



**The World Heritage List:
*Future priorities for a credible and complete
list of natural and mixed sites***

**A Strategy Paper prepared by IUCN
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Executive Summary

The strategy paper analyses the coverage of the world's existing natural and mixed World Heritage (WH) sites and sets out some indicative future priorities. It is largely based on a more detailed analysis (available separately) of the world's natural and mixed WH sites undertaken by the United Nations Environment Programme's World Conservation Monitoring Centre (UNEP-WCMC), titled: "*A Review of the Global World Heritage Network: Biogeography, Habitats and Biodiversity*".

Four principles have guided the preparation of this paper:

1. The key test for inscription on the WH List is that WH sites are sites of Outstanding Universal Value (OUV) as defined in Articles 1 and 2 of the WH Convention (see also Annex 1).
2. Although the new Operational Guidelines of the Convention (2004) call for a balanced, representative and credible WH List, it was never intended that the List should ensure complete "representativity" of all the earth's numerous ecosystems and habitats, which is the role of national, regional and other international protected area systems (see Annex 1).
3. As for any natural resource, natural and mixed WH sites, both existing and potential, are not distributed evenly around the globe. Therefore, a perfect "balance" for all areas and types is not achievable, nor does it follow that in every country there will be at least one site that will potentially qualify for inclusion on the WH List.
4. Since the test for inclusion on the WH List is that of OUV, it follows that the List cannot be open-ended and that there must be some kind of eventual limit on the total number of natural and mixed WH sites. However subsequent additions to the List may be needed in the light of new information and scientific knowledge.

This analysis is based on the review of the WH List in relation to a number of scientific assessments: (a) the Udvardy's Biogeographical classification; (b) the IUCN/SSC habitat classification; (c) WWF Ecoregions; (d) Conservation International Biodiversity "Hotspots"; (e) BirdLife International Endemic Bird Areas; and (f) IUCN/WWF Centres of Plant Diversity. IUCN has also reviewed Tentative Lists of States Parties as an input to this review. However, many Tentative Lists are incomplete and are not as useful as they could be in relation to the development of a strategy for future natural and mixed WH sites.

Key conclusions from this analysis are:

- i) Natural and mixed sites on the WH List cover almost all biogeographic regions, biomes, and habitats of the world with a relatively balanced distribution;
- ii) The biomes most commonly found in WH sites are Mountains, Humid Tropical Forests, Tropical Dry Forests and Mixed Island Systems;
- iii) There are major gaps in the WH coverage of the following biomes: Tropical Grassland/Savanna; Lake Systems; Tundra and Polar Systems; Temperate Grasslands; and Cold Winter Deserts;
- iv) A list proposing 20 key areas within these biomes with potential for new natural and mixed WH nominations is proposed. This list is indicative but not exclusive – there may be sites in other areas that also merit inscription, but the emphasis should be placed on these priority habitats, and;
- v) There is increasing use of serial site and transboundary nominations by a number of States Parties. While such initiatives are positive, IUCN considers that clearer directions and guidelines are needed to ensure that serial site nominations are properly prepared and that serial sites are effectively managed after inscription.

Based on this analysis IUCN recommends:

- i) A list of important habitats that need to be included in the WH List;
- ii) Steps to improve the utility of Tentative Lists in the identification of natural and mixed WH sites;
- iii) Improving the classification systems for global comparative analysis;
- iv) Preparing or revising a series of Global Theme Studies to provide an internationally-accepted scientific foundation for the nomination and evaluation of potential WH sites;
- v) Support for a "World Heritage Atlas";
- vi) Wider and better informed use of serial and transboundary nominations;
- vii) Full use of other international instruments and agreements; and
- viii) Giving more attention to the better management of existing natural and mixed WH sites.

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1. INTRODUCTION

This paper responds to the invitation by the World Heritage Committee at its 24th Session in Cairns (2000) to: "*proceed with an analysis of sites inscribed on the World Heritage and the Tentative Lists on a regional, chronological, geographical and thematic basis*". The proposed scope of the analysis was to: "*provide States Parties with a clear overview of the present situation, and likely trends in the short to medium term with a view to identifying under-represented categories*".

This strategy paper is prepared as an input by IUCN – the World Conservation Union to the Global Strategy for a Balanced, Representative and Credible World Heritage (WH) List¹. It follows from the preliminary analysis prepared for IUCN by Jim Thorsell, Senior IUCN World Heritage Advisor, which was presented to the 26th Session of the World Heritage Committee (Budapest, 24-29 June 2002).

The strategy paper analyses the coverage of the world's existing natural and mixed WH sites and sets out some indicative future priorities. It is largely based on a more detailed analysis (available separately) of the world's natural and mixed WH sites, undertaken by the United Nations Environment Programme's World Conservation Monitoring Centre (UNEP-WCMC), titled: "*A Review of the Global World Heritage Network: Biogeography, Habitats and Biodiversity*".

Four principles have guided the preparation of this strategy paper:

1. The key test for inscription on the WH List is that WH sites are sites of OUV as defined in Articles 1 and 2 of the WH Convention.
2. Although the new Operational Guidelines of the Convention (2004) call for a balanced, representative and credible WH List, it was never intended that the List should ensure complete "representivity" of all the earth's numerous ecosystems and habitats, or geological features².
3. As for any natural resource, natural and mixed WH sites, both existing and potential, are not distributed evenly around the globe. Therefore, a perfect "balance" for all areas and types is not achievable, nor does it follow that in every country there will be at least one site that will potentially qualify for inclusion on the WH List. Although preference may be given to sites in selected regions or biomes, rigorous standards of evaluations should still be maintained, in line with the principle of OUV.
4. Since the test for inclusion on the WH list is that of OUV, it follows that the List cannot be open-ended and there must be some kind of limit, or ceiling, on the total number of natural and mixed WH sites.

1 The revised Operational Guidelines (2004) include the following wording in section: II.A.2: "The Global Strategy for a Balanced, Representative and Credible World Heritage List is an action programme designed to identify and fill the major gaps in the World Heritage List. It does this by encouraging more countries to become States Parties to the *Convention* and to develop Tentative Lists and nominations of properties for inscription on the World Heritage List."

2 Representivity is, however, an explicit objective for the Global Biosphere Reserve Network. This is reinforced in the background document (WHC-02/CONF.201/6) for the April, 2002 World Heritage Bureau, which states: "One of the objectives of the MAB Programme is to create a representative list of sites corresponding to the Biogeographic Provinces (BP) of the world but this is not the objective of the WH Convention. The Convention deals with sites of outstanding universal value and there are many BPs that do not contain sites of this calibre. Therefore, in its analysis of the WH List and Tentative Lists IUCN will seek to identify those geographical areas and ecosystems of the world containing sites of potential outstanding universal value which are not represented on the WH List."

2. APPROACH

This paper presents a summary analysis of the occurrence of natural and mixed WH sites, based on data held at UNEP-WCMC and a comprehensive review of relevant material. Sources of information used for this review include those identified in Annex 2.

Natural and mixed WH sites are inscribed under one or more of the natural criteria. Criterion (i) relates to sites that are of OUV in terms of earth's history; this is discussed below in Section 3.4. The rest of the analysis relates to the identification of sites that are of OUV in terms of criteria (ii) (natural processes and systems) and (iv) (biodiversity). Natural criterion (iii) (natural beauty) is assessed on a case-by-case basis: there is no agreed international framework for this criterion³.

This part of the review, therefore, relates to natural criteria (ii) and (iv), and is based on the framework provided by Miklos Udvardy in "A Classification of the Biogeographical Provinces of the World". This classification system was originally prepared to guide the development of the Biosphere Reserve Network, and was published by IUCN in 1975 with an update in 1982. Udvardy's system for classification of the world for conservation purposes begins with the Biogeographic Realm (BR). This system defines eight BRs, which are continent or sub-continent sized areas with unifying features of geography and fauna/flora. These are further divided into 14 Biomes and 193 Biogeographic Provinces, with provinces broadly corresponding to floristic regions of botanists and faunal provinces of zoologists.

The Udvardy System of Realm and Biome classification has proved a very effective framework for assessing natural and mixed WH sites and will continue to be of major utility for the future assessment of WH sites. However, it has a number of limitations (for example it does not effectively cover the marine environment) and does not adequately reflect the full range of habitats occurring in existing natural and mixed WH sites. Accordingly, other classification systems which complement Udvardy are used by IUCN in the evaluation of natural and mixed WH sites and are presented in this report. These include: the IUCN/SSC habitat classification, WWF Ecoregions, Conservational International Biodiversity "Hotspots", BirdLife International Endemic Bird Areas, and IUCN/WWF Centres of Plant Diversity.

In accordance with the decision of the WH Committee at Cairns (2000), IUCN has also reviewed the Tentative Lists of States Parties to the World Heritage Convention as an input to this review. However, IUCN concludes that many Tentative Lists are incomplete and are not as useful as they could be in relation to the development of a strategy for future natural and mixed WH sites. An important reason for this is that until very recently the inclusion of a site in a State Party's Tentative List was not a necessary precondition of nomination in the case of natural sites. This was requested by the WH Committee only at its meeting in Cairns, less than four years ago. In addition many existing Tentative Lists are often out-of-date, do not include any natural sites, are unrealistic in some of their proposals or do not properly take into account global conservation priorities. Furthermore, very few of the existing Tentative Lists have been harmonized at the regional level.

However, IUCN notes that some States Parties (e.g. Madagascar and Canada) have undertaken comprehensive reviews of their natural and mixed WH sites (both inscribed and potential sites) as an input to the preparation of their Tentative Lists. In the case of the Tentative List prepared for Canada it also proposes areas that may merit nomination as transboundary WH sites. There is much that can be learned from this experience. IUCN concludes, however, that more work is required to improve the quality of Tentative Lists before they can be effectively used as a tool to assist the further identification of potential natural and mixed WH sites.

³ All the references to natural criteria relate to those used in the Operational Guidelines in force at the time of writing. The new Operational Guidelines will involve a renumbering of these.

3. ANALYSIS OF THE WORLD HERITAGE LIST

3.1 Analysis of WH sites by Udvardy Classification System

3.1.1 Review of sites by Biogeographical Realm (Udvardy, 1982)

Table 1 below summarises the occurrence of natural and mixed WH sites in each Biogeographic Realm and the percentage cover of existing WH sites in each Realm.

Notes on Table 1:

- ✓ The Oceanian (5 sites) and Antarctic (6 sites) Biogeographic Realms are not analyzed further in this report as the land area is very small and site ratios are correspondingly distorted.
- ✓ The continent of Antarctica (only a part of the Antarctic realm) is not included in this analysis as the WH Convention does not legally apply to that continent.
- ✓ The Australian Biogeographic Realm has 12 natural sites but Australia as a State Party has 2 natural sites in the Antarctic Realm and one in the Oceanian.
- ✓ Three WH sites (Air Ténéré, Everglades and Manas) overlap two realms so the total number of sites is inflated from 172 to 175.
- ✓ There are 462,644.95 km² of WH sites that are marine and coastal sites and have no assigned Udvardy Realm. These include 338,661 km² of sea in the Great Barrier Reef and 49,595 km² in the Galapagos Islands.

Table 1: Distribution of natural and mixed WH sites by Udvardy Biogeographic Realm

Udvardy Realm	# of WH Sites	Land Area (km²)	Area of WH sites (km²)	% Realm in WH sites
Afrotropical	32	22,156,119.20	285,454.01	1.29
Antarctic	6	285,805.65	25,021.04	8.75
Australian	12	7,704,908.69	69,786.06	0.91
Indomalayan	16	7,533,958.05	12,051.90	0.16
Nearctic	18	22,895,770.40	210,068.41	0.92
Neotropical	33	18,975,799.20	243,531.11	1.28
Oceanian	5	1,035,302.22	16,934.21	1.64
Palaearctic	53	54,137,006.84	387,626.64	0.72
TOTAL	175	135,195,853.37	1,250,473.40	0.92

(Source: UNEP-WCMC)

Analysis of coverage by Realm:

The Palaearctic Realm has the most WH sites (53) and the largest area in WH sites but a relatively low percentage cover (0.72%) since it is by far the largest realm. The Neotropical realm has almost double the number of WH sites (33) compared to the Nearctic (18) but percentage cover is only one-third greater (1.28% versus 0.92%). The Indomalayan realm is not well covered despite its importance. Its 16 WH sites cover only approximately 0.16% of the realm, which is mainly related to the small size of the WH sites listed in this realm.

3.1.2 Review of Sites by Biome (Udvardy, 1982).

The Udvardy system further classifies the world into 14 ecosystem types, which are referred to as Biomes. The occurrence of existing natural and mixed WH sites within Udvardy's 14 Biomes is as shown in table 2 below.

Notes on Table 2:

- ✓ Some sites incorporate more than one biome, so the total number of sites is inflated.
- ✓ Marine/coral reef sites are not reflected in Udvardy's system.
- ✓ Site classifications are best estimations of main values.

Table 2: Number of natural and mixed WH sites by Udvardy Biomes (Source: UNEP-WCMC)

Biome	No. of WH Sites
Mixed Mt. Systems	32
Humid Tropical Forests	26
Tropical Dry/Deciduous Forests	25
Mixed Island Systems	22
Subtropical/temperate Rainforest	14
Warm Desert/semi-deserts	13
Temperate Broad-leaf Forests	12
Temperate Needle-leaf Forests	10
Evergreen sclerophyll Forest/Scrub	9
Tropical Grassland/Savannas	8
Lake systems	5
Tundra/polar desert	4
Temperate Grasslands	4
Cold Winter Deserts	0

Analysis of coverage by Biome

All of Udvardy's Biomes contain WH sites, except Cold Winter Deserts. Mountain systems (32), tropical humid (26), and tropical dry forests (25) are the three most common biome classifications found in existing WH sites. Tundra and polar systems (4) and temperate grasslands (4) are the least common biome classifications occurring in existing WH natural and mixed sites.

3.1.3 Review of Sites by Biogeographical Provinces (Udvardy,1982).

The Udvardy system further subdivides the 8 Biogeographic Realms into 193 Biogeographical Provinces (BP). Each province is characterised by distinct fauna, flora, soil types and climate. UNEP-WCMC's analysis of the coverage of WH sites within the 186 Biogeographical Provinces, for which data was available, found that WH sites occur within 108 provinces. The analysis underlined the findings of the Biome analysis: there is limited coverage of WH sites within the polar, lake and tundra biomes by comparison with the humid, subtropical and mixed mountain system biomes.

3.2. Analysis of WH sites by IUCN Theme Studies

3.2.1 IUCN Theme Studies

In 1996, IUCN, in response to the WH Committee's strategic approach to preparing the "Global Strategy", began to produce a series of "Global Theme Studies" which provide overview assessments of major themes and habitat groupings relating to natural sites. These global theme studies were produced in cooperation with the WH Centre, UNEP-WCMC and a number of partners, including the Ramsar Secretariat. In some cases theme studies were produced following technical workshops, such as those held on tropical forests (Berastagi, Indonesia, 1998) and on tropical marine sites (Hanoi, Vietnam, 2002); others are listed in Annex 2. Eight IUCN Global Theme Studies have been completed and distributed to the WH Committee, published in various professional journals and placed on the IUCN WH website. It is planned that these studies be periodically updated to reflect changing understanding and emerging trends, and that remaining themes should also be addressed. At present the IUCN Global Theme Studies cover:

1. Geological history and fossil sites
2. Wetland and marine protected areas
3. Forest protected areas
4. Human use of natural WH sites
5. WH sites of importance for biodiversity
6. Mountain protected areas
7. Boreal forests protected areas
8. Geological sites, landforms and processes (to be completed in 2004)

Further information is given about these Global Theme Studies and other information sources in Annexes 2 and 3. From the findings of the IUCN Theme Studies it is also possible to derive an additional analysis of coverage by habitat types and this is presented in Table 3.

Table 3: Number of natural and mixed WH sites in different habitats as derived from IUCN Theme Studies.

IUCN Theme (No. of Thematic Studies)	No. of natural / mixed WH Sites
Terrestrial wetlands (1)	60
Marine (1)	26
Coastal areas (2)	25
Mountains (6)	56
Tropical forests (3)	50
Geological Sites (2)	46
Grassland/savannas	21
Temperate forests (3)	20
Deserts (non polar)	12
Subtropical forests (3)	12
Boreal forests (7)	10
Sub-polar/polar tundra (7)	7

Notes on Table 3

- ✓ Many sites contain more than one theme element, so total numbers exceed the total number of WH sites.
- ✓ For Theme Studies not yet completed (e.g. grasslands, deserts), the figures are estimates.
- ✓ More thorough assessments on the marine and coastal themes would be advisable in any future revision of this working paper so as to more clearly highlight marine habitat types, such as coral reefs (already there are 20 sites containing coral reefs) and seagrass beds. In relation to marine sites a technical meeting to follow-up on the Global WH Marine Biodiversity Workshop will be held at the WH Centre in early September 2004.

Analysis of coverage derived from IUCN Theme Studies

An analysis of IUCN Theme Studies and of Table 3 indicates that samples of virtually all the world's major natural habitats/features are to be found among current natural and mixed WH sites. Wetlands, mountains and tropical forest components are the dominant habitat types in existing WH sites. Coastal and marine areas follow in relation to dominant habitat types, whilst sub-polar/polar tundra sites are the least common habitats found in the current list of WH sites. Boreal forests appear less common in number but this is compensated by their substantial size.

The existing IUCN Global Theme Studies have some limitations in coverage and the following additional studies are proposed by IUCN: Deserts and Grasslands; Polar Regions; and Freshwater Lakes/Wetlands. A regional assessment of Central Asia is currently underway.

3.3 Analysis of WH sites by other Global Classification Systems

As noted above, the Udvardy system suffers from a number of limitations in the analysis of natural and mixed WH sites. Moreover, the IUCN Theme Studies have developed in a way that is not completely consistent with Udvardy’s classification. Nevertheless, Udvardy’s system is a very important source of global-level assessment for terrestrial habitats and will continue to be of use for IUCN’s evaluation of natural and mixed WH sites.

Other alternative systems for global conservation frameworks and prioritisation have also been developed and these are described below. These include: the IUCN/SSC Global Habitat Analysis; WWF’s Global 200 Ecoregions; Conservation International’s Biodiversity Hotspots; BirdLife International’s Endemic Bird Areas, and IUCN/WWF Centres of Plant Diversity. Systems for classification of marine areas are included in several of the above, an important gap in the Udvardy system. Most of the data in these systems relate to natural processes and systems (natural criterion ii) and biodiversity (natural criterion iv).

3.3.1 The IUCN/SSC Global Habitat Analysis.

This scheme divides the world’s terrestrial and marine habitats into a hierarchical series of 13 first level habitat categories, 82 second-level categories and 154 third-level categories. The first level habitat category (with the exception of 3 artificial habitat classes) is most relevant to this present analysis, as the subsequent series set out some very specialised habitat types that are likely to be too detailed for consideration under the WH Convention.

WH sites occur in all 10 of the first level IUCN/SSC system habitat types. A breakdown of natural and mixed WH sites containing these first level habitats is in Table 4:

Table 4: Distribution of natural and mixed WH sites in IUCN/SSC first level habitat types

IUCN/SSC first level habitat types	No. of natural and mixed WH sites in which these habitat types occur
Forest	160
Wetland (inland)	144
Rocky barrens	111
Shrubland	111
Grassland	109
Coastal/intertidal	55
Desert	48
Sea	40
Savannah	38
Caves/subterranean	29

IUCN/SSC habitats occur throughout all biogeographic regions with lower densities of WH sites in the Nearctic, Palearctic and Oceania Realms.

Three of the first-level habitats cover a much greater area than all others, together accounting for 72% of the total area of the natural WH network:

- Forest 474,000 km²
- Sea 466,000 km²
- Desert 310,000 km²

While this may suggest that marine areas and deserts are “well-represented”, in fact the figures for these habitats are distorted by two very large marine sites (the Great Barrier Reef and Galapagos) and two very large desert sites (Air-Ténéré and Tassili N’Ajjjer).

The IUCN/SSC system also identifies second-level habitats. Further analysis of the WH List indicates that 1,720 of these second-level habitats occur within existing natural and mixed WH sites.

Conclusions that can be drawn from the IUCN/SSC data set are:

- ✓ Samples of all the world’s first-level IUCN/SSC natural habitats are found in most of the existing natural and mixed WH sites. Examples of the finer subdivisions of these habitats of course will not be found as completely but all the major types are already incorporated in the WH List. This finding supports the analysis of the Udvardy system and that of the IUCN Global Theme Studies: virtually all of the world’s major habitat types can be found in the existing natural and mixed WH sites.
- ✓ A closer look at the IUCN/SSC data, however, reveals that in several regions (Nearctic, Palearctic and Oceania) WH sites contain lower than average coverage of habitats; several habitat types (savanna, sea and desert) are also relatively poorly covered.
- ✓ Habitat types that emerge from a review of this data set which may have potential for WH nomination include:
 - ~ The Succulent Karoo;
 - ~ Flooded grasslands such as Okavango and the Sudd swamps;
 - ~ Red Sea corals;
 - ~ Namib desert;
 - ~ Madagascar moist forests;
 - ~ Western Ghats;
 - ~ High latitude and sub-polar tundra;
 - ~ Central Asian deserts;
 - ~ Montane forests in Polynesia and New Caledonia, and
 - ~ Sub-antarctic habitats in southern Chile, southern Argentina and South Georgia.

3.3.2 WWF’s Global 200 Ecoregions

The WWF Global Ecoregion System of the Worldwide Fund for Nature (WWF) is based on a combination of biogeographic realms, and floristic/zoogeographical provinces. WWF defines 867 ecoregions on the planet. WWF further defines 238 “Global 200” regions which are considered biologically outstanding and priorities for conservation action. Of this total, 142 are terrestrial, 53 are freshwater and 43 are marine. The following table relates the WWF scheme to current WH natural and mixed sites:

Table 5: Number of natural and mixed World Heritage sites by WWF Ecoregions

WWF Ecoregion Type	World total	# with WH sites	% of ecoregion
Terrestrial	142	92	65
Freshwater	53	30	57
Marine	43	25	58
Total	238	147	62

It is clear from the analysis of the WWF Global Ecoregion System that most of their priority ecoregion types have WH sites within them, with a slightly higher proportion in terrestrial ecoregions.

It does not necessarily follow that all 238 of WWF’s most biologically outstanding ecoregions should or will have an area that would meet WH criteria or indeed meet the Conditions of Integrity. Nevertheless, the WWF system is useful in assessing the broad extent of remaining areas with potential as natural and mixed WH sites, as well as providing a basis for comparative analysis. Several terrestrial and marine ecoregions that do not currently have a WH site and which appear to IUCN to have potential as natural or mixed WH sites include:

- ~ Andaman (sites within the marine ecoregion);
- ~ Arctic tundra;
- ~ Benguela Current (marine) ;

- ~ Central Asian deserts;
- ~ Fiji (sites within the marine ecoregion);
- ~ Gulf of California (marine);
- ~ Karoo desert;
- ~ Madagascar moist forests;
- ~ Maldives/Chagos atolls (marine);
- ~ New Caledonia dry and moist forests;
- ~ Palau (sites within the marine ecoregion);
- ~ Red Sea (sites within the marine ecoregion);
- ~ Socotra desert;
- ~ Sudd-Sahelian savanna and flooded grasslands;
- ~ Tahiti (sites within the marine ecoregion);
- ~ Volga and Lena River deltas; and
- ~ Western Ghats and associated ecosystems (wetlands and forests).

3.3.3 Conservation International's Biodiversity "Hotspots"

Conservation International (CI) has pioneered the concept of biodiversity "hotspots". This concept recognises that certain areas on Earth have exceptional concentrations of endemic species, many of which are undergoing rapid loss of habitat. CI notes that 44% of all vascular plant species and 38% of all animal species occur in less than 2% of the globe's terrestrial area. CI further urges that concerted and effective conservation action be focused on these hotspot areas to prevent large-scale extinctions which may otherwise occur. WH sites have been inscribed within 21 of the 25 hotspots and another (South Africa's Cape Floral Kingdom) is to be considered by the WH Committee in 2004. However, this does not necessarily mean that the best sites or all potential WH sites in these 22 hotspots have been listed.

The three hotspots not containing a WH site are:

- New Caledonia,
- Central Chile, and
- The Succulent Karoo.

Although it does not necessarily follow that all hotspots contain a site of OUV that would also meet the Conditions of Integrity, a WH nomination from any of these three areas would potentially be a strong candidate on biodiversity grounds, as would some additional or extended areas in other hotspots.

3.3.4 BirdLife International's Endemic Bird Areas

BirdLife International has identified 218 Endemic Bird Areas (EBAs) around the world to assist in the identification of priority areas for bird conservation. BirdLife International gives ratings of 'critical', 'urgent' or 'high' to all these EBAs in accordance with conservation priority. Often, avian diversity is one of a number of justifications for WH nomination, particularly in relation to natural criterion (iv), as it is an important indicator of biodiversity levels in general. However, there is currently no WH site that is inscribed solely on the basis of avian species and EBAs are unlikely to be used as the sole determinant for WH justification. Nonetheless, many WH sites protect critical bird habitat. IUCN notes that 74 EBAs (34% of the global total) are found in 83 natural and mixed WH sites, underlining the importance of this consideration. BirdLife International's database thus serves as an important supplemental source of information in relation to the identification of potential natural and mixed WH sites.

3.3.5 IUCN / WWF Centres of Plant Diversity

IUCN and WWF have identified almost 250 sites important for the conservation of higher plants. These Centres of Plant Diversity (CPDs) either have high plant species diversity; contain a large number of endemic species, or both. Currently, 87 existing WH sites are located in 57 CPDs. Although it does not follow that all CPD's should be represented within a natural or mixed WH site, knowledge of areas that are of global importance for plants will often form a basis of a nomination

and, potentially, inscription. The CPD database is also of considerable use in assessing and comparing conservation priorities.

3.4 Geological Sites

Geological heritage is a subset of the world's natural heritage that falls under natural criterion (i), *“outstanding examples representing major stages of earth’s history including the record of life, significant ongoing geological processes in the development of landforms or significant geomorphic and physiographic features”⁴*.

The IUCN Theme Study on “Geological Landforms, Features and Processes” is currently undergoing further refinement and will be published in late 2004, but some of the preliminary findings are outlined below.

- ✓ Global geodiversity, at a wide range of scales, makes up a major component of the current WH site system: a total of 125 WH sites in 60 countries have features of geological significance (i.e. 2/3 of all existing sites) although not all are inscribed under natural criterion (i). For example karst sites and volcanoes are widespread and fossil sites now cover most geological time periods. However, the IUCN geological theme study mentioned above would provide further detailed guidance on this issue.
- ✓ 21 of these properties in 11 countries have significant fossil deposits or values recording the evolution of life on earth, and within 11 of these properties in 8 countries these features have been assessed of OUV.
- ✓ A total of 50 natural and mixed properties in 30 countries have been inscribed under natural criterion (i); 10 of these are inscribed only under this criterion.
- ✓ Furthermore, 47 sites were inscribed under criterion (ii) prior to 1994⁴, of which 35 are provisionally estimated to contain earth science features of OUV, (the remainder contain other values). The total number of sites presently recognised as of OUV for their earth science features is therefore likely to be around 85.
- ✓ 43 natural and mixed WH sites (as well as several cultural WH sites) have a karst component, 13 of which have been inscribed largely for their karst features.
- ✓ WH fossil sites currently represent significant evidence of the record of life within 11 of the 15 periods of geological time recognised since the explosion of life on earth in the Cambrian Period, c.600 million years ago. The periods not currently represented are the Silurian, Paleocene, Oligocene and Pliocene. Fossil sites showing the early stages in the evolution of life before the Cambrian are also not currently recognised on the WH List.

From the thematic assessment completed to date it appears that many WH sites display the Earth’s geological history, features and processes.

The theme study also confirms the particular difficulties that exist in dealing with geological WH site nominations. This is caused by the lack of a global system for recognising sites that are of international earth science importance, but are not of OUV and therefore not acceptable as WH Sites. The new UNESCO-supported initiative to create a Geopark network⁵ is being increasingly used to recognise important geological sites and landforms. Indeed it is now emerging as a potentially significant complement to the WH Convention and a useful means of recognizing the many thousands of such sites that comprise earth’s geodiversity. Whilst Geoparks are not being developed under a formal inter-governmental convention, the WH Committee may wish to consider how it can encourage States Parties to develop this initiative. This programme could be developed to

⁴ Prior to February 1994, when the criteria were last revised, sites representing ongoing processes were inscribed under natural criterion (ii).

⁵ This initiative has been proposed under the International Geological Correlation Programme (IGCP) which is a joint endeavour of UNESCO and IUGS (International Union of Geological Sciences), and is also supported by the IGU (International Geographical Union).

provide a significant alternative way of recognizing the large number of sites that comprise earth's geodiversity, but which do not qualify for World Heritage status.

4. CONCLUSIONS

A number of conclusions can be drawn from the above analysis:

1. Natural and mixed sites on the WH List cover almost all biogeographic regions, biomes, and habitats of the world with a relatively balanced distribution.
2. The biomes most commonly found in WH sites are Mountains, Humid Tropical Forests, Tropical Dry Forests and Mixed Island Systems.
3. There are major gaps in the WH coverage of the following biomes: Tropical Grassland/Savanna; Lake Systems; Tundra and Polar Systems; Temperate Grasslands; and Cold Winter Deserts. There is thus potential for listing natural and mixed WH sites within these biomes.
4. There are also some terrestrial and marine habitat types within these biomes which may have potential for WH inscription. These include sites that have been defined as priorities by CI, IUCN/SSC, WWF and BirdLife International. Nominations from any of the areas listed below should receive priority⁶:

Grasslands

- ~ Sudd-Sahelian savanna and flooded grasslands
- ~ Sub-antarctic grasslands, including South Georgia
- ~ Sub-polar and arctic tundra

Wetlands

- ~ Flooded grasslands such as Okavango and the Sudd swamps
- ~ Volga and Lena River deltas
- ~ Western Ghats rivers

Deserts

- ~ Succulent Karoo
- ~ Namib desert
- ~ Central Asian deserts
- ~ Socotra desert

Forests

- ~ Madagascar moist forests
- ~ Forests in southern Chile and southern Argentina
- ~ Dry and moist forests in New Caledonia
- ~ Western Ghats forests

Marine

- ~ Red Sea corals
- ~ Andaman Sea (sites within the marine ecoregion)
- ~ Benguela Current (marine)
- ~ Marine sites within the following WWF ecoregions: Fiji, Palau and Tahiti
- ~ Gulf of California
- ~ Maldives/Chagos atolls

⁶ Note that geological sites are not included here: see Section 3.4.

In translating the above list into a programme for nominating and inscribing additional WH sites, IUCN would emphasise the following:

- The list is indicative but not exclusive – there may be sites in other areas that also merit inscription, but the emphasis should be placed on these priority habitats.
- The list is broad rather than prescriptive. Any site identified within these habitats must not only meet the criteria, but would also have to satisfy the Conditions of Integrity under the Operational Guidelines of the WH Convention before it could be inscribed. In this context it is essential that sites nominated are formally protected under national / sub-national legislation or under clear and fully recognized principles of customary law.
- As noted at the outset, it is a core principle that all natural and mixed sites inscribed on the WH List must be of OUV. Therefore, there is a clear implication that there must be a finite number of existing and potential sites for inclusion on the WH List. Though further analytical work will be required to determine this with confidence, IUCN considers that a number in the range of 300 natural and mixed WH sites should be sufficient to complete this part of the WH List. This might be done over say a 10 year time period. However subsequent additions to the list may be needed in the light of new information and scientific knowledge.
- There is increasing use of serial site and transboundary nominations by a number of States Parties. While such initiatives are positive, IUCN considers that clearer directions and guidelines are needed to ensure that serial site nominations are properly prepared and that serial sites are effectively managed after inscription.
- It is also useful to consider WH sites in relation to other types of protected areas with respect to the application of OUV and the concept of 'representativeness'. This relationship is expressed diagrammatically in Annex 1. The diagram shows the relationship of WH sites to other protected area types and systems in terms of relative scale (global numbers) and the application of OUV as the key determinant for moving protected areas 'across the OUV line' onto the WH List. Below the OUV line, the diagram highlights the importance of all protected areas for ecosystem, landscape and species conservation based on the application of the principle of effective representivity.

5. RECOMMENDATIONS

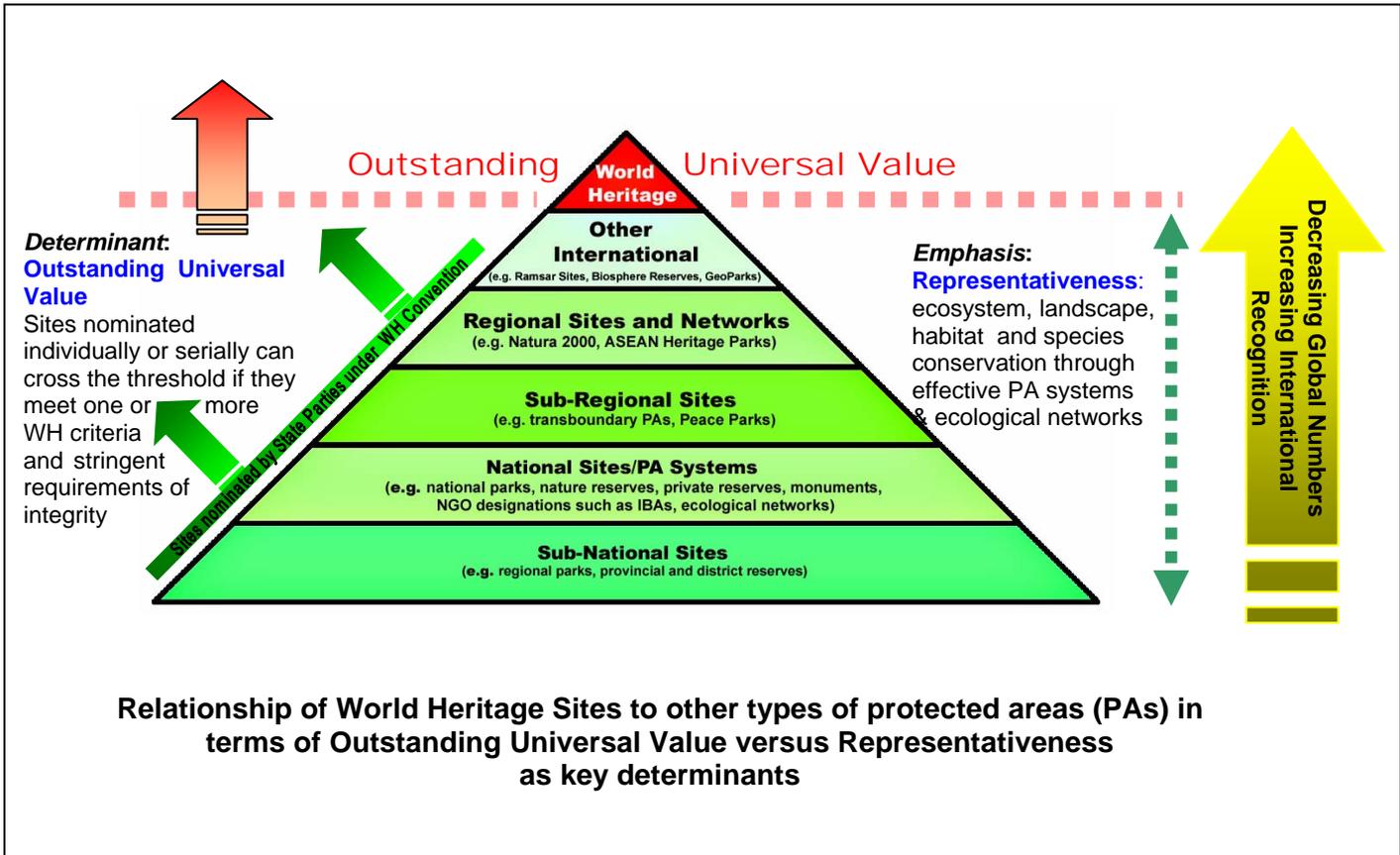
As a result of the above analysis IUCN makes the following recommendations:

1. In relation to **nominations**, the list of priority areas above provides initial indications of the important habitats that should be included in the WH List.
2. **Tentative Lists** should be developed so that they become a more effective tool to assist in the identification of natural and mixed WH sites at national and regional/sub-regional levels. Therefore: a) a technical workshop should be held to identify how this might be done, drawing on the small number of models that already exist; and b) this workshop should be followed by regional and sub-regional meetings to harmonise these lists, where possible linked to the cycle of Periodic Reporting.
3. The **Udvardy System** should remain an entry point for global comparative analysis and for the broad categorization of WH sites. Assessment based on this system should be complemented by the use of other classification systems, particularly those that address the gaps in the Udvardy analysis. The WWF marine ecoregions could be particularly useful in this regard.
4. **Global Theme Studies** should be developed and refined as they are vital to providing an internationally-accepted scientific foundation for the nomination and evaluation of potential WH sites. Therefore: a) the following studies should be completed within the period 2004 to 2008: Deserts and Grasslands; Polar regions; Central Asia (currently underway); and Freshwater

Lakes/Wetlands/Rivers; and b) existing theme studies should be periodically updated, taking into account recommendations arising from the Periodic Reporting process.

5. Support should be given to the UNEP-WCMC proposal to prepare a “**World Heritage Atlas**” – graphically and cartographically presenting the current distribution of WH sites according to the various data sets discussed above. This should be of great assistance to States Parties in preparation of nominations.
6. **Serial and transboundary nominations** should be more widely used, but additional technical and policy guidance is required on how to take advantage of the opportunities they provide. This should be done through a series of global and regional / sub-regional workshops. These workshops should promote regional / sub-regional processes to identify sites that may merit consideration as part of serial and transboundary nominations. Priority should be given to the application of the conditions of integrity across national and sub-national borders.
7. Full use should also be made of **other international instruments and agreements** to complement sites inscribed on the WH List. These include MAB Biosphere Reserves (designated under the UNESCO's Man and the Biosphere Programme) and Ramsar Sites (designated under the Ramsar Convention on Wetlands of International Significance). There are also a number of regional level designations for sites recognized as of regional significance, such as the EU system of Natura 2000 sites, and the Alpine and Carpathian Conventions. In relation to geological sites, the role of the Geopark Initiative has been referred to (Section 3.4). In addition there are the particular cases of High Seas and Antarctica for which the WH Convention is not suited. In the latter case, the Antarctic Treaty offers a good international instrument to encourage collaboration and conservation.
8. The attention of the WH Committee, and that of States Parties, should gradually to switch from questions of nominations to the **better management of existing natural and mixed WH Sites**. These should demonstrate exemplary models of management, aiming to show how conservation can effectively contribute to biodiversity conservation and sustainable development. It is essential that all WH sites are adequately resourced and managed; in many cases management needs to be strengthened. As the WH List gets closer to eventual completion, more attention should be placed on issues related to the State of Conservation of WH sites, and on policies and programmes designed to maintain their integrity.

ANNEX 1: Schematic representation of the relationship of World Heritage Sites to other types of protected areas (Chape 2004)



ANNEX 2

Sources of information used for the IUCN review of the World Heritage List and Tentative Lists.

IUCN technical and thematic studies:

- The World's Greatest Natural Areas: an indicative inventory of natural sites of World Heritage Quality (1982).
- Earth's geological history: a contextual framework for assessment of World Heritage fossil site nominations (1994).
- Global Overview of Wetland and Marine Protected Areas on the World Heritage List (1997).
- A Global Overview of Forest Protected Areas on the World Heritage List (1997).
- A Global Overview of Human Use of World Heritage Natural Sites (1997).
- A Global Overview of Protected Areas on the World Heritage List of Particular Importance for Biodiversity (2000).
- Which oceanic islands merit World Heritage status? (1991).
- Report of the working group on application of the World Heritage Convention to islands of the Southern Ocean (1992).
- Future directions for natural WH sites in East and Southeast Asia. Filling the Biome Gaps: a thematic approach to achieving Biodiversity conservation through World Heritage, Les Molloy (2000).
- Potential natural World Heritage sites in Europe, Lars-Erik Esping (1998).
- A Global Representative System of Marine Protected Areas. 1995. World Bank/IUCN. 4 vols.

Reports from selected regional meetings and UNESCO World Heritage initiatives to identify potential natural World Heritage Sites:

- Task force to select a global inventory of fossil sites (1991);
- Nordic World Heritage - proposals for new areas for the UNESCO World Heritage List (1996);
- Identification of potential World Heritage sites in Arab countries (1999);
- Tropical Forests (Berastagi meeting report, 1998);
- Identification of WH properties in the Pacific (1999);
- Regional Workshop on the Nomination of World Heritage Sites, Mozambique (2000);
- Seminar on Natural Heritage in the Caribbean, Suriname (2000);
- Central Asian meeting (2000);
- Karst sites in East and South East Asia (2001);
- Alpine Arc meetings (2000-2001).
- Tropical marine and coastal sites (Vietnam workshop, 2002).
- Boreal forest protected areas (Russia, Oct. 2003).