are biologically unique; there is nothing quite like them in the world" (L. Brown, 1971). Within the relatively small size (36,000ha. in total) exists one of the most diverse and spectacular avifaunal assemblages in the world. As summarised more recently in an overview of the soda lakes of the Rift Valley: "Soda lakes in the Rift Valley of eastern Africa are among the world's most productive natural ecosystems. A conspicuous feature of these lakes are enormous flocks of lesser flamingos grazing on the thick green suspensions of algae. In contrast to such prolific biological activity are the harsh physical and chemical conditions and a depauperate

fauna". (J.M. Melack in **East African Ecosystems and their Conservation**. McClanahan and Young eds. 1996)

4. INTEGRITY

4.1. Legal Protection

Each of the three sites is under a different form of protection: Lake Nakuru is a National Park (managed at the national level by the Kenya Wildlife Service); Lake Bogoria is a National Reserve (managed by two local County Councils but under national policy set by Kenya Wildlife Service); and Lake Elmenteita consists of the existing Soysambu Wildlife Sanctuary (private land) also managed under the national policy set by Kenya Wildlife Service and the lake itself which is awaiting gazettelement as an addition to Soysambu. Although National Park status for all three sites would be a more ideal form of protection, existing realities of local grazing rights and private land justify the reserve designations for Bogoria and Elmenteita. Nakuru is also a Ramsar site and Bogoria has been proposed.

4.2. Management

Both Nakuru and Bogoria have resident wardens in charge with a sufficient budget and complement of staff. A new management plan for Nakuru is nearing completion and an initial draft has been prepared for Bogoria. Elmenteita does not have a staff person directly responsible as most of the area is under private ownership (except the lake surface which is owned by the government). A local landowners association, however, provides a local management structure and entry is closely controlled. The only exceptions here are some soda and salt extraction (done by hand) along the northwestern shore and grazing by nomadic pastoralists in the south. Preparation of a management plan for the site is in the early stages.

There is no single management authority for the three components of the nomination nor is there a particular need for one as all are under general supervision of the Kenya Wildlife Service in cooperation with three District Councils.

4.3. Boundaries and Justification

Individually each of the three sites has particular and closely related natural values. The lake levels fluctuate greatly and there are strong migratory connections between each of the sites even on a daily basis. All three are thus strongly linked in what could be referred to as a "flamingo system" after the dominant species using the lakes. One major missing link in this system is Lake Natron in Tanzania, the breeding location for the entire flamingo population of up to four million birds. In terms of Conditions of Integrity iv which notes that seasonal breeding and nesting sites for migratory species should be protected, Lake Natron should ideally be nominated for inclusion as part of this serial site. The Kenyan authorities have written the Director of the World Heritage Centre (26 Feb, 2001) to note that "discussions with Tanzania will also be initiated on the protection measures at Lake Natron and the possibility of incorporating that site in future to form a transboundary World Heritage within the Rift Valley Lakes". Meanwhile, Tanzania is considering putting forward Natron as a Ramsar site. Other lakes of secondary but significant importance for flamingos in Kenya are Magadi and Logipi. Neither of these lakes are protected and there are no current proposals to do so. In neither case is birdlife threatened.

4.4. Threats

As evident from the pronounced shifts in species composition and abundance that have occurred in response to natural water level variations, the ecology of the shallow soda lakes is particularly sensitive to hydrologic changes. Although each of the lakes faces a range of management issues, Bogoria and Elmenteita do not face serious threats. In contrast, Nakuru National Park has long been an area where conservation has been in conflict with development. Nakuru is an important and expanding agricultural and industrial centre. It is also a major tourist attraction, with up to 300,000 foreign and local visitors per year. Lake Nakuru town is an important industrial and agricultural centre (500,000 people) whose growth directly affects the lake. Three major rivers, the Njoro, Makalia and Enderit, drain into the lake, together with treated water from the town's sewage works and the outflow from several springs along the shore. Until recently, treatment of waste water entering the lake from the town was inadequate. An expanded sewage treatment works is now in operation but concerns about industrial pollution and surface runoff persist. The Lake Nakuru Conservation and Development Project, supported by WWF, has been working for some years to improve urban environmental standards and encourage

sustainable land-use in the catchment. Nearly half the catchment is now under cultivation, and river flows have reduced markedly while silt loads have risen. This problem will be exacerbated by recent deforestation in the Eastern Mau Forest Reserve which provides the catchment for much of Nakuru's water. Encroachment and settlement in this forest (reportedly by as many as 28,000 people) needs to be reversed and natural vegetation allowed to regenerate, or the lake may have little future.

The lake's ecology, though relatively simple, is fragile. Populations of *Spirulina*, and the invertebrates, fish and flamingos that feed on these species, can only be supported under specific, narrow ecological conditions. Severe declines in waterbird numbers (other than flamingos) since 1993 point to major changes in the food chain – specifically, a lack of fish and invertebrates – associated with a period of low lake levels. Lake Nakuru's levels fluctuate naturally due to little understood interactions between hydrology, meteorology and geology. It is unknown how human pressures may have influenced the natural cycle. The National Park is now entirely surrounded by a 74km electric fence that prevents movements of animals in or out. Large mammal populations in the Park are expanding, and careful management will be needed to avoid ecological imbalances – for instance, giraffe are currently destroying the *Acacia* woodland through de-barking of trees.

Nakuru, thus, is under pressure from threats mostly outside its borders. The management plan now in preparation fortunately takes a regional view and is proposing a number of initiatives within the watershed to better ensure the integrity of the park. Whether or not Nakuru has a future will very much depend on the implementation of measures outlined in this plan. The effectiveness of these measures requires on-going assessment and evaluation.

In summary, IUCN concludes with the following:

- The serial nomination is justified as no one of the three sites on its own would adequately display and protect this unique Rift Valley "flamingo system";
- One major component of this system, however, is missing which is the breeding grounds for the Lesser Flamingo at Lake Natron in Tanzania. The inclusion of Lake Logipi should be investigated in future by the state party;
- Both Nakuru and Bogoria have well-established management regimes while Elmenteita has not advanced to this point as yet; and
- While Bogoria and Elmenteita are not currently under serious threat, Lake Nakuru is facing significant management challenges that will require major efforts to address.

5. ADDITIONAL COMMENTS

A separate report provides an evaluation of the proposed extension of the Sibiloi/Central Island National Park to incorporate South Island National Park. As noted, this has been proposed as a separate site by the State Party.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

These three Rift Valley lakes – Bogoria, Nakuru and Elmenteita – are internationally important for three reasons:

Criterion (ii) Ecological Processes

The shallow alkaline endorheic lakes of the Rift Valley are of great scientific interest to limnologists studying the high productivity of these distinct ecosystems. The low species diversity and abundant resident population make soda lakes especially appealing environments in which to conduct investigations of trophic dynamics and ecosystem processes. The production of huge biomass quantities in these distinctive soda lakes and the food chain that this green algae supports are also of international scientific value. IUCN considers that this site meets World Heritage natural criteria ii.

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

The presence of up to 4 million lesser flamingos which move between the three lakes is an outstanding wildlife spectacle. The natural setting of all three lakes surrounded by the steep escarpment of the Rift Valley and associated volcanic features provides an exceptional scenic backdrop. IUCN considers that this site thus also meets natural criterion iii.

Criterion (iv) Biodiversity and threatened species

Within the relatively small size of each of the Reserves some of the highest levels of bird diversity in the world are recorded. Although the soda lakes themselves do not support an especially diverse fauna, the woodlands and freshwater habitats surrounding them do. Along with the high populations of flamingos that the three lakes support, the site is a critical habitat for a diverse assemblage of other avifauna. IUCN considers that this site meets criterion iv.

In terms of the Conditions of Integrity as provided in the Operational Guidelines, there are three issues of concern:

- Most bird species are migratory (or vagrant) and, in this case, the three lakes do not contain the seasonal breeding and nesting sites for the millions of flamingos that spend most of the year in the nominated site. The breeding area is Lake Natron in Tanzania which, although unprotected, is fortunately not threatened. Discussions between Kenya and Tanzania on protection measures have been initiated.
- One of the three reserves – Lake Nakuru – is under threat from pollution and de-forestation in its catchment basin. If corrective actions are not taken, the water quantity and quality will continue to decline to the point that resident bird populations will suffer large losses. The new management plan and the WWF project are addressing the difficult issue of influencing external urban, agriculture and forestry issues but great efforts will be required to implement corrective measures. This situation needs to be carefully monitored.
- The gazettement process in one of the three reserves in the nomination – Elmenteita – is not yet complete. The existence of a privately owned ranch in the site is a secondary concern despite it being under "Wildlife Sanctuary" status at present. Gazettement is expected soon but the Kenyan authorities still need to clarify the controls this designation has over private land and the adequacy of the legislation. Inscribing the site without including Elmenteita would not be sufficient as it is a key part of the three lake system.

7. RECOMMENDATION

The Bureau noted that this site fulfils criteria (ii), (iii) and (iv). The Bureau decided to refer the nomination back to the State Party for confirmation from the Kenyan authorities of the timing and effectiveness of the Wildlife Sanctuary status for Lake Elmenteita. The Bureau requested the Centre to contact the Kenya Wildlife Service to urge them to complete the process of preparing management plans for each of the three reserves, to underline concerns over threats to Lake Nakuru and to encourage them in their discussions with Tanzania over the need to ensure that Lake Natron receives adequate protection.

The Bureau furthermore encouraged the Tanzanian authorities to ensure that Lake Natron receives adequate protection. The Bureau noted that Lake Natron could in the future be considered as an extension to the site as it is important for the integrity of the nominated area.

As at 20 October 2001 IUCN has not received confirmation from the State Party on the Wildlife Sanctuary status of Lake Elmenteita and therefore recommends that the Committee **defer** a decision on the site until this confirmation is available.

Map 1

Map 2

Map 3

Map 4

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

SIBILOI/CENTRAL ISLAND NATIONAL PARKS (KENYA) EXTENSION TO INCLUDE SOUTH ISLAND NATIONAL PARK

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (3 references).
- ii) **Additional Literature Consulted:** McClanahan F.R. and T Young. 1996. **East African Ecosystems and their Conservation.** OUP.
- iii) **Consultations:** Kenya Wildlife Service staff.
- iv) **Field Visit:** January 1997. J. Thorsell.

2. SUMMARY OF NATURAL VALUES

Lake Turkana (formerly Lake Rudolph) is located in the arid hot region of northern Kenya's Rift Valley near the border with Ethiopia. It is 265km in length with an average width of 30km. In the Turkana basin, the existing World Heritage site of Sibiloi/Central Island covers 157,585ha and was inscribed in 1997 under natural criteria (i) and (iv). South Island, the proposed extension, is the largest island in the lake found 100km to the south of Central Island. It was established as a National Park in 1983 with a size of 3,900ha including a 1km extension into the surrounding lake. Similar to Sibiloi/Central Island, South Island National Park (SINP) is a breeding ground for crocodile, hippopotamus and a range of venomous snakes. It is key stopover point for palearctic migrant waterbirds with a population of some 220,000, about half of which are the Little Stint. SINP is one of Kenya's Important Bird Areas as defined by BirdLife International. Lake Turkana waters are the most saline of all the major lakes of East Africa but the waters surrounding the Park support 47 species of fish, 7 of which are endemic to the lake. The SINP is a part of Mount Kulal Biosphere Reserve which extends over the southern part of Lake Turkana

3. COMPARISONS WITH OTHER AREAS

Lake Turkana with its unique geochemistry and geological history is one of Africa's most important breeding areas for the Nile Crocodile. Its avifauna are shared with other Rift Valley parks in the region including Samburu, Kulal and Awash. Sibiloi has the additional feature as the locality for the rich source of hominid and invertebrate fossils at Koobi Fora. As the third national park in the Turkana basin, South Island is the largest of the 3 islands in the lake. It's much larger size than Central Island make it a more important site for birdlife and other terrestrial wildlife (particularly snakes).

4. INTEGRITY

As an island, the boundaries of the proposed extension are clear. The inclusion of the surrounding 1km lake frontage is similar to other components of the existing World Heritage site. A management plan (with support from the World Heritage Fund) for all 3 of the Turkana parks is now in preparation. Although the island is visited by local artisanal fisherman, its remote location and lack of freshwater has discouraged human occupation and it exists in a relatively undisturbed state. The inclusion of SINP in the site would add to the representivity of the Lake Turkana ecosystem by complementing the natural values of the existing World Heritage site. If approved, the total size of the site would increase from 157,585ha to 161,485ha, or 2.4%.

5. ADDITIONAL COMMENTS

The original nomination of Sibiloi/Central Island was submitted on the basis of both natural and cultural criteria. The Committee deferred inscription on cultural criteria but ICOMOS is expected to reassess the nomination with new data from a theme study of hominid fossil sites.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

Similar to the rationale for the inscription of the existing site, South Island reinforces both criterion (i) and (iv). It adds further to both the representation of volcanic features of the Rift Valley and the waters of Lake Turkana. It is particularly important for avifauna, particularly waterbirds, as well as providing more crocodile nesting habitat.

7. RECOMMENDATION

The Bureau recommended to the Committee the extension of Sibiloi/Central Island by the addition of South Island National Park. As requested by the State Party, the new name of the site would be **“Lake Turkana National Parks”**. The Bureau strongly encouraged the Kenyan authorities to complete the management plan for the three parks as an integrated unit.

Map 1

C.3. Indomalayan Realm

C.4. Neotropical Realm

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

CERRADO PROTECTED AREAS: CHAPADA DOS VEADEIROS AND EMAS NATIONAL PARKS (BRAZIL)

Background information: Chapada dos Veadeiros was nominated by Brazil in 2001 and IUCN, in its evaluation report to the June Bureau session, recommended the need to explore the possibility of nominating other relevant sites, which more adequately address the complexity of the cerrado ecoregion. The Bureau noted the high importance of the Cerrado ecoregion for the conservation of biological diversity and the need to enhance representation of this ecoregion in the World Heritage List. The Bureau decided to refer the nomination back to the State Party to prepare a serial nomination including Chapada dos Veadeiros National Park which more adequately addressed World Heritage criteria. In August 2001, the State party submitted a revised serial nomination including Chapada dos Veadeiros National Park and Emas National Park. This evaluation refers to this serial nomination.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (12 references).
- ii) **Additional References Consulted:** Dinerstein, E. *et. al.* 1995. **A conservation assessment of the terrestrial ecoregions of Latin America and the Caribbean.** Washington D.C.; MMA/Funatura/CI, 1999. **Priority areas for the Conservation of Biodiversity of Pantanal and Cerrado regions.** Brasília; IBAMA and PROAVES. 1998. **Priority actions for the conservation of biodiversity of Cerrado and Pantanal,** Brasília; Minister of the Environment, CI and Funatura. 1999. **Plano de Manejo, Parque Nacional da Chapada dos Veadeiros,** Brasília; Governo do Estado de Goiás. 2000. **Reserva da Biosfera do Cerrado – Fase II,** Goiania; Governo do Estado de Goiás, WWF, and Oficina de Ciências e Artes. 2001. **Área de Proteção Ambiental Pouso Alto,** Goiania; Dardenne, M. D. and J.E. Guimarães Campos. 2000. **Geological and Paleontological Sites of Brazil: Chapada dos Veadeiros National Park, Goiás;** WWF. Ano II - Número III – December, January and February, 2001. **Veadeiros Jornal,** Alto Paraíso; WWF. 2001. **Chapada dos Veadeiros: estabelecimento de um projeto integrado de conservação e desenvolvimento no Cerrado (PICD).**
- iii) **Consultations:** 5 external reviewers contacted, National, State and Municipal Government officials, park staff, local NGOs and community representatives.
- iv) **Field Visit:** March 2001. Allen D. Putney. August 2001. Pedro Rosabal

2. SUMMARY OF NATURAL VALUES

The Cerrado is the second largest ecoregion in Brazil, after the Amazon basin. Most of the Cerrado ecoregion is located in the Brazilian Highland Central Plateau with a limited portion in Bolivia. This plateau is an ancient, pre-Cambrian geological structure with nutrient-poor and, moderate to highly acid soils. Throughout the Tertiary and Holocene ecological conditions in this region remained stable facilitating the development of a highly specialised flora and fauna. This formation corresponds to the Biogeographic Province of Campos Cerrados (Udvardy, 1975) and ranks among the world's richest in biological diversity. The WWF/World Bank conservation assessment of terrestrial ecoregions of Latin America ranked the Cerrado as "globally significant" The Cerrado flora is species rich, counting up to 350-400 vascular plant species per hectare. Throughout the world only a few tropical rain forests can boast a greater number of vascular plant species per hectare.

The WWF/World Bank conservation assessment also described the ecoregion as "vulnerable" and of the "highest priority for conservation action". Despite its biodiversity importance, much of the Cerrado has been converted to agriculture, cattle ranching and urbanisation. Very few large contiguous areas of undisturbed

natural ecosystems survive. Among the largest of these are the two sites included in this Cerrado Protected Areas (CPA) serial nomination. Both the Chapada dos Veadeiros National Park (CdVNP) and Emas National Park (ENP) are located in the geographical centre of the Brazilian Cerrado Ecoregion, and both are in Goiás State.

CdVNP includes the highest altitude of the Cerrado ecoregion and covers an extension of 235,970ha, which makes it the largest National Park within this ecoregion. CdVNP is surrounded by the Environmental Protection Area (EPA) of Pouso Alto with 872,000ha, which corresponds to IUCN Protected Area Management Category VI (IUCN, 1994). The area covered by CdVNP and Pouso Alto is extremely important in the regional context for maintaining the hydrological regime, as due to its geology and soils characteristics it is a key area for recharging the existing aquifers while contributing to a number of rivers that flow into the Amazon basin. The altitude in CdVNP varies from 400 to over 1,600m. It contains a rich mosaic of cerrado landscapes and habitat types including: wooded savannah; grasslands; scrublands; dense wooded savannah; gallery forest; semi-deciduous forest; wetlands; and exposed rock.

This mosaic of landscapes and habitats, which overlays a variety of geological structures (including some of the oldest rock formations in the world) gives the CdVNP its high biological diversity. Endemism is high in the park, especially in areas above 1,200m. A biodiversity survey conducted in 1997 revealed 1,476 species of vascular plants, 50 of which are rare or endangered. Samples from gallery forest showed 145 species/ha, with are close to the figures in the Amazon Basin. Fauna includes: 45 species of mammals, eight of which are rare or endangered; 306 species of birds, 20 of which are rare or endangered; 49 fish species, of which 38 could not be identified at the species level and are probably highly localised endemics; 34 species of amphibians, of which eight are possibly new species; approximately 1,000 species of moths; and 160 species of native bees of which 6 are new to science. The CdVNP contains populations of several large mammals, including giant anteater, giant armadillo, maned wolf, spotted jaguar and pampas deer. The EPA of Pouso Alto has recently been established (May 2001) to enhance conservation outside the park and so help ensure the long-term viability of these populations.

ENP covers 131,868ha and is located at the northwest of the Brazilian Plateau within the Sierra dos Caipaós. This plateau reaches 880m within the park before it falls south to the Paraná River Basin and the vast inland wetlands of the Brazilian Pantanal, thus conferring on ENP an important regional hydrological function. Compared to CdVNP, the dominant landscape of ENP can appear monotonous with savannah formations (*cerrado sensu stricto*) dominating the area, but there are also important local variations in the vegetation, mainly as a result of soils and hydrological factors. In areas with the richest soils, semi-deciduous forest is found. Results from monitoring and research of the movement of key species in ENP indicates the high importance of this forest for species such as the spotted jaguars, pumas and ocelots. The floristic survey conducted in the open savannah reported 601 species of vascular plants with seven of these being newly-discovered species. According to the findings of CI's biodiversity assessment, the total number of plants for ENP probably should reach over 800 species once the riparian and semi-deciduous forest zones have been fully studied.

ENP has become internationally known for its rich vertebrate fauna. It is considered one of the most important sites for conservation of large mammals in South America and the only national park in the Neotropics where large mammals are easily visible. There are 78 species of mammals reported from ENP, some of which also occur in CdVNP. Endangered species include the maned wolf - considered the Cerrado's flagship species - spotted jaguar, puma, ocelot, giant ant-eater, giant armadillo, giant rat, pampas deer, marsh deer, river otter, agouti, flower bat and short-tailed opossum. Four new species of small mammals were recently discovered in the park, including a rodent and an opossum. According to researchers working on CI's biodiversity assessment of ENP, more new animal species may also be discovered as it is considered that around 30% of the park has not been subject of adequate surveys and systematic research. It is therefore very important to further support biodiversity research at this site, as it would help to better understand the ecology and biodiversity values of the entire cerrado ecoregion.

Of the 354 bird species registered in ENP, 12 are endangered species including the black and white hawk-eagle, the crowned solitary eagle and the yellow-faced amazon parrot. ENP is an important site for bird conservation in the Neotropics, containing many endemic species of specialist grassland birds. This is particularly important in view of the loss of grassland generally in the Cerrado ecoregion. There are 69 reptile species reported for ENP, of which ten are very rare and 15 (22% of the total) are endemic to the Cerrado ecoregion. Four new species of reptiles have recently described for the Cerrado. CdVNP and ENP together account for 84 reptile species but only 25 of them are common to both areas. For the whole Cerrado ecoregion around 110 reptiles species have been reported; the two nominated areas contain a remarkable sample of reptiles (73%) of this ecoregion.

One of the reasons the Cerrado Ecoregion is globally significant is because it is perhaps the oldest of the major tropical ecosystems. Changes in world climate over geological periods have moved central South America's ecosystems south to north and east to west, and back again, several times. Within the Cerrado Ecoregion, CPA is centrally located. Moreover, because of the altitudinal range which occurs in these areas, they are probably the only areas within the Cerrado ecoregion where species and habitats have been able to adjust to climate changes by vertical movement rather than by moving to different longitudes or latitudes. This has permitted the survival of rare and relict life forms, and encouraged the development of a number of endemics that exist in the proposed serial site. Experts in Cerrado ecology predict that CPA is a key site for Cerrado species adapting to climate change. CPA is very important as a base from which key species of fauna can move out to re-populate surrounding areas and remaining "islands" of natural and semi-natural vegetation within the Cerrado ecoregion. This role has been demonstrated in the case of ENP by a Conservation International (CI) biodiversity research programme, designed to help develop a Cerrado-Pantanal biological corridor. While similar research has not yet taken place in CdVNP, it is believed that this site plays a similar role.

3. COMPARISON WITH OTHER AREAS

The Cerrado Ecoregion is partially represented in two existing World Heritage Sites, the Noel Kempff Mercado National Park (NKMNP) in Bolivia and the Pantanal Conservation Complex in Brazil. Both of these areas are on the fringes of the Cerrado while CPA is located in the core of this ecoregion. The Pantanal Conservation Complex includes only small areas of Cerrado, while NKMNP contains a good portion of this kind of ecosystem, thus its more appropriate to compare this serial site with NKMNP. In more general terms, CdVNP can also be compared with Canaima National Park (Venezuela), which includes a large area of tropical savannah (the Gran Sabana) but of different biogeographic characteristics than Cerrado (Los Llanos and Guyanan Biogeographic Provinces, Udvardy 1975).

NKMNP is a composite of different ecoregions, mainly Amazonian (80% of the site), Cerrado and Chaco. The Cerrado portion is limited to 272,000ha on the Huanchaca Plateau; therefore a proper comparison should be mainly focused on this part of NKMNP. The 540 species of vascular plants reported from the Huanchaca Plateau is relatively few compared to almost 1,500 species recorded in CdVNP alone. Of the 125 mammal species found in NKMNP, only 25 occur in Cerrado habitats compared to the 78 mammal species found in ENP. The habitats and landscapes of the Cerrado, which are protected in NKMNP, are less diverse than those protected in CdVNP. On the other hand, ENP contains the best remaining sample of the Cerrado *sensu stricto*, which is only to be found in Brazil and that it is not at present represented in the World Heritage List.

While there are other protected areas in the Brazilian Cerrado, the nominated site stands out for its exceptional place in conserving the flora, fauna and altitudinal range of this ecoregion. Also, no other protected areas contain an equivalent mosaic of ecosystems; nor are they so representative of the Cerrado. For example Pacaas Novos National Park is an enclave in the Amazonian ecoregion, and Chapada Diamantina National Park contains a mixture of Cerrado and Caatinga ecosystems. Furthermore, other protected areas in the Cerrado ecoregion, such as Brasilia National Park, Chapada dos Guimaraes National Park and Grande Sertao Veredas National Park, suffer from a number of integrity issues and some uncertain land tenure questions that limits the effectiveness of their management.

While the areas forming this serial site contain a variety of geomorphological features that are important to understanding the origin and evolution of the region, these features are not comparable to those of other World Heritage sites inscribed on the World Heritage List under this criterion, for example, Ischigualasto-Talampaya in Argentina.

4. INTEGRITY

4.1. Boundaries:

At the time of the first IUCN evaluation in May 2001, CdVNP covered an area of 65,515ha and IUCN noted the "difficulty in maintaining biodiversity in such a limited area." In May 2001, the Pouso Alto EPA buffer zone for CdVNP was established, the area being a continuation of the existing Cerrado ecosystems protected by CdVNP. This area is well protected from exploitation due to its poor soils and complex relief. Furthermore, in September 2001 a Federal Decree expanded the size of CdVNP to 235,970ha, making CdVNP the largest National Park in the Cerrado ecoregion. The reason for the creation of the Pouso Alto EPA and the extension of the size of the

Park has been to include all important areas required for the long-term survival of key species, particularly large predators.

ENP is almost entirely surrounded by agricultural areas and thus does not have the additional support provided by a buffer zone. However, the management of ENP has been carefully planned so as to avoid impacts from outside, particularly from fires (see point 4.3). Research conducted in the area by the Emas Foundation, revealed that large predators are using this area for feeding and breeding, which is evidence that the size is sufficient to meet the biological needs of these species. This is supported by the rarity of attacks by large predators on cattle outside this area.

4.2. Management

A management plan was prepared for CdVNP in 1998 but has not been fully implemented due to the lack of financial resources. However, the plan is in the process of being reviewed to take account the recently approved extension of the CdVNP. A participatory process to prepare this new management plan has already started. WWF/Brazil and Pro-Nature Foundation (FUNATURA) also support the on-going management of CdVNP. The CdVNP has a relatively small, but highly motivated, staff of two technical staff, including the Park's Director, and three rangers working on-site. Personnel from WWF/Brazil, the Chapada dos Veadeiros Tourist Guide Association and the Flower Collectors Association support the park's staff. This team has built constructive relationships with surrounding communities, which has helped to reduce threats to the park.

The park has adequate infrastructure for management activities with entrance stations, a visitor centre, housing for staff and researchers, guard posts, and trails to major visitor attractions. There are no human inhabitants within the park, and important segments of the local population in the eight surrounding communities are effectively involved with park management activities.

Financing of park management depends on the budget received from IBAMA for operations and park staff salaries funded by the National Treasury. In recent years, the annual budget has varied between US\$60,000 and US\$120,000. However, a large proportion of this budget is dedicated to salaries and it is not sufficient to maintain and operate the park. The new management plan for this site envisages developing the financial sustainability of CdVNP through revenue generation schemes.

In the case of ENP, a management plan was prepared in 1981 and updated in 1996. IBAMA and Emas Foundation aim to review the existing management plan to incorporate results from on going research projects of ENP's biodiversity. This is planned to begin in December 2001 and will also involve a participatory process, including neighbouring farmers who will be encouraged to develop better agricultural practices that would avoid impacts on ENP. The preparation of the new management plan is also linked to the implementation of the CI project to establish a biological corridor linking the Cerrado ecosystem to the Pantanal. There are two technical staff, including the Park's Director, and six rangers working on-site. In addition between 9 and 11 researchers are permanently working in research projects providing additional support to park management activities.

As in the case of CdVNP, the financing of ENP depends on the budget received from IBAMA for operations and park staff salaries funded by the National Treasury. The annual budget for the ENP has varied between US\$40,000 and US\$80,000 in recent years. Emas Foundation provides additional funding support for research, which is linked to the implementation of CI's project on the Cerrado-Pantanal biological corridor, funded by USAID. While the park's administration considers the available funding sufficient for key management activities, more is required to support the research programme on ENP biodiversity. There are also emerging challenges related to the potential impact of invasive species to the Park that would certainly require additional funding support.

4.3. Threats

There were a number of threats to CdVNP integrity, mainly related to fires, mining, flower collecting, hunting and uncontrolled tourism. These have been reduced significantly in recent times. This has been accomplished mainly by positive interaction with local communities that at present are actively involved in the conservation and management of this area. Perhaps the most effective strategy has been to give local communities an effective financial stake in the park's tourism activities. The commercial collection of flowers is a major source of income in the region, but considerable effort has been made to divert this activity to areas outside the park where sustainable management practices are pursued.

The main threat to CdVNP is the increasing level of visitation. In the past, uncontrolled public-use damaged a few small areas within the park. However, the closing of access roads and imposition of strict controls have improved this situation. Since 1995, when the monitoring of visitor numbers began, park visitation has varied from 8,000 to 26,000 people per year. Most are from Brasilia, but increasingly visitors come from São Paulo and Rio de Janeiro. Public use is limited to the park's major attractions, which occupy only 2% of the park's area. The focus is on the spectacular rapids, waterfalls, natural pools and canyons of the Preto River. Visitors are not permitted in the park unless accompanied by a guide; there are over 200 self-employed guides in the Chapada dos Veadeiros Guide Association. Their services include interpretation; garbage collection, fire control, trail maintenance and visitor safety, but they have no law enforcement powers. A new plan for park visitation, which is currently under review as part of preparation of the new management plan for CdPVNP, makes provision for: viewing points along the paved highway on the eastern border of the park; a trekking trail that will cross the park from the southeast to the northwest; additional visitor sites; and enhancing the capacity of the guides working in the park. These provisions are intended to manage and control visitation, thus reducing damaging impacts to the park's integrity.

The situation for ENP is quite different. Despite being the only national park in the Neotropics where large mammals are easily visible, the level of visitation is very low: only 60-80 people visit the site annually, most of them specialised visits focused on the charismatic fauna. A key threat to ENP integrity is the impact of fires coming from nearby agricultural areas. After a fire in 1990 that affected almost half the park, the need for a comprehensive fire control programme was highlighted. The fire control programme that is now in place is based on results from research on the role of natural fires in Cerrado's ecology. It is an effective programme and a useful model to apply in other Cerrado parks. No fires affecting the site from nearby agricultural areas have been reported since 1994.

The ecological isolation of ENP – it is almost entirely surrounded by farmland – can also be considered a threat to this site. This has been partially solved through good management practices aimed at reducing impacts coming from surrounding agricultural areas. Moreover, the Emas Foundation, with CI, is implementing a project, which aims to link ENP with other semi-natural areas, mostly state reserves, to develop a Cerrado-Pantanal biological corridor, which would help to overcome the isolation of this site.

Another emerging threat to ENP is the increasing presence of exotic grasses species. It has so far affected only the boundary zone, and is still absent from most of ENP. However, a monitoring system is in place to prevent further invasion, as grass seeds are brought into the park by wind and by animals that move across park boundaries.

4.4. Serial Site

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

a) What is the justification for the serial approach? The Cerrado ecoregion is the second largest of Brasil after the Amazonian basin. This is a complex ecoregion with a variety of habitat types that are impossible to be represented by a single site but rather by a serial site as CPA. While separated by around 400km both CdVNP and ENP occur in the Brazilian Highland Central Plateau, which is considered the core of the cerrado ecoregion. CPA covers all habitat types identified for the Cerrado and most of the flora and fauna species described for this ecoregion, including a number of endangered species of global significance.

b) Are the separate elements of the site functionally linked? All areas within the cerrado ecoregion have been functionally linked throughout the Tertiary and Holocene and the ecological conditions in this region remained stable facilitating the development of a highly specialised flora and fauna. These linkages still exist as CdVNP and ENP play a key role in the repopulation of cerrado's flora and fauna to the remaining semi-natural areas associated with them. They are also functionally linked in relation to the maintenance of the hydrological regime of the cerrado while also contributing to the Amazon and Pantanal basins.

c) Is there an overall management framework for all the units? The two areas of this site have separate management plans and management regimes. For practical, logistical and financial reasons it is difficult at present to have an integrated management plan for both sites. However, this may be achieved in the near future through the implementation of the proposed projects for the Pantanal-Cerrado Biosphere Reserves and the CI's project to develop a Cerrado-Pantanal Biological Corridor.

5. ADDITIONAL COMMENTS

It is widely believed in the region of CdVNP that the quartz crystals, which are found in the park and surrounding area, are a potent source of bioenergy that has therapeutic and restorative effects on humans. The community of Alto Paraíso, on the eastern boundary of the park, caters to visitors seeking guidance in meditation, enlightenment, and physical and spiritual renewal. They have thus created a specialised niche in the tourism market for “spiritual” tourism. Park management has now recognised the potential and requirements for this specialised form of tourism. Discussions are being held to develop special management arrangements for park visitation by these groups. There is also an effort underway to harness the potential of this type of tourism for developing innovative environmental education and visitor interpretation programmes.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

CPA has been nominated under all four natural criteria. IUCN considers that criteria (ii), (iii) and (iv) are most relevant.

Criterion (ii): Ecological processes

CPA has played a key role for millenia in maintaining the biodiversity of the Cerrado Ecoregion. Due to its central location and altitudinal variation, it has acted as a relatively stable species refuge when climate change has caused the Cerrado to move north-south or east-west. This role as a species refuge is ongoing as Earth enters another period of climate change. IUCN considers that the nominated site meets this criterion.

Criterion (iii): Site containing superlative natural phenomena or exceptional natural beauty

The CdVNP contains a variety of features, such as waterfalls, cliff faces, inselbergs, and a meteorite crater that are interesting landforms which contribute to the natural beauty of the site. However, these features are not comparable to those existing in other World Heritage sites, such as the Pantanal Conservation Complex in Brazil and Canaima National Park in Venezuela. Moreover, the landscapes of ENP may appear somewhat monotonous and lacking in striking landforms. IUCN considers that the nominated site does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

CAS contains samples of all key habitats that characterise the Cerrado ecoregion – one of Earth’s oldest tropical ecosystems. It contains over 60% of all floral species and almost 80% of all vertebrate species described for the Cerrado. With the exception of the Giant Otter, all of the Cerrado’s endangered large mammals occur in the site. In addition, the site supports many rare small mammals and bird species that do not occur elsewhere in the Cerrado and a number of species new to science have been discovered in CPA. IUCN considers that the nominated site meets this criterion.

7. RECOMMENDATION

That the Bureau recommends to the Committee the **inscription** of the Cerrado Protected Areas on the World Heritage list under natural criteria (ii) and (iv). IUCN considers that there is a strong case for including the “buffer zone” of CdVNP (Pouso Alto EPA) within the site, as this area shares key natural values of CdVNP and adds substantially to its protection.

The Committee may also wish to request the State Party:

- To provide additional support to CdVNP so as to help finalise and implement the revised management plan for the enlarged site. This plan should give particular attention to issues of tourism and visitor management. The State Party, if it wishes to do so, should consider making a request for assistance from the World Heritage Fund to support this process;
- To further encourage and support the development and implementation of the project for the Cerrado and Pantanal Biosphere Reserves that would help to promote an overall management framework for CPA;

- To further encourage and support the development and implementation of the CI project to establish a Cerrado-Pantanal biological corridor which, in the medium and long-term, would help to overcome the relative isolation of Emas National Park, and;
- To provide greater support to the research programmes underway in ENP.

Map 1

Map 2

Map 3

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

FERNANDO DE NORONHA ARCHIPELAGO/ROCAS ATOLL TROPICAL INSULAR COMPLEX (BRAZIL)

Background information: Fernando de Noronha National Marine Park was nominated by Brazil in 2000. IUCN in its evaluation report (2000) noted “*Fernando de Noronha National Marine Park has been nominated for inscription on the World Heritage List on the basis of all four natural criteria. The information that is provided in the nomination document is not sufficient to justify inscription.*” The World Heritage Committee, at its twenty-fourth session in Cairns, Australia (December 2000), noted that the State Party requested postponement. In February 2001 the State Party submitted a serial nomination of Fernando de Noronha/Atoll das Rocas Tropical Insular Complex. This evaluation refers to this serial nomination.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (10 references).
- iii) **Additional Literature Consulted:** Bibby *et al*, 1992. **Putting Biodiversity on the Map. Priority Areas for Global Conservation.** Cambridge, UK; Stattersfield *et al*, 1998. **Endemic Birds Areas of the World: Priorities for Biodiversity Conservation.** Cambridge, UK; Biodiversity Support Program, Conservation International *et al*, 1995. **A Regional Analysis of Geographic Priorities for Biodiversity Conservation in Latin America and the Caribbean.** Washington, DC; IUCN Tropic Forest Program/ World Conservation Monitoring Centre, 1998. **Brazil, Atlantic Coastal Forests: Conservation of Biological Diversity and Forest Ecosystems;** Davis, S.D. *et al* **Centres of Plant Diversity.** Vol. 3. IUCN Gland, Switzerland; Prance, 1987. **Biogeography of neotropical plants. In Biogeography and Quaternary History in Tropical America.** Whitmore and Prance, (eds) pp 46-65. Oxford: Clarendon Press; Kikuchi, R.K.P and Z.M.A.N. Leão, 1997. **Rocas: An Atoll built primarily by coralline algae.** In **Proceedings of the 8th International Coral Reef Symposium**, Vol.1, pp 731-736. UNEP/IUCN. 1998. **Coral Reefs of the World.** Vol. 1: Atlantic and Eastern Pacific. IUCN Gland, Switzerland and Cambridge, UK; GBRMPA/WB/ IUCN, 1995. **A Global Representative System of Marine Protected Areas.** Vol. 2: Wider Caribbean, West Africa and South Atlantic. Washington DC, USA; Elder, D. E. and Pernetta, J. eds., 1991. **Oceans.** London, UK; Sanches, T. M. and Bellini, 1998. **C. Juvenile *Eretmochelys imbricata* and *Chelonia mydas* in the Archipelago of Fernando de Noronha, Brazil.** In **Chelonian Conservation and Biology**, Vol.3, No.2. pp 308-311, Washington DC, USA.
- iv) **Consultations:** 4 external reviewers, Fernando de Noronha National Marine Park, IBAMA, Secretary for the Environment of Pernambuco State, TAMAR Regional Project, Local Community Council, Local Association of Fishermen, Local Association of Tourism Operators, Aguas Claras Dive Centre, Golfinhos Rotadores Project.
- v) **Field Visit:** Pedro Rosabal, February 2000 and August 2001.

2. SUMMARY OF NATURAL VALUES

This serial nomination includes Fernando de Noronha National Marine Park (FNNMP) and Atoll das Rocas Biological Reserve (AdRBR). These sites (FNNMP/AdRBR) are located in the Western South Atlantic Ocean, off the northeastern coast of Brazil (see Map 1). FNNMP, under the jurisdiction of the State of Pernambuco, includes a terrestrial area of 1,190ha, comprised of 70% of the main island of Fernando de Noronha, (excluding the island's urban nucleus), as well as 21 smaller offshore islands and islets. The marine area of FNNMP covers 9,580ha and is surrounded by a buffer zone that extends to the 2,000m isobar (see Map 2). AdRBR, approximately 150km to the west of FNNMP, is under the jurisdiction of the State of Rio Grande do Norte. AdRBR is an elliptical reef that includes two small islands, the 3.5ha Lighthouse Island (Ilha do Farol) and 3.2ha

Cemetery Island (Ilha do Cemitério). The marine part of this Biological Reserve covers around 7,500ha and it is surrounded by a buffer zone that extends to the 2,000m isobar (see Map 3).

The nominated site is located on the Southern Atlantic submarine ridge. The Fernando de Noronha Archipelago represents the emerged peaks of this submarine mountain system that rises 4,000m from the ocean floor to an altitude of 323m ASL at Morro do Pico on the main island of Fernando de Noronha. Atoll das Rocas has been formed by the growth of reefs on the submerged peaks of the submarine ridge. Coralline algae have been the primary builders of the das Rocas with secondary deposition by coral. The site represents the first record of coralline algae as primary reef builders during the Quaternary period. It is also the only atoll in the South Atlantic Ocean and one of the smallest in the world. The coastline of FNNMP alternates between high cliffs and sandy beaches and its geology is characterised by a number of volcanic rock types, including pyroclastic deposits of tufa and breccia, lavas and formations such as volcanic plugs, dykes and domes.

There are less than ten oceanic island sites in the South Atlantic and FNNMP/AdRBR represents more than 50% of the ocean's islands in terms of surface area. The highly productive coastal waters around islands are used by many fish species for spawning and as a refuge for juvenile fish. The shallow waters also provide habitat for benthic organisms (such as coral, sponges and algae). Oceanic islands therefore play a key role in the reproduction and dispersal of marine organisms, providing a staging point for the colonisation of other coastal areas and the surrounding ocean. Since FNNMP/AdRBR represents such a large proportion of insular South Atlantic coastal area, it is an important repository for the maintenance of biodiversity for the entire South Atlantic basin.

FNNMP vegetation is classified as Insular Atlantic Forest – a sub-type of Atlantic Rainforest which is considered the world's most threatened tropical forest. Insular Atlantic Forest is only found in FNNMP. To date over 400 species of vascular plants have recorded in FNNMP, including three endemics. FNNMP also contains the sole oceanic mangrove in the South Atlantic. The vegetation on Atoll das Rocas is mainly herbaceous, salt-resistant, and typical of sandy beaches where *Cyperaceae*, *Gramineae* and *Amaryllidaceae* species are predominant.

The nominated site contains the largest concentration of tropical seabirds, in terms of numbers and species diversity, to be found in the Western Atlantic. 55 migratory species have been recorded in FNNMP, 14 of which breed in the Park. Resident bird species include six natives, three of which are locally endemic, including the Noronho vireo or "sebito". The archipelago is considered a Global Centre of Bird Endemism (BirdLife International, 1998). In AdRBR 32 species have been recorded, of which 11 species regularly nest on the atoll. Approximately 150,000 birds utilise the atoll, including the largest South Atlantic colonies of sooty terns, brown noddies and masked boobies. Based on the diversity and number of individuals, AdRBR is considered the single most important site for tropical seabirds in the whole Atlantic (BirdLife International, 1998).

There is an abundance of marine fauna in the nominated area. Two species of marine turtles breed in the site: the hawksbill turtle – the world's second most threatened species – and the green turtle. AdRBR is considered Brazil's second largest reproductive area for green turtles after Trindade Island. 15 species of coral have been recorded of which six are endemic to Brazil. 95 species of fish have been reported in FNNMP – including two species endemic to the archipelago – while 147 species of fish have been recorded from AdRBR. Research undertaken by the Brazilian Marine Turtles Conservation Project (TAMAR) indicates that AdRBR is an important feeding ground for juvenile hawksbill and loggerhead sea turtles during their migration to the Eastern Atlantic coast of Africa.

FNNMP has important scenic values associated with its diversity of coastal landscapes and their combination with an impressive gradient of colours of the surrounding waters. On the other hand AdRBR offers spectacular scenes associated with the tide regime. At high tide only two sandy islands and some isolated rock formations in the surrounding reef stand above water. The scene changes dramatically at low tide when the reef ring of the Atoll – a natural 1.5m wall bordered by several sandbanks – is exposed and several shallow lagoons and tidal pools are formed producing a spectacular and colourful landscape. In addition, large numbers of fish get trapped in tidal pools, transforming the atoll into a natural aquarium of great beauty. Underwater both sites present the best diving conditions of the South Atlantic and are considered among the 10 top diving sites of the world. This relates to the abundance of big fishes and sharks, the variety of submarine forms, and an exceptional visibility up to 50m and a light extinction depth of 87m.

A significant natural feature of the site is the concentration of spinner dolphins in FNNMP. This species is commonly found in tropical oceans and is included in the category "insufficiently well-known but dependent on Conservation" in the IUCN Red List. Almost every morning, between 1000 and 1200 spinner dolphins come to

the waters of the Golfinhos Bay in FNNMP to rest up before returning to the ocean at night to feed. This high concentration of spinner dolphins in a relatively small area is an interesting natural phenomenon that attracts the attention of scientists and divers worldwide. Spinner dolphins marked in FNNMP have also been seen in AdRBR. Coloured dolphins, regular dolphins, flippers, melon-head dolphins, pilot whales, minke whales and humpback whales have also been recorded in the nominated area.

3. COMPARISON WITH OTHER AREAS

The nominated area is a biogeographic province of its own – Fernando de Noronha Island Biogeographic Province. According to the classification of Marine and Coastal Realms, the site falls within the Tropical Coastal Realm of the South Atlantic Marine Region. There are no World Heritage sites in either of these biogeographic regions.

Representing a submarine volcanic mountain system, FNNMP/AdRBR may be compared to other Atlantic volcanic islands such as Ascension, St. Helena, and Trinidad. However, its higher biodiversity and the occurrence of Insular Atlantic Rainforest, only to be found in this site, differentiate the nominated area from these islands. Moreover these other Atlantic volcanic islands have been substantially transformed by development and do not enjoy the degree of protection of FNNMP/AdRBR. There are a number of volcanic island World Heritage sites in the Pacific, such as the Galapagos (Ecuador), Cocos Island (Costa Rica) and Hawaii Volcanoes (USA) and East Rennell (Solomon Islands). The differences in oceanography and marine biodiversity between the two oceans make it difficult to compare these sites to the nominated area. This is also the case for Aldabra Atoll (Seychelles) in the Indian Ocean. However, in terms of flora, FNNMP with 400 species is more diverse than Cocos Island (235) and Aldabra Atoll (178).

Though Cocos Islands, Galapagos and the New Zealand Sub-Antarctic Islands have greater numbers of seabirds, the nominated area has relatively high seabird numbers when compared other Southern Atlantic sites such as Gough Island, or to other sites in the Tropical Coastal Realm of the South Atlantic Marine Region. In terms of fish species, Cocos Island has a greater diversity than the nominated area. However, FNNMP/AdRBR has larger populations of some shark species, particularly the lemon shark, than Cocos Island which is important for hammerhead and white-tip sharks. The lemon shark is the subject of ongoing research in AdRBR due to the presence of an increasing resident population, in contrast with the population depletion that is occurring in the Eastern Pacific and West Atlantic. In addition Cocos Islands and Galapagos Islands do not show the ecological linkages that the nominated site has in relation to the survival of marine turtles, dolphins, sharks and other marine species.

FNNMP has important scenic values related to the combination of high cliffs alternating with sandy beaches and an impressive gradient of colours in the sea around the archipelago. However, this is not as impressive as the scenery offered by Cocos Islands with its precipitous forest-covered slopes and waterfalls, or when compared with Hawaii, Galapagos or Gough Island. The scenic values associated to the pristine landscape of AdRBR, as described in section 2, are very high and so peculiar that they can stand by their own in comparison with other world heritage sites. A distinct feature of this nomination is the presence in FNNMP of a resident population of spinner dolphins. The only other known resident population occurs in Kealake'akua Bay, in Hawaii. The population in the nominated site exhibits a well-defined pattern of activity, including nightly feeding in deep ocean waters and AdRBR, followed by a return to Baía dos Golfinhos to rest. The dolphins arrive at the Bay with a remarkable punctuality, between 07:00-07:30hrs each morning and their arrival is spectacular due to the high number of individuals. This is one of the main attractions for visitors who can watch this phenomenon from the high cliffs surrounding the bay. According to the well-known underwater photographer and explorer Tim Burton "there is no other place in the world where you can see such a high concentration of dolphins in such a small area".

In sum, FNNMP/AdRBR has a number of features which differentiate it from other Island World Heritage sites. Being a Biogeographic Province on its own, as well as a Global Centre of Bird Endemism also makes this site quite distinctive.

4. INTEGRITY

4.1. Boundaries:

The terrestrial and marine components of the nominated area are well protected. The boundaries of the nominated area are considered adequate for conserving marine biodiversity. On the main island of Fernando de Noronha all key terrestrial habitats are included in the park and all the terrestrial areas of Atoll das Rocas are within the core zone of the protected area.

4.2. Management:

FNNMP/AdRBR has adequate legal protection from a number of Federal and State laws and regulations. IBAMA is the Federal Agency responsible for the management and conservation of the site. The site has two separate management plans, one for FNNMP and one for AdRBR. The management plan for FNNMP was prepared in 1990 that is being implemented with local government and IBAMA financial support. This plan is adequate and its implementation well resourced and supported by local people. The plan strictly controls tourism developments and visitation. Regulations also control migration to the main island so that the population cannot rise above the present level of 2,500 people. Commercial fisheries are forbidden but traditional fisheries are allowed subject to licenses and regulations. Licenses are granted only to the families of traditional fishermen. A management plan for AdRBR was prepared in 1992 and is under implementation. As only researchers are allowed visit AdRBR and all fisheries are strictly prohibited, the management plan is mainly focused on enforcement, research and monitoring activities.

FNNMP is patrolled by 11 rangers equipped with four vehicles and a speedboat. TAMAR also actively participates in management providing staff for land patrols and permanent observation points overlooking waters around the main island. A good relationship exists between the park and the local community and many local individuals and organisations such as divers, fishermen and tour operators assist park staff in monitoring for illegal activities. The combined efforts of the Park Administration, TAMAR and the local people provide a remarkable successful partnership to control and patrol this site. The Marine Park Authority and the District Council for the Environment actively promote the active participation of local people in conservation activities. In AdRBR there are two permanent staff whose monitoring efforts are assisted by the 3-4 researchers on the atoll. AdRBR staff are supported by the Brazilian navy who help maintain the base on the atoll. The navy also provides immediate backup with planes or coastguard boats when illegal fishing boats are reported.

The Federal Government provides a management budget of US\$80,000 per year for FNNMP and around US\$30,000 for AdRBR. Both sites receive additional funding for specific projects or conservation initiatives from the Ministry of the Environment's National Environment Fund. FNNMP receives additional funding from a Visitor's Tax and entrance fees. The level of funding and additional support is considered to be adequate for the management of the site.

4.3. Tourism

While tourists are not permitted in AdRBR, FNNMP is one of the most visited parks in Brazil (400,000 visitors in 2000) with diving being a big attraction. Regulations restrict the number of visitors to the main island to a maximum of 420 per day and the importation of non-recyclable material. The Regulations also restrict the amount of tourist accommodation on the island to its current level of approximately 1000 beds. Following the 2000 IUCN visit to FNNMP, the Sustainable Development and Ecotourism Management Plan has been finalised and is under implementation. The plan also covers the area outside FNNMP, the urban nucleus of the main island, which is subject to strict environmental regulations. This plan addresses the carrying capacity of different zones within the park and regulates boating and diving.

A good network of trails and well trained local guides help to reduce visitor impact. Annual training courses for local guides and diving operators are organised by tourism agencies with the support of IBAMA and the TAMAR Project. WWF-Brazil also provides technical and financial support for communication and interpretation. An interpretation centre is located on the main island and all visitors are requested to attend a presentation on FNNMP, which explains regulations and management. As nature-based tourism is the main source of income for local people there is a genuine interest in conserving the area's natural values. Tourism in FNNMP is well regulated and managed and IUCN did not detect any adverse impacts from tourist activities in the park.

4.4. Threats

Given the location of the site and its effective management and regulation there are few threats to its integrity. There is a potential threat from oil spills, however, this is considered very low. The port on Fernando de

Noronha island is well equipped to deal with accidents and existing shipping lanes are located far from the site where oceanic currents would disperse oil or waste before it could reach the site.

4.5. Serial Site

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

a) What is the justification for the serial approach? Though separated by 150km, both clusters occur on the Southern Atlantic submarine ridge. Together they represent more than half of the insular Southern Atlantic and are extremely important for the dispersion of benthic larvae and the maintaining and re-population of fish stock in the surrounding oceanic waters.

b) Are the separate elements of the site functionally linked? There is a clear connection between FNNMP and AdRBR in relation to biological and ecological processes. The benefits from sharing the same marine currents and oceanographic regime that influence the ecological processes occurring in both sites. They are clearly linked in an ecological corridor on which a number of species such as marine turtles, dolphins, and sharks survival depends. In the case of marine turtles the linkages go beyond the South Atlantic as these species use this site in their migration to the Western Coast of Africa.

c) Is there an overall management framework for all the units? The two clusters of this site have separate management plans and management regimes. For practical and logistical reasons it is difficult to have an integrated management plan for both sites as they respond to different management objectives (FNNMP is a Category II protected area while AdRBR is a Category Ia protected area according to IUCN, 1994). However they do implement in a coordinated way a number of research projects on key species such as marine turtles, sharks and birds.

5. ADDITIONAL COMMENTS

FNNMP has an interesting history of human occupation represented by a number of sites within the park. The archipelago was once of strategic importance for controlling access to Brazil which prompted the construction of a system of fortresses -- nine of them on the main island. Considering the limited size of the main island -- 17 km² -- this is probably the highest density of military construction worldwide. Also of cultural value is São Miguel Palace, formerly the administration centre of the penitentiary, but now housing the administrative headquarters of the State District of Fernando de Noronha. In AdRBR there are a number of shipwrecks around the atoll of great interest for underwater archaeology. Some of them have been partially studied and mapped but much more work remains to be done.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

This serial site has been nominated for inscription on the World Heritage List on the basis of all four natural criteria.

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

FNNMP/AdRBR represents volcanic islands that are the surface manifestation of a submarine mountain system but it does not represent the process of formation of this system. There are many volcanic World Heritage island sites so the nominated are cannot be considered unique in this respect. Atoll das Rocas is a good example of an atoll constructed primarily by coralline algae in the Quaternary period. It is also the only atoll in the South Atlantic Ocean and one of the smallest in the world. However, there are existing atoll World Heritage sites and there are sites in the Pacific Ocean which would better represent this phenomenon. The site also has ongoing coastal geomorphological processes but these are common to coastal zones throughout the world. IUCN considers that the nominated serial site does not meet this criterion.

Criterion (ii): Ecological processes.

FNNMP/AdRBR represents over half the insular coastal waters of the Southern Atlantic Ocean. These highly productive waters provide feeding ground for species such as tuna, billfish, cetaceans, sharks, and marine turtles as they migrate to the Eastern Atlantic coast of Africa. An oasis of marine life in relatively barren, open ocean,

the islands play a key role in the process of reproduction, dispersal and colonisation by marine organisms in the entire Tropical South Atlantic. IUCN considers that the nominated site meets this criterion.

Criterion (iii): Superlative natural phenomena or exceptional natural beauty.

Baía dos Golfinhos is the only known place in the world with such a high population of resident dolphins and Atoll das Rocas demonstrates a spectacular seascape at low tide when the exposed reef surrounding shallow lagoons and tidal pools forms a natural aquarium. Both sites have also exceptional submarine landscapes that have been recognised worldwide by a number of specialised diving literatures. IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species.

FNNMP/AdRBR is a key site for the protection of biodiversity and endangered species in the Southern Atlantic. Providing a large proportion of the insular habitat of the South Atlantic, the site is a repository for the maintenance of marine biodiversity at the ocean basin level. It is important for the conservation of endangered and threatened species of marine turtles, particularly the hawksbill turtle. The site accommodates the largest concentration of tropical seabirds to be found in the Western Atlantic Ocean, and is a Global Centre of Bird Endemism. The site also contains the only remaining sample of the Insular Atlantic Forest and the only oceanic mangrove in the South Atlantic region. IUCN considers that this serial nomination meets this criterion.

7. RECOMMENDATION

That the Bureau recommends to the Committee the **inscription** of Fernando de Noronha Archipelago/Atoll das Rocas Insular Complex on the World Heritage List under natural criteria (ii), (iii) and (iv). The Bureau may also wish to recommend that the State Party take steps to control potentially adverse activities in the ecological corridor between the two island components of the site. IUCN would like also to recommend that, for easy reference, this site be inscribed under the name of the Brazilian Atlantic Islands.

Map 1

Map 2

Map 3

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

ALEJANDRO DE HUMBOLDT NATIONAL PARK (CUBA)

Background note: The IUCN technical evaluation of Alejandro de Humboldt National Park (AHNP), nominated by Cuba in 1999, was presented to the twenty-third session of the Bureau in July 1999. Based on IUCN's advice the Bureau adopted the following recommendation:

“The Bureau noted that Alejandro de Humboldt National Park is considered to meet natural criteria (ii) and (iv) but decided to defer the nomination to allow approval of the law expanding the Park and approval of an expanded boundary which links the currently isolated core zones. Until this law and this boundary is in place, the integrity of the site cannot be guaranteed.”

ADDITIONAL INFORMATION

IUCN has received a copy of recently approved legislation (Accord No. 3880 of the Executive Committee of the Council of Ministers, 1 February 2001), which establishes a number of new protected areas as part of the development of the National Protected Areas System of Cuba. The legislation includes provisions for the expansion of AHNP. IUCN has also received a detailed map of the expanded park (see Map 1). The new boundaries link the core zones (Cupeyal-Ojito de Agua Sector and the Jaguaní Sector) which were separated from each other at the time of the 1999 nomination. The new boundaries also encompass a marine and coastal component; thus the expanded park covers a range of ecosystems from the sea to some of the highest peaks in eastern Cuba. IUCN considers that the expanded boundaries adequately respond to the Bureau's concerns on the integrity of this site.

APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

Criterion (ii): Ecological processes

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

Criterion (iv): Biodiversity and threatened species

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

RECOMMENDATION

That the Bureau recommend to the Committee that Alejandro de Humboldt National Park be **inscribed** on the World Heritage List under natural criteria (ii) and (iv). The Committee may also wish to recommend that the

State Party consider requesting Technical Assistance to finalise the management plan for this site, taking into account the conservation requirements of the extended boundaries.

Map 1

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

GALAPAGOS MARINE RESERVE (ECUADOR) EXTENSION TO GALAPAGOS NATIONAL PARK

Background note: The Galapagos Marine Reserve (GMR) was nominated in 1994 as an extension of the Galapagos National Park (GNP) which was inscribed in the World Heritage List in 1978. The importance of extending this site to cover the marine environment was emphasised in the original evaluation of GNP as to enhance the protection of the whole islands as a number of species in GNP have string linkages with the marine environment for their survival. In 1994 IUCN evaluation considered that GMR did meet natural criteria (ii), (iii) and (iv) but its inscription was deferred conditional to the solution of a number of integrity problems.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (38 references)
- ii) **Additional Literature Consulted:** Fundación Natura/WWF. 1997, 1998, 1999, 2000. Galapagos Report. (Annual Monitoring Reports); Fundación Natura/TNC. 2000. Galápagos – Dinámicas Migratorias y sus Efectos en el Uso de los Recursos Naturales, 226p; BirdLife International. 2000. **Endemic Bird Areas of the World**; Davis, J. (ed.) **MPA News**. (various feature articles on Galapagos); Anon. 1999 – 2000. Marine Reserve Problems. **Galapagos News**; Ben-Yami. 2001. Managing Artisanal Fisheries of Galapagos. WWF Consultant Report; Benstead-Smith R. 2001. Conservation of Biodiversity and Sustainable Use of Resources in the Galapagos Marine Reserve. Status, Investment Needs and Long-Term Financial Needs. CDF Internal Document. 10p; Anon. 1999. Plan de Manejo – Reserva Marina de Galápagos. Publicado en el Registro Oficial 173, 150p; Roberts. C.M. and J. Hawkins. 2000. **Fully Protected Marine Reserves – A Guide**. WWF; Jackson. M.H. 1985. **Galapagos**. U. Calgary Press; Sullivan Sealy, K. and G. Bustamante 1999. Setting Geographic Priorities for Marine Conservation in Latin America and the Caribbean. TNC. 125p; Anon. 1999. Projections of the Charles Darwin Foundation; Bradus, J. et al. 1984. Coastal and Marine Resource Management for the Galapagos. Woods Hole Technical Report; Bustamante R.H. 2000. Marine Conservation and Human Conflicts in the Galapagos Islands. **MPA News**. March; Jenkins, M. & T. Mulliken. 1999. Ecuador's Sea Cucumber Trade. **Traffic Bull.** 17(3), 17(1), 18(1); UICN-SUR et. al. 2000. Diseño final del Subprograma de Manejo de la Reserva Marina de Galápagos. IDB Project.
- iii) **Consultations:** 14 external reviewers contacted, Minister of Environment, Congress Deputy for Galapagos Province, Mayor and Vice Mayor of Santa Cruz, Directors and Staff of Galapagos National Park, Director and staff of Charles Darwin Research Station, Director of Ministry of Tourism, Association of Galapagos Tour Operators, Secretary General of Charles Darwin Foundation, Ecuadorian Conservation NGO's (WWF, Fundación Natura, TNC, CEDENMA), Director UICN-SUR, Youth of the World Galapagos Representatives, Santa Cruz Fishing Cooperative.
- iv) **Field Visits:** February, 1994 – J. Thorsell, D. Elder, B.Ortiz;
March, 2001 – J. Thorsell, C. Maretti

2. SUMMARY OF NATURAL VALUES

The Galapagos Marine Reserve (GMR) comprises the waters around the 120 islands of the Galapagos National Park (GNP). While the size of the park is 76,651km², covering all terrestrial parts of the islands, the boundary of the GMR extends 40 nautical miles offshore and covers an area of 133,000km². The GMR was formally established in March, 1998 when the Special Law for the Galapagos (SLG) was passed. Before this Law the

area had been a "Marine Resources Reserve" since 1986. Since 1996, responsibility for managing the GMR rests with the GNP. The entire GMR is proposed for extension of the existing World Heritage site (GNP).

The Galapagos marine environment is a "melting pot" of species that biogeographers have recognised as a distinct biotic province. The convergence of three distinct ocean currents has transported marine biota from tropical and subtropical regions of Central and South America and the Indo Pacific. The level of endemism is quite high, averaging 20-25% of marine species, mainly fish. Due to the cool waters of the Humboldt Current 4 to 6 months per year, the Galapagos is considered a marginal environment for coral reefs. Corals, however, are found in some localities where warmer waters prevail. There are some 447 species of fish representing 92 families. At least 51 species (17%) are endemic to the Galapagos. There are large numbers of dolphins (8 species), sea lions and fur seals (both endemic sub-species). Sharks (12 species) and rays (6 species) are common and the Galapagos are internationally important for two species of sea turtles: green turtle and hawksbill turtle. They are common in the surrounding waters, with the former nesting on sandy beaches. Several species of Baleen whales occur (fin, humpback) as well as toothed whales (pilot, killer) and sperm whales are regularly encountered. The interaction between the terrestrial and marine environment is particularly important for the marine iguana and for 27 of the islands 57 bird species especially the flightless cormorant, the Galapagos penguin and large numbers of nesting seabirds.

Geologically the area is also a "hot spot" being at the meeting point of the Nazca, Pacific and Cocos tectonic plates. The islands have been formed by volcanoes rising out of a submarine platform at a depth of 1,300m. In outer waters, ocean depths fall to 4,000m except for the existence of several seamounts which rise to less than 100m below sea level. Climate is strongly influenced by the annual cycles, upwellings and convergence of the ocean currents and undercurrents which meet in the region. Average precipitation varies from 300 mm along the coast to over 1000mm at higher elevations. El Niño events cause wide annual variations in rainfall and temperature.

The GMR is a multiple use area where artisanal fishing only is allowed under the SLG. About 1200 people are employed by the fishing industry with sea cucumbers, lobsters and various fin fish being the predominant catches in recent years. The Management Plan for the GMR defines about 17% of the Galapagos coastline (2 miles out to sea) as "no-take" zones. The extension of the "no-take" zones has been defined through a long process of consultation between local communities representatives, fishermen, researchers from CDRS, GNP staff, and representatives of the tourism sector, thus representing an strong commitment from all key stakeholders involved in the management of this area. Nevertheless it should be noted that a recent meeting of Biodiversity of the Marine Environment in Galapagos discussed the possibility of "no-takes" zones eventually being extended to cover 35% of GMR.

3. COMPARISONS WITH OTHER AREAS

There are currently 6 marine reserves on the World Heritage List: Aldabra (Seychelles); Great Barrier Reef (Australia); Vizcaino Whale Lagoons (Mexico); Cocos Islands (Costa Rica), Belize Barrier Reef, and Tubbataha Reef (Philippines). There are several other World Heritage sites where adjacent marine features are protected (e.g. Fraser Island, Scandola, East Rennell, Komodo, Shark Bay, Lorentz) and several other islands where the marine part of the system has not been included (St. Kilda, Henderson). After the Great Barrier Reef, and the NW Hawaiian Islands, the Galapagos is the third largest marine reserve in the world. With its whales, sea lions and seabirds it has certain affinities with El Vizcaino Whale Sanctuary and Cocos Islands National Park. Likewise it compares in many ways with the Aldabra site with its sea turtles and tortoises. Galapagos shares many features with the Northwestern Hawaiian Marine Reserve and with the Key Largo and Channel Island marine sanctuaries in USA as well as the Kermadec Island Reserve in New Zealand. Biologically it is significantly more diverse than the other eastern Pacific islands of Clipperton, Cocos Islands, or Juan Fernandez.

A number of unique features distinguish the Galapagos from all the above:

- **High diversity** – a rich and varied flora and fauna compared to other marine insular environments in the Eastern Pacific.
- **High degree of endemism** in the marine biota – around 25 % of most groups occur nowhere else on earth.

- **Complex and unusual system of oceanic currents** – cool currents, upwelling areas, and water masses of different origins transporting bioelements from tropical and subtropical regions of the American continent as well as from the Indo-Pacific biotic province.
- **Unusual mixed biogeographic affinities** – strong phyto and zoogeographical affinities with the Tropical and Subtropical American continent, with many elements representing the Peruvian/Chilean and West Pacific Provinces.
- **Large habitat-type diversity and highly complex marine communities** relative to other insular marine areas in the Eastern Tropical Pacific. The variety of geomorphological characteristics offer a high density of marine habitats isolated from the continent. Comprises rocky, vertical cliff face, mangrove, sandy beach, lagoon, embayment, and hypersaline panne habitats.
- **Critical importance to a large number of terrestrial organisms** which are dependent on the marine environment for survival. Many animals such as the penguin, fur seal, sea lion, flightless cormorant, waved albatross, and marine iguana – not to mention the large array of bird species – are directly dependent on the marine environment for their existence. Of 57 resident bird species in Galapagos, 27 depend on the surrounding ocean.
- **A long tradition of scientific research** with the active presence of the Charles Darwin Research Station (CDRS) since 1960.

It is recognized that the Galapagos coral fauna is depauperate compared to western pacific reefs and that its diversity of fish (307 species) is much lower than the Hawaiian islands (471 species). However, taken as a whole, the Galapagos Marine Reserve is clearly one of the most unique, scientifically important and biologically outstanding marine areas on earth. This conclusion parallels the case made for the Galapagos islands (inscribed in 1978) and the establishment of the surrounding marine reserve make the archipelago one of the world's most important natural areas.

4. INTEGRITY

When the Galapagos Marine Resource Reserve was nominated in 1994 (see Background note) the IUCN Technical Evaluation concluded that the area did meet World Heritage natural criteria but that integrity issues were such that the immediate inscription on the World Heritage List was not considered. The 18th Session of the World Heritage Committee deferred a decision noting that it: "...was seriously concerned that the proposed Marine Reserve and the Galapagos Islands faced the following threats to their integrity:

- Over fishing and illegal fishing of a wide range of species;
- Human pressures from the local population (growing at an estimated rate of 8.5% per year, mainly due to immigration) and tourism on both terrestrial and marine resources;
- Inadequate management capacity and infrastructure;
- Adverse impacts of introduced animals and plants;"

Further, "these threats call for mitigative action vis-à-vis:

- Augmenting management capacity;
- Encouraging institutional cooperation;
- Stepping up law enforcement, and
- Conducting research on sustainability of resource use in the Marine Reserve."

The World Heritage then sent a high-level monitoring mission consisting of the Chair of the Committee and the Director of the World Heritage Centre which formed the basis of further discussions in 1996, 1997, and 1998. In response to this on-going attention from the World Heritage Committee as well as other conservation organisations, the Ecuadorian authorities have made a significant effort to improve management of the site, as

has been reported in various State of Conservation reports. Solid progress has been made on the following aspects:

4.1. Legal Framework

The foundation for management of the GMR is contained in the “Special Law for the Galapagos” passed in March, 1998. Under this law, the Galapagos National Park Service (GNPS) is the government institution responsible for managing the GMR under the supervision on an Inter-institutional Management Authority (IMA). The law defined the GMR as a multiple use area and as part of Ecuador’s system of protected areas. The Special Law gives a measure of autonomy to the islands allowing 40% of the visitor fees collected to go directly to the Park plus another 5% for the marine reserves. The Ministry of Environment has been leading preparation of the long overdue specific regulations on fisheries, tourism, environmental control, and introduced species/agriculture. The fifth set of regulations controlling human migration is being prepared by National Institute for Galapagos (INGALA). Each of the above sets of regulations, especially the fisheries, will be important for providing the basis for management. Drafts of the regulations are in an advanced state and are expected to be approved before July, 2001.

4.2. Boundaries

Limits of the GMR now extend 40 nautical miles offshore (instead of the 15nm originally proposed) and encompass 133,000km². This is a much more demanding area to manage but it encompasses important marine features such as the offshore sea-mounts.

4.3. Local Involvement

Since 1996 the CDRS and GNPS have invested major efforts in resolving chronic conflicts between fishing, tourism and conservation interests by developing a participatory approach to management. A Core Group is composed of representatives of GMR stakeholders from the tourism, fisheries and conservation sectors. Regular meetings of this Core Group resulted in many agreements that were incorporated into both the Special Law and the GMR Management Plan. Without this participatory process at the local level, very limited progress would have been achieved in resolving conflicts. In spite of the progress achieved in reducing conflicts there is still a good deal of social tension, particularly with the fisheries community that has repeatedly ignored adherence to the fisheries quotas established for the GMR, despite the fact that the quotas were proposed through a participatory process.

4.4. Management Plan

Although a plan for previous marine resources reserve existed, it was in need of updating in light of the new legal basis and the expanded size of the GMR. The new Plan defines a zonation system including “no-take” zones amounting to 17% of the island’s coastline. The Participatory Management Board has now been institutionalised and meets on a regular basis. The Plan also limits extractive use to “artisanal fishing” by local residents and was officially approved by Government in 1999.

While the management plan for the GMR rightly gives emphasis to fisheries issues, it also considers how to better regulate tourism activities. According to a number of reviewers, tourism could become a major problem in the future. There is no overall limit established for marine tours and the carrying capacity for diving sites in the Marine Reserve area is not yet defined. The Marine Conservation Strategy for GNP includes this issue as a priority activity (see Annex 1).

4.5. Management Capacity

Staff working on marine issues in both the GNP and CDRS have increased from only 3-4 in 1994 to some 75 in 2001 (including 25 who work on patrol boats) plus 15 volunteers. Equipment in the form of patrol boats is crucial and this too has been augmented.

4.6. Research

The CDRS is now much more actively engaged in research on the GMR with a marine section consisting of 25 staff. Most of these people are employed in monitoring fishery catches. Research has expanded on inshore marine biodiversity and on the heavily-exploited species, notably sea cucumber and lobster. An international marine

biodiversity workshop was organised in 1999 by WWF and the CDF. This work has aided in the negotiations in annual fishing schedules and quotas. The CDRS has prepared a plan for its investment needs to further expand its marine program in the future.

4.7. Management Resources

Substantial funding has been identified to support this extra effort. This has been found through the share of gate fees, additional subventions from the Ecuador Government and grants and donations from the private sector, foundations and conservation groups. A project to obtain a loan from the IDB was prepared by IUCN's Regional Office for South America in the amount of \$18 mil. plus \$4 mil. from Government. This project will focus on implementation of the GMR management plan and approval is anticipated in April, 2001. Additional funds from the GEF (\$18 mil.) and UNF (\$4 mil.) have also been arranged but will focus on the terrestrial environment over the next 5 years.

4.8. Enforcement

Without the regulations in place, progress has been limited in controlling immigration, limiting fishery seasons and catches, and preventing illegal commercial fishing. Both the Navy and the marine unit of the GNP have intercepted a number of vessels and discouraged others but prosecutions have been few and illegal fishing continues. Even worse, the Navy has allowed the release of several seized vessels which has implicated them in the illegal fishing business and reduced the Government's credibility in enforcing the law. This was further weakened during the fisherman strike of November 2000 where intimidation of park staff and violent action led to the Government backing down on quota limits.

Annual monitoring reports on the illegal commercial fisheries in the GMR show that many thousands of sharks have been taken out of Galapagos waters and that long-lining for other finfish has had severe effects on many other species. Moreover, the loosely regulated controls on sea cucumber harvesting have led to a precipitous decline in the population which may never recover to sustainable levels. Despite all the other areas of progress, the lack of sufficient enforcement has led to a continued over-fishing which is a major threat to Galapagos marine environment.

In sum, although there has been substantial effort and progress in addressing integrity issues in the GMR as identified by the 1994 World Heritage Committee, the marine resources of Galapagos continue their downward negative trend. Monitoring and research show that harvests of high value species (black coral, sea cucumber and lobster) are proving to be non-sustainable. For example, the total capture of different species of white fish has declined in 37% between 1997 and 1999, for the same period the total capture of lobsters has declined in 17% (Informe Galapagos 1999-2000, Natura Foundation). Even the former bacalao fishery has declined. The illegal capture of sharks has resulted in high losses and the growing numbers of fishers immigrating to the islands (from 300 in 1994 to 1200 in 2001) is greatly adding to pressures on the marine environment.

On the positive side, two key actions are expected soon that will set a much firmer basis for addressing the issues. First is the passage of the regulations which will clearly specify what limits are on fisheries, immigration, etc., and will allow more effective application of the Special Law. Second is the IDB loan for implementing the GMR plan which devotes \$4 mil. to strengthening the control and security system. There is also a growing public sentiment within Ecuador to address illegal fishing activities more firmly, which, with the added resources and resolve of the GNPS, could lead to a reduction in further damage. Commitment at the central political level, however, is a fundamental prerequisite. Any revisions to the Special Law that would weaken it would be very detrimental to the participatory group process that agreed to it as well as affect the conclusions of IUCN's evaluation.

A summary of what needs to be done to make the GMR a model of a marine protected area is given on (Annex 1) which outlines the marine conservation strategy of the CDF and GNPS.

5. ADDITIONAL COMMENTS

International media attention on the GMR was given when an oil spill resulted from the grounding of the tanker "Jessica" on 16 January 2001 on San Cristobal Island. Initial reports of damage were alarming but through a combination of manpower, technology, ocean currents and favourable weather conditions, the spill appears only to have caused minor short-term damage. Wildlife mortality was low when wind and current took the fuel out to

sea where it dispersed. Full effects on the marine resources of the area will not be known until longer term monitoring studies are completed but damage to date appear to be minimal.

The accident, that has proved to be caused by negligence, triggered the preparation of work on a contingency plan for future emergencies and has led to efforts to improve the regulatory framework to minimise future hazards. Handling of the spill cost the Ecuador Government several million dollars, part of which was covered by external assistance. The Jessica remains stranded, the Captain has been charged, and insurance compensation is being sought. Suggestions have been made by WWF and others that the Ecuadorian Government designate the GMR as a “particularly sensitive sea area” (PSSA) under the International Maritime Organisation (IMO). The benefits of such an initiative are being studied by INGALA and Ecuador Maritime authorities.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

The importance of extending legal protection to the seas around the Galapagos Islands and managing the archipelago as one unit has been recognised for many years. Since 1994 when Ecuador initially nominated the marine reserve as an extension, efforts have been made to better define the limits, document the values and institute a management system.

Similar to the inscription of the terrestrial component on the basis of all four natural criteria, the GMR would meet the criteria as follows:

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

The geology of the archipelago is clearly apparent above sea level but also extends to the sea floor where processes are equally continuing. The meeting of three major tectonic plates – Pacific/Nazca/Cocos – is the basis for the existence of the islands and is of significant geological interest. The site demonstrates the evolution of the younger volcanic areas in the west and the older areas in the east. On going geological and geomorphological processes (lava flows, underwater gas flows, small seismic movements, and erosion) also occur in the marine environment although not easily studied. The GMR includes key elements as well as on-going processes that conforms the geological puzzle that originated the Galapagos Islands, almost no other site in the world offered protection of such a complete continuum of geological and geomorphological features.

Criterion (ii): Ecological processes

The islands are situated at the confluence of 3 major eastern Pacific currents and this convergence has had major evolutionary consequences. The Galapagos marine environment is a “melting pot” of species that biogeographers have recognised as a distinct biotic province. The direct dependence on the sea for much of the island’s wildlife (e.g. seabirds, marine iguanas, sea lions) is abundantly evident and provides an inseparable link between the terrestrial and marine worlds.

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

The GMR is an underwater wildlife spectacle with abundant life ranging from corals to sharks to penguins to marine mammals. No other site in the world can offer the experience of diving with such a diversity of marine life forms that are so familiar with human beings that they accompany divers. The diversity of underwater geomorphological forms are an added value to the site producing a unique diving experience not to be found anywhere else in Earth. The GMR has justifiably been rated as one of the top dive sites in the world.

Criterion (iv): Biodiversity and threatened species

With a great diversity of species of fish, sea turtles, invertebrates, marine mammals and sea birds, the GMR is the major stronghold for wildlife in the eastern Pacific. In additions, there is a high rate of endemism in marine life and many species are internationally threatened.

The islands and the surrounding marine environment of the Galapagos are thus inextricably linked and together from a unit that meets all four World Heritage criteria.

7. RECOMMENDATION

The Bureau recommended the inscription of the Galapagos Marine Reserve, as an extension to the Galapagos Islands World Heritage site, under natural criteria (i), (ii), (iii) and (iv). The Bureau recognised all the effort made over the past seven years by the Ecuadorian authorities to extend protection to the marine environment. The Bureau expressed the urgency for further strengthening of management, particularly on enforcement activities. The Bureau requested the State Party to complete all steps to finalise the adoption of the regulations deriving from the Special Law for Galapagos before the December session of the Committee.

In September 2001, the World Heritage Centre received a letter from the State Party noting that significant progress has been made in preparing the Regulations on tourism and fisheries under the Special Law on the Galapagos. According to this letter, it is expected that the Regulations will be passed by the Ecuadorian Government in November 2001. IUCN will provide an update on the state of the Regulations at the December Committee session.

Given the progress on the Regulations and the likelihood of them being passed in the short-term, IUCN recommends that the Committee **inscribe** the Galapagos Marine Reserve on the World Heritage List under natural criteria (i), (ii), (iii) under the name “Galapagos National Park and Marine Reserve”.

The Committee may also wish to commend the State Party on progress made to date on the approval of the Regulations and request the State Party to invite an IUCN mission to review the implementation of Regulations in late 2002.

Annex 1: Marine Conservation Strategy of the Galapagos National Park and Charles Darwin Foundation

- 1. *Develop the participatory management system***
 - Establish a secure legal and institutional framework and take part in the established participatory forums
 - Develop a Marine Reserve management plan and supplementary plans for specific resources, habitats, etc.
 - Develop the capabilities of stakeholder groups
 - Strengthen the functioning of the Participatory Management Group. Communicate technical information appropriately to the Group and the Interinstitutional Management Authority, among others
 - Build understanding of and support the participatory management structure
- 2. *Strengthen the capability of the management authorities***
 - Develop effective regulations and procedures and ensure that the law is applied
 - Build GNPS capabilities in control, patrolling, and judicial procedures. Develop collaboration on law enforcement with the Navy, government bodies, and stakeholder organizations
 - Develop the capabilities of the GNPS in marine management and of the CDF in marine research
- 3. *Ensure that ecosystem structure and function are maintained***
 - Establish, protect, and monitor zones for research and, in some cases, non-extractive economic use
 - Control and monitor extractive use
 - Control and monitor land-based impacts
 - Monitor species representative of the ecosystem's diversity of biological communities and their functioning
 - Monitor variables of the physical environment .Study the functioning of the ecosystem
- 4. *Conserve key species, including exploited species, vulnerable species, and species important for science and tourism***
 - Study the biology, ecology, abundance, and distribution of each key species .Protect each species against actual or potential threats
 - Prepare contingency plans for the conservation of species at risk
- 5. *Monitor and control the use of the Marine Reserve***
 - Develop and apply regulations for fisheries, tourism, and scientific and educational activities in the Marine Reserve
 - Monitor fisheries and use the results in fisheries planning
 - Monitor tourism in marine sites and use the results in tourism planning

Source: Charles Darwin Foundation. 2000 Projection. 1999 Annual Report

Map 1

WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

KAIETEUR FALLS NATIONAL PARK (GUYANA)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (6 references).
- ii) **Additional Literature Consulted:** Anon. 2000. Seminar on Natural Heritage in the Caribbean, Paramaribo, Suriname, February 2000. Synthesis Report. UNESCO; Barnett, A. & R. Shapley. 1999. **The Final Report of the Potaro Plateau Zoological Expedition.** Dept. of Life Sciences University of Surrey, U.K.; Bourne *et al.* 2000. Vocal Communication and Reproductive Behaviour of the Frog *Colostethus beebei* in Guyana. **Journal of Herpetology** 39-00A; Eggleton, P. *et al.* 1999. A Checklist of Termites from Kaieteur National Park, Guyana. **Proc. Entomol.Soc.** 101 (3) pp 687-689. Washington; Forte *et al.* 1988. **Rapid Rural Appraisal, Chenapau/Kaieteur National Park** (Draft) Internal document, Co-operative Republic of Guyana; Hutchinson, C. 1999. Kaieteur National Park Tourism Development – Preliminary Observations and Recommendations. Draft memo, **Conservation International**; Lechner, L. 1997. Infrastructure Development at Kaieteur National Park. Prepared for World Bank and the Government of Guyana – **National Protected Areas System Project**; Schuerholz, G. 1991. **Kaieteur National Park, Guyana. Diagnostic Report.** WWF – USA; Wilkinson, B. 1998. (26-11-98) Environment – Guyana Mining Activities Taking a Toll. **Global Information Network**; Wilkinson, B. 1999. (03-11-99) Population – Guyanan Amerindians Increasingly Militant. **Global Information Network.**
- iii) **Consultations:** 7 external reviewers contacted, the Hon. Samuel Hinds, Prime Minister of Guyana, the Hon. Vibert DeSouza, outgoing Minister of Amerindian Affairs, Guyana National Commission for UNESCO, Protected Areas System Project senior staff, Iwokrama (internationally funded research NGO active in Guyana) staff and national park staff.
- iv) **Field Visit:** April 2001, Peter Hitchcock.

2. SUMMARY OF NATURAL VALUES

The Kaieteur National Park (KNP) constitutes the only formally recognised protected area currently existing in Guyana. Covering an area of approximately 63,000ha of the Guiana Shield, KNP contains a good representation of the Guyanan moist forests, as well as some examples of upland savannas and other habitat types. The site also includes the renowned Kaieteur Falls which mark the point where the Roraima formation gives way to the coastal lowland. At this point, the Potaro River falls 226m to the splash basin below, entering a scenic gorge about 20km long before discharging onto the lowlands.

KNP includes a diverse tropical rain forest. In some areas, the forest opens onto a wide shrub-herb “Guiana type” savanna. Some 1,100 plants have been recorded in the Preliminary Checklist for KNP but much work remains to be done to survey the biological resources of the park. Several endemic plant species are found in the park, including a member of the family *Rapataceae* endemic to the Guiana Shield, and a newly described fern (*Hecistopteris kaieteurensis*). Preliminary studies from recent visits by scientists have indicated that the area contains a moderate diversity of fauna, with numerous previously unidentified forms and several species of particular conservation concern. A preliminary survey of the plateau has recorded 53-54 species of mammals, including giant otter, bush dog and jaguar. The co-habitation of three species of capuchin monkey on the plateau is another feature. The avifauna is of interest with 187 recorded species, comprising nearly 50% of the total number of species recorded in Guyana. Several bird species have been newly discovered in Guyana, while others are rare or endangered.

3. COMPARISON WITH OTHER AREAS

Though KNP is the only protected area in Guyana, a national system of protected areas has been proposed under which there will eventually be an additional seven protected areas. KNP is representative of Udvardy's Guyanan Biogeographical Province which includes two natural World Heritage sites: the Central Suriname Nature Reserve (CSNR) and Canaima National Park in Venezuela. KNP is also representative of the 'Guyanan Moist Forest' one of the WWF Global 200 priority ecoregions for conservation action.

With 1.6 million hectares, CSNR includes a much more complete example (i.e. 3000% more) of the different habitat types that are typical of the lower elevations of the Guiana Shield. The Reserve comprises the entire gradient of altitudes from almost sea level (25m) to the top of the highest peak in Suriname (1,230m). Canaima National Park is also much larger than KNP, covering 3 million hectares, and it contains greater habitat diversity and altitudinal range (350-2,730m). The flat summits of the tepuis in Canaima contain high levels of endemism which has led to the recognition of 'Pantepui' as a distinct biogeographical entity. For example, the Pantepui region is home to 36 bird species which are totally restricted to the vicinity of the tepui mountains. Though KNP includes several outlier tepuis of Roraima sandstone, these are minor in extent compared with those of Canaima and are therefore represent lower levels of biodiversity.

CSNR is home to almost 6,000 species of vascular plants and a diversity of animals. The biodiversity values of KNP are less evident, even when it is compared to other areas in Guyana which have already been identified in World Heritage Global Strategy fora as potential World Heritage sites, such as the Upper Mazaruni watershed. The low level of biodiversity recorded at KNP relative to other protected areas in the region is a reflection of the relative intensity of surveys. The survey of the biological resources of KNP is far from complete. However, due to the lower habitat diversity of KNP, the final tally of species will fall well short of those of CSNR and Canaima. This has been substantiated by recent work conducted by the Smithsonian Institute which reports that KNP represents only 17% of the species recorded for Guyana, Suriname and French Guiana; although the authors indicate that this "is no doubt an underestimation of the total taxa of the area", and the true level of biodiversity in KNP may be higher than that recorded to date, it will not be comparable to that of CSNR and Canaima. Moreover, the biodiversity of the nominated area is far from being representative of the Guiana Shield province as a whole. Table 1 summarises some of the relevant components of these World Heritage sites with which the nominated site has been compared.

Apart from CSNR and Canaima, there are about 40 other designated protected areas distributed among six countries (Brazil, Colombia French Guiana, Guyana, Suriname, and Venezuela) covering forest and savanna ecosystems in the Guianan province, of which perhaps the most notable is the Pico da Neblina Transfrontier Park (Brazil 2,200,000ha and Venezuela 1,360,000ha).

The nomination document relies to some extent on the nominated site being representative of habitats in the Guiana Shield. Although, KNP's location and altitudinal range provide a sample of the shield, the site fails to capture adequately the tepui component of the shield and contains only small areas of typical Guiana Shield savanna landscape.

KNP includes the renowned Kaieteur Falls. In South America the falls are second in height only to the Angel Falls (918 m), within the Canaima World Heritage site. Unlike the Angel Falls, however, Kaieteur carries a large volume of water year round. But, Angel Falls is only one element of Canaima's extensive tepui landscape from which the park derives its scenic value. Though KNP includes several outlier tepuis, these are minor in extent compared with those of Canaima. The Iguazu/Iguaçu World Heritage sites also contain a far more impressive waterfall feature.

Table 1: Comparative Analysis with other Major Protected Areas on the Guiana Shield.

	Kaieteur National Park (Guyana)	Central Suriname Nature Reserve World Heritage site (Suriname)	Canaima World Heritage site (Venezuela)
Size (hectares)	63,000	1,600,000	3,000,000
Plant diversity	1,100	6,000	4-5,000
Mammal diversity	53	110 (estimate) (185 national)	118

Bird Diversity	187	400 (680 national)	550
Altitudinal Range (metres)	500 – 1,200	25 - 1,230	350 - 2,730

In summary, KNP is clearly not in the same league as other sites in the region in terms of size, diversity and biological importance.

4. INTEGRITY

4.1. Boundaries

KNP is part of a continuous tract of mostly pristine rainforest which extends west to the Venezuelan border and east to the Suriname border and into Brazil. However, without the protection of the surrounding forests, KNP is a small protected area, which fails to capture adequately the tepui component and savanna landscapes of the Guiana Shield.

KNP, together with the rest of the Potaro River catchment, provides the potential to protect a geographically significant example of a complete river catchment from upland tepui, through upland mature river, major waterfall, deeply incised canyon and lowland floodplain. However, in its current form the nominated site does not contain "...all or most of the key interrelated and interdependent elements in their natural relationships..." (Operational Guidelines paragraph 44. (b)(i)).

KNP's integrity depends on maintaining the natural habitat of adjacent lands, something that at present cannot be guaranteed. Also, given that the catchment of the Potaro River is not protected, future development upstream of the park could impact the Falls and the associated river environment. For example, the construction of roads close to the park boundaries would pose a significant threat to the park. IUCN concludes that the current boundaries of the site do not include key natural elements and are not adequate to protect the park against future development.

4.2. Legislation

KNP is the only formal protected area in Guyana. Originally established in 1929, KNP has undergone many boundary changes. Reduced to less than 12,000ha during the 1970's and 1980's, KNP was enlarged in the 1990s to its current area of 63,000ha. The present national park was established by Government legislation in 1999 (amended in 2000 to re-instate Amerindian hunting rights). However, the legislation is limited in scope and does not formally establish a regulatory regime nor an institutional framework. Protection from forest operations is currently limited by policy level decisions, and the IUCN mission was informed that comprehensive regulatory legislation is being developed.

Although traditional peoples are still resident in the vicinity of the park, and claim land rights to at least part of the park, there is no traditional protection regime in place. There is potential for a negotiated form of traditional protection but this has been held up by an ongoing dispute between the Government of Guyana and the indigenous people of Chenapau (see 'Land Tenure' below).

4.3. Management

The nominated site is managed by the Kaieteur National Park Board appointed by the Office of the President, which retains overall responsibility and accountability to the Parliament of Guyana. A 'Master Plan' has been prepared for KNP but in reality it is more appropriately described as a tourism infrastructure plan for the Kaieteur Falls precinct. It certainly does not address the wider conservation issues of the national park. Indeed, it was prepared before the park was enlarged in 1999. No management plan has been initiated for the park and there is a real risk that the precinct planning for Kaieteur Falls section will dominate the management of the national park as a whole.

4.4. Human and Financial Resources

There are only two on-site wardens who operate with minimal resources. This level of staffing may be adequate to manage visitors to the Kaieteur Falls precinct but is inadequate for overall park management, especially for the surveillance of remote areas.

4.5. Public Use

Visitors to the park are currently estimated at 2,500-5,000 annually. Access to the nominated area is only by aircraft or boat. The IUCN field mission raised concerns about the cumulative impact of aircraft movements to and from the Kaieteur Falls airstrip. The more that tourism is developed at KNP, or in adjacent areas requiring access via the airstrip, the greater is the risk that the aesthetic value of this outstanding waterfall precinct will be impaired. This underlines the urgent need to commence management planning for the park.

4.6. Land Tenure

The nominated area is wholly owned by the Government of Guyana. However, the majority of the enlarged KNP is claimed by the Patamona community of Chenapau village as indigenous-owned land. This area encompasses all of Chenapau's hunting and fishing grounds and is the only source of clean water available to the community. The rivers and creeks in Chenapau's titled lands, which are contiguous with the borders of the extended park, have been disturbed by mining operations. Initial establishment of the park denied the Amerindian community their traditional rights to the land. Although a subsequent amendment of the legislation restored the rights to hunt and fish, the issue of indigenous land title rights is still the subject of dispute and court action. Resolution of the issue will be protracted.

Before the mission, IUCN received letters from the Captain of Chenapau, as well as from international non-governmental organisations representing the Chenapau Patamona people. These communications stated that the Chenapau Patamona had not been adequately consulted about the 1999 extension of the National Park and that this was the subject of an ongoing legal dispute with the Government of Guyana outlined above. The letters also stated that the Chenapau Patamona had not been adequately consulted about the nomination of the site for World Heritage status. The IUCN mission was scheduled to meet with a delegation of Patamona from Chenapau, however, a flight cancellation and civil disturbances in Georgetown delayed the mission by 24 hours. The Patamona delegation had left the planned rendezvous at Manzies Landing by the time the IUCN mission arrived.

4.7. Threats

KNP comprises mostly intact tropical rainforest with negligible vehicular access and development. Adjacent lands maintain their natural vegetation, mostly with tropical rainforest, and are sparsely inhabited. There are no current major development projects that put the park's integrity at risk; the principal activity conflicting with the objectives of the protected area is illegal fluvial mining for gold and diamonds both outside and within the nominated site. Though such mining is likely to be limited to exploitation of alluvial deposits along streams, the impact on water quality and aquatic life is potentially serious. The IUCN field mission noted that the Government of Guyana has been successful in controlling mining within the park. However, on-going effective control is challenging due to the difficulty of detecting small-scale mining operations. Mining in the unprotected upstream catchment of the Potaro River also represents a continuing, though limited, threat to the water quality of the KNP.

In conclusion, IUCN notes that KNP does not meet the conditions of integrity, especially in respect of catchment protection, lack of a management plan, inadequate regulatory legislation and an inadequate institutional framework and staffing.

5. ADDITIONAL COMMENTS

KNP is an integral part of a continuous tract of rainforest which extends from Canaima National Park in Venezuela, through Brazil and Guyana, to CSNR in Suriname. KNP therefore has the potential to contribute to the physical linking of the two existing World Heritage sites on the Guiana Shield. KNP would be one of the potential building blocks in such a visionary scheme that would link the existing World Heritage sites in one large transnational protected area. The Iwokrama Project Area to the east, the concession area held by Conservation International to the southeast and the proposed Pakaraima Mountains and Roraima national parks to the west and northwest, together with KNP, are strategically located contributions to the concept of a major continuous rainforest (and savanna) link across the width of Guyana. The huge area of Guyana known as the

Southeastern Forests have also been identified as being of high conservation value and could contribute significantly to the concept. The IUCN mission discussed the concept of such a “Guiana Parkway” with Guyana Government officials and reaction to the idea ranged from guarded support to enthusiasm.

There is also the potential for cooperation with Suriname and France to extend the concept through Suriname to French Guiana, possibly linking with a large protected area currently under consideration in southern French Guiana. The Mount Roraima section of Brazil would also make a valuable contribution to the concept, similar to that of the MesoAmerican Biological Corridor. This major corridor tract of protected areas within Guyana and its neighbours could be a viable World Heritage nomination in its own right and could become one of the world’s great transfrontier protected areas. However, this proposal is very premature and is unlikely to be feasible within the next decade.

6. APPLICATION OF CRITERIA

The nomination document does not specify the criteria under which the site has been nominated and the nomination document is thus considered incomplete. IUCN suggests that criteria (iii) and (iv) may be relevant.

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

Although the case for qualification against Criterion (iii) is not explicit in the nomination document, considerable attention is given to the natural beauty of the Kaieteur Falls. There can be no doubt that the Kaieteur Falls is a site of natural beauty. They are a national icon in Guyana and are known in adventure travel and local tourism circles. However, the falls are far less impressive than many other waterfall sites on the World Heritage List (Iguazu, Victoria Falls, Canadian Rocky Mountain Parks, and Nahanni). Apart from the falls, a case has not been made for the outstanding natural beauty of the nominated site as a whole. In this respect it contrasts with Canaima National Park World Heritage site in adjacent Venezuela, with its extensive tepui landscape and associated waterfalls such as Angel Falls.

Criterion (iv): Biodiversity and threatened species

The site protects a good example of the mid-altitude forest of the Guiana Shield. This includes several species of particular conservation concern such as jaguar, giant otter and harpy eagle although the numbers are not known. Given the close biogeographic relationship between Canaima National Park, Central Suriname Nature Reserve and KNP, all being part of the Guiana Shield, a comparative analysis of these three protected areas is relevant to assessment of the nominated site. The comparative analysis, summarised in Table 1, clearly shows that KNP has significantly lower levels of biodiversity than the existing World Heritage sites. Further surveys can be expected to increase the species lists for KNP but it will never compare with those of Canaima or Central Suriname. IUCN therefore considers that the nominated site does not meet this criterion.

In conclusion, IUCN does not believe that the KNP meets the relevant World Heritage criteria. However, it considers that the Guyana portion of the Guiana Shield has World Heritage potential, and that this could be of even greater value if linked with the Canaima World Heritage site to the west and perhaps also to the CSNR in Suriname to the south east. IUCN appreciates that the realisation of such a vision could take a number of years, as a number of countries would be involved. Nonetheless, from a conservation standpoint, such an extensive World Heritage site, based upon the tepuis, rainforest and savanna systems of the Guiana Shield, would be a potential addition to the global network of forest World Heritage sites.

7. RECOMMENDATION

The Bureau did not recommend inscription of Kaieteur National Park on the World Heritage List.

The Bureau encouraged the State Party to initiate management planning in the Park and also encouraged the development of a national protected area system for Guyana.

The Bureau also noted that important forests exist in the Guiana Shield region and encouraged the State Party to explore the potential for a larger World Heritage nomination.

Map 1

Map 2