World Heritage papers 4

Proceedings of the World Heritage Marine Biodiversity Workshop

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Proceedings of the World Heritage Marine Biodiversity Workshop

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Foreword

This year we are celebrating the 30th anniversary of the World Heritage Convention. Over this period the Convention has provided protection for numerous cultural and natural treasures of our World, and it continues to do so. Sites deserving of World Heritage status demonstrate the flexibility and diversity embodied in the heritage concept and spirit of the Convention, for example - the Galápagos Islands, the Great Barrier Reef, the Grand Canyon, the Great Wall and Giza pyramids, among others. The World Heritage Committee, the statutory body in charge of the protection of these sites, has recognized that the World Heritage List does not yet fully represent all types of cultural and natural heritage, which are of outstanding universal value. Therefore it has encouraged the World Heritage Centre and other partners to take action to support the States Parties of the Convention in nominating sites for World Heritage status that will over time ensure the natural and cultural treasures of the World are protected and thereby provide ecological and social benefits for society in perpetuity.

Coastal and marine ecosystems support most of our Planet's functioning and provide invaluable economic benefits, yet only about five percent of sites on the World Heritage List are nominated for coastal-marine heritage values at this time. Several reports on the state of marine ecosystems and related resources give alarming indications on their condition. For example, coral reefs and associated mangrove forests and seagrass beds are severely threatened from a combination of human activities and natural influences, e.g. climate change. Urgent action is needed to revert the decline of these globally significant diverse and productive ecosystems. I see the World Heritage Convention as an important tool to bring attention and protection for these unique ecosystems as they are a compelling illustration of major types of natural heritage not sufficiently represented on the World Heritage List.

I see it as our duty, not only to make the World Heritage List more representative of different types of heritage, but to recognize and protect extraordinary examples of marine ecosystems which are true expressions of global heritage. Therefore, this recent expert workshop to examine nomination opportunities for more tropical coastal, marine and island sites is well timed and I am pleased the workshop has resulted in a clear set of concrete priority actions and areas. This guidance will enable the States Parties, the World Heritage Committee and the World Heritage Centre alike, to take immediate and strategic actions to address our urgent need for enhanced protection and sustainable management of tropical, coastal, marine and small island ecosystems. We at the World Heritage Centre have taken the recommendations very seriously and have already commenced work to promote and assist nominations of transboundary marine properties based on the findings of this report.

In nominating marine sites, the States Parties not only benefit from the increased attention brought to these sites in the form of additional funding from our partners and donors, but also from managing these sites in a way that can provide ongoing livelihood, food security and revenue streams for coastal and island societies through sustainable management of tourism and fisheries benefits associated with these sites. For example, we now know the locations, and have a better understanding of the functions critical breeding areas for valuable fish stocks and other

marine species. When breeding and spawning areas are protected, fish stocks can multiply and be 'seed banks', supplying fishery resources at source as well as to many other sites depending upon the migration cycle and pathway of the species.

The expert meeting suggested innovative World Heritage nomination mechanisms, such as linking several marine protected areas as one serial site or transboundary nominations from two or more countries sharing important areas for marine diversity. I would encourage States Parties to consider these innovative approaches when preparing nominations of the marine ecosystems. Due to the dynamic and fluid nature of marine environment, serial and transboundary approaches are appropriate for delineation of marine World Heritage sites. Transboundary nominations can also serve as an important peace-building instrument between different nations.

The World Heritage Convention is a valuable mechanism for conservation of marine ecosystems, but so far its full potential has not been exploited. Therefore, I see this workshop as an important first step in rallying more attention to the Convention's use for marine conservation. I look forward to receiving support and co-operation from all the workshop participants and their organizations as well as from our partners and naturally the States Parties themselves in implementing the recommendations listed in this report.

Francesco Bandarin
Director
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Acknowledgments

The workshop organizers, UNESCO World Heritage Centre and the U.S. National Oceanic and Atmospheric Administration, wish to express deep appreciation for the assistance and collaborations of everyone who made this workshop a success and to acknowledge the many individuals and organizations that provided support to make this workshop possible. Firstly, we would like to acknowledge the generous funding from the United Nations Foundation, for without such support, this workshop would not have been possible. The leadership of IUCN World Commission on Protected Areas - Marine Theme in directing this effort must be recognized along with the advisory support from the workshop Steering Committee that provided insight in the program development.

A number of other organizations must be acknowledged for their efforts: The World Wildlife Fund – US; The Nature Conservancy; and Conservation International who were each instrumental in developing the framework that outlined the biogeographic approach for identifying priority areas. We would like to especially acknowledge the contribution of WWF-US for assembling the datasets that were stage setting for achieving the outcomes of the workshop and led to the success of the experts in identifying and reaching final consensus on the globally significant areas for tropical marine biodiversity. UNEP-WCMC provided maps and background information about the marine and coastal World Heritage sites already inscribed on the World Heritage List.

Special thanks are extended to the many members of the IUCN - The World Conservation Union for their contribution to the project, most importantly to our host organization, IUCN Vietnam Office, for their continuous support and gracious professional assistance, which allowed smooth running of the workshop. The valuable technical staff and support of WWF - Vietnam also contributed to the effort. The Ha Long Bay Management Authority set the stage for the week by taking workshop participants to an informative site visit that provided the workshop participants with understanding of the challenges facing many World Heritage properties.

Our sincerest thanks go to all workshop participants, who supported us through the difficult times following the postponement of the workshop in September 2001. Everyone worked enthusiastically during the workshop and thus enabled us to achieve the workshop goals of defining priorities and recommending areas from tropical coastal, marine and small island ecosystems for nomination on the World Heritage List.

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Glossary of terms

Nomination terms:

Serial nomination (the word "cluster" has also been used for this in the text): any nomination, which consists of two or more physically unconnected areas, but which are related for example because they belong to the same geological, geomorphological formation, the same biogeographic province or the same ecosystem type. The series itself should be of outstanding universal value, not necessarily its components taken individually. Serial nominations are inscribed as a single property on the World Heritage List. The locations, size and boundaries of each component must be made clear in the nomination (Section I of the Nomination Format).

Transboundary nomination: nomination of a property that spans an international boundary(ies). Transboundary nominations are inscribed as a single property on the World Heritage List.

Transboundary serial nomination: a combination of the two above-mentioned. The nominated property should be managed jointly.

Outstanding Universal Value: in the text of the World Heritage Convention, outstanding universal value is the threshold of value to be satisfied when inscribing properties on the World Heritage List. One or more of the World Heritage selection criteria as described in the Operational Guidelines must be met.

Marine Protected Area: a Marine Protected Areas is "any area of the intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment". (World Conservation Union – IUCN 1988, Kelleher 1999)

"Tropical marine and coastal": as defined in the UNEP-WCMC discussion paper:
(i) marine components as those areas from deep ocean to areas immediately below high water level;
(ii) coastal components as those areas of land and brackish and fresh water immediately adjacent or in close proximity to the sea;
(iii) tropical areas to include sub-tropical areas approximately within latitudes 30°N and 30°S.

Tropical marine, coastal and small island ecosystem terms:

Archipelago: a group or chain of many islands.

Atoll: a circular or horseshoe-shaped coral reef that grows upward from a submerged volcanic peak and encloses a lagoon; may support low-lying islands composed of coral debris. Common in the Pacific.

Barrier reef: a long, narrow coral reef, roughly parallel to the shore and separated by a lagoon of considerable depth and width. It may lie a great distance from a continental or island coast. It is often interrupted by passes or channels and can emerge above the sea surface during low tide.
Benthic: bottom dwelling; living on or under the sediments or other substratum.

Bleaching: the process when a coral polyp expels it's symbiotic zooxanthellae from coral host body.

Community: all of the animals living in a specific area (habitat), often described by the most abundant or obvious organisms.

Continental or insular shelf: the submerged shelf of land that slopes gradually from the exposed edges of a continent or island where drop off to the deep seafloor begins. When the shelf drops gradually and there is not a distinctive shelf break (usually located at 20-60m depth) the edge of the shelf is conventionally situated at 200m depth.

Coral reef: a wave resistant structure whose foundation is the result of the skeletal construction and cementation processes of hermatypic corals, calcareous algae, and other calcium carbonate secreting organisms. It also includes other non-carbonate organisms residing on or associated to the building structure.

Ecosystem: a natural system including the sum total of all living things, the non-living environment and its physical forces, and the relationships among these including processes such as predation, competition, energy flow and nutrient cycling.

Estuary: a semi enclosed body of water that has a free connection with the open sea and within which seawater is diluted measurably with freshwater that is derived from land drainage.

Fringing reef: a shelf reef that grows close to shore. Some develop around oceanic islands.

Habitat: place or environment where a particular species or group of organisms live.

Mangrove: tropical or subtropical trees and shrubs that are variously salt tolerant and can form dense systems of roots and branches at the land-sea interface, ultimately building land.

Mollusk: a taxonomic division of the animal kingdom that includes snails, slugs, octopuses, squids, clams, mussels, and oysters.

Monitoring: periodic measurements of the same parameters, physical or biological, designed to detect change over time.

No-take reserves: geographic areas where by law no one is allowed to fish or collect biological specimens. Rules can apply to one or more species. They are also named marine reserves or fishery reserves.

Oceanic reef: a reef that develops adjacent to deep waters, often in association with oceanic islands.
Patch reef: a coral boulder or clump of corals unattached to a major reef structure.

Pelagic: life forms living in the water column.

Phylum (plural phyla): Related group within a kingdom of flora or fauna containing classes, orders, families, genera and species with similar general form.

Platform reef: a large reef of variable shape lacking a lagoon, seaward of a fringing reef and or a barrier reef, for which the width is more than half its length.

Reef: an underwater structure; something that extends up from the seafloor but does not rise above the surface of the water.

Reef lagoon: a warm, shallow, quiet waterway separated from the open sea by a reef crest.

Runoff: water that flows in streams, rivers, or even artificial structures (such as waterways, channels, or streets) or other impervious surfaces, and reaches nearshore environments; runoff drain water and many different natural particulate matter such as sediments and nutrient, but also pollutants from urban and agricultural land uses, e.g. sewage, heavy metals, fertilizers from lawns and agriculture.

Seagrass: rooted, submerged marine or estuarine macrophytes of several species (phanerogams and algae). Habitats created by seagrass meadows are among the most diverse and productive estuarine environments.

Species richness: the number of species in an area or biological collection.

Spur and groove reef: a coral reef formation characterized by rapid and substantial fingerlike projections of coral accumulation (spurs) separated by sand (grooves) that form in the direction of prevailing waves.

Upwelling: the movement of cold, nutrient rich water from a specified depth to the surface.

Watershed: the area that is drained by a river or estuary and its tributaries.

Wetland: an area where saturation with water is the dominant influence on characteristics of the soil and on the composition of the plant community.

Zooxanthellae: a group of dinoflagellate algae living in association with one variety of invertebrate groups (e.g. corals).

Acronyms

ASEAN – Association of Southeast Asian Nations

CI – Conservation International

FAO – Food and Agricultural Organization

GEF – Global Environment Facility

ICRAN – International Coral Reef Action Network

ICRI – International Coral Reef Initiative

IMO – International Maritime Organization

IUCN – World Conservation Union

LAC – Latin America and Caribbean

NGO – Non-governmental organization

NOAA – National Oceanic and Atmospheric Administration

PERGSA – Red Sea and Gulf of Aden Environment Programme

PSSA – Particularly Sensitive Sea Areas

RAP - The Representative Areas Program (Australia)

ROPME – Regional Organization for the Protection of the Marine Environment

ROWA – Regional Office for West Asia

SIDS – Small Island Developing States

SPA Protocol – Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean

SPAW - Specially Protected Areas and Wildlife in the Wider Caribbean Region

TNC – The Nature Conservancy

UN – United Nations

UNDP – United Nations Development Programme

UNEP – United Nations Environment Programme

UNESCO – United Nations Educational and Scientific and Cultural Organization

UNF – United Nations Foundation

WCMC – World Conservation Monitoring Centre

WCPA – Marine – World Commission on Protected Areas Marine

WHC – World Heritage Centre

WWF – World Wide Fund for Nature

WWF-US – World Wildlife Fund – US

The Hanoi Statement

Sixty-two coastal and marine scientific experts attended the "World Heritage Marine Biodiversity Workshop: Filling Critical Gaps and Promoting Multi-Site Approaches to New Nominations of Tropical Coastal, Marine and Small Island Ecosystems" held in Hanoi, Vietnam from 25 February to 1 March, 2002.

Workshop participants gathered to assess the marine biodiversity of the tropical realm and identify opportunities to expand World Heritage coverage of areas of Outstanding Universal Value (OUV). The primary objectives of the workshop were to:

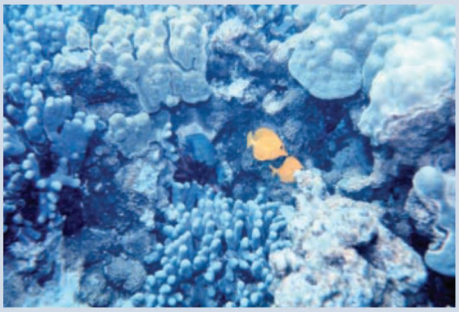
1) Reach expert consensus on tropical coastal, marine, and small island ecosystems for potential nomination as World Heritage sites.

2) Identify innovative opportunities for applying a multi-site approach (serial and transboundary nominations) to pilot one or more World Heritage site nominations.

During the workshop, internationally and regionally recognized experts worked together to develop a scientifically-based consensus global list of areas of outstanding universal value for marine biodiversity for further consideration by State Parties to the World Heritage Convention and other interested entities for nominations on the World Heritage List.

A biogeographic approach, utilizing the World Heritage criteria, was used to identify a representative set of priority areas important for biodiversity value, with an emphasis placed on large-scale interconnections within the areas. The Workshop participants discussed use of the World Heritage Convention as a mechanism for conserving the biodiversity of outstanding marine and coastal areas. The Workshop outcomes are directed to remedy under-representation in World Heritage coverage of tropical coastal, marine and small island ecosystems. World Heritage status is highly valued, but at the moment amongst the 730 sites inscribed on the World Heritage List very few are inscribed for their marine values.

The workshop participants concluded that many tropical coastal, marine, and small island ecosystems have suffered and continue to suffer substantial environmental damage. This degradation threatens the viability of important species, the existence of critical marine habitats, the functionality of marine systems, the livelihoods of hundreds of millions of people, and the economies of many coastal states and nations.



Therefore, Workshop participants recommend to the World Heritage Committee that in relation to tropical marine, coastal and small island ecosystems:

1▷ Immediate steps and attention must be taken to enhance global marine conservation efforts by improving the coverage and geographic representation of tropical marine, coastal and small island ecosystems of Outstanding Universal Value (OUV) as World Heritage sites.

2▷ Under-represented regions should be better represented on the World Heritage list.

3▷ An ecosystem approach should be applied to develop a "network" of truly outstanding sites under World Heritage protection in light of the diversity and connectivity of the marine environment.

4▷ The nomination process should be used as a tool to build management capabilities at areas of outstanding universal value, with an aim to meet World Heritage requirements.

5▷ Wherever feasible, marine World Heritage sites and other marine protected areas must be large enough to include the sources of larvae needed to replenish populations of organisms depleted by disturbances, to encompass important migration routes, and to fully protect viable breeding stocks of species that are endangered or crucial to ecosystem integrity.

6▷ Recognizing that the small jurisdictional size of individual Small Island Developing States (SIDS), such as the Lesser Antilles, may limit their competitiveness for selection as World Heritage Sites, IUCN and the World Heritage Committee should take steps to ensure that SIDS are sufficiently represented as natural marine sites, or mixed sites with natural marine and/or terrestrial, as well as cultural components. While individual criteria maybe met by these sites, it is clear that their relative competitiveness remains low in comparison with larger marine ecoregions. In addition, there is often insufficient information for the clustering of multi-island sites, reducing their competitiveness in cluster and trans-boundary nominations. Special attention must be given to SIDS, with reference to biodiversity the small jurisdictional size of individual SIDS and in particular their marine components may limit their competitiveness for World Heritage Site selection.

7▷ Cultural and natural components of the World Heritage Convention should work more effectively together where applicable especially in relation to ecosystems that have both outstanding concentrations of biodiversity and rich, traditional human cultures. It was particularly noted that traditional ownership and cultural traditions of coastal and small island communities provide a significant basis for long-term conservation.

8▷ Where shipping occurs through or near a World Heritage site, investigations should be initiated to determine whether designation of the area as a Particularly Sensitive Sea Area by the International Maritime Organization would be appropriate.

9▷ The unique biodiversity attributes of areas of the high seas and threats to which they are subject need to be recognized by a program to identify and establish World Heritage sites that represent these attributes.

10▷ More information about ecological components and processes, as well as about proven and effective management practices is needed to guide the management of existing World Heritage sites. Therefore, Workshop participants suggest that support be given from the World Heritage Fund, as well as from other donors, for applied research, monitoring on ecology, threats, and management practices, which will support effective management of World Heritage sites. The participants of the workshop will use their networks to promote research at World Heritage sites.

11▷ It is essential that sites already on the World Heritage List provide for improved monitoring and effective management. Capacity building is an urgent requirement in many countries.

12▷ As effectively managed areas, World Heritage sites can play a key role as models for "BEST PRACTICE" in the management of marine protected areas.

13▷ Existing World Heritage list containing marine or coastal components deserve the State Party's consideration for geographic extension in order to include larger representation of marine and coastal biodiversity, as appropriate.

14▷ More information about ecological components and processes is needed in areas that include potential World Heritage sites. The workshop suggests that resources be allocated to research and monitoring in these areas.

15▷ To enhance management and facilitate information exchange among existing marine and coastal World Heritage sites, a World Heritage marine and coastal site managers' network should be established in collaboration with other organizations and existing networks.

16▷ Other mechanisms, such as Biosphere Reserves, Ramsar site designations and marine protected area networks should be applied to strengthen and complement the World Heritage Convention and give international recognition to important marine sites.

17▷ More adequate resources and collaboration among donors, NGO's and government agencies should be provided to effectively manage and evaluate existing and potential World Heritage areas.

18▷ Mechanisms should be implemented to ensure the continuation of the process initiated with this workshop in support of this objective. A meeting of World Heritage coastal and marine site managers should be held in conjunction with the World Parks Congress (South Africa, September 2003) to assess the benefits and management effectiveness of World Heritage sites.

19▷ A similar workshop dealing with temperate seas should be conducted as soon as practicable.

A list of tropical marine, coastal, and small island areas of outstanding universal value for biodiversity is provided for consideration by State Parties to aid in identifying sites that could be nominated to the World Heritage list. The workshop identified a number of cluster and trans-border areas and the possible extension of several existing World Heritage sites. These areas were chosen based primarily on biodiversity-related criteria, given currently available information from major marine ecosystem and provinces throughout the world.

Workshop participants, as representatives of the marine science and conservation community, endorse and support this initiative to develop a science-based approach to fill gaps in the World Heritage listing of natural areas by IUCN and signatories to the World Heritage Convention to assist in the process of identifying areas of outstanding universal value for biodiversity in the tropical coastal, marine and small island ecosystem areas of the world. It was recognized that this group of experts did not have sufficient knowledge of all areas within the regions, which might merit for World Heritage status. It was therefore suggested that further studies be undertaken, for example, in the Western Indian Ocean in order to identify priority areas. Annex 3 summarizes the findings from the consultative process carried out after the workshopto determine high priority areas in the Central Indian Ocean.

Participants commend the workshop process, conclusions and recommendations and agree to communicate this concluding statement to the World Heritage Convention and others as appropriate, externally and to their own organizations for consideration and support.

Regional Priority Areas

The group of sixty-two experts identified nearly 120 areas of importance as tropical coastal, marine and small island ecosystems that may merit consideration for World Heritage listing. The following list is based on the knowledge and expertise of the workshop participants. Where expertise was not available to adequately review the sites, that information is noted.

A List: Areas that the group of experts unanimously recognized to be of Outstanding Universal Value (OUV) in terms of their tropical coastal, marine and small island biodiversity attributes. The experts recommend that, as a matter of high priority, the State Parties consider nominating sites from these areas onto the World Heritage List.

B List: Areas that were identified by experts to have significant components of OUV. The group of experts recommends that the State Parties carry out further studies in co-operation with national and international experts in order to ascertain which OUV components would be of World Heritage value and prepare nominations as appropriate.

C List: The experts considered that the following areas may be of OUV but the information available at the meeting was not adequate to discuss them in further detail. Hence it is recommended that the State Parties undertake further review and analysis in co-operation with national and international experts in order to determine the OUV value of these potential sites.

More detailed discussions on threats and feasibility for top-ranked sites are summarized in a table at **Annex 2** at the end of this report.

< The Lists >

(Numbers refer to regional maps)

▶ outheast Asia

A List:
1. Raja Ampat Region (Indonesia)
2. Spratlys Island Group (under dispute by 6 South China Sea nations)
3. Tubbataha-Cagayan Ridge (Philippines)
4. N. Borneo/ Balabac Strait/ Turtle Island Cluster (Philippines, Malaysia)
5. Semporna/Tawi-tawi Chain (Malaysia)
6. Berau Islands (Indonesia)
7. Banda/Lucipara Cluster (Indonesia)

B-List:
8. Greater Ha Long Bay (Vietnam)
9. Surin/Mergui (Thailand, Burma)
10. Phuquoc/Namdu (Kampuchea and Vietnam)
11. Condao/Nhatrang (Vietnam)
12. Hoi An (Vietnam)
13. Iriomote Island and Sekisei Lagoon (Japan)
14. Batanes Island Cluster (Philippines)
15. Manado/Bunaken (Indonesia)
16. Wakatobi (Indonesia)
17. Surigao-Siargao (Philippines)

C-List:
18. Andaman/Nicobar Island Chain (India)
19. Pulau Dayang Bunting (Malaysia)
20. Redang/Perhentian Island Cluster (Malaysia)
21. Calamianes Cluster (Philippines)
22. Zamboanga Region (Philippines)
23. Teluk Cendrawasi (Indonesia)
24. Alor Channels (Indonesia)
25. Kimberly Islands (Australia)

▶ Pacific

A List:
1. New Caledonia (France)
2. Milne Bay (Papua New Guinea)
3. Rock Islands Cluster (Palau)
4. New Hanover and Manus Cluster (Papua New Guinea)

5. Marovo Lagoon and Arnavon Islands (Solomon Islands)
6. Pohnpei-Kosrae Island Cluster (Federated States of Micronesia)
7. Line Islands Cluster (Cook Islands, Kiribati, the United States and French Polynesia)

B List:
8. Austral Islands (France)
9. Ha`apai Islands (Tonga)
10. Kandavu / Lau Group (Fiji)
11. Marquesas (France)
12. NW Hawaiian Islands (US)
13. Phoenix Group (Kiribati)

C List:
14. Bikar, Bokaak, Wotho, Rongelap Atolls (Marshall Islands)
15. Fly River and Northern Great Barrier Reef Cluster (Papua New Guinea and Australia)
16. Gilbert Islands (Kiribati)
17. Huon Peninsula (Papua New Guinea)
18. Pitcairn and Easter Islands (UK, Chile)
19. Tokelau
20. Tuvalu
21. Wallis and Futuna (France)
22. Vanuatu
23. Yadua Taba (Fiji)

► Latin America and Caribbean

A List:
1. Cocos-Galapagos-Malpelo extension (Costa Rica, Ecuador and Colombia), opportunity for serial nomination
2. Sea of Cortez - Gulf of California (Mexico)
3. Mayan Coast Reefs – Sian Ka`an expansion– Banco Chinchorro (Mexico)
4. Belize Barrier Reef System, opportunity for site expansion to include watershed and reef corridors
5. Revillagigedo and Clipperton Islands (France and Mexico)
6. Southern Cuba Coral Archipelago
7. Southern Caribbean Island Group (The Netherlands and Venezuela)
8. San Andres Archipelago (Columbia)

B List:
9. Jaragua (Dominican Republic)
10. Parque Nacional del Este (Dominican Republic)
11. Andros Island (Bahamas)
12. Exuma Cays (Bahamas)
13. Peninsula Osa - Golfo Dulce (Costa Rica)
14. Tortuguero-Miskitos Islands (Nicaragua)
15. St. Lucia Island

16. Tobago Cays (St. Vincent & the Grenadines)
17. Saba Island and Bank (The Netherlands)
18. Guadeloupe (France)
19. Reentyancias e Lencois Maranhensis (Brazil)

C List:
20. Panama Bight (Panama, Colombia and Ecuador)
21. Gulf of Darien (Panama and Colombia)
22. NE Brazil Coast

▶ West Africa

A List:
1. Niger Delta (Nigeria), opportunity for serial nomination with Cross River Barrier lagoon system
2. Densu Delta, Muni, Sakumo, Songor and Keta Lagoons (Ghana), opportunity for serial nomination
3. Sao Tome and Principe (Equatorial Guinea) including Annabon Island, opportunity for transboundary and serial nomination
4. Boloma Bijagos (Guinea-Bissau)
5. Skeleton Coast National Park (Namibia)

B List:
6. Ascension Islands
7. Great and Little Scaries Estuary (Sierra Leone)
8. Grand Lahou and Ebrie Complex (Cote D'Ivorie)
9. Aby, Tendo, Ehy Lagoon Complex (Cote d` Ivorie, Ghana) opportunity for serial nomination of West Africa barrier lagoon systems
10. Ehunli/Akpuho Lagoons and Nyile/Kpani Estuary (Ghana)
11. Nokoue Lake and Porto Novo Lagoon (Benin)
12. Coastal Lagoons (Gabon)
13. Cross River Estuary (Nigeria, Cameroon)

C List:
14. Benguela Coast (The Republic of Congo, Democratic Republic of Congo and Angola)

▶ East Africa

A List:
1. Astove-Cosmoledo, extension of Aldabra World Heritage Site (Seychelles)
2. Bazaruto Archipelago (Mozambique)
3. Rufiji River Delta- Mafia-Songo Songo, (Tanzania), opportunity for serial nomination with Kilwa Kisiwani cultural World Heritage site
4. Maputo Bay – Ponto do Ouro, (Mozambique), opportunity for transboundary site with Greater St.

Lucia World Heritage Site
5. Mnazi Bay-Ruvuma-Quirimbas, (Tanzania, Mozambique), opportunity for transboundary and mixed site
6. Europa and Scattered islands (with Bassas de India, Juan de Nova, Glorieuses) (France), opportunity for serial nomination
7.Nosy Tanikely, Nosy Be (Madagascar)

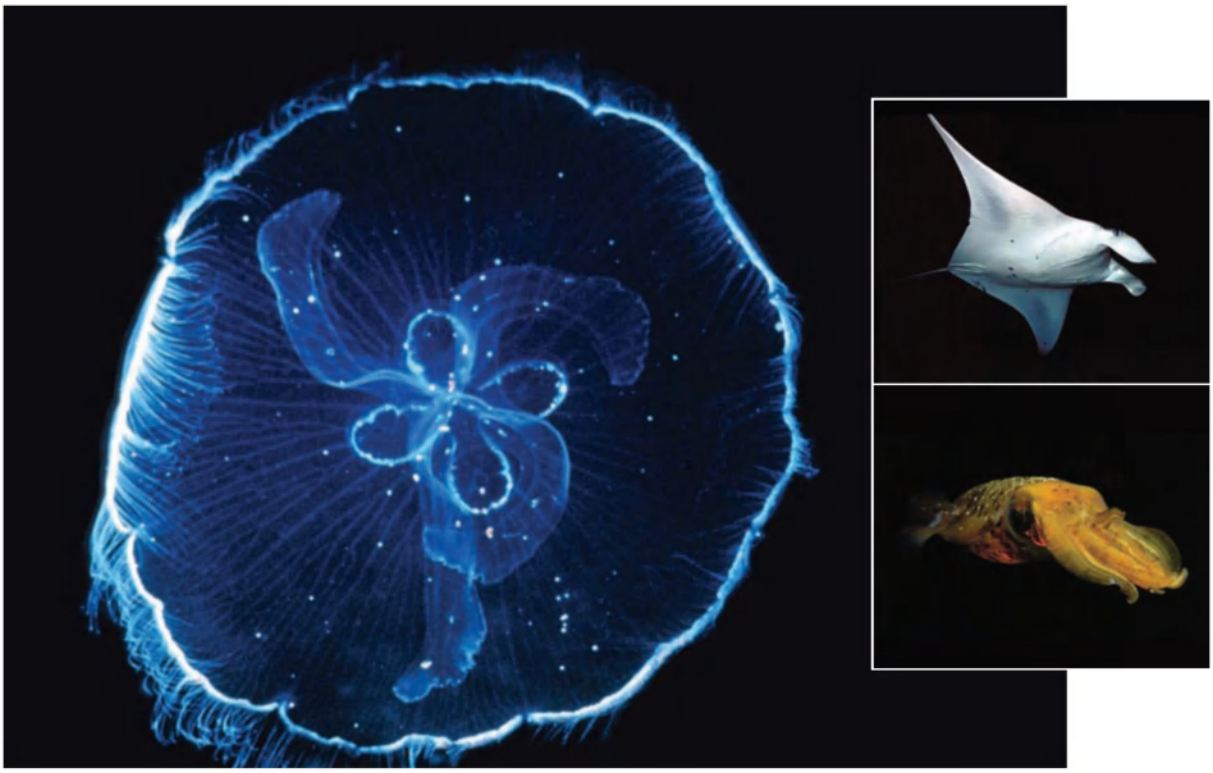
B List:
8. Kiunga-Lamu Archipelago (Kenya), opportunity for mixed nomination
9. Pemba Island (Tanzania)
10. Cargados Carajos (Mauritius)
11. Comore Archipelago (Comoros), opportunity for serial nomination with Madagascar
12. Toliara – Nosy Ve (Madagascar), opportunity for serial nomination
13. Zambezi Delta (Mozambique)

C List:
14. Nacala- Mossuril (Mozambique)
15. Primeiras-Segundos Islands (Mozambique)
16. Saya de Malha Banks (Mauritius)
17. Maldive Islands
18. Chagos Archipelago (United Kingdom)
19. Lakshadweep Islands (India)
20. Palk Strait/Gulf of Mannar (India)
21. Sundarbans (Bangladesh)
22. Cocos-Keeling/Christmas Island serial site (Australia)
23. Ningaloo reef (Australia)

► Middle East

A List:
1. Northeast Red Sea (Saudi Arabia, Egypt, Israel)
2. Socotra Archipelago (Yemen)
3. Southeast Oman
4. Southern Red Sea Complex (Saudi Arabia, Yemen, Djibouti, Eritrea)
5. Southern Gulf (United Arab Emirates)
6. Hawar Islands (Bahrain)
7. Jubail Wildlife Sanctuary (Saudi Arabia), opportunity for transboundary serial nomination with Hawar Islands

B List:
8. Gabal Elba Conservation Area (Egypt)
9. Sangeneb Atoll (Sudan)
10. Belhaf Bir Ali (Yemen)
11. Heraa Protected Area (Iran)



Background

While the oceans comprise 70% of the earth`s surface, less than 1% of the marine environment is within protected areas, compared with nearly 9% of the land surface. Additionally, over half of the global population resides within 60 km of the shoreline, placing increasing stresses on coastal and marine resources and the areas upon which they depend. (WCPA – Marine Strategy). In terms of the number of phyla, the marine realm is much richer than the terrestrial. Marine ecosystems contain representatives of some 43 phyla while terrestrial environments contain only 28 phyla. (World Resources Institute). Yet, the biodiversity of the marine realm is still being discovered and described; there are estimates of millions of species that have not been catalogued, and new species are discovered every year. As the distribution of biodiversity and supporting ecosystems becomes better understood, those setting priorities must also consider the utility for conservation through an examination of the economic, scientific, and cultural values. To ensure that coastal, marine and small island biodiversity sites are better represented on the World Heritage list, we are challenged to consider these factors as well.

It is widely recognized that coastal, marine and small island biodiversity sites are underrepresented on the World Heritage list. Of the 730 (as of February 2003) cultural and natural sites included in UNESCO`s World Heritage List (563 cultural, 144 natural and 23 mixed properties in 125 States Parties), less than hundred sites are recognized for their biodiversity value, and an even

smaller subset, less than 10 sites, are recognized entirely for their marine biodiversity value. There are about 30 tropical World Heritage Sites with marine components; however, the majority of sites are managed for their terrestrial biodiversity, rather than their marine biodiversity. The distribution of the tropical marine, coastal and small island ecosystems sites currently on the World Heritage list is provided in Map 1.

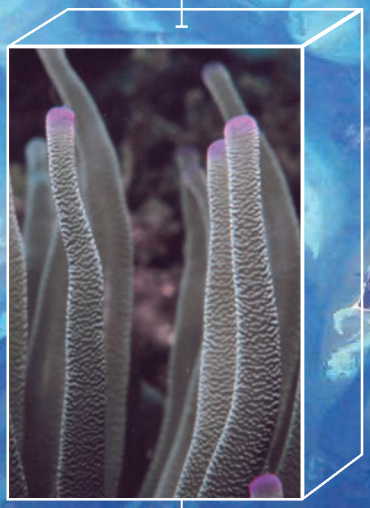
To address this issue, the UNESCO World Heritage Centre, in collaboration with the IUCN and the U.S. National Oceanic and Atmospheric Administration convened a workshop for internationally and regionally recognized experts to explore ways and means of improving the representation of tropical coastal, marine and small island ecosystems on the World Heritage List. The workshop was held in Hanoi, Vietnam, February 25 – March 1, 2002, with generous support from the United Nations Foundation (UNF). UNF has been working with UNESCO World Heritage Centre since 1999 after the formal adoption of the Biodiversity Programme Framework, which established World Heritage biodiversity sites as one of the priorities for UNF grant support. The workshop was organised as a part of UNESCO/IUCN/UNFIP project "Filling critical gaps and promoting multi-sites approaches to new nominations of tropical coastal, marine and small island ecosystems".

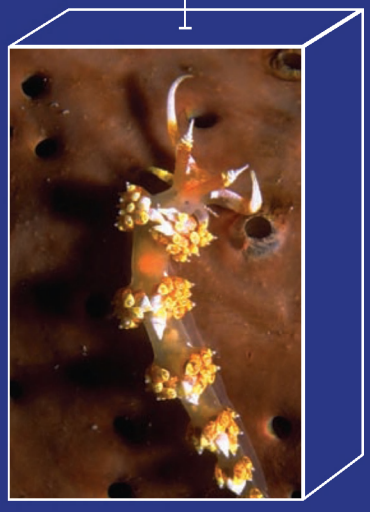
The workshop aimed to remedy the gaps in World Heritage tropical coastal, marine and small island ecosystem coverage by developing a scientifically based consensus list of potential areas in such ecosystems (as summarized in Regional Priority Areas List above). This is the first step in the process of expanding coverage of such areas to maximize conservation of globally significant marine biodiversity. This report provides the findings of the workshop and describes the potential World Heritage areas discussed by the experts. The findings represent the workshop participants' consensus on areas of regional and global significance for their biodiversity values.

The process to identify the priority sites was based on the use of an array of overlaid datasets and explicit criteria adapted for World Heritage sites building on criteria used by other international conventions and organisations. The internationally and regionally recognized experts used these criteria and datasets to prioritise and complement their own knowledge of those regions. The identification process is described in detail in Annex 2.

Through out the development of the workshop and in the preparation of this report, several shared challenges and recommendations have emerged that are key to advancing the findings of the workshop summarized in this report. These are presented at the end concluding section of this report, but evolve from the regional discussions. It is also worth noting, that while the mandate of this workshop was for tropical areas, many aspects of marine conservation and management are relevant to temperate areas. Therefore, the workshop participants encourage State Parties from all nations to reflect on the findings in this report and put actions in place to highlight and protect significant examples of marine heritage across the globe.

Discussion of areas by regions





The regional overviews presented here are drawn from information gathered at the Hanoi workshop and from a set of reports written by experts prior to the workshop addressing the outstanding marine biodiversity values of each tropical region. The purpose of this section is to provide the context for the priority lists of areas selected at the workshop and presented here. The biodiversity values of the region, the threats to those values and specific regional considerations are discussed.

A discussion of the multi-site recommendations from each regional group will follow each overview. One of the workshop goals was to investigate potential areas for nomination as serial and transboundary World Heritage sites. Recommendations for these areas were made within the overall priority lists developed by the regional working groups.

The potential multi-site nominations evolved from the regional discussions on priority areas. Within each region, those areas that contained interconnected or complementary marine biodiversity values were highlighted and recommended for linking through serial recommendations. Illustrations of connectivity in marine systems discussed were diverse in scale and scope, but fundamental for taking a holistic approach to marine conservation. Some recommendations focused on many large scale oceanographic or geomorphologic features that can cover large areas in marine systems that create specialised niches for marine flora and fauna, e.g. continental shelves, underwater trenches, offshore banks, thermoclines, currents and eddies.

It was also recognized that in many situations, marine organisms are migratory for some period of their life cycle. For example, corals may spawn in one place and the are taken by currents to settle on substrate in another place; many fishes have localised spawning or nursery areas, but migrate elsewhere as adults; and marine megafauna such as whales and turtles, as well as birds are renown for traversing the globe in search of breeding and nesting areas. The workshop acknowledged the increasingly informing role of marine science in guiding conservation actions regarding appropriate scope, scale, size and location of marine areas in light of the enhanced observing, tracing, genetic and modelling tools available today.

With the above perspectives in mind, the workshop proposed that multiple sites within broad regional groupings could either be nominated as serial and/or trans-boundary sites and are defined as follows:

1) A serial (or cluster) of sites linked spatially or temporally through a thematic connection;

2) Trans-boundary sites extended across international borders or contained within different countries and nominated as a serial site.

The regional groups used these definitions, the workshop biodiversity criteria and the World Heritage criteria for natural properties to develop multi-site recommendations for potential World Heritage nomination.

While the Hanoi Statement is a consensus statement from the workshop, the regional discussions also yielded important recommendations and raised regionally significant issues. These recommendations for IUCN, the World Heritage Committee and UNESCO are listed under each region.

Southeast Asia

The area under consideration includes the marine and coastal areas of the Philippines, Indonesia, Brunei Darussalam, Malaysia, Singapore, Myanmar, Thailand, Cambodia and Vietnam (Association of Southeast Asian Nations - ASEAN) extending from 93°E and 141°E to 21°N and 12°S. Combined, these countries have a coastline of 92,451 km, 15.8% of the world's total. Numerous volcanic and coral islands separate the region into seas of different sizes, with varying degrees of embayment. The group also considered areas in China, Japan and Korea that contain tropical and subtropical marine systems.

Southeast East Asia is recognized as having the world's richest marine biodiversity (at genetic, species and ecosystem levels), (IUCN/UNEP 1985, Kelleher et al. 1995). It is the center of the world's hard coral diversity (Veron 1995), particularly around eastern Indonesia, the Philippines and South China Sea's Spratly Islands where over 70 hard coral genera have been documented. Throughout the rest of the region, over 50 hard coral genera can be found. The reefs support a high diversity of associated plant and animal species, contributing to the region's status as the global center of marine invertebrate species such as

mollusks and crustaceans. (Briggs 1974) The region also contains a high diversity of sea grass and associated flora and fauna, with 16 species of sea grass documented (second only to Australia), in the coastal regions of the Philippines. (Fortes 1995) The region contains high diversity of nearshore fish, with over 2000 species documented (Briggs 1974), sea snakes, and marine mammals, and serves as critical habitat for four species of sea turtle. Despite high connectivity of marine habitats in the regions, there are many endemic species.

The main threats to marine biodiversity in this region are coastal development and resource exploitation, specifically poaching of reef fish species, marine turtles their eggs and destructive fishing practices. Threats from shipping and potential oil exploration also exist.

The Southeast Asian regional group developed it recommendations based on the biogeographic information available at the workshop, as well as on expert knowledge. There are two areas that stand out within the top priority list due to high levels of available information on biodiversity values and the potential threats associated with lack of management. These two areas are Raja Ampat and the Spratly Islands. The group also recognized several areas that were data deficient that could not be properly assessed for their biodiversity value. These areas are listed in the "C" category.

Southeast Asia multi-site discussion

The Southeast Asian regional group recommended the Spratly Island Group, an area under jurisdictional dispute by six South China Sea States (Brunei Darussalam, China, Malaysia, Philippines, Taiwan, and Vietnam), as a potential trans-boundary cluster for World Heritage Listing. It can be linked with the existing World Heritage area at Tubbataha in the Philippines. The Spratly Islands contains at least 30 small islands and 600 platform and atoll reefs. This area's outstanding universal value is due to its relatively pristine state, location within the highest marine biodiversity region of East Asia (with approximately 70 genera of hard corals), importance as a potential larval source reef for fish and invertebrates, importance as a sea turtle nesting area and because of the high seabird populations present. This area is highly productive and an important area of connectivity for marine species within the region. The major threat to the area's marine biodiversity is potential oil and gas exploration activities. Multinational management of the Spratly Islands has been proposed, but it is not yet endorsed by all of the nations that claim the area. This lack of management and territorial dispute are barriers to the area's nomination to the World Heritage List. However, it is important to note that many international agencies have expressed concern over the potential degradation of the Spratly Islands should its status remain unchanged; World Heritage listing could be a catalyst for creating a management regime.

Another multi-site recommendation is the potential cluster that would include an expansion of the existing Tubbataha World Heritage site with Cagayan Ridge in the Philippines. This extension would increase the biodiversity value of the existing World Heritage area by including unique physical reef features, including atolls that serve as sources and sinks for coral, seagrass, fish and invertebrate larvae, and by linking important migration routes for seabirds, turtles and fish through the region. In addition, the extension as a whole would be a microcosm of the region's marine biogeography in terms of reef types. The area is threatened by poaching activities (turtles, giant clams, groupers and Napoleon wrasse) and potential damage from shipping. Nomination of this extension is highly feasible, mainly due to the strong support by international and national NGOs, universities and UNESCO for its long-term conservation.

A third multi-site recommended is the trans-boundary cluster of North Borneo/ Balabac Strait/ Turtle Islands (Philippines, Malaysia). This

cluster of Malaysian and Philippine Islands with coral reef, mangrove and sand beaches contains important nesting areas for green and hawksbill sea turtles. The Turtle Islands are an existing ASEAN Heritage area with trans-boundary management in place for its sea turtle populations. There is high interest in the conservation of this area, evidenced by its inclusion as a potential management area in the ICRAN framework. Given the level of national and international support for the conservation of this cluster, feasibility for its nomination is strong.

The final multi-site recommended by the Southeast Asian group is the Banda/Lucipara Cluster (Indonesia), which can be combined with the cultural World Heritage site at Banda for a mixed nomination. This area has high levels of marine biodiversity with largely undisturbed reefs, healthy seagrass beds, hawksbill sea turtle habitat and is part of an important bird migration route. The area also has high geological significance; its location is the collision area of two tectonic oceanic plates, giving rise to unique reef structures such as colonization on recent lava flows. Overall, there are low threats to this potential cluster, but there have been reports of blast fishing in the area. The feasibility of nominating Banda/Lucipara as a mixed natural/cultural cluster is high due to support for its long-term conservation from local authorities, a local Banda NGO, TNC, the Dutch government and UNESCO. However, there is currently no management plan in place, which could hinder nomination.

Recommendations by the Southeast Asia group:

1) Expand existing marine World Heritage sites at Tubbataha and Ha Long Bay to include additional areas of World Heritage value.

2) Recognize opportunities for complementary nominations in the region based on other World Heritage categories e.g. World Heritage Karst and World Heritage Culture sites.

3) Recognize that all the sites identified by the Southeast Asia group have outstanding marine biodiversity value. Sites with high levels of information were evaluated as possessing outstanding universal value and we recommend that similar levels of information be obtained for all sites in order to allow similar evaluations.

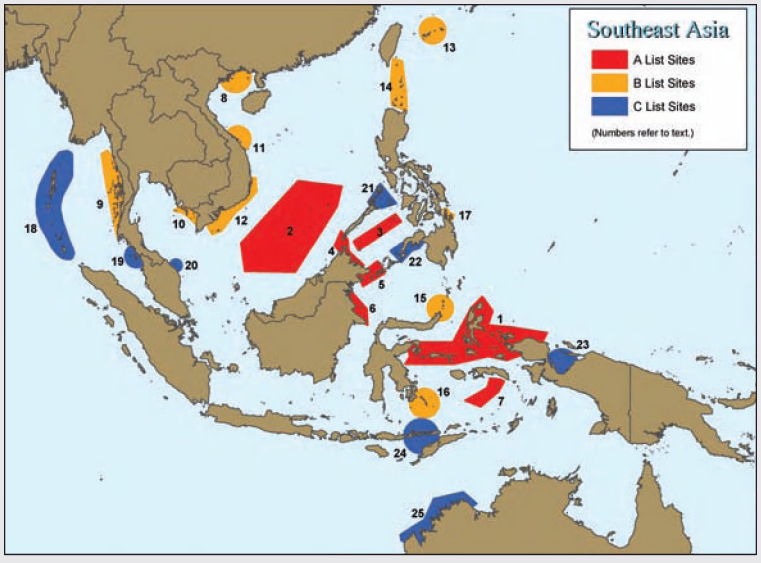
4) Develop a management framework for Raja Ampat to facilitate the possible nomination of this outstanding site.

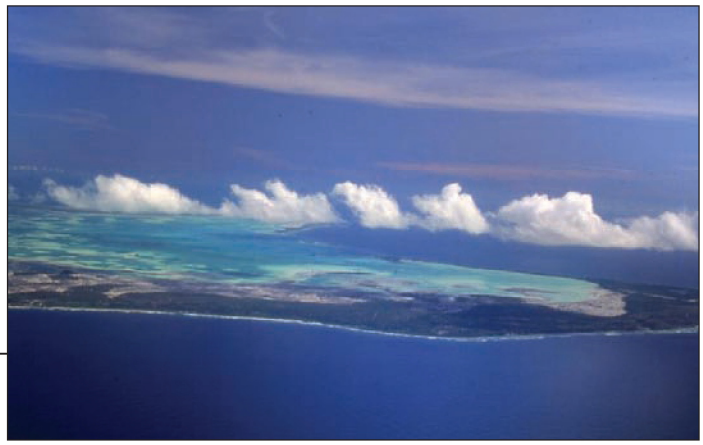
5) Communicate our findings on the Outstanding Universal Value of the marine biodiversity values of the Spratlys Islands to relevant regional bodies.

6) Take steps to allow state parties to proceed with nominations for all identified Southeast Asian sites, should they wish to. For example development of management plans and, transborder agreements.

General Recommendation:

1) Having noted major shipping lanes near many sites of World Heritage value, we recommend that extra care be taken over shipping and siting of shipping lanes in this instance.





Pacific

The area under consideration in the tropical Pacific covers approximately 29 million km≈, 1/3 of the earth`s surface, the largest expanse considered by any of the regional groups. It extends from Palau and Papua New Guinea in the west and to Easter and Sala y Gomez Islands of Chile in the east (however, the expert group focused on the western Pacific and did not consider Easter Island or any areas further east). The northern boundary includes the Hawaiian Islands and Wake and Johnston atolls of the United States and the Northern Mariana Islands. The southern boundary lies north of the subtropical islands of Australia (Lord Howe and Norfolk Islands) and New Zealand (Kermedec Island), which fall within the Australia/New Zealand Marine region. The area under consideration consists of 22 islands countries and territories (not including Hawaii and the islands of Chile) covering only 550,000 km≈ of land with about 5.2 million inhabitants. In contrast to the small land areas, most of these island states encompass enormous sea areas within their Exclusive Economic Zones (EEZs), resulting in very small land to sea ratios. Currently there are only seven countries that are party to the convention in this large region, Fiji, Samoa, Kiribati, the Marshall Islands, the Solomon Islands and Papua New Guinea, Vanuatu, Nine and Federated States of Micronesia and Palau. Efforts are underway to increase this number.

Almost all of the Pacific Islands have an entirely coastal character; all parts of the inland influence, or are influenced by processes and activities occurring on coastal lands and in coastal

waters. It is believed that the Pacific islands region has more rare, endangered and threatened species per capita than anywhere else on earth. The region's marine environment comprises an enormous and largely unexplored resource, including the most extensive and diverse reefs in the world, the largest tuna fishery, the deepest oceanic trenches and the healthiest remaining populations of many globally threatened species including whales, sea turtles and salt water crocodiles. Its high islands support large blocks of intact rainforests, including many unique species and communities of plants and animals found nowhere else in the world. For some islands, more than 80% of the species are endemic, unfortunately, about 50% of these species are reported to be at risk. (SPREP 1999)

The main threats to biodiversity in the region are common to island ecosystems noted for their fragility and susceptibility to degradation. These threats include invasive species, habitat loss or modification from development activities, marine and terrestrial resource exploitation, and climate change.

Settled initially some 20,000 years ago, most of the habitable islands of the Pacific were occupied variously by Melanesian, Micronesian and Polynesian people. The cultural significance of marine resources and their management in the Pacific region is high. The group recognized this in their assessment of marine biodiversity value and included cultural heritage features as complementary to biodiversity value throughout their process.

Because the Pacific is an expansive region, it was difficult for the group to narrow down the list of priority areas. Further, because there are large regions of the tropical Pacific for which little or no information on marine biodiversity is available, it was difficult for the group to come up with a definitive list of areas for potential listing. With additional information on both biodiversity and associated cultural importance, it is possible that the list would change. The regional expert group recognized several areas that possess Outstanding Universal Value and should be protected now, but they lack the necessary supporting scientific information for nomination at this point.

The Pacific regional group recognized areas of Outstanding Universal Value, for which there is strong supporting scientific information on biodiversity characteristics and which are feasible for nomination to the World Heritage List, as highest priority. The two highest ranked areas in the region are respectively Milne Bay, Papua New Guinea and Palau. Lying at the apex of two marine biogeographic provinces, Milne Bay has high marine, coastal and island biodiversity, with thriving coral reef, mangrove and seagrass ecosystems as well as intact island forest communities. The area is virtually pristine, with few current threats. In addition, there is strong traditional management in place. Palau, known for its famed rock islands, contains a wealth of other marine biodiversity attributes, including many endemic species in its marine lakes, high hard and soft coral, seagrass and mangrove diversity. The area is under increasing threats from tourism and development, and traditional management of the marine environment is being eroded. However, Palau's decision to become a signatory party to the World Heritage Convention in 2002 is a promising avenue to reduce these threats to its biodiversity.

A nomination of New Caledonia (France) is being prepared to submission to the World Heritage Committee. It contains one of the few double barrier reefs in the world, and the second largest barrier reef (second in size to the Great Barrier Reef), with high documented biodiversity of fish, mollusk and coral species. However, this area is highly threatened from mining activities on the islands

Pacific multi-site discussion

Due in part to the expansiveness of the Pacific region and to the arrangements of land-masses and associated coastal marine areas in island clusters, all of the areas recommended as top priority can be considered as multi-sites. With this in mind, this discussion will focus on the three areas that the group chose to label as potential multi-site nominations, New Hanover and Manus Cluster (Papua New Guinea), the Line Islands Cluster (Kiribati, Cook Islands, US) and the Pohnpei-Kosrae Cluster (Federated States of Micronesia). It should be noted that these areas were not the very top priority areas that emerged from the group discussion, but they are on the "A" list.

The New Hanover and Manus Cluster in Papua New Guinea is a remote area in a state of high naturalness. It contains forest, coral reef, mangrove and highly productive and diverse seagrass systems. It is connected to the center of biodiversity of the Southeast Asia region, into which it feeds larvae. Intertwined with these biodiversity attributes, there is a complex system of traditional ownership that adds to its value as a potential mixed natural/cultural World Heritage area. There are a number of threats, such as dynamite and potential cyanide fishing, potential logging on the islands and phosphate mining. However, these threats can be minimized or eliminated by conservation actions. This area may be more feasible to nominate as a World Heritage area than others in the region because Papua New Guinea is one of the few Pacific nations that is party to the Convention.

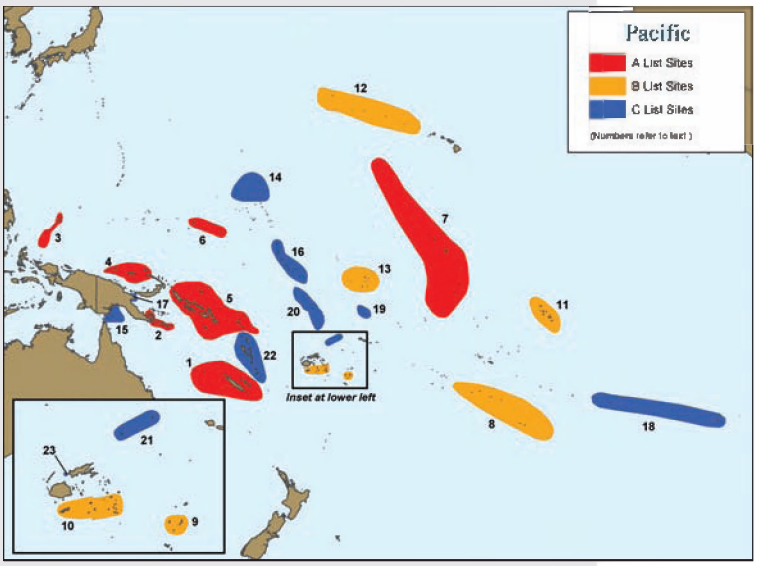
The Line Islands Serial is a trans-boundary cluster within Kiribati, Cook Islands, the US and French Polynesia. These pristine islands are largely uninhabited and contain healthy reefs. The area is located in the center of a major upwelling, and is one of the world's largest fly-ways, holding up to 6 million birds at peak migration periods. The serial includes Kirimati atoll, the largest atoll in the world, with hundreds of hypersaline ponds, which adds to its importance for large seabird populations. The serial includes Palmyra atoll, the second largest US atoll. This atoll is pristine and contains the largest population of red footed boobies and black noddys in the world. The area also includes a green turtle breeding ground. Due to the isolation of this serial, there are few existing threats except those posed by introduced predators on the islands. However, there is a proposed Japanese space facility and poaching may occur. The main barriers to the potential nomination of this cluster as a World Heritage site are the non-signatory status of the Cook Islands to the Convention.

The Pohnpei-Kosrae Cluster in the Federated States of Micronesia contains highly productive seagrass, mangrove and coral reefs. The outer islands are in pristine condition. This area is an ideal candidate for a mixed cultural/natural nomination, as it meets the cultural World Heritage criteria. There are important megalithic ruins on both islands, which are from a little known, highly industrious culture that moved massive basalt columns to create elaborate complexes of temples, housing and burial sites in marine and coastal areas. There are a number of threats to the area from increasing development pressure on Pohnpei and its reefs as well as offshore areas that are heavily harvested. The live fish trade is also increasing in the region. The Federated States of Micronesia has recently ratified the World Heritage Convention, which increases the feasibility of nomination to the World Heritage list. This feasibility is enhanced by NGO support for conservation efforts.

Recommendations by the Pacific group:

The group requests recognition of the immense importance of the Pacific for the protection of the World's biodiversity, yet the current level of marine protection (with Biosphere Reserves serving as other Protected Areas) is very low. Therefore, the group requests that the World Heritage Committee give high priority to increased assistance (funding, aid, capacity building) to ensure better marine protection.

1) Increased attention given to identifying suitable high seas areas for protection under the World Heritage Convention and to developing the legal/political basis for establishing them, recognizing the great importance of biodiversity in the high seas of the Pacific in sea mounts, hydrothermal vents and other deepwater areas.



2) Identify areas requiring more scientific surveys to provide baseline or more recent information to identify additional areas of Outstanding Universal Value and to ensure better representation of the Pacific Region based on scientific knowledge and future World Heritage nomination.

3) Include cultural experts to identify areas of Outstanding Universal Value at the proposed regional meeting. These areas and the surrounding land and marine environments should be considered for opportunities under the World Heritage "mixed" or "cultural" landscape categories.

4) Support management capacity building for marine, coastal and small island areas throughout the Pacific. This process should occur in parallel with the creation of a World Heritage area. Also, best practices and management information should be freely communicated to the areas.

5) Recognize that while there are areas of Outstanding Universal Value for which the scientific knowledge may be limited, such areas need to be protected as soon as possible. (e.g. World Heritage, Biosphere Reserve or other).

6) Initiate a regular monitoring system for the Pacific Region with adequate intensity to demonstrate the health of major ecosystems and indicator species (e.g. coral reefs, mangroves, seagrasses, cetaceans, dugongs, turtles and seabirds).




Latin America and the Caribbean

The area under consideration consists of both the Atlantic and Pacific tropical and subtropical coasts of Latin America, including the Caribbean Sea, Sea of Cortez and Gulf of Mexico. It extends on the Atlantic side from Palm Beach, Florida (USA) south to Cabo Frio, Brazil and extends on the Pacific side from the Sea of Cortez, Mexico to Cabo Corrientes, Mexico south to Peninsula Illescas, Peru. The area also includes the oceanic islands of Clipperton and Revillagigedo (Mexico), Cocos (Costa Rica) and the Galapagos (Ecuador). The group decided to include the Sea of Cortez, considered a warm-temperate biogeographic province (Sullivan Sealey and Bustamante 1999), because it contains subtropical fauna of high biodiversity value and represents an important transition zone between the warm temperate Northeast Pacific and the East Tropical Pacific. It contains approximately 12,120,328 km≈ of Exclusive Economic Zone from 44 counties and territories, 27 of which are islands nations or territories, 23 of these are members of the World Heritage Convention.

Overall the region includes numerous offshore and nearshore islands, keys and banks, and extensive deep ocean basins. The main coastal ecosystems in this region include mangrove (dominated by continental and island forest), coral reef, sea grass, mixed (large shallow banks

and islands, coral, sea grass and mangroves), beach, upwelling and rocky platform systems.

The threats to marine biodiversity in this large region vary but include marine resource exploitation and coastal development. Overfishing, sewage and agricultural runoff, deforestation, loss of wetlands, irresponsible boating /diving and destructive fishing are the main causes of biodiversity loss and habitat degradation.

The LAC working group based their assessment of biodiversity value in part on the biogeographic classification work done by TNC (Sullivan Sealey and Bustamante 1999), as well as the other meta-databases provided at the workshop. The experts added their knowledge, notably on megafaunal distribution and migration, to the information provided. They concluded that the areas to focus on for further consideration should be those that coincided with the highest biodiversity value on the three major meta-databases (TNC, CI hotspots and WWF 200): the Mesoamerican Reef, the Sea of Cortez and the Gulf of Darien. The regional group recognized the importance of considering the Sea of Cortez as a whole, but realized the political difficulty of nominating the entirety as a World Heritage area. Secondarily, the group considered areas that coincided as highest biodiversity value on two of the three metadatabases: Panama Bight, Galapagos Islands, Greater Antilles, Northeastern Brazil, "Humboldt Zone" and Caribbean Colombia/Venezuela. The resultant priority areas (both multi-site and single area recommendations) are included in the overall table of areas in Annex 1.

There was consensus among the working group members that the World Heritage Site process may not be the best platform for protecting sea turtle critical habitat (nesting, foraging, migration) in the region because critical zones are vast and involve large numbers of range states. The exceptions - where critical sea turtle habitat coincides with other World Heritage values - are areas that have already been identified during the workshop as priority areas, such as the Mexico/ Belize reefs, South Cuba Reefs, and the Sea of Cortez.

Latin America and Caribbean multi-site discussion

The group recommended four potential multi-site nominations, two trans-boundary and two cluster nominations. The two trans-boundary recommendations are the Cocos Islands / Galapagos Islands/Malpelo Island oceanic corridor and the Southern Caribbean Island Group. The two cluster recommendations are Sian Ka`an/Banco Chinchorro (an expansion of the existing Sian Kan`an World Heritage area), and the South Cuba Reefs.

First, and potentially the strongest potential nomination, is the Cocos Island/Galapagos Islands/Malpelo Island trans-boundary area. The strength of this potential nomination lies in its current management framework and the constituent governments` (Ecuador, Costa Rica and Columbia) interest in protecting this large area. There is an existing Presidential level agreement between the three countries for its joint stewardship. This agreement presents a unique and favorable window of political opportunity for a World Heritage. The importance of this area`s biodiversity is based on high endemism, population scale ecological attributes, and the importance of the area for large pelagics (namely sharks), whales and sea birds.

The second trans-boundary area, the "Southern Caribbean Island Group" unites the Netherlands Antilles with Venezuela, potentially building on bilateral agreements these two governments have in other marine-related areas. It includes the islands of Bonaire and Curacao (the Netherlands Antilles), and the Los Roques archipelago and Las Aves (Venezuela). The LAC regional group views this continental shelf cluster as highly important in terms of its biodiversity value, as well as a potential tool to increase Venezuela`s involvement in the World Heritage program. The area`s biodiversity importance lies in its high coral diversity relative to other areas in the region, population scale ecological attributes, and the particular qualities of Los Roques. Los Roques harbors the most important and well-conserved coral reef/sea grass/mangrove complex of the South American Caribbean coast, and its significant populations of threatened commercial fish species, like groupers and queen conch, which make it a likely larval source area for the region.

The cluster recommendation, Sian Ka`an/ Banco Chinchorro is an extension of the existing, highly successful World Heritage area at Sian Ka`an (which is also a Man in the Biosphere Reserve). The extension of this existing area would increase the coverage of biodiversity and representative watershed to reef corridors. Banco Chinchorro is a well managed and protected multiple use area that includes the largest Caribbean atoll. By incorporating it in the recommendation, connectivity and a larval pump to the Gulf of Mexico and South Eastern United States, (important nursery areas), would be preserved.

The other cluster recommendation, the South Cuba Reefs, includes the areas of Archipélago Los Canarreos through Guanahacabibes. This coastal and marine habitat corridor is one of the least impacted in the Caribbean region, and contains extensive reef, sea grass and mangrove habitats, as well as large oolite bank formations. The high biodiversity of coral and reef-associated species in the cluster is well-represented, as are the presence of several reef fish spawning aggregations. In addition, several endangered species are present, including sea turtles (green and hawksbill), crocodiles, Antillean manatee and sea bird species.

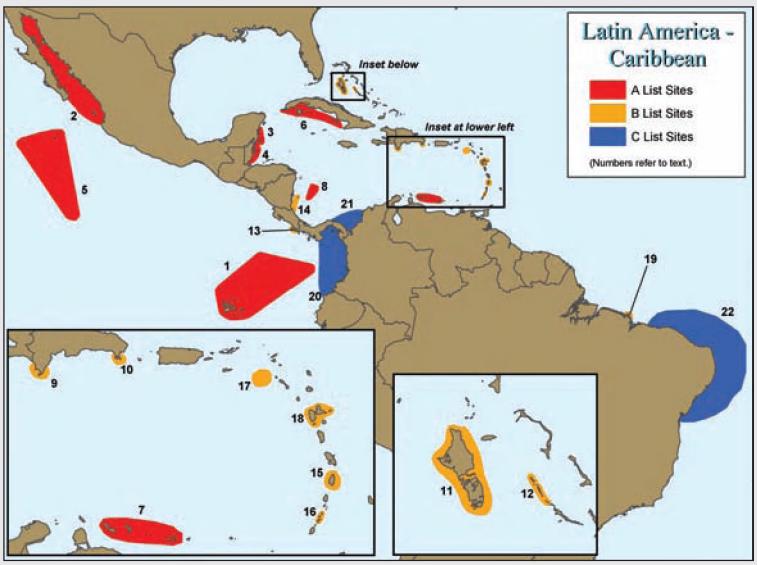
Recommendations by the Latin America and Caribbean group:

The Latin American and Caribbean working group developed a resolution to put forth to the World Heritage Committee and UNESCO related to Small Island Developing States (SIDS)

"We would like to call attention to the special case of Small Island Developing States (SIDS), such as in the Lesser Antilles, and note that with reference to biodiversity the small jurisdictional size of individual SIDS (and in particular their marine components) may limit their competitiveness for World Heritage Site selection. While these sites may meet individual criteria, it is clear that their relative competitiveness remains low in comparison with larger marine ecoregions. n addition, there is often insufficient information for the clustering of multi-island sites, reducing their competitiveness in clustering and transboundary proposals.

Therefore, we propose that IUCN and the World Heritage Committee examine the special case of these islands; specifically, their outstanding value as integrated coastal, cultural, and aesthetic landscapes. We ask that IUCN and the World Heritage Committee consider steps to ensure that SIDS are sufficiently represented for their unique contributions to the World Heritage portfolio of sites."

The group also emphasized the need to use the ecosystem approach to marine conservation, which often requires co-operation amongst neighbouring countries. The group noted the few encouraging initiatives in the Latin American region such as the Meso-American Reef Initiative, the Belize-Guatemala-Honduras tri-national agreement as well as the marine peace parks, the sister-parks movement, and others that can be applied to other regions to promote this approach.



West Africa

The area under consideration includes the coastline of West Africa from Senegal to the Congo, between 16°N and 5°S; approximately 7000 km. Throughout most of the region, the continental shelf is narrow; ranging between 15 and 105 km. (GEF/UNEP 2001). Twelve of the sixteen nations in this region are signatory parties to the World Heritage Convention.

The west coast of Africa is strongly influenced by river basin drainage, oceanic currents, upwelling, and climate (wet and dry seasons) and contains a wide variety of wetlands, including tidal swamps and seasonal marshlands associated with river deltas and estuaries as well as extensive coastal lagoons. The lagoon system extends over 800 km between Cote d'Ivoire and eastern Nigeria, covering over 400,000 hectares of open water. Mangrove ecosystems exist throughout the West African coast, with extensive forests occurring along the coasts of Guinea and Guinea Bissau, the Gambia, Senegal, Sierra Leone, the Niger Delta and Cross River Estuary. These wetland systems comprise part of the West African Flyway, a major migratory bird route that provides year round habitat for many bird species. The region is rich in living marine resources that support fishing industries for pelagic and demersal fish species and provides livelihoods and foreign exchange for many coastal communities. Four species of marine turtles, Atlantic green, hawksbill, leatherback and olive ridley, are found in the Gulf of Guinea. There are several marine mammal species that inhabit the waters of the Gulf of Guinea including the Atlantic humpbacked dolphin (listed as highly endangered under CITES) and the African manatee (listed as vulnerable under CITES).

The most significant threats to biodiversity in the coastal zone of the region are habitat degradation, pollution of coastal waters, coastal erosion, overexploitation of resources and invasive aquatic plant species. Urbanization and development in the region increases pressures on marine resources - many of which are poorly managed open access resources. To a great extent, industrial and domestic sewage is discharged untreated into creeks, estuaries, lagoons and immediate inshore areas, representing major contamination sources to the marine environment. Construction and development activities such as dams, sand wining, construction of coastal structures and upstream forestry practices, have also hastened coastal erosion processes. Notably, in areas of Gabon and Nigeria and Cameroon where there are increasing numbers of oil wells and refineries and associated port development, interference with coastal sediment accretion processes has led to increased storm water damage, flooding and shore recession.

The West African regional group used the biogeographic information provided and expert knowledge to determine the recommendations for potential World Heritage listing. The lack of scientific studies of the coastal and marine regions of West Africa limited the information available for this exercise. However, the best available knowledge is represented in the recommendations of this regional group.

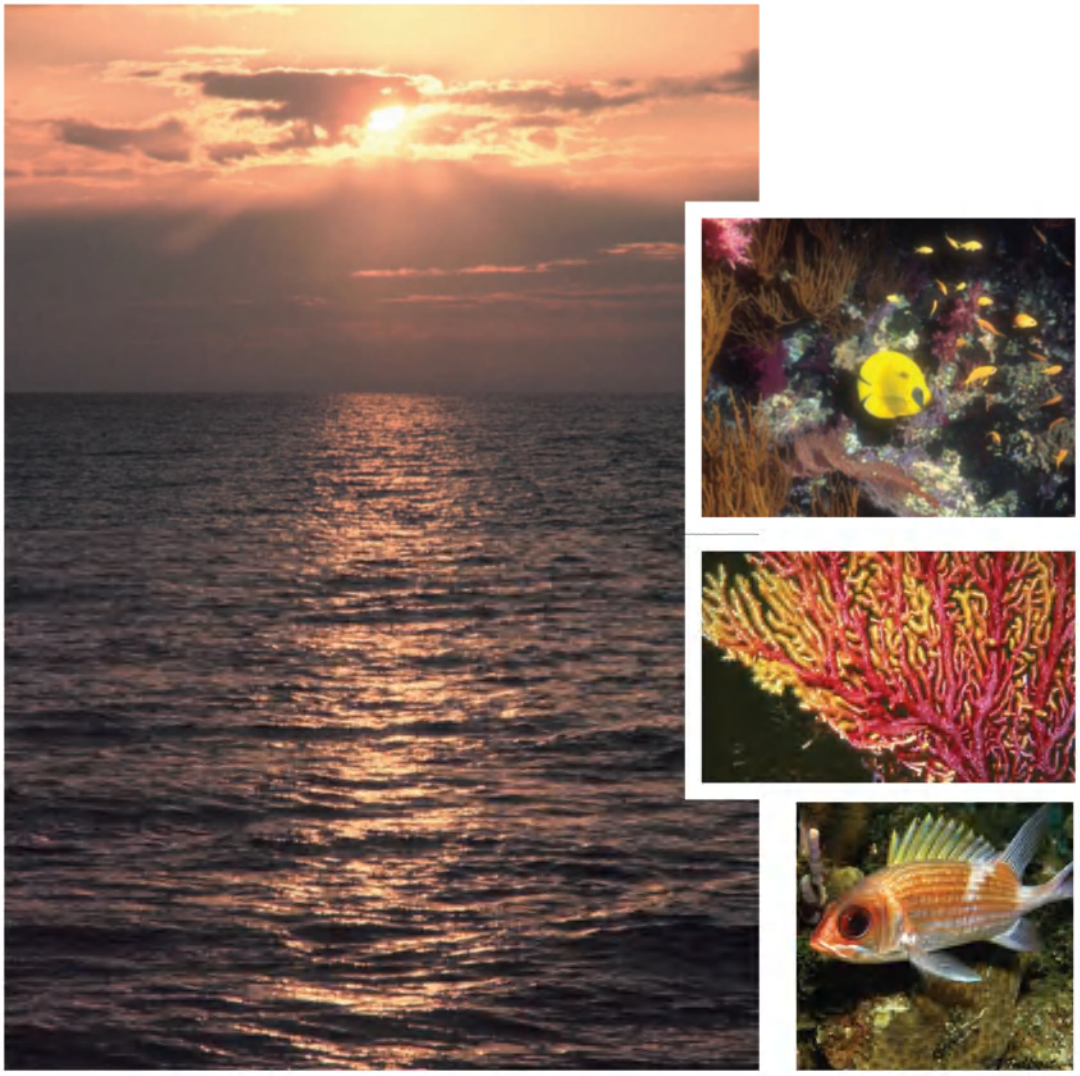
West African multi-site discussion

The West African regional group included two multi-site recommendations in its list of priority areas for potential World Heritage listing. These two are the islands of Sao Tome and Principe and Equatorial Guinea (including Annabon Island), and the cluster of the Dense, Muni, Sakumo, Songor and Keta Lagoons of Ghana.

The highest ranked multi-site recommendation from the group was the islands of Sao Tome and Principe and Equatorial Guinea including Annabon Island. This trans-boundary cluster of four islands is in an important upwelling area with high marine productivity. Relative to other areas in this region, there is a high level of endemism and species richness among coral and fish species. These areas are managed, but there is sparse information on management practices.

The largest impediment to the nomination of this cluster is that neither Sao Tome and Principe nor Equatorial Guinea is a signatory party to the World Heritage Convention.

The next highest ranked multi-site recommendation is the cluster of the Densu Delta, Muni, Sakumo, Songor and Keta Lagoons in Ghana. These five lagoons have a high level of species richness as a cluster. They are all highly important for large populations of migratory birds, with Keta Lagoon being the most important seabird site along the Ghana coast, with 72 species of birds present (Ntiamoa-Baidu and Gordon 1991), including 60% of the Ghana's wading bird population (Ntiamoa-Baidu and Hepburn 1988). These lagoons also harbor endangered species, including leatherback and green sea turtles. The Keta Lagoon is the only extensive mangrove system in Ghana. The major threats to these lagoons are waste disposal from industrial and agricultural activities, overexploitation of mangrove and fishery resources, and impacts from upstream dams (namely in the Keta and Songor Lagoons). These five lagoons are managed under the Ghana's Coastal Wetlands Management Project and are all maintained as Ramsar sites. There are no major constraints to the nomination of this lagoon cluster as a World Heritage area.

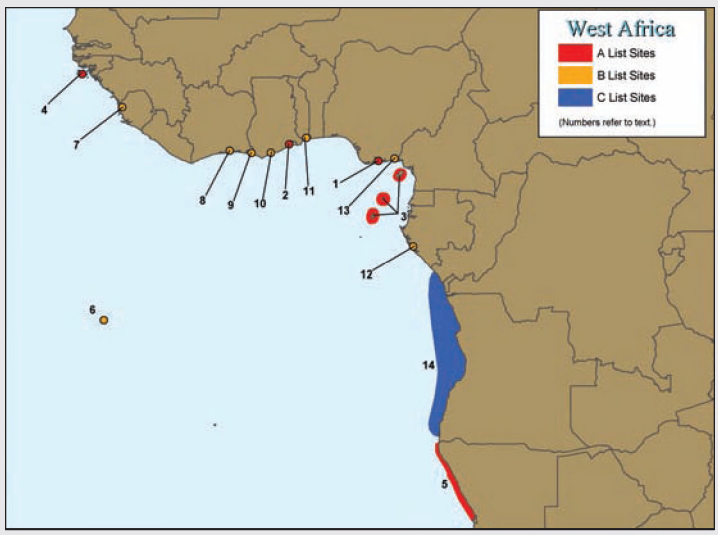


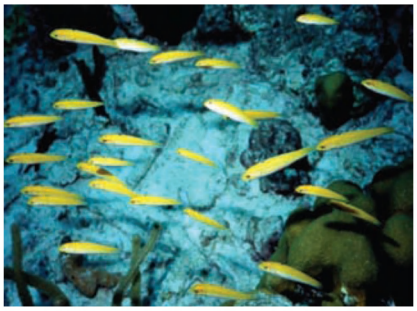
Recommendations by the West Africa group:

World Heritage sites must demonstrate ecosystem integrity and for West Africa this may be a significant challenge to listing sites under the Convention definitions. While much of the marine and coastal areas of West Africa are highly urbanized and resources fragmented, restoration of resources at a regional level may be a vital component for further consideration of sites for World Heritage. From a regional perspective there are coastal and marine areas that merit consideration and the World Heritage Convention offers an opportunity to make political links with State Parties to pursue discussions for transboundary and serial nominations, and to promote the utilization of Man and Biosphere approach as well as the Ramsar Convention for regional conservation of these resources.

The Global Program of Action for Protection of the Marine Environment from Land-based Activities (West and Central Africa) can serve as a focal point to strengthen the dialogue and promote discussions for a unified management and restoration of these resources, especially in promoting multi-site nominations.

Several sites that were reviewed by the regional experts lacked sufficient data for analysis. The participants recommend that additional studies are needed to update information on potential sites, particularly in Angola, Namibia and offshore areas.





East Africa

The areas under consideration in East Africa include the mainland countries of Somalia, Kenya, Tanzania, Mozambique and northern South Africa and the island states of Madagascar, Mauritius, Reunion, Comoros, Mayotte (governed by France) and the Seychelles. The continental shelves of the region are narrow (15-25 km), and drop off to depths greater than 4000m in the Indian Ocean – except for the banks and islets associated with the island states. Oceanic currents and how they are affected by the monsoon seasons have major influence on the biogeography of the region. It is a unique subdivision of the world's largest biogeographic province, the tropical Indo-Pacific, based on biogeographic patterns of corals and other species, which show a clear separation of the Indian Ocean beyond the Sri-Lanka-Chagos Line (Sheppard, 1987 and 2000). The region contains two marine World Heritage sites, Aldabra atoll, and Greater St Lucia Wetland Park in South Africa.

The main coastal habitats in this region are coral reefs and communities, mangroves and sea grass beds. Overall for the region, there is a minimum of 10,627 shallow water macrofaunal species, of which 10-20% are endemic (Richmond 1997 and 1999). Species diversity in the region tends to fall from east to west and with increasing latitude both north and south of the equatorial zone (Sheppard 2000). The marine habitats and associated species in the region have changed

drastically over the past few decades, most notably due to coral bleaching, including the 1998 event that caused 70-99% coral mortality and the decline of the dugong.

The main threats to marine biodiversity in the region are: overexploitation of living marine resources, destructive fishing methods and associated habitat degradation, land and marine based pollution, siltation, habitat conversion for agriculture, tourism and, to a lesser extent, mariculture and climate change.

The East African group used the biogeographic information provided in addition to expert knowledge to develop their potential lists of World Heritage nominations. There were several sites in the central and western Indian Ocean that were discussed, but not ranked or prioritized by the group due to lack of information and expertise available at the workshop. These areas included: the Maldive Islands, Chagos Archipelago, Lakshadweep Islands, Palk Strait/Gulf of Mannar, Bangladesh Sundarbans, Cocos-Keeling/Christmas Island serial site, and Ningaloo reef. These areas are currently being addressed through additional regional discussions between experts in the central and western Indian Ocean region. It was clear from the expertise present at the workshop, and is presented in the overall workshop recommendations, that these areas merit this additional consideration.

East African multi-site discussion

The East African regional group included five multi-site recommendations on their high priority list (A List) of potential World Heritage Areas, including clusters, trans-boundary clusters and a serial recommendation. These areas include the Astove-Cosmeldo-Aldabra cluster, Seychelles (extension of Aldabra World Heritage Area), the Rufiji River Delta – Mafia Island-Songo Songo cluster, United Republic of Tanzania (linked to existing cultural World Heritage area, the Ruins of Kilwas Kisiwani and Ruins of Songo Mnara), Maputo Bay-Ponto do Ouro, Mozambique trans-boundary cluster (with the existing World Heritage site, the Greater St. Lucia Wetland Park, South Africa), Mnazi Bay-Ruvuma-Quirimbas trans-boundary area, Tanzania and Mozambique, and the Europa and Scattered islands (with Bassa de India, Juan de Nova and Glorieuses) serial, France.

In addition there were three multi-site recommendations on the second level priority list (B List). These areas are the Kiunga Lamu, Kenya mixed natural/cultural cluster, the Comore Archipelago, Comoros trans-boundary cluster and the Pemba Island, Kenya with Tanga-Shimoni, Tanzania cluster.

The highest ranking multi-site recommendation from the East African regional group was the extension to the existing World Heritage site at Aldabra, Seychelles – the Astove-Cosmeldo-Aldabra cluster. These isolated, uninhabited atolls contain intact marine ecosystems, including pristine lagoons and coral reefs with high fish diversity, large fish and large seabird colonies. Clustering Astove and Cosmeledo atolls, which have more diverse marine habitats than Aldabra, with the existing World Heritage area will increase the sustainability of marine protection in the region. The feasibility of this nomination is high due to the existence of government institutions that support protection, low population in the area and low levels of stakeholder conflict. There is a potential for environmentally beneficial interactions with ship based eco-tourism to increase funding, monitoring and enforcement. Currently, the threats to the area include vulnerability to fishing pressure and poaching as well as invasive species, sea level rise, coral bleaching and oil spills. World Heritage listing and the benefits it brings could increase the funding for enforcing fishing restrictions.

The second ranked multi-site recommended by the East African group was the Rufiji River Delta- Mafia Island-Songo Songo cluster in the United Republic of Tanzania, which would be linked to an existing cultural World Heritage site, the Ruins of Kilwa Kisiwani and Ruins of Songo

Mnara. This cluster contains extensive high diversity coral reefs, sea grass beds and riverine and deltaic mangrove systems. The mangrove areas are important breeding habitat for many species of fish and prawn, and are nesting and breeding habitat for waterfowl. There is an abundance of marine megafauna, including crocodiles, sea turtles and dugong. The feasibility of this nomination is high due to strong institutional structures, which provide for effective protected area management and monitoring. In addition there is strong stakeholder support among resident communities as well as in the private sector.

The third ranked multi-site recommended by the East African group was the trans-boundary cluster of Maputo Bay – Ponto do Ouro, Mozambique, linked to the existing World Heritage site, the Greater St. Lucia Wetland Park in South Africa. This area contains the southernmost coral communities in East Africa, has high endemism of soft corals, fish and plant species, unique sabellerid reef communities, and contains important feeding areas for sea turtles, dugong, whales, white and whale sharks. Coelecanth is also present in this area. The feasibility of nominating this multi-site is high due in part to a transfrontier protocol between Mozambique and South Africa on conservation and resource use that would link this cluster with the Greater St. Lucia Wetland Park in South Africa. However, the protection of marine resources in the area will be threatened if the potential port construction at Ponta Dobela is actualized. This port would increase development and immigration into the area. This region is also threatened by increasing tourism development and localized overfishing.

Recommendations by the East African group:

The East Africa working group noted that while the region has taken a lead in the designation of Marine Protected Areas, there are still large areas of the marine environment that are not effectively protected and managed, and call on the World Heritage Committee to promote conservation in the region by expansion of existing World Heritage sites to improve their value and status, as well as by designation of new sites of Outstanding Universal Value.

The group also noted that the highest priority sites contain multiple environments, sites of ecological and cultural value, and cover large areas of sea and adjacent coastlines. We therefore call on World Heritage Committee to promote the nomination of such large heterogeneous units as cluster (and trans-boundary, where appropriate) sites.

We therefore recommend that:

1) The East African region poses numerous opportunities for nominations of mixed sites that contain both natural and cultural values. It is recommended that those opportunities be actively sought. This can also enhance the eligibility of a number of candidate sites. These sites could include Toliara (Madagascar), Rufiji River Delta-Mafia-Songo Songo (Tanzania) (combined with listed Kilwa cultural site) and Kiunga-Lamu (with listed cultural World Heritage site at Lamu).

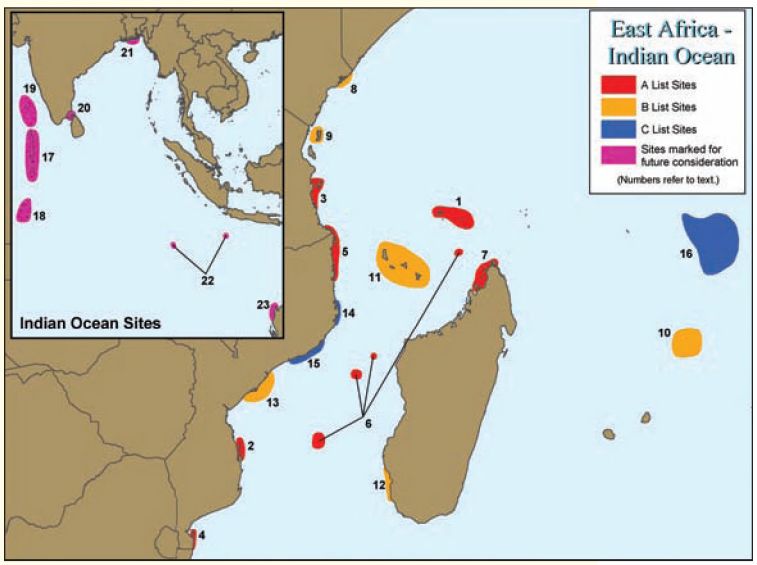
2) Priority sites in the East African region already contain areas for designated as Marine Protected Areas, which can provide a seed for nominating the larger areas in which they are found for World Heritage designation.

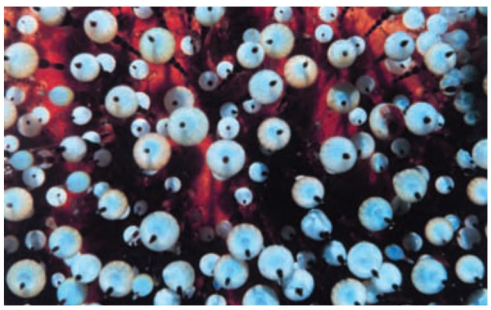
3) In many East African countries the legislation need to be updated so that marine protected areas can have sufficient size and legal status to meet the World Heritage requirements.

4) Often in East Africa little is known of the effectiveness of site management. Adaptive management tools need to be developed to assess management effectiveness.

5) Proactive approaches should be taken to link the World Heritage Convention with other global and regional conventions and initiatives in order to provide for more detailed guidelines for site identification and encouragement for work to identify potential World Heritage sites in the region.

6) Development of a network of World Heritage sites should be considered to reinforce their conservation.





Middle East

The geographic area under consideration includes the Red Sea and its adjacent twin Gulfs of Suez and Aqaba, the Gulf of Aden, the Arabian Sea and the Gulf sub-regions (the term Gulf is now the commonly accepted name for the body of water previously known as the Arabian Gulf, Persian Gulf, Inner Gulf or Regional Organization for the Protection of the Marine Environment (ROPME) Sea Area, and will be used henceforth). It includes the coastlines of 15 countries, six of which are World Heritage Convention member states. The region extends from approximately 10º N; 32º E to 30º N; 65 Eº, and encompasses various distinctly marine and coastal habitats, containing complex and unique tropical marine ecosystems, especially coral reefs, with high biological diversity and many endemic species.

Within the region are found the world's largest loggerhead turtle population, the Western Indian Ocean's largest hawksbill turtle rookery, an isolated humpback whale population, a unique, biogeographically isolated coral community, the world's second largest aggregations of endangered dugong, large manta ray aggregations, and a host of other marine mega- and micro- fauna.

The coastal habitats are surrounded by some of the driest land in the world, such that continental influences are limited, but the waters are major shipping lanes due to regional petroleum reserves, with high-risk bottlenecks at the narrow Straits of Hormuz, the Bab Al-Mandab, and the Gulf of Suez. While parts of the region are still in a pristine state, environmental threats from habitat destruction, over-exploitation and pollu-

tion are increasing rapidly, requiring immediate action to protect the region's coastal and marine environment. The political instability of the region is a constraint to environmental conservation.

Middle East multi-site discussion

The Middle East working group included two trans-boundary cluster recommendations in their priority list of potential World Heritage nominations and one trans-boundary area. Respectively, they are, the Gulf Complex –(Saudi Arabia, the United Arab Emirates and Bahrain), the Southern Red Sea Complex –(Saudi Arabia, Yemen, Djibouti, and Eritrea) and the Northeast Red Sea and Gulf of Aqaba –(Egypt and Saudi Arabia).

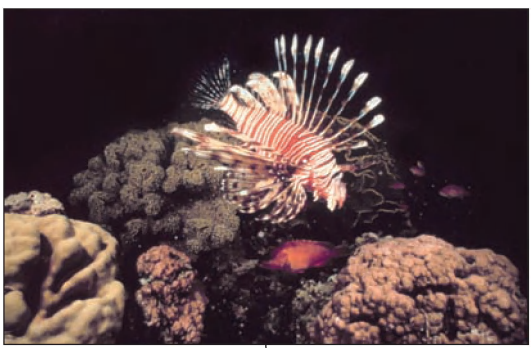
The Gulf Complex is composed of three single areas of outstanding universal value, which share interconnected species gene pools. In the Gulf there is unique adaptation among corals and other reef-associated species to temperature extremes - with important implications for maintenance of global biodiversity in an era of climate change. In addition, the Gulf contains universally important endemism and evolutionary significance for tropical marine species. There are important, unique populations of marine mammals (cetaceans and dugong) and turtles in this region that require protection as a cluster or network of areas for their long-term conservation. The areas included in the Gulf cluster are also proposed individually on the working group's "A" list because of their high biodiversity significance and are the Southern Gulf which includes the areas of Murawah Island and Bu Tini Shoals in the United Arab Emirates, the Hawar Islands of Bahrain and the Jubail Wildlife Sanctuary in Saudi Arabia.

The Southern Gulf area contains extensive seagrass beds, which is key habitat for dugongs. It is under low threats, but may be difficult to implement as a World Heritage area because of inter-Emirate disputes and a lack of protected area legislation in the United Arab Emirates. However, the nation recently became signatory to the World Heritage Convention. Hawar Islands of Bahrain are pristine island ecosystems just offshore of Quatar. The area contains dugongs and is very important for bird populations, harboring the largest nesting population of the endangered Socotra cormorant in the world. There are low threats to this area, and a management plan is currently being written. Bahrain is a signatory to the World Heritage Convention, and the government supports the conservation of Hawar Islands, which would make the nomination of this area highly feasible. The Jubail Wildlife Sanctuary contains diverse reef and seagrass habitats with coral species that have high tolerance for salinity and temperature extremes. The area is a key bird wintering site and flyway and is the nesting site for hundreds of thousands of terns. It is also the largest green and hawksbill turtle rookery in the Gulf, from which turtles migrate to Oman, the United Arab Emirates and Iran. Threats to this area include nearby oil extraction operations and shipping. Extensive bleaching damaged corals inshore, but had little effect on offshore corals. The feasibility of nominating this area to the World Heritage list is unclear. It is currently a de facto protected area awaiting royal declaration, but there are no NGOs lobbying for its long-term protection. Saudi Arabia is a signatory to the World Heritage Convention.

A second cluster recommended by the Middle East group is the Southern Red Sea Complex. This complex is composed of Farasan (Saudi Arabia) /Dahlak (Eritrea), Belhaf Bir Ali (Yemen), Sept Freres Islands/Ras Siyan and Bab al Mandab (Djbouti). Farasan, an existing MPA, has the most extensive mangroves in Saudi Arabia, a diverse range of coral and algal reefs, intertidal flats and seagrass beds, high fish diversity and contains dugongs, sea turtles and 4 species of cetacean. Dahlak is considered a larval reservoir that feeds Farasan. Belhaf Bir Ali has the highest diversity of reef fish communities in the region, has extensive high cover coral reef

communities that result from its volcanic history, and contains a unique saltwater crater with fringing mangrove forests. Sept Freres Islands/Ras Siyan and Bab al Mandab contain diverse coral reef and associated faunal assemblages and are important seabird nesting areas. Ras Siyan contains an important shark nursery area. There are a number of threats to this cluster of areas. They lie close to major shipping lanes and ports and are impacted by coastal development activities and nearby oil drilling activities in Yemen. Also, the areas are near or are contained within major fishing grounds in the Red Sea. The feasibility of nominating this cluster to the World Heritage list is intermediate to low, mainly due to political constraints, namely border disputes between Saudi Arabia and Yemen, and the fact that Eritrea is not in the Arab League. It is promising that PERSGA (Programme for the Environment of the Red Sea and Gulf of Aden) intends to link its MPAs into a regional network, which would include some of the areas in this cluster. All of the nations involved in this potential cluster are signatories to the Convention, with the exception of Djibouti.

The Northeast Red Sea and Gulf of Aqaba trans-boundary area consists of Ras Mohammed, Al Wejh bank (Saudi Arabia), and Gabal Elba (Eygpt). Ras Mohammed has high oceanographic importance because of its unusual geological processes and an upwelling area that facilitateslarval transport. It contains the northernmost mangroves in the region and is known for its diverse coral reefs. The area is also an important turtle foraging site. Al Wejh Bank contains extensive coral reefs and is an existing Marine Protected Area. Gabal Elba has fringing reefs rich with fish and marine mammals, seagrass beds and mangroves, which serve as an important breeding habitat for birds. Together, these areas contain important upwellings, diverse coral reefs and associated species, mangrove areas, marine turtles, dugongs. Threats to the trans-boundary area are oils spills, land reclamation, sedimentation and significant anchor damage from irresponsible recreational diving practices. Threats may be increased by extensive fishing in the area. Feasibility for establishment of this site is enhanced by the existence of the Al Wejh Bank MPA, some current management plans and initiatives in place in both Egyptian and Saudi to develop further management plans.



Recommendations by the Middle East group:

The Middle East regional working group put forth the following recommendations:

1) Protect sites representative of the Middle East region's unique and Outstanding Universal Value as World Heritage sites, recognizing that the Middle East region has no World Heritage sites selected for their marine biodiversity value.

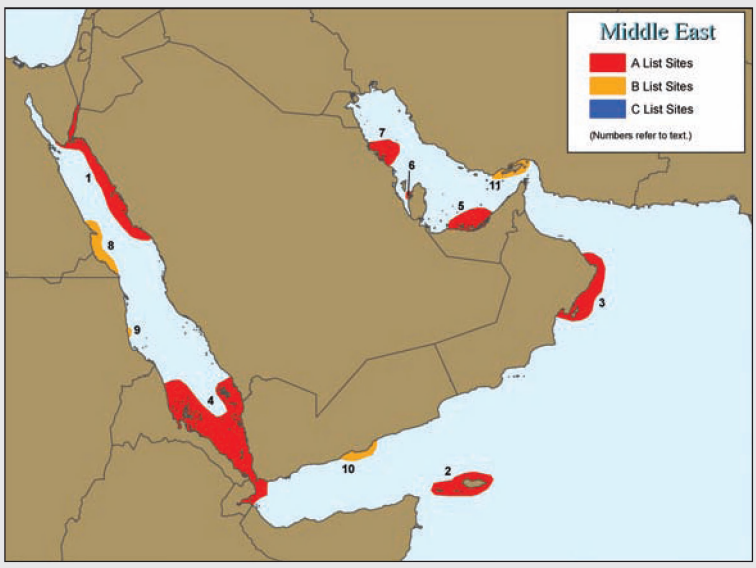
2) Give high priority to increased assistance (funding, aid, capacity building) to ensure better marine protection in the Middle East region.

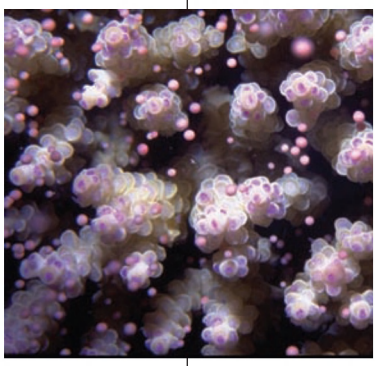
3) Recognize that coral and other reef associated species in the Gulf region are adapted to a wide variety of temperature variations and thus may play a role in mitigating climate change. Recommend that the World Heritage Committee list areas such as the Jubail Wildlife Sanctuary - Hawar Islands – Southern Gulf cluster, that safeguard the long-term protection of marine biodiversity.

4) Recognize the importance of the unique subpopulations of marine mammals and marine turtle species that exist in the Middle East region, and enhance the protection of their habitat by listing areas in which they exist as World Heritage sites.

5) Recognize that the Middle East region contains universally important endemic species and has evolutionary significance for tropical marine species.

6) Protect important migration and genetic exchange, via international coordination of site selection when necessary.





CONCLUDING CHALLENGES & RECOMMENDATIONS

As illustrated in the area-specific proposals above, World Heritage designation has the potential to be a highly appropriate mechanism for conserving significant marine features of various types and scales. However, the regional expert discussions also highlighted several important shared challenges to adding areas to the World Heritage List and their long-term conservation in general. Workshop participants and organizers thought that both the challenges and recommendations for moving forward must be communicated to UNESCO, IUCN and the States Parties to ensure realistic progress. The conservation of the recommended areas for their importance to marine biodiversity is critical and must be pursued, whenever feasible, by State Parties working with others. This chapter first highlights the challenging issues, which must be given careful consideration in future efforts to nominate these areas. The report closes with a suite of recommendations that evolve from the report findings, which can be used to catalyse strategic action that will profile and protect the World's globally significant repositories of marine heritage.

Shared challenges:

1) Loss of pristine areas: Pristine areas are absent from most regions. Impacts from human pressures are posing an increasing threat to the long-term survival of tropical coastal and marine ecosystems and biodiversity. Many human pressures, such as destructive fishing practices, loss of vital habitats including coral reefs, mangroves and seagrasses continue to place many tropical coastal, small island ecosystems and resources at risk.

2) Loss of ecological integrity and social cohesion: The long-term integrity of these areas needs to be maintained, which requires monitoring of natural and social variables that influence integrity. Monitoring the values upon which the site is inscribed on the World Heritage List presents can be difficult to translate the general criteria into specific and measurable environmental and socio-economic indicators. Simply tracking traditional environmental indicators, such as species richness, population sizes and levels of endemism are not adequate in most cases. There are no current tropical marine Natural World Heritage areas that track social variables in association with environmental variables. Even simple, traditional indicators are not always monitored in World Heritage areas, due to management's lack of skills, time and/or funding. Monitoring is not always a priority making it very difficult to understand how the area's integrity changes over time.

3) Information gaps: In many regions the assessment of coastal and marine biodiversity values is hindered by the existence of areas for which little or no information relevant to conservation has been gathered. With the use of a Geographic Information System (GIS) as a tool, these areas can easily be overlooked because they appear to have few or no values associated with them, while areas that are well studied can appear to be more important simply because of available information. Among the regional groups, the region that contains the largest expanse of unstudied areas is the Pacific. This lack of information impeded a complete assessment of priority areas for marine conservation in this region. Other regions, such as the Middle East and West Africa, though less expansive than the Pacific, also contain large areas that have been minimally studied. In these cases, civil wars and political obstacles hinder research. Comparatively, the regions of the Caribbean and Latin America, Southeast Asia and East Africa are more data rich. However, even areas within these regions exist for which little information is available.

4) Limited management capacity: Many areas proposed by the regional experts groups lacked any management capacity or had management capacity inadequate to support proper environmental protection. Several of these areas appeared as the top priorities for protection in the regions. For example, in the Southeast Asian region, both Raja Ampat (Indonesia) and the Spratly Islands (disputed), the region's top two candidates for

potential World Heritage listing are currently unmanaged. Lack of management is a constraint to World Heritage Listing. According to the conditions of integrity for Natural Heritage properties, as defined in the Operational Guidelines, an area cannot be nominated if it does not have a management plan or clear evidence of intent to develop one. Every effort must be made to ensure that a management plan is developed for these sites in order to maintain their long-term sustainability. Another challenge to the management requirements of the Convention is traditional resource management regimes, which do not use a formal management plan. In the Pacific region, many of the proposed areas are managed through traditional regimes, which are gaining acceptance under World Heritage.

5) Lack of integration of cultural and natural values: Where appropriate, cultural heritage values need to be recognised along with natural heritage values. Due to this recognition at the outset of the workshop, the participants agreed to use an additional cultural heritage criterion alongside with the workshop's biodiversity criteria, where applicable to the assessment of potential World Heritage areas. This issue was central to the regional expert discussions in the Pacific regional group, and came up throughout the other regional discussions. In the Pacific, there are many traditional cultures that integrate natural resource use and protection into their social structures, which makes consideration of biodiversity values alone inappropriate.

6) Political instability: Political instabilities such as civil wars or ethnic unrest hinder both research and conservation of these areas thus making the World Heritage nomination difficult to achieve. In both the West Africa and Middle East region, political situations are major barriers to World Heritage nominations as well as for conducting basic research.

The above issues must receive attention as we move forward to listing the areas recommended in this report as World Heritage sites. If State Parties are to embrace these areas for their biodiversity values, we must also value their importance for aesthetics, scientific, and economic contributions. Every effort must be taken to recognize their importance among World Heritage and to ensure their long-term sustainability as representatives of biodiversity value in the tropical marine realm.

Recommendations for World Marine Heritage Conservation

Implementation of the World Heritage Convention over the next 30 years is an opportunity to fill gaps and to establish a system of globally representative marine and coastal World Heritage sites. Through a strategic approach for nominating marine and coastal sites, State Parties are encouraged to move forward with the areas recommended in this report and conduct further evaluation to not only address the serious gaps in the present coverage of marine sites, but concurrently better manage sites already on the list through monitoring and evaluation of management effectiveness. As noted in the start of this report, the workshop mandate was to focus on issues and opportunities for tropical areas. However, many of the report findings and recommendations also apply to temperate systems, and State Parties from all countries are encouraged to consider World Heritage status as possible mechanism for conserving their marine heritage.

Transboundary and serial site nominations must be encouraged as an appropriate mechanism to best represent World Heritage values within the marine realm and as a way to establish dialogues between State Parties and different partners to determine the appropriate mechanisms to protect significant marine and coastal ecosystems. Therefore in filling the gaps in marine biodiversity among the World Heritage List the experts concluded that the following recommendations be considered when establishing and/or extending World Heritage sites.

Coverage and Representation:

• **Ecoregional representation** - All ecoregions must have sites to ensure the protection and representation of core areas of outstanding universal value.

• **Habitat representation** - Transboundary or serial sites must include all essential types of habitats and with such environmental quality so as to allow organisms and populations to perform their basic biological processes (growth, feeding, reproduction, recruitment), and the biological communities to establish fundamental ecological links across habitats.

• **Expansion of existing sites** - Consider the expansion of existing sites to ensure adequate size and inclusion of marine resources in existing natural and cultural sites where appropriate.

Ecosystem Function, Scale And Integrity:

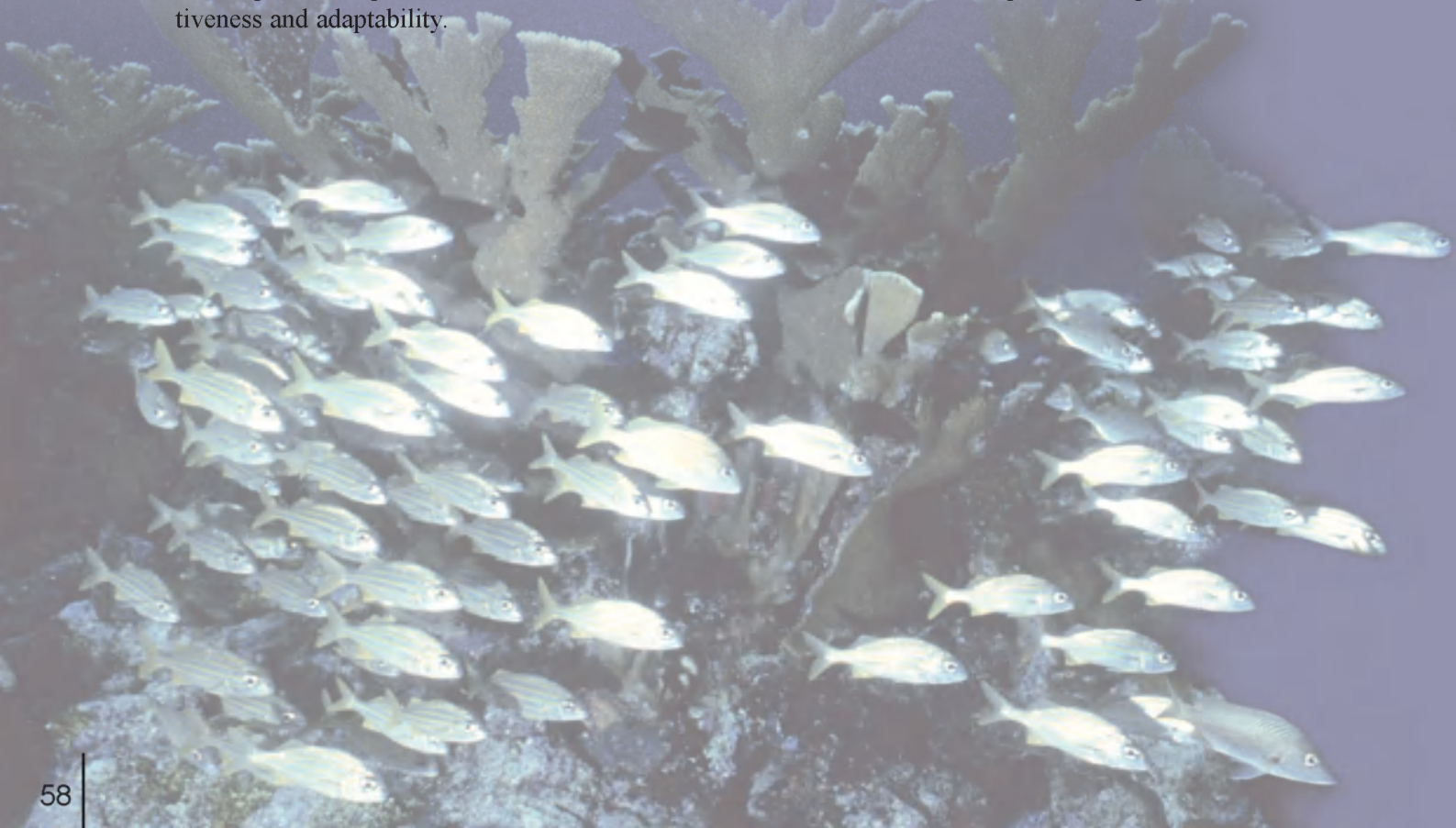
• **Connectivity and scale** – Areas need to be large enough to embrace whole ecosystem functioning. For example, the importance of ocean currents in dispersing larvae, sites need to be located up-and downstream of ocean currents to maximize the protection of sources and sinks of larvae.

• **Recovery** - Wise multiple use management should be applied to restore functionality of damaged ecosystems. The few remaining pristine areas should be strictly managed so that they can serve as regeneration areas and as seed banks.
• **Terrestrial & marine linkages** – Where appropriate, include terrestrial habitats that have ecological links with marine areas, e.g. the importance of watershed quality in the conservation of coastal areas.
• **Human and ecological integrity links** - Biodiversity value and the integrity of a site must take into account the degree of human alteration at the site, as well as regional socio-economic influences.

Information Needs, Research and Monitoring:

• **Baseline data needs** – Information gaps hinder proper analysis of biodiversity and there is a need for scientific and socio-economic surveys in many regions.

• **Sustained research and monitoring** – Regular monitoring that corresponds to appropriate ecological temporal and spatial variables, as well as social influences is needed to improve management effectiveness and adaptability.



Management and Capacity Building:

• **Nomination process** – The steps involved in preparing a nomination to World Heritage can be used identify strengths and weaknesses of a site and require that effective management tools are put into place.

• **Maintain financing and support levels** – World Heritage sites must be recognized as high priority conservation areas for funding and collaboration both nationally and internationally. These areas represent both national and international heritage, whose maintenance is a shared global responsibility.

• **Best practise** – World Heritage sites should be developed for and gain recognition as models of best practise for management of protected areas.

Strategic Planning and Governance:

• **Foster transboundary opportunities** - A number of conservation initiatives conducted by several organizations emphasize the ecosystem approach to marine conservation. This advanced scheme of planning and implementing biodiversity protection is still evolving and must be strengthened in order to promote trans-border conservation initiatives.

• **High seas** – Legal opportunities for extending World Heritage sites to include high seas areas should be studied in future as they contain various species and habitats of World Heritage value. For example, designate World Heritage sites and areas in their vicinity as Particularly Sensitive Areas under International Maritime Organisation to help mitigate threat of oil spills and other accidents.

• **Small island developing states** – Transboundary and serial nominations should be encouraged to meet the conditions of integrity for marine sites. The special needs and limitations of small islands need to be taken into account.

• **Complementary international and national instruments** - World Heritage site consideration should be done in concert with other international (e.g. Ramsar, Man and Biosphere) and national mechanisms (national parks) to ensure match appropriateness of the tool and conservation management goals.

• **Global strategic development** - World Heritage marine sites should be viewed as contribution to a broader global network of marine heritage, including tropical and temperate ecosystems. As such, a complementary strategic assessment of temperate marine heritage opportunities should be encouraged, working towards a Global Marine World Heritage Strategy.

Name of site -country	Sites included within	Trans-boundary /Serial?	Outstanding Universal Biodiversity Values	Major threats	Feasibility of nomination
Raja Ampat Region (Indonesia)			• World's highest coral diversity • World's largest leatherback turtle nesting site	• Low threats except for some threats from fishing (habitat destruction)	• Lack of management is a constraint • Support exists by several large national and international institutions to develop and implement long term conservation measures, with national government
Spratly Island Group (under dispute by 6 South China Sea nations – Brunei Darussalam, China, Malaysia, Philippines, Taiwan, Vietnam)	Approximately 30 small islands and 600 platform and atoll reefs	Transboundary and Serial	• Relatively pristine with intact island habitats • Within highest biodiversity region of East Asia seas region with approximately 70 genera of scleractinian coral • Studies suggest potential source reef for fish and invertebrates • Connectivity • High productivity • Marine turtle nesting site • High seabird population	• Potential oil and gas exploration activities	• Low due to dispute over ownership of area
Tubbataha-Cagayan Ridge (Philippines)	Bastera and Beazley reefs	Serial with existing World Heritage site at Tubbataha	• Unique physical ridge features • High biodiversity • Atolls serving as source and sink of coral, seagrass fish and invertebrate propagules • Microcosm of the region's marine biogeography in terms of reef types • Important migration route for birds, turtles, fish	• Near major shipping channels • Poaching for turtles, giant clams, groupers, Napoleon wrasse	• High stakeholder involvement in conservation in this area from national and international NGOs, universities and UNESCO

N. Borneo/ Balabac Strait/ Turtle Islands Cluster (Philippines, Malaysia)	Turtle Islands – 3 Malaysia and 6 Philippine islands in the Sulu Sea	Transboundary and Serial	• Important nesting site for green and hawksbill turtles • Migration corridor • Mangrove, coral reefs and sand beaches	• Turtle capture and egg harvesting • Potential future threat from logging and palm oil plantation development	• North Borneo: proposed MPA likely to be funded by UNEP, potential target site for management in the framework of ICRAN, strong support by central government • Turtle Islands is an existing ASEAN Heritage site. There is a management plan and joint management committee: Ministry of Environment and Sabah Parks (Malaysia), Parks and Wildlife Bureau/ WWF (Philippines side)
Semporna/Tawi-tawi Chain (Malaysia)			• High diversity of fish and invertebrates • Important sea turtle habitat	• Blast fishing in some areas	
Berau Islands (Indonesia)			• Intact and extensive mangrove area with proboscis monkey • High marine species diversity offshore • Kakaban lake – endemic jellyfish, fish, crustaceans • Large green turtle nesting site	• Future impact of port development	• Has private sector, tourism, government support; support of international conservation groups (WWF, TNC, etc) • In initial stages of community-based fisheries management; alternative sources of income are in place (e.g. giant clam farming)
Banda/Lucipara Cluster (Indonesia)		Serial and can be combined with potential cultural World Heritage site at Banda	• High marine biodiversity with largely undisturbed reefs • Healthy seagrass beds • 764 enchinoderm species • Hawksbill turtles • Important bird migration route • Collision area of two tectonic anf two oceanic plates – important geological significance (also gives rise to unique reef structures – high colonization on recent lava flows	• Some reported blast fishing	• Local authorities in strong support of international status, local NGO supported by TNC, Terangi, UNESCO involved in data collection and initial management actions • Strong stakeholder involvement

Name of site - country	Sites included within	Trans-boundary /Serial?	Outstanding Universal Biodiversity Values	Major threats	Feasibility of nomination
New Caledonia (France)		Serial	• One of few double barrier reefs and 2nd largest barrier reef in the world (40,000 km≈) • High geological diversity in reef types • Corals, mangroves, seagrasses, Green turtles, dugong, high species richness (approx 300 corals, 5,500 molluscs, 1800 fish, 17 reptile species) • Many endemic molluscs • Contains major nesting site for green turtle	• High threats from mining activities on land	• French Government preparing nomination
Milne Bay (Papua New Guinea)		Serial	• Apex of 2 provinces – hybrid center • Forests, mangroves, seagrasses, corals, deep-water • Major nesting location • Major biodiversity – many hybrid species • Threatened species (turtles, dugong, etc.) • Virtually pristine	• Overall low threats - Virtually pristine now • Potential sedimentation from logging	• Low local capacity •Strong traditional management in place • Major conservation projects planned • PNG has ratified World Heritage Convention
Palau		Serial	• Marine lakes with endemic species • Only hawksbill turtle breeding site in Micronesia • High diversity of hard and soft corals, seagrass, mangroves etc.	• Rapid development on main island • Tourism expanding rapidly • Sedimentation from roads, logging • Port impacts - sewage • Over exploitation of fisheries • Destruction of spawning aggregations • Collection of hawksbills and corals • Harvest of Acropora as lime for chewing betlenut	• Complex government - State & National • Complex traditional ownership • Traditional management being eroded • Ratified World Heritage Convention in 2002 • Recognised world-wide - 'a natural wonder of the world' • Major conservation projects underway (NGOs, PICRC, GCRMN)

New Hanover and Manus Cluster (Papua New Guinea)		Serial	• High seagrass productivity & diversity • Forests, corals, mangroves, seagrasses • Feeds larvae into the "centre of marine biodiversity" • High degree of naturalness – virtually intact	• Reefs seriously threatened by dynamite fishing • Potential target for cyanide fishing • Potential for forestry impacts • Phosphate mining on seabird islands (Manus complex)	• Complex traditional ownership • Very remote • Major conservation opportunities along with traditional conservation
Solomon Islands (including Morovo and Arnavon Lagoons)		Serial	• Largest double barrier reef in the world (Morovo), lagoon surrounded by raised barrier reefs • Corals, seagrass, mangrove, leatherback turtle nesting	• Development pressures in areas of high population • Logging, mining & domestic waste are problems • Over exploitation of fisheries, espec. on local scale (beche de mer & Trochus)	• Complex layers of government • Traditional ownership • Ethnic unrest and political instability • Solomon Islands already has one World Heritage site, East Rennell
Pohnpei-Kosrae Cluster (Federated States of Micronesia)		Serial	• High productivity for seagrasses, mangroves and corals (Kosrae) • Corals, reefs, seagrasses & mangroves • Outer islands in pristine condition • Major habitat diversity	• Development pressures on Pohnpei e.g. leading to sedimentation • Waste management • Live food fish trade increasing • Heavy harvesting of reef flat & offshore fisheries	• Meets cultural criteria for a mixed site (Nan Modal & Kosrae) • Low capacity for communities to manage large projects • Complex government structure • Some unresolved ownership issues • Local communities supportive • Good NGO participation • FSM in process of ratifying World Heritage Convention
Line Islands Serial (Kiribati, Cook Islands, the United States and French Polynesia)	Includes Kirimati atoll (Christmas island), Palmyra atoll, Kingman reef, Teraina, Tabuaeran	Transboundary and serial	• Centre of major upwelling; hence major seabird numbers • One of world's largest fly-ways • High seabird numbers (up to 6 million at peak) • Green turtle breeding area • Healthy reefs • Uninhabited • Serial nomination ensures sufficient size • Includes Kirimati atoll – largest in world, mostly undisturbed, hundreds of hypersaline ponds, important for seabirds • Includes Palmyra atoll– 2nd largest US atoll, pristine, fish and wildlife undisturbed, largest population of red footed boobies and black noddies in the world	• Significant predator problems (cats, rats, dogs) • Japanese space launching facility proposed • Poaching	• No traditional population so little cultural heritage • Little access - very remote • Difficult to manage due to isolation • Cook Islands is not a State Party of the World Heritage Convention • French Polynesia could be included in the serial

Name of site -country	Sites included within	Trans-boundary /Serial?	Outstanding Universal Biodiversity Values	Major threats	Feasibility of nomination
Cocos-Galapagos-Malpelo Triangle (Costa Rica, Ecuador, Colombia and Panama)	Isla del Coco National Park World Heritage site, Galapagos National Park and Marine Reserve World Heritage site, Malpelo Island and Coiba Island	Transboundary and serial	• One of the World's most biologically diverse geographical province • High endemism on land and sea, biological corridor • Migratory species, sharks, whales, seabirds, important fisheries • Geological hotspot	• Overfishing • Tourism	• Signed agreement among Presidents of Costa Rica, Ecuador, Colombia and Panama to pursue joint management initiatives; strong local/international NGO presence
Clipperton-Revillagigedo (France and Mexico)		Transboundary and serial	• Biogeography and endemism • Charismatic mega-fauna • The only Eastern Pacific atoll • The stepping stone in migration of coastal marine species from the western to eastern Pacific • Highly intact marine ecosystems	• Generally low, no coastal development • Intensive fishing	Unknown
Southern Cuba Coral Archipelagos	Los Canarreos Archipelago through Punta Guanahacabibes, Archipiélago Jardines de la Reina; several existing and proposed MPAs, wildlife refuges and biosphere reserves included	Serial	• High biodiversity (green and hawksbill turtle nesting, representative major habitat corridors; major spiny lobster and queen conch populations • One of least impacted areas of Caribbean • Largest and most habitat diverse shelf areas in insular Caribbean (barrier and patch reefs, islands, mangroves forests (extensive in Zapata Swamp) and extensive sea grass beds • Unique Oculina dominated ring-shaped muddy bottom lying coral reefs • Endangered species crocodiles, turtles, birds • Includes several reef fish spawning sites • Extensive sea grass beds, and mangroves (Zapata Swamp) • One of 4 places in world with extensive oolite bank formation ($CaCO_3$ precipitation)	• Threats currently low, but will increase rapidly with time (coastal development, tourism likely to grow in Cuba) • Relatively high fishing pressure over fish and lobster resources in most areas	• MPAs already present or forming (several still lack management plans); Cuba has strong Protected Areas program • Cuba is signatory to World Heritage convention; high research capacity

San Andres Archipelago (Colombia)	Includes San Andres, Providencia and neighboring islands	Serial	• Connectivity between Southern and Northern Caribbean Basins, biogeography • High biodiversity, endangered species	• Extremely high human density in San Andres • Fishing, invasive species	• Good management structure and NGO presence; MAB site, ongoing MPA initiative
Sian Ka'an - Banco Chinchorro (Mexico)	Includes the Sian Ka'an Biosphere Reserve (a World Heritage site) and the Banco Chinchorro B.R.	Serial	• High biodiversity and representative watershed/reef corridors. • Banco Chinchorro- largest of Caribbean atolls, excellent multi-use zoned MPA • Connectivity and larval pump to Gulf of Mexico and South-East US, important nursery area for many species	• Major coastal development program planned for southern Quintana Roo, including cruise ships, many associated impacts	• Local, national and international focus, including the MesoAmerican Reef System GEF project • Existing World Heritage Site strong government and NGO presence; high research capacity
Belize Barrier Reef System	Includes the existing World Heritage Site plus other recently established protected areas	Serial	• Representative watershed/reef corridors • Major reef fish spawning sites; whale shark aggregations. • Connectivity and possible larval pump to G of Mexico and SE US	• Locally concentrated, river discharges, tourism	• Expansion of existing World Heritage Site, marine-terrestrial corridor; existing MPAs, MBRS larger context; local, national and international focus (including the MBRS GEF project); strong international research presence
Southern Caribbean Islands (The Netherlands and Venezuela)	Los Roques, Las Aves (Venezuela), Bonaire, Curacao (Netherlands Antilles)	Transboundary and Serial	• Coral diversity, island fauna • Los Roques contains the most important and well conserved coral reef-sea grass-mangrove complex of the South American Caribbean coast • Los Roques harbors significant populations of threatened commercial fish species (groupers, queen conch) and is likely a larvae source area	• Highly variable • Tourism • Overexploitation of some species	• Venezuela and Netherlands Antilles have good precedents in bilateral management; NGOs present; existing MPAs; well managed Bonaire National Park; some research capacity
Gulf of California (Mexico)		Serial	• Whales and pinnipeds, other endangered species, representative habitats, biodiversity • Biogeographically novel, high endemism, population-scale ecological attributes	• Locally concentrated land impacts currently and overfishing • Plan for Escalera Nautica (massive marina projects and land changes)	• Existing Mexican National Parks and World Heritage Site • Large NGO (local/ international) presence • Priority conservation areas exercise underway

Name of site -country	Sites included within	Trans-boundary /Serial?	Outstanding Universal Biodiversity Values	Major threats	Feasibility of nomination
Niger Delta (Nigeria)			• Largest mangrove ecosystem in Africa • Comprises 35% of the total mangrove forest in West Africa • Important for large populations of migratory birds • Endangered species including leatherback turtle, manatees, and primates • High endemism	• High threats from consumptive use, coastal erosion and climate change • Medium threats from marine pollution • Low threats from coastal development and land-based activities	• Needs adequate authorities and management • Local and traditional knowledge currently incorporated into marine conservation • Low levels of stakeholder involvement; conflict between ethnic groups hinder conservation • Mangrove and associated primates, turtle nesting and fishery resources should be tracked
Densu Delta, Muni, Sakumo, Songor and Keta Lagoons (Ghana)	Includes the 5 lagoons listed to left	Serial	• Important for large populations of migratory birds (all lagoons) • Endangered species including leatherback • Keta Lagoon is the only extensive mangrove system in Ghana • High species richness as a cluster site	• High threats from consumptive use and climate change • Medium threats from land-based activities and water quality • Low threats from coastal development, marine pollution and tourism	• Densu Delta and Muni and Sakumo Lagoons are existing Ramsar sites • Songor and Keta Lagoons are proposed Ramsar sites
Boloma Bijagos (Guinea-Bissau)			• Part of second most important mangrove area in West Africa • High marine productivity • More than 1 million migratory birds • Noted for sea-going hippos, 5 marine turtle species and dolphins • Coral communities	• Medium threats from consumptive use (e.g. fishing, mangrove depletion) • Low threats from coastal development, land-based activities, marine pollution, water quality and climate change	• Existing marine protected area although management adequacy is unknown • High incorporation of local and traditional knowledge for marine conservation assumed • Guinea Bissau is not a signatory to the World Heritage Convention

Sao Tome and Principe and Equatorial Guinea including Annabon Island	Transboundary and Cluster site comprised of four islands	Transboundary and Serial	• Important upwelling area • Fish and coral communities • High marine productivity (shrimps, lobsters and large pelagic populations)	• High threats from land-based activities, consumptive use (e.g. mangroves for fish preservation), climate change • Medium threats from coastal development and increasing population pressure (caused by migration to oil-related jobs) • Low threats from offshore oil activities	• High level of local and traditional knowledge incorporated in marine resource use • Lack of information about authorities, management, and stakeholders • Neither of the two states is a signatory to the World Heritage Convention
Skeleton Coast (Namibia)			• Rare coastal lichens • 80% of world population of cape fur seals (at Cape Cross) • Fragile coastal desert ecosystem • Area of upwelling	• High threats from consumptive use • Low threats from coastal development, land-based activities and marine pollution	• Majority of area existing national park; management and authority likely to be adequate • Namibia is a signatory to the World Heritage Convention

Name of site -country	Sites included within	Trans-boundary /Serial?	Outstanding Universal Biodiversity Values	Major threats	Feasibility of nomination
Astove-Cosmoledo, Extension of Aldabra World Heritage site (Seychelles)	Astove and Cosmeledo atolls	Serial with existing World Heritage site	• Highly isolated, intact marine ecosystems, including pristine lagoons and coral reefs with high fish diversity and large fish, large seabird colonies • Clustering Astove and Cosmoledo atolls (which have more diverse marine habitats then Aldabra) with the existing Aldabra World Heritage Site increases the sustainability of marine protection in the area	• Vulnerable to fishing poaching, invasive alien species, sea level rise, coral bleaching and oil spills	• Expansion of existing World Heritage Site • Existence of government institutions that support protection • There is low population, and few conflicting stakeholders • Potential for beneficial interaction with ship-based eco-tourism for funding, monitoring and enforcement
Bazaruto Archipelago (Mozambique)			• Last viable dugong population in region • Diverse coral communities • 4 species of sea turtle, 3 species whale, 4 species shark • High endemism likely (including 6 mollusc species) • Extensive and diverse sea grass beds and intertidal habitat	• Immediate threat: large scale tourism development • High fishing pressure (sharks, sea cucumber, clam, reef fish), also hard turtles and dugongs (but this is being ameliorated with current management) • Coral bleaching	• Strong government and donor structures, existing management and monitoring programs and tourism potential.
Maputo Bay – Ponto do Ouro (Mozambique)		Transboundary and serial possible with existing Greater St. Lucia World Heritage site	• Most southerly coral communities in region • High endemism of soft corals, endemism of fish and plant species • Unique sabellerid and coral communities • Important feeding area for turtles, dugong, whales, white shark, whale shark • Coelecanth present	• Single largest threat is possible port development and related immigration • Uncontrolled tourism development • Localized overfishing	• Highly feasible if port development does not proceed • Trans-Frontier Protocol between Mozambique and South Africa on conservation and resource use already signed, which would link site with Greater St. Lucia Wetlands Park

Mnazi Bay-Ruvuma-Quirimbas, (Tanzania, Mozambique)		Possible serial of 2 sites with one transboundary site for Mnazi Bay and Ruvuma complex	• Extensive reef complex with high coral diversity (>55 genera) • Extensive and diverse seagrass beds • Important turtle feeding and nursery site	• Overexploitation of fisheries at north and south ends, and reports of high exploitation in Quirimbas. Sea cucumber overexploited • Coral bleaching • Potential tourism development	• Strong development of institutional and management structures, including Integrated Coastal Management in both Tanzania and Mozambique • Community and private sector involvement • Low population pressure improves feasibility for conservation management
Rufiji River Delta-Mafia-Songo Songo, (Tanzania)	Potential mixed nomination with Kilwa cultural World Heritage site	Serial	• Extensive, high diversity coral reefs with high coral cover and >49 coral genera • Diverse seagrass beds • Extensive river and deltaic mangroves which are important breeding habitat for prawns, fish, and nesting and breeding habitat for waterfowl • Abundance of top predators, including crocodiles • Important feeding habitat for turtles and dugong	• Conflicting land and resource uses, particularly fishing, tourism and subsistence agriculture • Potential future impacts from Rufiji river watershed	• Strong institutional, management and monitoring structure, with good stakeholder support (community and private sector)
Europa and Scattered islands (w/ Bassas de India, Juan de Nova, Glorieuses) (France)		Serial	• Contains most important nesting site in Indian Ocean for green turtle	• Currently low threats because islands are isolated, with low population density with minimal ongoing human pressures	• Strong management possible through government agencies and joint surveillance and monitoring using boat-based tourism and research expeditions
NW Madagascar – Nosy Tanikely, Nosy Be			• Most pristine reef area in Madagascar, with little run-off influence and high diversity coral reefs • Dense mangrove forests	• Not highly threatened • Potential high fishing pressure – currently there is high level of subsistence fishing (including nomadic fishers) • Uncontrolled tourism development • Agricultural runoff and solid waste	• High biological value and strong community commitment, but unpredictable political climate and uncertain institutional relationships

Name of site -country	Sites included within	Trans-boundary /Serial?	Outstanding Universal Biodiversity Values	Major threats	Feasibility of nomination
Northeast Red Sea and Gulf of Aqaba (Saudi Arabia, Egypt)	Ras Mohammed, Al Wejh Bank, Gabal Elba	Transboundary and Serial	Ras Mohammed • High oceanographic importance, larval transport, unusual geological processes • Northernmost mangroves in region • Diverse coral reefs, turtle foraging sites Al Wejh Bank • Extensive coral reefs Gabal Elba • Extensive fringing reefs, mangroves (important bird breeding habitat), seagrass, fish and marine mammals	Gabal Elba: • Oil spills, land reclamation, sedimentation, recreation diving impacts (anchor damage significant), extensive fishing	• Al Wejh bank is an existing MPA • Egyptian and Saudi management initiatives exist, management plans exist or are being developed • Ras Mohammed nomination prepared
Socotra Archipelago (Yemen)	Largely pristine islands and marine environment		• Genetic cross roads in the region due in part to the Somali upwelling and Socotra gyre, giving rise to high diversity of marine habitat ranging from West Indian to Arabian faunal assemblages • One of the highest diversity of coral reefs in the W Indian Ocean (240 stony coral species recorded) • Sea turtles • Sea birds – only breeding site for certain populations • Terrestrial plant & animal endemism	• Increasing industrial fishery pressure • Potential for rapid development (plans for port development and tourism infrastructure)	• Existing protected area with management plan • Local community (including traditional and commercial fishers) support and work towards protection
Southeast Oman	Masirah Island, Bar al Hickman, Ras Al Hadd	Serial	Masirah Island, Bar al Hickman • Largest loggerhead turtle nesting grounds in world (>30,000 turtles/yr) • Important feeding ground for green turtle • 22 cetacean species (and two possible endemic species) Ras Al Hadd • One of the largest green turtle nesting sites in world (most important nesting site in Indian Ocean) (>20,000 turtles/yr)	• Low threats	• Oman's great record of environmental protection (recognized by UNEP) • Possible MAB status • Adjacent to existing Arabian Oryx reserve, natural World Heritage site

Southern Red Sea Complex (Saudi Arabia, Yemen, Djibouti, Eritrea)	Farasan (Saudi Arabia) /Dahlak (Eritrea), Belhaf Bir Ali (Yemen), Sept Freres Islands/Ras Siyan and Bab al Mandab (Djibouti)	Transboundary and serial	Farasan • Most extensive mangroves in Saudi Arabia • Diverse range of coral and algal reefs, intertidal flats and seagrass beds • High fish diversity • Dugongs, turtles, 4 species of cetacean Dahlak • Considered a larval reservoir connected to Farasan Belhaf Bir Ali • Contains unique salt water crater with fringing mangroves • Volcanic history, resulting in extensive, high cover coral communities (rare in Arabian Sea) • Highest diversity reef fish communities in Arabia Sept Freres Islands/Ras Siyan and Bab al Mandab • Diverse coral reefs and reef faunal assemblages • High seabird nesting • Important migratory route for seabirds • Important shark nursery in Ras Siyan	• Near major shipping lanes and major ports (marine pollution, groundings etc) • Coastal development • Nearby oil drilling in Yemen • Major fishing grounds in Red Sea	• PERSGA intends to link up its MPAs into a regional network • Political constraints: Eritrea is not in the Arab League, Yemen very independent, disputes over Yemen/Saudi Arabia border • Farasan is an existing MPA (1996) • No authority that manages coastal zone in Yemen and lack of funds for conservation • Djibouti is not a signatory to World Heritage convention
Southern Gulf (United Arab Emirates)	Murawah Island – Bu Tini Shoals	Part of Gulf Complex	• Extensive seagrass beds • Key habitat for dugongs	• Low threats	• Lack of protected area legislation in UAE • Inter-Emirate disputes • UAE is signatory to World Heritage convention
Hawar Islands (Bahrain)	Pristine islands near Qatar	Part of Gulf Complex	• Dugongs • Largest nesting population of the endangered Socotra cormorant in the world	• Low threats (largely pristine, isolated area)	• Preparing management plan • Nomination prepared already
Jubail Wildlife Sanctuary (Saudi Arabia)		Part of Gulf Complex	• Coral species with high tolerance for salinity and temperature extremes • Diverse reef and seagrass habitats • Key bird wintering site and flyway, nesting site for hundreds of thousands of terns • Largest green and hawksbill turtle rookery in the Gulf (from which turtles migrate to Oman, UAE, Iran)	• Nearby all major oil fields, heavy shipping, solid and liquid discharges • Extensive bleaching killed corals inshore, little effect offshore	• De facto protected area, awaiting royal declaration • No NGOs in Saudi Arabia to address this nomination • Saudi Arabia is signatory to World Heritage Convention

Annex 2. Introduction to workshop process

To reach consensus the participants used a biogeographic approach to conduct the analysis during the workshop. It was based in part on a participatory framework developed by organizations such as World Wildlife Fund (WWF), Conservation International (CI) and The Nature Conservancy (TNC), among others. The approach employed sets of explicit criteria that emphasized regional and global marine biodiversity value. It also considered the threats to these values and the feasibility of protection. Background research on marine protected area (and general protected area) criteria was conducted prior to the workshop, and included investigations into criteria used in other international and programmes (such as RAMSAR, Man and Biosphere (MAB), Convention on Migratory Species, The Baltic Convention, the International Maritime Organization's (IMO) criteria for Particularly Sensitive Sea Areas (PSSAs) and the Regional Seas agreements such as the Specially Protected Areas and Wildlife in the Wider Caribbean Region (SPAW) and the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA Protocol), IUCN criteria (developed by Kelleher et al. 1995), national level criteria (Representative Areas Program, Australia) and finally criteria used by international conservation NGOs (WWF, TNC and CI). The overall list of criteria was circulated prior to the workshop and the expert participants concurred on their use at the start of the workshop. The participants also agreed to consider cultural heritage as a criterion alongside the biodiversity criteria where applicable.

With the aid of an array of physical, biological and sociological datasets in GIS format, the experts began the site selection process in their regional groups by identifying broad areas containing regionally and globally significant biodiversity values, using the workshop's criteria as a standard set of guidelines across working groups. The criteria were not ranked relative to one another, as their priority may be different among regions. The criteria used are as follows:

1) Sites important for the maintenance of essential ecological processes or life-support systems, including sites of important geological, ecological, and oceanographic processes (high primary and secondary production, important upwellings, eddies etc.);
2) Sites of uniqueness, containing important habitat for rare, vulnerable or endangered species;
3) Sites of high endemism;
4) Sites of high species richness;
5) Sites representative of biogeographically important species assemblages or community types;
6) Sites important for shared populations, including areas significant as migrating, congregating, breeding, and/or feeding grounds, sites important for replenishment and maintenance, sites that contain key habitat for the various life history phases of these species;
7) Sites significantly large, in a state of naturalness, containing a variety of intact habitats and species assemblages (e.g. wetlands, islands, coastal zones such as watersheds, estuaries and reef systems) to maintain the integrity and sustainability of marine ecosystems and species populations;
8) Sites that also satisfy the cultural category of World Heritage.

Once the initial broad areas were identified using these criteria, smaller areas of outstanding universal biodiversity values within them were chosen for more detailed inspection. In this second stage, the proposal of multi-site areas was encouraged, including cluster, serial and transboundary areas. It is important to highlight that the regional groups discussed and recommended potential areas rich in their marine biodiversity, not sites. It is a task of the State Parties to the

Convention to delineate appropriate sites within these general areas for nomination as World Heritage. Conservation organizations and other non-governmental groups also are encouraged recommend sites, based on their expertise, for a State Party or multiple State Parties for their consideration.

Following, the threats to A-list areas were examined and the feasibility to be nominated as a World Heritage site assessed, using a standardized threats and feasibility assessment. Threats were examined in the following broad categories that each working group detailed according to those most prevalent in their region; threats from coastal development, threats from land based activities, marine pollution, consumptive use and climate change. Feasibility was determined by assessing how the area is protected and managed, whether or not traditional/local knowledge is incorporated into management practices, the level of stakeholder involvement and support for long-term conservation, and coverage the area under multilateral or bilateral agreements or international conventions. Additional information that contributed to a more complete understanding of the threats to biodiversity value and the feasibility for World Heritage listing was noted and considered in the final assessment of priority areas. This flexibility allowed the final list to express more regionally tailored priorities.

After the threats and feasibility assessment, the regional groups revisited the World Heritage criteria for Natural Heritage properties. These were factored into the biodiversity criteria and threats and feasibility assessment, as the final layer in this priority setting exercise. The Natural World Heritage Criteria state that to be nominated, areas must be one or more of the following:

1) 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; or
2) Be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals; or

3) Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance; or

4) 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.

In addition to these criteria, the conditions of integrity for natural World Heritage areas were considered, but were addressed more fully in the threats and feasibility assessment discussed above.

The final list of potential World Heritage areas recommended by each regional group is a representation of what the experts believe to be of outstanding universal value, as well as feasible for World Heritage nomination. The overall lists of recommended sites were discussed in the plenary, and the participants reached consensus on their presentation to the World Heritage Committee and State Parties to the Convention.

The final list of identified areas is presented in the Hanoi Statement. Detailed descriptions on threats and feasibilities of each of the highest priority areas are given in a table in Annex 1. The important biodiversity values contained in each tropical marine region were also discussed. The summary of those regional discussions is presented under Discussions of areas by region.

Annex 3. Potential World Heritages Sites of the Central Indian Ocean Region

A report "Potential World Heritage Sites of the Central and Indian Ocean Region" was prepared by Dr. Trevor J Ward, University of Western Australia, Perth, Australia as a supplemental contribution to complement the consultative process conducted during the Hanoi workshop. At the Hanoi workshop only a few specialists had experience on the central Indian Ocean region, and it was determined that a regional report should be prepared to determine the high priority areas. This annex summarises the findings of the report. Much of the information developed in that report. However, the final interpretations and conclusions developed for this summary report are those of the editors of the workshop report and not all of the findings are reported in this summary. The full paper is available on the workshop website (http://international.nos.noaa.gov/heritage).

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Regional Context

The region of focus for this assessment is the tropical and oceanic systems of the central Indian Ocean. The region comprises the Indian Ocean Rim countries and island nations broadly between 70°E and 100°E, including Myanmar, Bangladesh, India, Sri Lanka, Maldives, Chagos (UK), and the Cocos Keeling islands (Australia). A characteristic of the Central Indian Ocean region is that its biodiversity is poorly understood, and the grounds for determining World Heritage status are therefore less robust than in many other tropical ocean areas. The highest priority sites are likely to be those that are determined to be least disturbed.

*The region comprises five distinct biogeomorphic sub-systems:

1) the monsoon-dominated northern Bay of Bengal;
2) the low energy east coast of the Indian subcontinent;
3) the high energy west coast of the Indian subcontinent;
4) oceanic atolls of the Chagos-Laccadives Plateau;
5) the continental islands and fringing reef systems.

More than a quarter of the world`s population lives in the countries bordering the Bay of Bengal and the broader central Indian Ocean region, and many of these people subsist at or below the poverty level. Economic marine activities in the region include fishing, tourism, and the mining of coral and sand for use as construction materials, and the region is one of the world`s busiest marine transportation corridors. The coastal fisheries are of major socio-economic importance to all the countries as they provide direct employment for more than 2 million fishers. The coastal areas also support significant aquaculture production of shrimp and fish. In 1994, production was estimated to be 141,975 million tons, and utilised the work of 200,000 fish farmers in the Bay of Bengal area, and interest in aquaculture has continued to rapidly rise in the region.

The Indian Ocean is the smallest of the three 'great' oceans and much of its area is geologically 'young'. The boundaries can be defined as: Western limits—the meridian of Cape Agulhas to Antarctica; Eastern limits—south of Australia, Bass Strait, Cape Grim, Tasmania to Antarctica; north of Australia, Torres Strait; Northern limit—the Asian landmass. Marginal seas of the Indian Ocean include the Red Sea, Gulf of Aden, Persian Gulf, Gulf of Oman, Arabian Sea, Laccadive Sea, Bay of Bengal, Andaman Sea, Malacca Straits and Singapore Straits. The area covered by the Indian Ocean (excluding Arafura Sea) is 74,917,000 km≈, with a mean depth of 387 m. The maximum depth recorded is 7,437 m (24,444 feet).

The marine ecosystems and habitats range from the vast areas of deltaic mangroves and shallow turbid waters at the head of the Bay of Bengal to the oceanic trenches of the Indian Ocean proper. The Indian sub-continent separates the northern part of the Indian Ocean into two very different regions—the Bay of Bengal to the east and the Arabian Sea to the west. Both are monsoonal, but in the Arabian Sea evaporation exceeds rainfall and runoff, generating seasonal high salinity waters, whereas the Bay of Bengal is seasonally of low salinity, being strongly influenced by monsoonal rainfall and runoff from the five major rivers in its catchment. The northern part of the Bay of Bengal (India, Bangladesh, Myanmar) is dominated by soft substrate ecosystems and turbid, productive waters. The Sundarbans (India, Bangladesh) at the head of the Bay of Bengal is the world's largest mangrove wetland complex, and parts are now inscribed in World Heritage. Much of the east coast of India is gently sloping with deltas, beaches lagoons and marshes, while the west coast is exposed with rocky shores, headlands and heavy surf beaches.

The Lakshadweeps (India), Maldives and Chagos (UK) comprise a natural a chain of oceanic atolls, commencing to the west of India and extending south from about 12°N to about 8°S. These atolls rise from deep ocean trenches to the sea surface, and form small lagoon systems ringed by barely emergent sand cays and low islands. Many support well developed stands of vegetation even though the islands are only just above sea level, because they are largely out of the influence of cyclones which otherwise would destroy the plant communities. Although little studied, the Chagos Archipelago is considered to have one of the highest levels of coral diversity in the Indian Ocean.

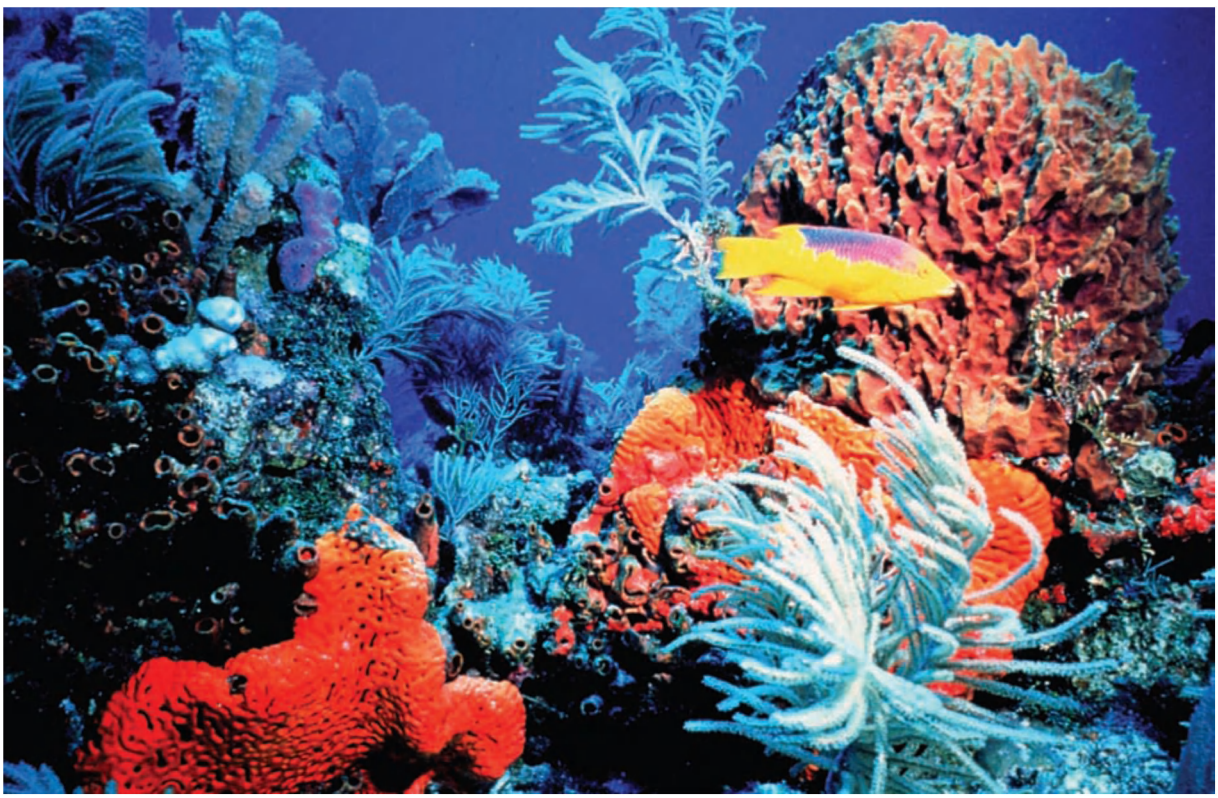
In contrast to the atolls, the islands of the Andamans and Nicobar group (India) and Sri Lanka are continental, and are lined with fringing coral reefs overlying sandstone and volcanic rock substrata. These form different ecosystems, often influenced by freshwater runoff from the islands and are associated with other hard substrate marine communities. The Mergui Islands (Myanmar), a complex string of at least 800 continental islands that are thought to be still mainly forested, are biologically similar to those of the adjacent islands in Thailand waters. The Mergui Islands have long been closed to human access, and are thought to be largely free from commercial fishing, industrial development, and, with only limited tourism and other visitation, to have retained many of their island and marine ecosystems in near pristine condition.

With the exception of Chagos and Mergui Archipelago, all the marine and island ecosystems in the region have come under heavy pressure from fishing, and from one or more of coastal development, sand mining, sedimentation and catchment pollution. The situation in Mergui

Islands is not clear, although it is assumed that because of their limited resident populations and controls on visitation, their environments are in a much healthier condition.

Without exception, all the corals in this region have suffered from coral bleaching episodes that have ranged from moderate to very severe, and some have so far failed to recover from the repeated bleaching events in the late 1990s. The impact on coral ecosystems has been widespread and intense; for example in Chagos: "Mortality was near-total to 15 m deep in northern atolls, and to > 35 m in central and southern atolls" (Sheppard et al. 2002). Similar bleaching impacts occurred in the Maldives, and in 2001 recovery was insignificant across large areas of the northern Maldivian atolls.

The coral reefs in the region (other than at Chagos) are intensively fished, commonly for bait fish for the widespread tuna fisheries, and many are still fished using destructive fishing practices (such as cyanide). Also, there is an increasing fishery for live fish throughout the region, both for human consumption and as specimen fish for the aquarium trade. However, across the entire region considered here, the real impact of these human uses on the biodiversity has been poorly documented, but is likely to be substantial. Some areas are obviously degraded because of poor land management practice and overfishing, but studies of biodiversity are limited to a few local situations, and the impact of human use can, in most cases, only be assumed.



Name of site -country	Sites included within	Trans-boundary /Serial?	Outstanding Universal Biodiversity Values	Major threats	Feasibility of nomination
Mergui Archipelago, Myanmar	Bay of Bengal and the Andaman Sea	Could be considered as part of an Andaman Sea Island transboundary nomination	• Represents the continental island ecosystems complex, natural range of associated tropical habitats, including terrestrial communities and adjacent marine reef systems in very good condition • Important cultural values of traditional subsistence fishing, hunting and agricultural practices • About 900 forested islands, range of sizes, covering 30,000 km≈	• 56% of reefs are threatened, mainly by overfishing, destructive fishing, coastal development, sedimentation and marine-based pollution	• Would require a specific and bilateral engagement • Would require additional study
Andaman and Nicobar Islands, India	Western Boundary of Andaman Sea	Could be considered as part of an Andaman Sea Island transboundary nomination	• Important range of complex marine and terrestrial habitats; major barrier reef ecosystem (320km) • Regionally and globally important area for leatherback, green, olive ridley and hawkesbill turtles; dugong; host to salt water crocodile • Coral reefs, seagrass assemblages, mangroves – all biogeographically important representatives of Indian Ocean assemblages in good condition • Corals-139 species,79 genera, seagrass-9 species • 795 km≈ coral reefs; islands forested	• Some areas degraded by human activities, but mostly in good condition	• Specific priority areas/islands established by BCPP •Strategically important area for national security
Trincomalee Bay and Pigeons Islands, Sri Lanka	Mahaweli River (drains the highlands of southern Sri Lanka)		• High primary and secondary productivity, nutrient rich ecosystem • Important feeding ground for sea birds, whale sharks and large whales, including blue whale, Bryde's whale and sperm whale • Breeding ground for sperm whales and large aggregations of small cetaceans • Relatively intact mangrove and reef systems as well as a diverse assemblage of islands uninhabited by humans • The terrestrial area of Pigeon Island has already been afforded protected status under national legislation but not the surrounding reefs • Trincomalee Bay is an ancient harbour (> 2500 years old) and a marine archaeological site containing many ship wrecks of importance	• Affected by recent coral bleaching events and storm damage	

Name of site -country	Sites included within	Trans-boundary /Serial?	Outstanding Universal Biodiversity Values	Major threats	Feasibility of nomination
Lakshadweeps, India	36 islands and lagoons (including 11 major ones) four large submerged reefs, and five large submerged shallow water banks	Could be considered as part of an Indian Oceans Atolls serial nomination	• Marine biodiversity is abundant and spectacular with many characteristic species, endangered marine fauna, luxuriant coral assemblages—about 105 coral species belonging to 37 genera have been recorded, 114 species of sea weeds and 6 species of sea grasses, 4 pelagic species of sea birds - Sooty Tern , Noddy Tern, Large Crested Tern , and Brownwinged Tern , nest and roost in large colonies, particularly on Pitti Island • Fish comprises 603 species, of which half are 'ornamental' varieties; Skipjack Tuna forms the major fishery of the islands • Four species of turtle, the Olive Ridley, the Leatherback, Hawksbill, and Green Turtle occur in the Lakshadweeps • One declared National Park, and visitation appears well controlled	• Outside of the National Park there is considerable human pressure on the islands, and mining of coral, dredging and sedimentation of corals are ongoing issues	
Maduganga Estuary, Sri Lanka			• High ecological significance • 19 species of endemic plants, and 8 nationally threatened plant species (ie, Lumnitzera littorea – a threatened mangrove species, the only location in Sri Lanka) • 20 species of endemic vertebrates, and 30 species of nationally threatened vertebrates • 13 species of migratory birds • < 1000 ha, but in a state of naturalness, with a variety of intact habitats and vegetation types • Bio-cultural landscape	• Increasing industrial fishery pressure • Potential for rapid development (plans for port development and tourism infrastructure)	• Existing protected area with management plan • Local community (including traditional and commercial fishers) support and work towards protection

Gulf of Mannar, India	21 uninhabited islands		• 3 major marine habitat types—coral reefs, seagrasses and mangroves, recognized for its biodiversity • 128 species of coral, 12 species of seagrass, 9 species of mangroves and many more species of associated flora and fauna • Habitat for dugong and cetaceans	• Evidence of 200 species being commercially exploited and 123 species which are believed to be vulnerable or endangered • Some reefs and surrounding coastal ecosystems are in decline because of coral bleaching, coral mining, destructive fishing, over exploitation, land based pollution	• The Gulf of Mannar was declared a Biosphere Reserve in 1989 for its outstanding natural value • Resource management systems developed to improve the conservation and environmental management of the area • Commitment of local and national government and community to develop and implement the Biosphere Reserve indicates that World Heritage inscription may be feasible
Cocos Keeling Islands, Australia	20 islands	Could be considered as part of an Indian Oceans Atolls serial nomination	• Species richness: 550 species of fish and 99 species of corals are recorded from the marine habitats, of the 99 coral species, two are possibly endemic species, and all but 12 are also found in Western Australia	• Fish, clams and other marine resources have been heavily exploited by the local population, but the impact of this on the marine habitats is unknown • The terrestrial vegetation of South Keeling Islands have been heavily impacted by human occupation, and there are a number of introduced plants and animals that, together with coconut plantations, have greatly changed the island flora and fauna	• Australia has a strong commitment to World Heritage, area could be supported for inscription for multi-site listing

Name of site -country	Sites included within	Trans-boundary /Serial?	Outstanding Universal Biodiversity Values	Major threats	Feasibility of nomination
Maldives	Series of 26 archetypal Indian Ocean atolls	Could be considered as part of an Indian Oceans Atolls serial nomination	• One of the most species rich marine areas within the region • 500 species of terrestrial higher plants, of which more than 300 are used in traditional medicinal practice, and more than 70 are endemic to the Maldives • A number of the atolls have islands with major natural freshwater lakes and wetlands, that are refuges for a range of birds • Coral reefs contain significant genetic and biochemical resources • Detailed biodiversity inventory has not been undertaken, it is estimated that there are about 250 species of scleractinian corals, a total of 55 genera of hermatypic corals have been recorded in the south and 41 genera from the north of the archipelago • Fish populations are both diverse and extremely abundant, over 1200 fish species have been recorded for the reefs and surrounding areas • Invertebrate fauna is largely undocumented but provisional estimates indicate that there are between 100-200 sponges, over 1000 crustacea, 500 molluscs and 100 echinoderms • Five species of turtle and a number of other globally and locally threatened marine species such as whales and whale sharks, black coral, dolphins, pearl oysters, stony corals, eels, skates and rays, parrot fish, bait fish, trochus shells, triton shells, and puffer fish have been declared as protected species • 23 species of birds have been declared as protected species • 15 small marine protected areas, where fishing is prohibited	• No protected island areas, or areas of marine habitat, that exist to sample the Maldives ecosystems for conservation purposes • Destructive fishing practices, little effective compliance for species protection in fisheries	• The lack of government commitment to implement effective marine conservation to date indicates that despite the global biodiversity significance, it is unlikely that the Maldives will be receptive to World Heritage inscription that requires protection of natural marine values in the atolls

Chagos Archipelago, British Indian Ocean Territory (UK)	5 emergent atolls	Could be considered as part of an Indian Oceans Atolls serial nomination	• Highest recorded diversity of corals (about 220 species in 58 genera) in the central Indian Ocean, and has several endemic coral species, fish diversity is documented as 784 species, with 3 species endemic to Chagos, and a further 45 species representing species confined to the Indian Ocean • Globally important for seabirds, turtles and other marine species • 17 pan-tropical Indian Ocean seabirds, most diverse breeding seabird community in the region, (may be of crucial significance to the fishing communities of Maldives and Seychelles) • Beaches significant nesting sites for both green and hawksbill turtles	• Excessive fishing (steps are now being taken to reduce) • Little existing management of the archipelago other than of Diego Garcia	• Managed by British Indian Ocean Territories (UK), with intention to achieve high levels of conservation; substantial stakeholder interest in World Heritage nomination, but strong interaction with regional security activities currently precludes a nomination

Potential Multi-site Listings

Indian Ocean Atolls Chagos (UK)

Lakshadweeps (India)

Maldives, Cocos Keeling (Australia)

The atolls of the central Indian Ocean are the archetypal atolls, and Chagos, Lakshadweeps, and Cocos Keeling are good representative examples of 3 different aspects of the ecology, geomorphology, evolutionary development and subsistence uses of this important global ecosystem type. Charles Darwin formulated his ideas of atoll development from his visit in the Beagle to the Cocos Keeling Islands. The marine ecosystems of Cocos Keeling and Chagos are in excellent condition, and represent very important aspects of global coral and other marine and terrestrial taxa diversity in the Indian Ocean. The subsistence use of atoll resources are well demonstrated by communities in the Lakshadweeps and the Maldives. A recent analysis identified this area (‘North Indian Ocean’)as a crucial global centre of multi-taxon endemism for tropical reef systems (Roberts et al. 2002). These atolls, as a group, also contain an important representation of a major atoll-based cultural landscape, particularly traditional subsistence fishing and subsistence atoll-based agricultural practices.

These atolls, as expressions of the globally unique biodiversity, geomorphic form and evolution patterns of Indian Ocean atolls, would satisfy all of the natural and cultural criteria for World Heritage inscription.

Andaman Sea Islands: Mergui Islands (Myanmar)

Mu Ko Similan NationalPark and Mu Ko Surin National Park (Thailand)

Similan and Surin are about 50 km off the coast of Thailand in the Andaman Sea, and have been consistently identified as of high regional priority for biodiversity conservation. This group of islands are part of a semi-continuous complex of more than 1,000 islands that lie to the west of the Malay Peninsula, off Myanmar and Thailand. While there is little available knowledge of the biodiversity of the Mergui Archipelago (Myanmar), pressures on the biodiversity up until recently are thought to have been limited, although now are beginning to increase as visitation is increasing, and so these islands are presumed to be in good condition. Anecdotal reports from dive tourists support this assumption. While the biodiversity is largely unknown, the intact vegetation on such an array of islands, with associated marine habitats and spectacular geomorphology, is likely to be of high global biodiversity significance. The biodiversity values of this set of forested continental islands, and the limited protection afforded such coastal islands elsewhere in the region, indicates that they are likely to be of global priority and form a potentially important transboundary World Heritage inscription.

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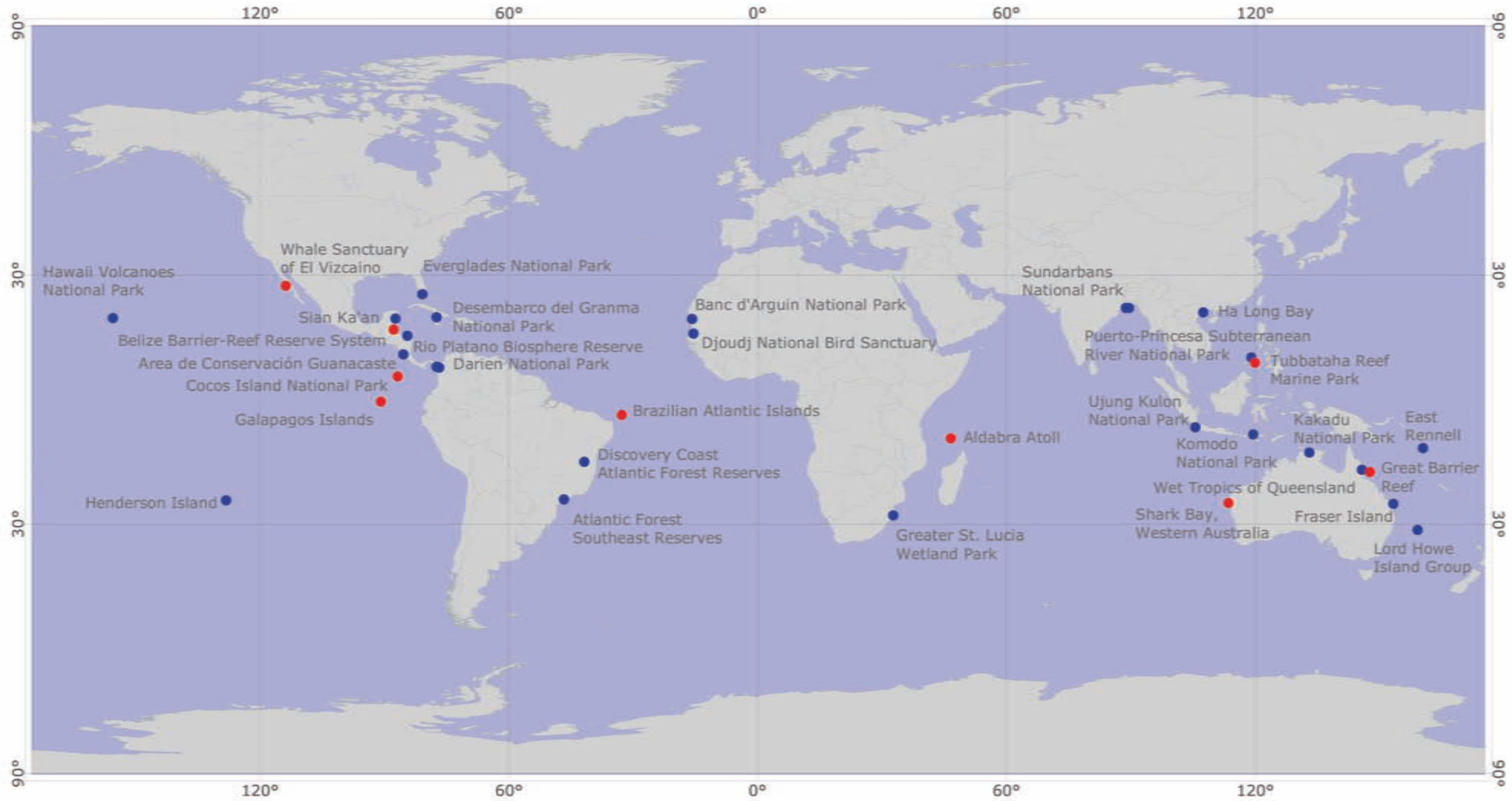

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World Heritage Site

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