The World Heritage Convention and the Protection of Biodiversity Hotspots

The Netherlands, Ministry of Agriculture, Nature and Food Quality, Department of Knowledge, 2007

Foreword

The Dutch Government fully supports the aims of the Convention on Biological Diversity and the Programme of Protected Areas under the Convention of Biological Diversity, aiming at the protection of nature in the world, counting up to a possible 10% of the worlds' land-area's.

The World Heritage Convention (UNESCO) is a powerful instrument for the protection of nature, with strong relations to the national protective instruments. In a positive contrast with other global conventions, the World Heritage Convention provides a strong legally binding instrument for the protection of natural sites all over the world. From the analysis in this book it becomes clear that the protection regime of the WHC provides very good possibilities to protect global biodiversity. Important and positive aspects of the WHC-approach are: the WHC-regime is already protecting more then 160 natural sites; the protection regime and the selection of sites is widely accepted; the protection regime covers not only core-areas but also buffer zones and -if needed- corridors, so the network of sites can provide resilience to the threats of climatic change; nominations are only accepted if there is local ownership and if there is a sound and realistic management plan that is financially secured.

Within the WHC, the concept of Outstanding Universal Value (OUV) is crucial. This concept of OUV is translated into ten operational criteria for the assessment of OUV, of which the criteria VII, VIII, IX and X are defined for the identification of natural sites.

Biodiversity hotspots can be used as indications for the identification of potential WHC-sites under criterion X. The natural sites, thus selected for the World Heritage List, are among the most important sites for the conservation of biodiversity in the world.

The aims of the Dutch Government for international nature protection as a contribution to the realisation of the aims of the Convention on Biological Diversity (CBD) are written down in the "International Policy Programme Biodiversity 2002-2006", and its' follow up: the "International Policy Programme Biodiversity 2007-2011". In these policy programmes, the protection of (semi-)natural sites within systems of protected area's is identified as a very high priority. It is our opinion that the World Heritage Convention can play a crucial role in the future protection of natural sites and biodiversity hotspots all over the world.

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Contents

1. Introduction

This publication explores the possibilities for synergising the protection of biodiversity hotspots within the World Heritage Convention.
It starts with an exploration of some major biodiversity hotspot-methods. Having presented the results of three major hotspot-methods, possible synergies with the WHC are identified. A specific focus is on Africa. Identified hotspots are compared with the natural sites on the tentative lists of State parties.

This publication is no new scientific publication but it builds on the work of thousands of scientists. Texts and maps are merely adapted from websites and databases. New is the way data are combined and brought to a conclusion.

A **biodiversity hotspot** is a biogeographic region which is a significant reservoir of biodiversity which is threatened with destruction.
The concept of biodiversity hotspots is originally suggested by Myers in two articles in "The Environmentalist" (1988 & 1990), revised after thorough analysis by Myers in "Hotspots: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions" (1999), and again revised by Mittermeier in the book "Hotspots revisited" (2004).

To qualify as a Conservation International biodiversity hotspot, a region must meet two strict criteria:
it must contain at least 1,500 species of vascular plants as endemics, and it has to have lost at least 70 percent of its original habitat. Around the world 34 areas are identified that each have lost at least 70% of their original habitat that each still contain more than 1500 endemic vascular plant species. These sites support nearly 60 percent of the world's plant, bird, mammal, reptile, and amphibian species, with a very high share of endemic species. These sites are called "biodiversity hotspots".

The Conservation International Biodiversity Hotspot-approach is not the only approach for assessing global or regional conservation priorities.
BirdLife International has identified all over the world 218 Endemic Bird Areas (EBA) each of which hold two or more bird species found nowhere else. Birdlife International also identified more then 11.400 Important Bird Areas all over the world.

Plantlife International coordinates several projects all over the world aiming at the identification of Important Plant Areas (IPA's) and has identified in Central Eastern Europe about 1500 IPA's, each holding a specific constellation of rare and/or threatened plants. The Butterfly-Association-Netherlands has identified in Europe 584 Prime Butterfly Areas, each holding a specific constellation of rare and/or threatened butterflies.

Concentrating on initiatives that cover all taxonomic groups and that are aiming at the identification of global hotspots, two other initiatives are also important to be analysed in this publication:
The World Wildlife Fund has developed a system called the "**Global 200 Ecoregions**", the aim of which is to select priority Ecoregions for conservation within each of 14 terrestrial, 3 freshwater, and 4 marine habitat types. They are chosen for their species richness, endemism, taxonomic uniqueness, unusual ecological or evolutionary phenomena, and global rarity.
The "**Alliance for Zero Extinction**", in which a large number of scientific organisations and conservation groups co-operate, focuses on the most threatened endemic species of the world and has as yet identified 595 priority sites, incorporating for example a large number of Birdlife's Important Bird Areas.

The three initiatives are all based on scientific criteria and quantitative thresholds. Systematic problems of these hotspot approaches are that some ecosystems and/or geographical regions are underrepresented. Examples are deserts and the largely unexplored marine world. Kareiva & Marvier (2003) have argued that the biodiversity hotspots, thus defined, do not adequately represent other forms of species richness (e.g., total species richness or threatened species richness), and do not make allowances for changing land use patterns. They argue that hotspots may represent regions that have experienced considerable habitat loss, but this does not mean they are experiencing ongoing habitat loss. On the other hand, regions that are relatively intact (e.g., the Amazon Basin) have experienced relatively little land loss, but are currently losing habitat at tremendous rates.
The three organisations aiming at the identification of global biodiversity hotspots and which methods and results are studied in this publication, are aware of these methodological problems.

2. Methods for the identification of biodiversity hotspots

The following methods for the identification of biodiversity hotspots are studied:
1. Alliance for Zero-Extinction.
2. Conservation International.
3. WWF Global 200.

The thus identified hotspots are compared with natural sites protected under international conventions.

Alliance for Zero Extinction (AZE)

Introduction
AZE scientists are working in collaboration with an international network of experts to identify sites that must be effectively protected to prevent the extinction of the world's most threatened species.
To date, AZE has identified sites for those taxonomic groups that have been globally assessed for threat level: mammals, birds, some reptiles (crocodilians, iguanas, turtles, and tortoises), amphibians, and conifers. Other taxa will be added as data become available. By drawing global attention to these areas, AZE aims to prevent the most imminent species extinctions. Once a systematic effort to conserve these sites and species is underway, AZE will expand its focus to additional areas, and wider-ranging highly threatened species.

Criteria
AZE uses the following criteria to identify priority sites (a site must meet all three to qualify):
1. Endangerment. An AZE site must contain at least one Endangered (EN) or Critically Endangered (CR) species, as listed on the IUCN Red List.
2. Irreplaceability. An AZE site should only be designated if it is the sole area where an EN or CR species occurs, contains the overwhelmingly significant known resident population of the EN or CR species, or contains the overwhelmingly significant known population for one life history segment (e.g. breeding or wintering) of the EN or CR species.
3. Discreteness. The area must have a definable boundary within which the character of habitats, biological communities, and/or management issues have more in common with each other than they do with those in adjacent areas.

Key-findings
So far, 595 sites have been identified that must be safeguarded to prevent the extinction of 794 of the world's most endangered birds, mammals, amphibians, reptiles and plants. Many sites have more than one AZE "trigger species" confined to them. See also the map *"Alliance for Zero Extinction: Key sites"*.

Conservation International

Introduction
Myers in 1988 first identified ten tropical forest "hotspots" characterized both by exceptional levels of plant endemism and by serious levels of habitat loss. In 1990 a further eight hotspots were added, including four Mediterranean-type ecosystems. Conservation International adopted Myers' hotspots as its institutional blueprint in 1989, and in 1996, the organization made the decision to undertake a reassessment of the hotspots concept, including an examination of whether key areas had been overlooked. Three years later an extensive global review was undertaken, based on quantitative thresholds for the designation of biodiversity hotspots.

Criteria
To qualify as a hotspot, a region must meet two strict criteria:
1. Number of endemic plant species. A region must contain at least 1,500 species of vascular plants (> 0.5 percent of the world's total) as endemics,
2. Habitat-loss. A region has to have lost at least 70 percent of its original habitat.

Key findings
In the 1999 analysis, published in the book “Hotspots: Earth’s Biologically Richest and Most Endangered Terrestrial Ecoregions”, and a year later in the scientific journal “Nature”, 25 biodiversity hotspots were identified.
In 2004 a revision was published: “Hotspots revisited”, by Mittermeier et all. This updated analysis reveals the existence of 34 biodiversity hotspots. Overall, the 34 hotspots once covered 15.7 percent of the Earth’s land surface. In all, 86 percent of the hotspots’ habitat has already been destroyed, such that the intact remnants of the hotspots now cover only 2.3 percent of the Earth’s land surface.
See also the map “*Conservation International: Biodiversity hotspots*”.
In addition to the Biodiversity Hotspots-approach, Conservation International also identified “High Biodiversity Wilderness Areas” and “Key Marine Regions”.

WWF- Global 200

Introduction
Biodiversity is not spread evenly across the Earth but follows complex patterns determined by climate, geology and the evolutionary history of the planet. These patterns are called "ecoregions". WWF defines an ecoregion as a "large unit of land or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions". The boundaries of an ecoregion are not fixed and sharp, but rather encompass an area within which important ecological and evolutionary processes most strongly interact. The Global 200 recognize the fact that, whilst tropical forests and coral reefs harbour the most biodiversity and are the traditional targets of conservation organizations, unique manifestations of nature are found in temperate and boreal regions, in deserts and mountain chains, which occur nowhere else on Earth and which risk being lost forever if they are not conserved.

Criteria
The Global 200 ecoregions are the results of regional analyses of biodiversity across the continents and oceans of the world, completed in collaboration with hundreds of regional experts worldwide and by conducting extensive literature reviews.
Finally, ecoregions that represented the most distinctive examples of biodiversity for a given major habitat type were identified within each bio geographic realm. They were chosen based on the following parameters:

1. Species richness
2. Endemism
3. Higher taxonomic uniqueness (e.g., unique genera or families, relict species or communities, primitive lineages)
4. Extraordinary ecological or evolutionary phenomena (e.g., extraordinary adaptive radiations, intact large vertebrate assemblages, presence of migrations of large vertebrates)
5. Global rarity of the major habitat type.

Only the biodiversity value of ecoregions sharing the same major habitat type were compared because the relative magnitude of parameters such as richness and endemism varies widely among them.

Key-findings
The Global 200 is a collection of the Earth's most biologically diverse and representative terrestrial, freshwater, and marine habitats--areas where the Earth's natural wealth is most distinctive and rich. Global 200 ecoregions are all unique expressions of biological diversity, each with its own highly distinctive species, ecological processes, and evolutionary phenomena. Some sites--Australia's Great Barrier Reef, the Galapagos Islands, the Florida Everglades-- are familiar. Others are less renowned: South Africa's Fynbos shrublands, for example, which contain extraordinary plant richness, and Indonesia's complex coral reefs and marine ecosystems, habitat for hawksbill and leatherback turtles, carpet sharks, and moray eels.
See also the map “*World Wildlife Fund Ecoregions: Global 200*”.

Comparison of the different systems for hotspot-identification

Criteria
In general it appears that these three hotspot-criteria demonstrate large differences in approach (see table 1). But it must be added that these large differences are in practice not as big as they might seem, as in practice a site with a very large number of species (criterion 1), in a lot of cases also can have a high number of endemic species (criterion 2). Similar patterns are immanent between the number of endemic species in a site (criterion 2) and the number of endangered species (criterion 7). This is because all three approaches are building on (different operationalisations) of the ideas of biological richness and threat.

Table 1: Which overlap is there in criteria used for the identification of hotspots?

	Crit. 1 Species-number	Crit. 2: Endemism	Crit. 3: Higher taxonomic uniqueness	Crit. 4: Extraordinary phenomena	Crit. 5: Global rarity of habitats	Crit. 6: Decline and/or threat of habitats	Crit. 7: Decline and/or threat of species	Crit. 8: Irreplacability	Crit. 9: Discreteness
AZE		+					+	+	+
CI		+				+			
WWF	+	+	+	+	+				

It is also clear that the maps, resulting of the different hotspot-methodologies, present very high differences in geographical delimitations of more or less similar hotspots.
AZE gives only a very delimitated coverage where the Global 200 have a very wide coverage.
On the other hand, the identified hotspots demonstrate a very high overlap, yet in geographically limited areas.

It can also be concluded that the hotspot-methodology also give some coverage of other approaches for the assessment of global conservation priorities, as e.g. the Endemic Bird Areas[1] and the Important Bird Areas[2]. For example the Global 200 Ecoregions all but three contain at least one Endemic Bird Area. 170 AZE sites qualify also as IBA's.

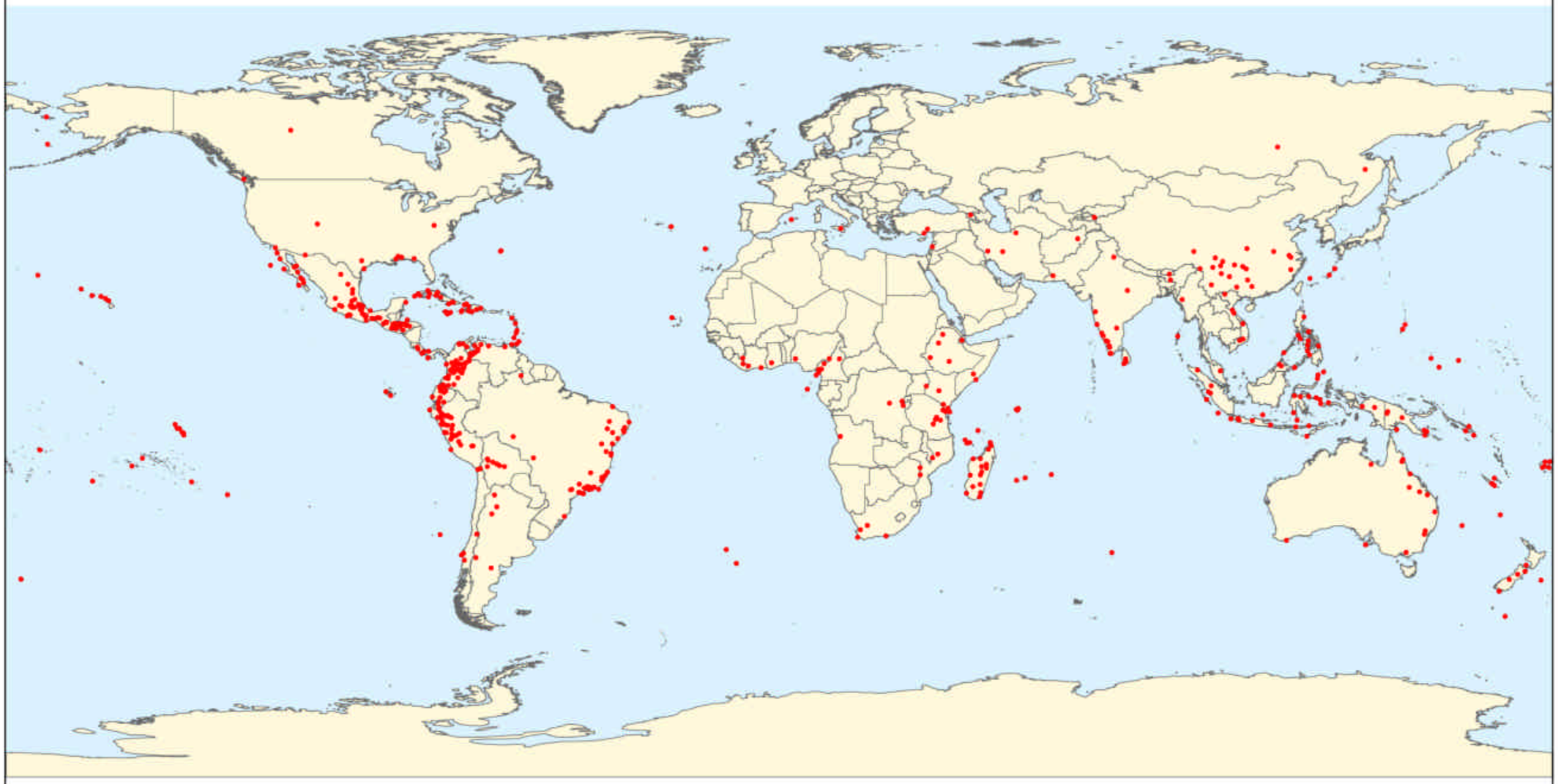
The map "*Sites protected under international conventions*" demonstrates natural sites protected under the World Heritage Convention, under the Wetlands Convention, and under the Man and the Biosphere Programme.

Conclusions

- The hotspot-methodologies are all three more or less based on the same rationale, i.c. biological richness and threat, but on different sets of criteria.
- The different criteria and methodologies produce quit different results.
- Within the widest delimitation, also roads, farms, cities etc. are incorporated.
- Europe and Meso-America's have a high level of protection of natural sites.
- Deficiencies in protection-level are large in South-America, Asia and Africa.

[1] BirdLife International has identified worldwide 218 "Endemic Bird Areas" (EBAs) each of which hold two or more bird species found nowhere else.
[2] BirdLife International has identified worldwide about 11.400 "Important Bird Areas" (IBAs) each of which holds a specific constellation of rare birds.

Alliance for Zero Extinction: Key sites



Legend

- AZE Key sites

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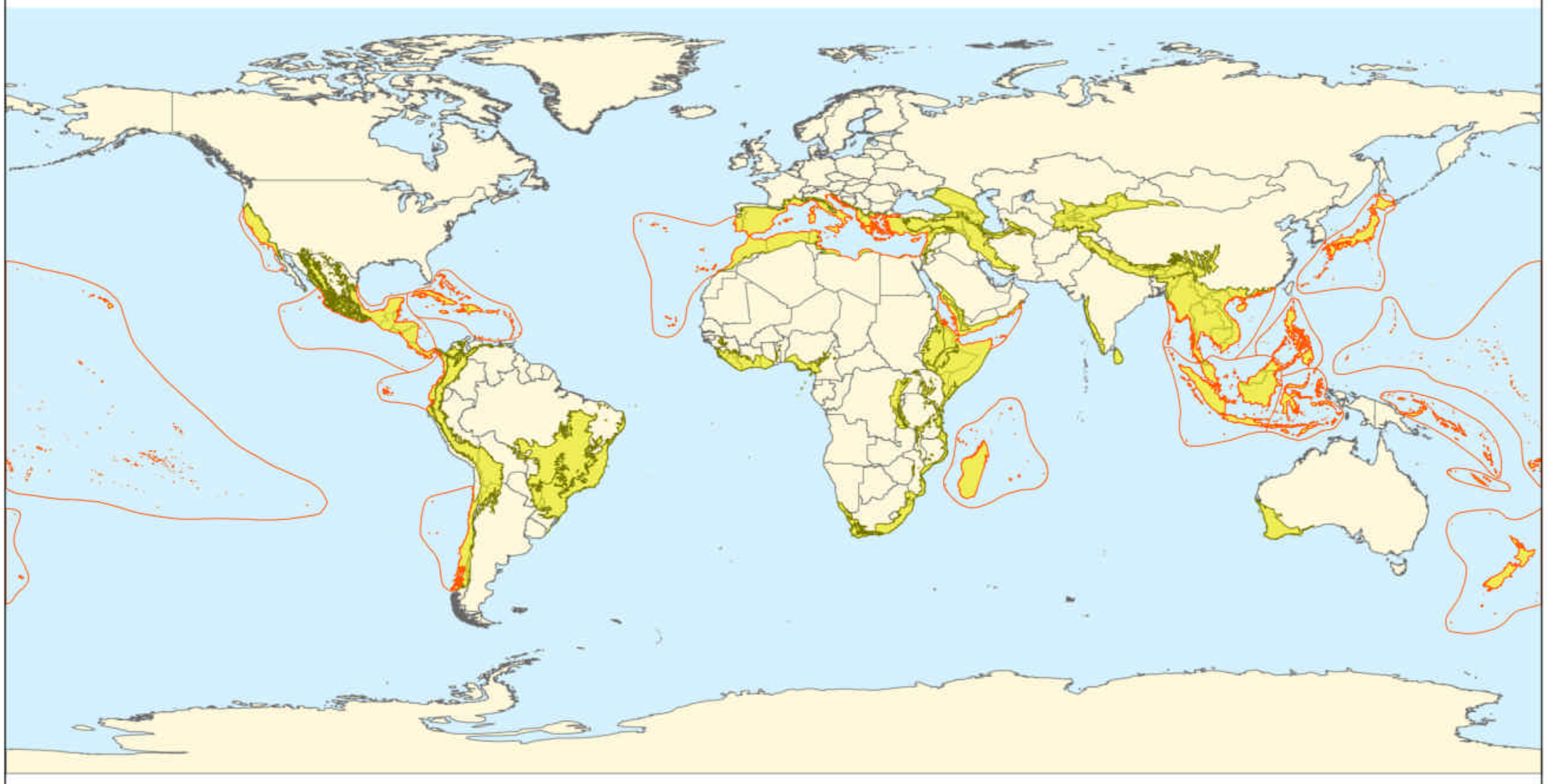
Conservation International: Biodiversity hotspots



Legend
- CI Terrestrial hotspot
- CI Marine hotspot

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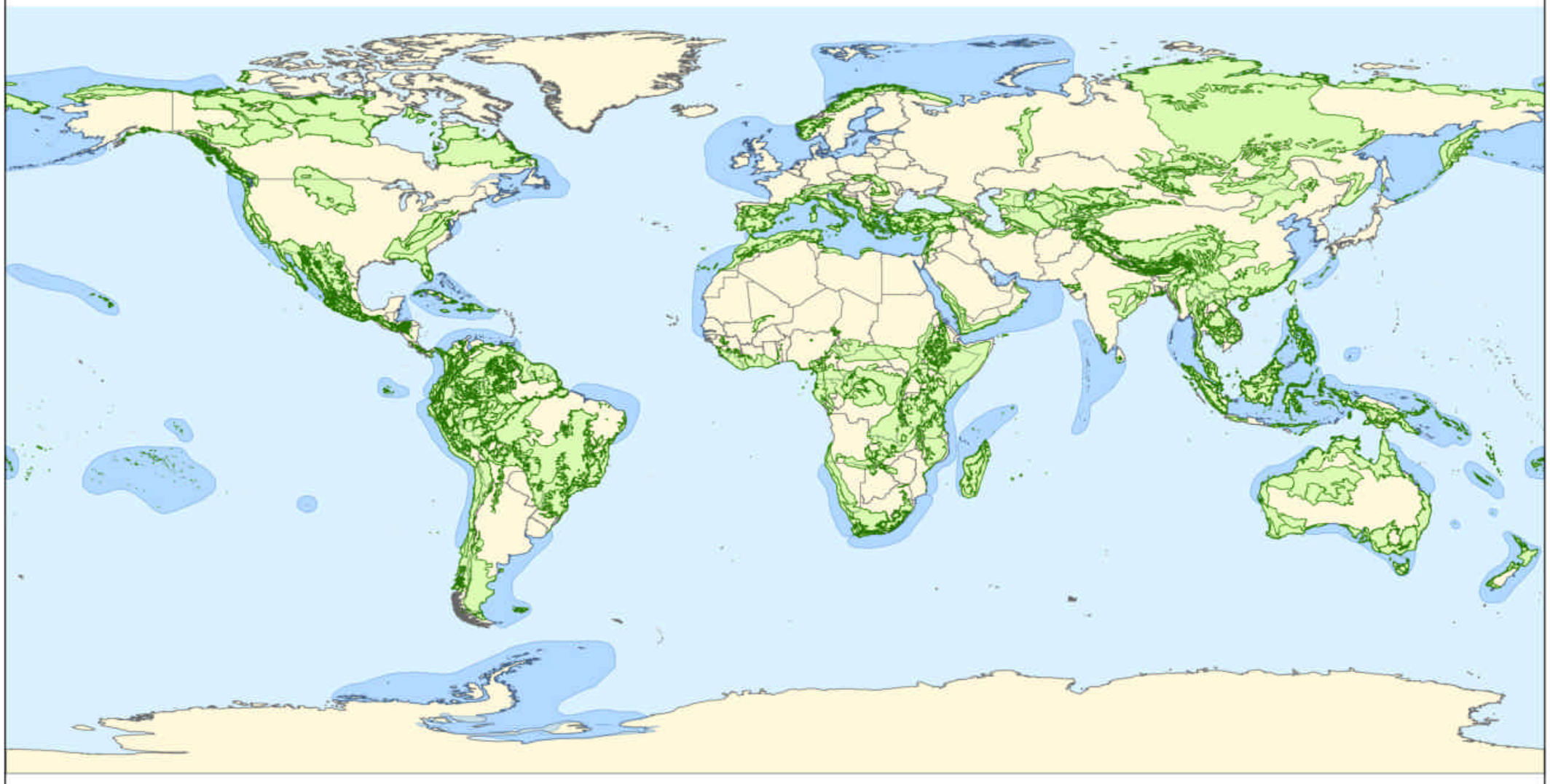
World Wildlife Fund Ecoregions: Global 200



Legend
- WWF Ecoregion terrestrial
- WWF Ecoregion marine

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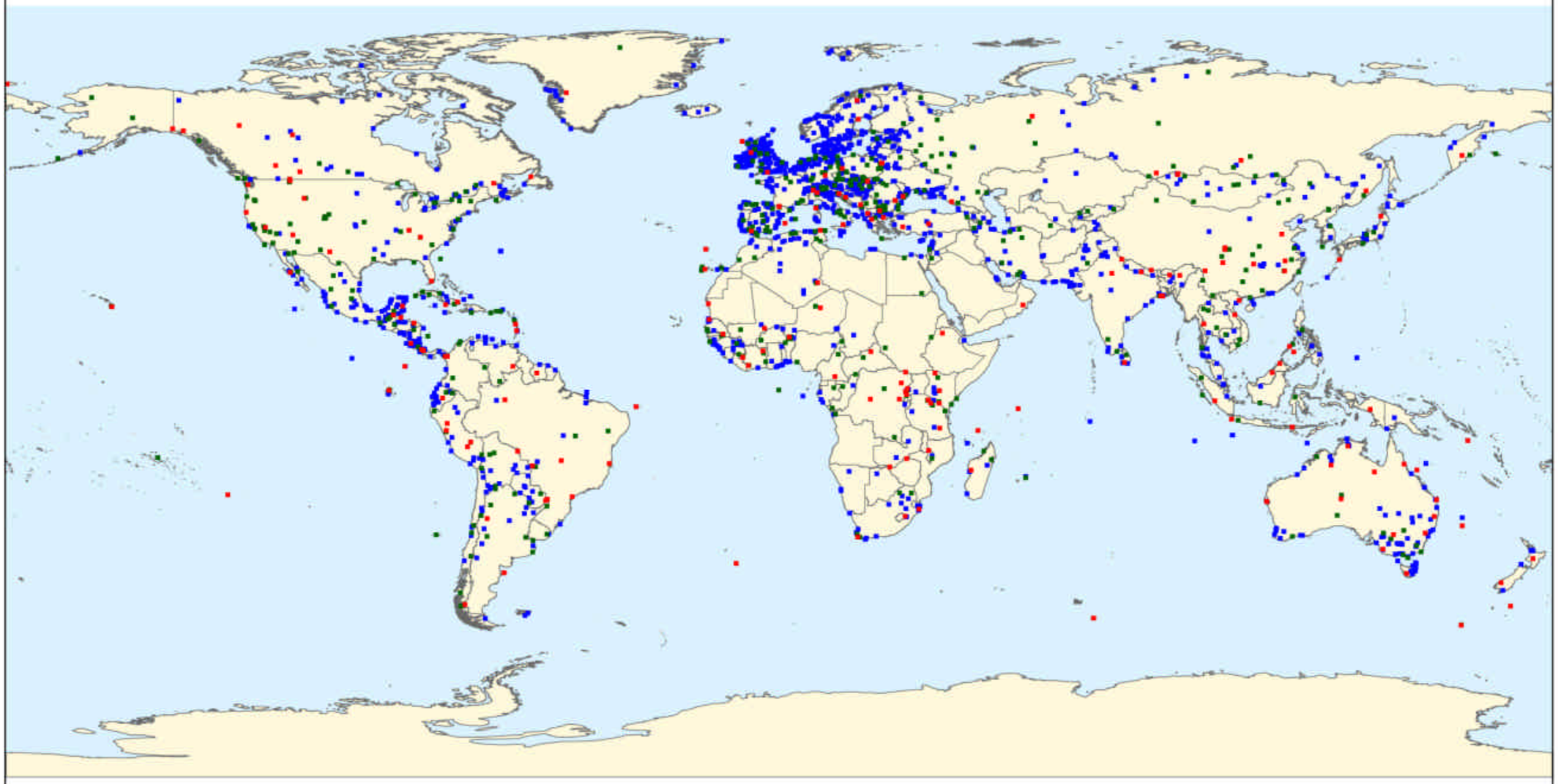
Sites protected under international conventions



Legend
- World Heritage Convention, natural sites
- UNESCO-MAB Biosphere Reserve
- Wetlands of International Importance (Ramsar)

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3. Focus on Africa

In this chapter the thus identified biodiversity hotspots are compared with a.o. the actual WHC natural sites and with the sites on national tentative lists. As this exercise in GIS is very time-consuming, this focus on Africa has been done for pragmatic reasons only".

See also "*Africa map*"

Alliance for Zero Extinction key sites: identified hotspots in Africa

Adiopodoume
Alaotra Lake
Aldabra atoll
Ambohitantely
Ampitambe Forest
Andohahela National Park
Andringitra National Park
Ankarafantsika Strict Nature Reserve and Ampoijoroa Forestry Station
Ankaratra Massif
Anosy Mountains
Bakossi Mountains
Bale Mountain National Park
Baly Bay National Park
Basile Peak National Park
Bobiri Forest Reserve
Buulobarde
Cedarberg-Koue Bokkeveld complex
Chimanimani Mountains
Daraina Forest
Elandsberg
Fierenanan
Foret de Day
Gabela
Gashaka-Gumti National Park
Gouna
IITA Forest Reserve Ibadan
Ilheu Raso
Isalo National Park
Itombwe Mountains
Jowhar - Warshiikh
Kahuzi-Biega National Park
La Digue Island
Little Abbai River
Mahe Highlands and surrounding areas
Menabe Forest
Meta - Gore - Tepi forests
Moheli/Mwali Highlands
Mont Manengouba
Mont Nganha
Mont Nimba
Montada de Areeiro
Montagne d'Ambre National Park and Special Reserve
Mountains of Bakossi
Mount Cameroon and Mokobo-Onge
Mount Elgon National Park/Mount Elgon
Mount Karthala
Mount Kenya
Mount Mulanje Forest Reserve
Mount Namuli
Mount Oku
Mount Rata and Rumpi Hills Forest Reserve
Ndzuani Highlands
Nyanga mountains
Pemba Island
Plaine des Chicots-d'Affouches
Rodrigues
Rubeho Mountains
Sao Tome lowland forests
Scierie forest
Shimba Hills
Silhouette Island
Simien Mountains National Park
Macchabé-Brise Fer Forest Southern Slopes
Table Mountain
Tai National Park and Nzo Faunal Reserve
Taita Hills forests
Tsaratanana area
Tsimanampetsotse Strict Nature Reserve
Udzungwa Mountains
Ukaguru Mountains
Uluguru Mountains
Usambara Mountains (East)
Usambara Mountains (West)
Zwedru

Conservation International- identified hotspots in Africa

Cape Floristic Region
Coastal Forests of Eastern Africa
Eastern Afro-montane
Guinean Forests of West Africa
Horn of Africa
Madagascar and the Indian Ocean Islands
Maputaland-Pondoland-Albany
Mediterranean Basin
Succulent Karoo

WWF-Global 200: identified Ecoregions in Africa

Albertine Rift montane forests
Aldabra Island xeric scrub
Arabian Sea
Atlantic Equatorial coastal forests
Cameroonian Highlands forests
Canary Current
Canary Islands dry woodlands and forests
Central African mangroves
Central Congolian lowland forests
Central Zambezian Miombo woodlands
Cross-Sanaga-Bioko coastal forests
Drakensberg montane grasslands, woodlands and forests
East African mangroves
East African montane moorlands
East Sudanian savanna
Eastern Arc forests
Eastern Congolian swamp forests
Eastern Guinean forests
Eastern Miombo woodlands
Ethiopian montane grasslands and woodlands
Ethiopian montane moorlands
Granitic Seychelles forests
Guinean montane forests
Inner Niger Delta flooded savanna
Kaokoveld desert
Lake Chad flooded savanna
Lowland fynbos and renosterveld
Madagascar dry deciduous forests
Madagascar ericoid thickets
Madagascar lowland forests
Madagascar mangroves
Madagascar spiny thickets
Madagascar subhumid forests
Madagascar succulent woodlands
Madeira evergreen forests
Mascarene forests
Mediterranean acacia-argania dry woodlands and succulent thickets
Mediterranean conifer and mixed forests
Mediterranean dry woodlands and steppe
Mediterranean High Atlas juniper steppe
Mediterranean Sea
Mediterranean woodlands and forests
Montane fynbos and Renosterveld
Mount Cameroon and Bioko montane forests
Nama Karoo
Namib desert
Namibian savanna woodlands
Northeastern Congolian lowland forests
Northern Acacia-Commiphora bushlands and thickets
Northern Zanzibar-Inhambane coastal forest mosaic
Northwestern Congolian lowland forests
Red Sea
Rwenzori-Virunga montane moorlands
Saharan flooded grasslands
Sao Tome, Principe and Annobon moist lowland forests
Serengeti volcanic grasslands
Somali Acacia-Commiphora bushlands and thickets
Southern Acacia-Commiphora bushlands and thickets
Southern Rift montane forest-grassland mosaic
Succulent Karoo
West Madagascar Marine
Western Congolian swamp forests
Western Guinean lowland forests
Zambezian Baikiaea woodlands
Zambezian flooded grasslands

WHC- Natural properties and mixed properties in Africa

Results by country, focussing on hotspots.

Algeria
Tassili n'Ajjer (1982)

Cameroon
Dja Faunal Reserve (1987)

Central African Republic
Manovo-Gounda St Floris National Park (1988)

Côte d'Ivoire
Mount Nimba Strict Nature Reserve (1981, 1982).
Taï National Park (1982)
Comoé National Park (1983)

Democratic Republic of the Congo
Virunga National Park (1979)
Garamba National Park (1980)
Kahuzi-Biega National Park (1980)
Salonga National Park (1984)
Okapi Wildlife Reserve (1996)

Ethiopia
Simien National Park (1978)

Gambia
James Island and Related Sites (2003)

Guinea
Mount Nimba Strict Nature Reserve (1981, 1982)

Kenya
Lake Turkana National Parks (1997, 2001)
Mount Kenya National Park/Natural Forest (1997)

Madagascar
Tsingy de Bemaraha Strict Nature Reserve (1990)

Malawi
Lake Malawi National Park (1984)

Mali
Cliff of Bandiagara (Land of the Dogons) (1989)

Mauritania
Banc d'Arguin National Park (1989)

Mozambique
Island of Mozambique (1991)

Niger
Air and Ténéré Natural Reserves (1991)
W National Park of Niger (1996)

Senegal
Djoudj National Bird Sanctuary (1981)
Niokolo-Koba National Park (1981)

Seychelles
Aldabra Atoll (1982)
Vallée de Mai Nature Reserve (1983)

South Africa
Greater St Lucia Wetland Park (1999)
uKhahlamba / Drakensberg Park (2000)
Mapungubwe Cultural Landscape (2003)
Cape Floral Region Protected Areas (2004)

Tunisia
Ichkeul National Park (1980)

Uganda
Bwindi Impenetrable National Park (1994)
Rwenzori Mountains National Park (1994)

United Republic of Tanzania
Ngorongoro Conservation Area (1979)
Serengeti National Park (1981)
Selous Game Reserve (1982)
Kilimanjaro National Park (1987)

Zambia
Mosi-oa-Tunya / Victoria Falls (1989)

Zimbabwe
Mana Pools National Park, Sapi and Chewore Safari Areas (1984)
Mosi-oa-Tunya / Victoria Falls (1989)

WHC- Tentative list of Natural properties en mixed properties in Africa: results by country

Here the names of the natural properties on national African tentative lists are presented. (See also the *Africa map*.). Some categories of tentative natural sites are deleted as the criteria for the selection of these sites have no relation at all with the biodiversity hotspot concept (for example meteorite craters).
The presentation of the resulting tentative sites on the map is only indicatively, as this was the best possible.

Some tentative sites could not be indicated on the map, as these were so widely described (for example “desert wadis”) that no geographical indication was possible.
“PN” means “National Parc”, “NR” means: “National Reserve”.

Algeria
PN Aures et gorges du Rhoufi

Botswana
Gcwihaba

Burkina Fasso
Parc National Niger

Cape Verde
Montantes de Ribeiras
Saline de Pedra

Chad
Archei
Lac Tchad
Lacs d’Ounianga
PN Zakouma

DCR
Upemba

Egypt
Bird migration routes
Desert wadis
Gebel Quatrani c.a.
Great desert
Mountain chains
Ras Mohammed Oasis and desert

Gabon
Ecosystem Minkebe
PN Ivindo
PN Moukala
PN Birougou
PN Bateké

Ghana
PN Kakum
PN Mole

Kenya
Great Rift
NR Lake Bogoria
Lake Naivasha
PN Lake Nakuru

Madagascar
Falaises Isandra
Forets Atsinanana
PN Nakuru

Malawi
Biosphere Reserve Mulanja
PN Nyika

Marocco
Dragonnier Aigal
Lagune Khnifiss
PN Dahkla
Talassementane
Toubkal

Namibia
Brandberg
Fishriver Canyon
Southern Namib Erg
Welwitschia Plains

Niger
Termit

Nigeria
PN Gashaki-Gumpti
Niger Mangroves
Oban Hills

Senegal
Delta Saloum
Lac Rose
PN Iles Madeleine

South Africa
Alexandria coastal dunes
Edward Islands
Richtersveld cultural landscape

Sudan
PN Dinder
PN Sanganeb
PN Wadi Howar

Togo
Fauna-reserve Aledjo
PN Fazao Mafakassa
PN Keran Oti Mandouri

Tanzania
Eastern Arc mountain Forests
PN Gombe
Jozani/ Chwaka Bay

Conclusions

Some natural WHC-sites in Africa are part of a biodiversity hotspot (widest interpretation).
More then 50% of the tentative natural WHC-sites in Africa is situated within a biodiversity hotspot (widest interpretation) and its biodiversity is threatened with extinction.
Urgent protection of these sites under the WHC is preferred because of its added value for the protection of global biodiversity.

As most tentative WHC-sites are much smaller then the identified biodiversity-hotspot in which the site is situated, other protective instruments are needed to realize good protection of the biodiversity hotspot as for example the instruments of nature-reserve, national park, national landscape, buffer zone, agri-environmental scheme and others.

A revision of the National tentative lists in Africa, based on the analyzed three hotspot-methods, can provide a clear perspective of the work that lies ahead within the aims and methods of the World Heritage Convention. The AZE-approach is in potential the most related hotspot-approach as this method identifies in a very specific and clear way some extra 60 natural sites in Africa which could be protected under the World Heritage Convention. Some of these sites are already mentioned in national tentative lists.

Combination map of identified hotspots

Sites protected under international conventions

Combination map of identified hotspots, sites protected under international conventions and WHC tentative natural sites

Combination map of identified hotspots and sites protected under international conventions

WHC tentative natural sites

World Heritage Convention tentative natural sites
World Heritage Convention, natural sites
Wetlands of International Importance (Ramsar)
UNESCO-MAB Biosphere Reserve
AZE Key Sites of endangered species
WWF Ecoregion terrestrial
WWF Ecoregion marine
CI Terrestrial hotspot
CI Marine hotspot
Overlap WWF and CI terrestrial ecoregions
Overlap WWF and CI marine ecoregions

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4. Synergies between the World Heritage Convention and Biodiversity-Hotspot-methodologies

In this paragraph the possible applications of the biodiversity hotspot-approach within the World Heritage Convention are analysed. The possible relations of WHC-criteria VII, VIII, IX and X with the hotspot-methodologies and -criteria are analysed.

The WHC-criteria for natural and/or mixed properties read:
" Nominated properties shall therefore:
(VII): contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;
(VIII): be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features;
(IX): be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;
(X): contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation".

From Table 2 it appears that the hotspot-criteria mostly support WHC criterion X. The WHC criteria VII, VIII and IX are not or only partly covered by the biodiversity hotspots-approach, which is reasonable as these criteria aim at different phenomena then the identification of biodiversity hotspots. This means that the identified biodiversity hotspots can be used as a guiding principle for the identification of potential WHC criterion X sites only.

Table 2: Do WHC criteria coincide with global hotspots criteria?

	Crit. 1 Species-number	**Crit. 2: Endemism**	**Crit. 3: Higher taxonomic uniqueness**	**Crit. 4: Extraordinary phenomena**	**Crit. 5: Global rarity of habitats**	**Crit. 6: Decline and/or threat of habitats**	**Crit. 7: Decline and/or threat of species**	**Crit. 8: Irreplacability**
WHC VII								
WHC VIII		(+)	+					
WHC IX				(+)				
WHC X	+	+	+	(+)	+	+	+	+

Evaluating criteria, coverage and application of (global) instruments for the protection of natural sites, it appears from table 3 that the WHC-approach and methodology give very good perspectives for effective protection of biodiversity hotspots, as the WHC covers all habitats- and species groups, and its protection regime requires a good management plan, builds on local and national ownership, and provides bufferzones and corridors if needed.

The periodically, and public reporting system on the "State Of Conservation" is a good provision, focusing public and policy-attention on the adequate protection of threatened sites. This means that at this moment, the World Heritage Convention is one of the best global instruments for the protection of natural sites.

Table 3: Is the WHC an adequate instrument for the protection of hotspots? Are there more appropriate global conventions?

Name of international instrument/ ecological network	Core area's	Buffer-zones	Corridors	Bottom-up approaches	Management plan	Quality of nomination process 1)	All habitats and species groups	Feed-back mechanism on protective regime 2)	Since which year in function:
Wetlands (RAMSAR)	+	-	-	+	+	+	-	+	**1971**
WHC	+	+	+	+	+	+	+	+	**1972**
N 2000 (EU)	+	-	+	+	+	+	+	+	**1992**
CBD	+	( )	( )	( )	( )	( )	( )	( )	-
PEEN 3)	+	( )	+	( )	( )	( )	+	( )	-

1) looking at transparency and peer-review
2) periodic, public reporting on state of conservation
3) Pan European Ecogical Network
- means not applicable
( ) means undefined and/or not concluded yet.

5. General conclusions and perspectives

The total inventory of the three global biodiversity hotspot-methods provides a solid overview of the great work still left be done for the effective protection of all biodiversity hotspots all over the world.

The World Heritage Convention is now protecting about 160 natural site all over the world. It could be expected that in the next 30 years another 200-250 natural sites can be brought under the WHC regime, being a substantial part of the worlds' biodiversity hotspots. Reasoning from the level of protection that a lot of natural sites are needing, WHC can deliver an important, but only partly solution.

State parties to the WHC are advised to consider the preparation of nominations of tentative sites within a biodiversity hotspot with greatest urgency, as these sites are of internationally acknowledged value for biodiversity.

The geographical configurations of the hotspots thus identified cover sometimes very large areas. It seems not to be realistic that these immense areas can be protected under the World Heritage Convention. Some further selective mechanism within these hotspot-regions or ecoregions is needed ("the best of the best"). The AZE-methodology seems to provide some answer to these questions in a practical way.
Using these hotspot-methodologies, only tentative sites for which WHC criterion X is applicable, are selected. For the other WHC categories and criteria, other inventories and selections should be made.

Evaluating method, coverage and ownership, WHC is one of the best global instruments for the protection of natural sites. The WHC-approach and -method gives the best guarantee for local and national ownership, provide buffer zones and corridors if needed, and the management plans and the periodically reporting system secure a good protection regime.

There is a urgent need to prepare nominations to realise a sufficient level of protection of biodiversity in Africa. At least 60 biodiversity hotspots are in an urgent situation. The preparations of these nominations could take up to 10 years or more. Special attention could be given to the preparation of nomination-dossiers along the West Paleactic Flyway and along the Great Rift Valley Flyway. There is a great need for support from other State-parties for the preparation of these nomination-dossiers and the implementation of locally supported management plans.

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Colophon

Publication 2007/073
Ede, June 2007

Orders for copies with reference to DK 2007/073 at E-mail: DKinfobalie@minlnv.nl

No. of copies: 100

Text: A. van Opstal

Maps: B. Looise

Photographs: A. van Opstal / H. Savenije

Print: Ministry of Agriculture, Nature and Food Quality,
department IFZ/Bedrijfsuitgeverij

Production: Department of Knowledge
Bedrijfsvoering / Publicatiezaken
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