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EXPERT WORKSHOP ON ECOLOGICAL CRITERIA AND BIOGEOGRAPHIC CLASSIFICATION SYSTEMS FOR MARINE AREAS IN NEED OF PROTECTION
Azores, Portugal, 2-4 October 2007

REPORT OF THE EXPERT WORKSHOP ON ECOLOGICAL CRITERIA AND BIOGEOGRAPHIC CLASSIFICATION SYSTEMS FOR MARINE AREAS IN NEED OF PROTECTION

INTRODUCTION

1. At its eighth meeting, the Conference of the Parties to the Convention on Biological Diversity (CBD) requested the Executive Secretary to refine, consolidate and, where necessary, develop further scientific and ecological criteria for the identification of marine areas in need of protection, and biogeographical and other ecological classification systems, drawing on expertise and experience at the national and regional scale. In this regard, the Conference of the Parties decided to convene a scientific expert workshop and requested the Executive Secretary to provide the results of this workshop to the Subsidiary Body on Scientific, Technical and Technological Advice prior to its ninth meeting as well as to the Secretary-General of the United Nations for the purpose of informing the process under the General Assembly of the United Nations (decision VIII/24, para. 46).

2. In pursuance of paragraph 46 of decision VIII/24, the Executive Secretary, with the generous financial support from the Government of Portugal, organized an Expert Workshop on Ecological Criteria and Biogeographic Classification Systems for Marine Areas in Need of Protection from 2 to 4 October 2007 in Azores, Portugal. The Workshop was held at the Hotel Marina Atlântico, Ponta Delgada, San Miguel Island, Azores, Portugal.

3. The terms of reference of the Workshop were, as described in annex II of decision VIII/24, to: (i) refine and develop a consolidated set of scientific criteria for identifying ecologically or biologically significant marine areas in need of protection, in open ocean waters and deep sea habitats, building upon existing sets of criteria used nationally, regionally and globally; (ii) compile biogeographical and ecological classification systems for delineating ocean regions and ecosystems, building on existing broad classification systems, and including more detailed subregional classification systems where they exist in a nested approach, and initiate future development by making recommendations for further work to fill gaps; and (iii) compile a consolidated set of scientific criteria for representative networks of marine protected areas, including in open ocean waters and deep-sea habitats.

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4. The Workshop stressed that, in accordance with the relevant decisions, marine protected areas are one of the essential tools to help achieve conservation and sustainable use of biodiversity in marine areas beyond areas of national jurisdiction, and noted the goals of the World Summit on Sustainable Development (WSSD) including "the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks, by 2012." In order to structure the workshop discussions and provide appropriate scientific advice in response to its terms of reference, the workshop felt the need to be clear about the objective of a global network. Wording from decisions of the Conference of the Parties was examined, and the following objective was adopted: *To maintain, protect and conserve global marine biodiversity through conservation and protection of its components in a biogeographically representative network of ecologically coherent sites. Using the best available scientific information, the precautionary approach and ecosystem approach will be applied to help halt the losses in biodiversity.*

5. The Workshop was attended by experts from Brazil, Canada, Croatia, Egypt, Honduras, India, Mexico, Mozambique, New Zealand, Portugal, Russian Federation, Slovenia, Thailand, Togo, and Yemen. The experts were selected among experts nominated by Governments in consultation with the Bureau of the Conference of the Parties. The Workshop was also represented by the Bureau of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) and by a resource person provided by Australia. Experts/observers from the following United Nations bodies, specialized agencies, and other bodies attended: the United Nations Division of Ocean Affairs and the Law of the Sea (UNDOALOS), the Food and Agriculture Organization of the United Nations (FAO), the Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention), the National Oceanic and Atmospheric Administration (NOAA), the World Conservation Union (IUCN), the Global Coral Reef Monitoring Network, and Conservation International. Experts from local institutions also attended as observers. The list of participants is attached as annex I.

ITEM 1. OPENING OF THE MEETING AND ORGANIZATIONAL MATTERS

6. The Workshop was opened at 9 a.m. on Tuesday, 2 October 2007 by Mr. Kalemani Jo Mulongoy on behalf of the Executive Secretary of the Convention on Biological Diversity. Mr. Mulongoy welcomed participants and expressed his appreciation to the Government of Portugal for hosting the Workshop, and other governments and organizations for sponsoring their representatives. He then provided a brief background for the organization of the Workshop and clarified the scope of the Workshop, noting in particular the importance of the outputs of the Workshop in achieving the 2010 target. He wished a great success to the Workshop in its deliberation.

7. Mr. Ricardo Serrao Santos, from the University of the Azores, welcomed the participants on behalf of the Regional Government of the Azores. He explained the biological and ecological significance of the marine waters and deep sea habitats of the Azores region, which became the foundation for the long-term tradition of the region's efforts on deep-sea marine species and habitat conservation. He then provided some examples of the recent initiatives of this region under the European Union directives on the management of the sea bird and marine protected areas as well as in fisheries management.

8. Mr. João Rosmaninho de Menezes, President of the Institute for the Conservation of Nature and Biodiversity (ICNB), delivered a welcoming remark on behalf of the Government of Portugal. In recognition of biodiversity and climate change as top priority agenda, he underlined the need for our concerted efforts to move forward in developing and implementing a comprehensive range of policies to effectively address these issues, including regulatory measures, economic incentives, and cross-sectoral partnerships. He then drew particular attention to vulnerable deep sea habitats, such as seamounts, cold water coral, and hydrothermal vents, which are also found in marine waters around the Azores and in the wider range of the northeastern Atlantic Ocean. Informing the workshop of the existing efforts on marine protected areas as well as other national efforts within the Exclusive Economic Zone and the extended

continental shelf of Azores, he wished that the Workshop would contribute to a better protection and sustainable use of our seas.

ITEM 2. ELECTION OF OFFICERS, ADOPTION OF THE AGENDA AND ORGANIZATION OF WORK

9. After a brief self-introduction of the participants, the Workshop elected Mr. Ricardo Serrão Santos (Portugal) as the Workshop Chair.

10. The Workshop adopted the agenda, as contained in the document UNEP/CBD/EWS.MPA/1/1.

11. The Workshop approved the organization of work for the meeting, with the following changes to the proposed organization of work contained in annex II to the annotations to the provisional agenda (UNEP/CBD/EWS.MPA/1/1/Add.1): (a) All the discussion took place in plenary except for item 3, when a break-out group session was organized to address the criteria for (i) open ocean waters and (ii) deep sea habitats; (b) The presentations for items 3 and 5 and related general discussions were made in a consecutive manner in plenary, and the additional discussion on item 3 took place in the break-out group session mentioned above. The break-out group on open ocean waters was chaired by Mr. John Leathwick (New Zealand), and that of deep sea habitats by Ms. Elva G. Escobar (Mexico). Ms.Tatjana Bakran-Petricioli (Croatia) and Mr. L. Kannan (India) served as rapporteurs for the break-out groups on open ocean waters and deep sea habitats respectively; and (c) Item 4 was considered after the completion of item 3 and 5.

12. The Secretariat of the Convention on Biological Diversity briefed the Workshop on the terms of reference and the expected outputs of the Workshop.

ITEM 3. REFINING AND DEVELOPING A CONSOLIDATED SET OF SCIENTIFIC CRITERIA FOR IDENTIFYING ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS IN NEED OF PROTECTION, IN OPEN OCEAN WATERS AND DEEP-SEA HABITATS, BUILDING UPON EXISTING SETS OF CRITERIA USED NATIONALLY, REGIONALLY AND GLOBALLY

and

ITEM 5. COMPILING A CONSOLIDATED SET OF SCIENTIFIC CRITERIA FOR REPRESENTATIVE NETWORKS OF MARINE PROTECTED AREAS, INCLUDING IN OPEN OCEAN WATERS AND DEEP-SEA HABITATS

13. For the consideration of these items, the Workshop had before it two documents, UNEP/CBD/COP/8/INF/16 (Protected areas: consideration of the recommendations of the Ad Hoc Open-ended Working Group on Protected Areas) and UNEP/CBD/COP/8/INF/39 (Report of the scientific experts' workshop on criteria for identifying ecologically or biologically significant areas beyond national jurisdiction- 6-8 December 2005, Ottawa) as well as a compilation of e-mail communications contributed by participants prior to the workshop under these agenda items in response to the key framing questions listed in annex III to the annotations to the provisional agenda (UNEP/CBD/EWS.MPA/1/1/Add.1).

14. In addition, two presentations were made on the existing sets of criteria used nationally, regionally and globally for (i) identifying ecologically or biologically significant marine areas in need of protection (agenda item 3) and (ii) representative networks of marine protected areas (agenda item 5), by Mr. Jake Rice and Mr. Jeff Ardron respectively.

15. Mr. Jake Rice's presentation mainly focused on reporting the results of a scientific experts workshop on criteria for identifying ecologically or biologically significant areas beyond national jurisdiction, held from 6 to 8 December 2005, in Ottawa, Canada. He began with useful clarification regarding the concepts of areas in need of enhanced management, ecologically and biologically significant areas, and marine protected areas. He then explained scientific criteria for ecological and biological significance, as identified by the Ottawa Workshop, including: uniqueness or rarity, critical life-history functions/habitats, vulnerability, productivity, and biological diversity. He also addressed the Ottawa Workshop's deliberation on the representativity criteria.

16. Mr. Jeff Ardron began his presentation with a question, "what is a representative network?", highlighting ecological coherence as an important element to a representative network. He then explained three types of criteria: scientific, vulnerability, and practical criteria. For the scientific criteria, he proposed five criteria, including: representativity, adequacy/viability, replication, connectivity, and ecological significance. In view of practical challenges involved in the application of these criteria, he proposed three initial steps: (i) protection of ecologically and biologically significant areas, (ii) biogeographic representation, and (iii) ensuring good spatial distribution. He also suggested strategies in overcoming constraints related to limited data availability: (i) use stakeholder and expert knowledge, (ii) identify best examples, and (iii) identify the best-known examples.

17. The break-out group session was then convened and prepared criteria building on the results of the Ottawa Workshop (2005). These criteria were then revised and consolidated in the plenary session as attached in annex II.

18. With regard to criteria for identification of representative network of marine protected areas, the workshop considered the proposed criteria put forward by Mr. Jeff Ardron, and refined them as attached in annex III.

ITEM 4. COMPILING BIOGEOGRAPHICAL AND ECOLOGICAL CLASSIFICATION SYSTEMS FOR DELINEATING OCEAN REGIONS AND ECOSYSTEMS, BUILDING ON EXISTING BROAD CLASSIFICATION SYSTEMS, AND INCLUDING MORE DETAILED SUBREGIONAL CLASSIFICATION SYSTEMS WHERE THEY EXIST IN A NESTED APPROACH, AND INITIATING FUTURE DEVELOPMENT BY MAKING RECOMMENDATIONS FOR FURTHER WORK TO FILL GAPS

19. For the consideration of this item, the Workshop had before it documents containing the summary results of the Scientific Experts' Workshop on Biogeographic Classification Systems in Open Ocean and Deep Seabed Areas Beyond National Jurisdiction, held from 22-24 January 2007, at the National University of Mexico, Mexico City, as a joint expert effort under the co-sponsorship of United Nations Educational, Scientific and Cultural Organization (UNESCO), Intergovernmental Oceanographic Commission (IOC), The World Conservation Union (IUCN), Australia, Canada, Mexico and the J.M. Kaplan Fund. The Workshop had before it UNEP/CBD/COP/8/INF/34 (Global coastal and marine biogeographic regionalization as a support tool for implementation of the Convention's programmes of work) as well as its updated version published in *Bioscience* (Vol.57, No.7, pp. 573-583), which describes a new global system for coastal and shelf areas: the marine ecoregions of the world (MEOW), a nested system for 12 realms, 62 provinces and 232 ecoregions, and other information documents provided by the Workshop participants and relevant partners, as listed in annex I to the annotations to the provisional agenda (UNEP/CBD/EWS.MPA/1/1/Add.1). In addition, the Workshop had before it the compilation of electronic communications contributed by participants prior to the Workshop under this agenda item in response to the key framing questions listed in annex III to the annotations to the provisional agenda (UNEP/CBD/EWS.MPA/1/1/Add.1).

20. At the plenary session, two presentations were made on: (i) overview of existing biogeographical and ecological classification systems by Mr. Ian Cresswell, and (ii) key results and recommendations of the Mexico City Workshop as well as the on-going and planned follow-up activities by Ms. Elva G. Escobar.

21. Mr. Cresswell provided an overview of existing global bioregionalisation, including marine zoogeography, large marine ecosystems, biogeochemical provinces, and the classification system of the Marine Ecosystems of the World (MEOW). He addressed constraints associated with global classification, in particular difficulties related to delineating boundaries, data paucity, and limitations in combining classifications for pelagic and benthic systems. He provided various examples of marine bioregionalizations undertaken at regional and national levels, including bioregionalisation of the southern ocean (e.g. key outputs from the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) August 2007 Workshop), Russian experiences in the Arctic Ocean, as well as Australian and New Zealand experiences. Recognizing that there is no single method of regionalization dominant in use, and mathematical techniques are often limited by the lack of data, he concluded that analysis of existing data layers combined with expert knowledge, including judicious use of biological data, would provide the best solution at present.

22. Ms. Escobar provided a background to the efforts made at the Mexico City Workshop, including the commitments made on marine protected areas by the World Summit on Sustainable Development and the decisions made by the eighth meeting of the Conference of the Parties to the Convention on Biological Diversity. The Mexico City Workshop provided information on principles and framework for recognition and classification of coherent biogeographic regions of the open ocean waters and deep sea habitats, and discussed methods to describe and delineate distinct areas of the deep seabed. The Workshop considered some principles in its undertaking, such as: (i) to separate benthic and pelagic systems; (ii) not to use diagnostic species concept; (iii) not to apply terrestrial biome concept as it is not appropriate because species composition matters; (iv) to reflect processes not patterns, and (v) consider systems as being hierarchical/nested. She highlighted the unequal availability of data by global regions as one of the key constraints. She then presented key outputs of pelagic and benthic groups with maps, and informed the Workshop of their plan for publication of the results.

23. After the exchange of views and ideas during the plenary, the Workshop considered the proposed summary and recommendations put forward by Mr. Ian Cresswell and Ms. Elva G. Escobar, and refined them as attached in annex IV.

ITEM 6. OTHER MATTERS

24. No other matters were discussed.

ITEM 7. ADOPTION OF THE REPORT

25. Participants considered and adopted the report of the Workshop on the basis of a draft report prepared and presented by the Chair with some changes.

ITEM 8. CLOSURE OF THE MEETING

26. In closing the workshop, the Chair thanked all the workshop participants for their contribution to successfully concluding the Workshop, highlighting that it was an honour to host this Workshop in Azores, where serious efforts are being made for marine protected areas. Mr. Kalemani Jo Mulongoy reiterated his appreciation to the Government of Portugal for generously hosting the Workshop, and expressed his sincere appreciation to Workshop participants, in particular the chair of the Workshop, the chairs and rapporteurs of the breakout groups, for their valuable contributions. He also recognized the key

role played by Ms. Maria Elisa Oliveira from the Institute for Nature Conservation and Biodiversity, in organizing and preparing for the workshop.

27. Mr. Frederico Cardigos, Regional Director of Environment, made some closing remarks, on behalf of the Regional Secretary of the Environment and the Sea. He highlighted that the Azores was the first biogeographical region to classify its habitats under the European Natura 2000 network (13% of the territory), designating 23 sites of conservation importance and 15 special protected areas. With a vast exclusive economic zone, close to one million square kilometres, the Regional Government was committed to protecting its marine environment and biodiversity. Mr. Cardigos then informed the Workshop of the Government's initiatives on the management of island natural parks. The marine park of the Azores, designated beyond 12 nautical miles, would be managed by the Regional Government in partnership with various stakeholders, including the local community and the University of Azores. A network of ecological centres had been also established to enhance environmental education of the younger generation.

28. The Workshop Chair declared the Workshop closed at 5 p.m. on Thursday, 4 October 2007.

Annex I

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Annex II

TABLE 1. SCIENTIFIC CRITERIA FOR IDENTIFYING ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS IN NEED OF PROTECTION, IN OPEN-OCEAN WATERS AND DEEP-SEA HABITATS 1/

Criteria	Definition	Rationale	Examples 2/	Consideration in application
Uniqueness or Rarity	Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features	• Irreplaceable • Loss would mean the probable permanent disappearance of diversity or a feature,or reduction of the diversity at any level.	*Open ocean waters* Sargasso Sea, Taylor column, persistent polynyas. *Deep sea habitats* endemic communities around submerged atolls; hydrothermal vents; sea mounts; pseudo-abyssal depression	• Risk of biased-view of the perceived uniqueness depending on the information availability • Scale dependency of features such that unique features at one scale may be typical at another, thus a global and regional perspective must be taken

1/ An area qualifies as an ecologically or biologically significant area in need of enhanced protection if it meets one or several of the following criteria. These criteria are to guide selection, but the decision should be based on a precautionary approach. Vulnerability and naturalness will often be applied in combination with other criteria.

2/ See also appendix 1 to annex II

Criteria	Definition	Rationale	Examples 2/	Consideration in application
Special importance for life history stages of species	Areas that are required for a population to survive and thrive.	Various biotic and abiotic conditions coupled with species-specific physiological constraints and preferences tend to make some parts of marine regions more suitable to particular life-stages and functions than other parts.	Area containing (i) breeding grounds, spawning areas, nursery areas, juvenile habitat or other areas important for life history stages of species; or (ii) habitats of migratory species (feeding, wintering or resting areas, breeding, moulting, migratory routes).	• Connectivity between life-history stages and linkages between areas: trophic interactions, physical transport, physical oceanography, life history of species • Sources for information include: e.g. remote sensing, satellite tracking, historical catch and by-catch data, Vessel monitoring system (VMS) data. • Spatial and temporal distribution and/or aggregation of the species.
Importance for threatened, endangered or declining species and/or habitats *3/*	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.	To ensure the restoration and recovery of such species and habitats.	Areas critical for threatened, endangered or declining species and/or habitats, containing (i) breeding grounds, spawning areas, nursery areas, juvenile habitat or other areas important for life history stages of species; or (ii) habitats of migratory species (feeding, wintering or resting areas, breeding, moulting, migratory routes).	• Includes species with very large geographic ranges. • In many cases recovery will require reestablishment of the species in areas of its historic range. • Sources for information include: e.g. remote sensing, satellite tracking, historical catch and by-catch data, vessel monitoring system (VMS) data.

3/ "Declining" defined according to the criteria of the Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention)

Criteria	Definition	Rationale	Examples 2/	Consideration in application
Vulnerability, Fragility, Sensitivity, or Slow recovery	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery.	The criteria indicate the degree of risk that will be incurred if human activities or natural events in the area or component cannot be managed effectively, or are pursued at an unsustainable rate.	*Vulnerability of species* • Inferred from the history of how species or populations in other similar areas responded to perturbations. • Species of low fecundity, slow growth, long time to sexual maturity, longevity (e.g. sharks, etc). • Species with structures providing biogenic habitats, such as deepwater corals, sponges and bryozoans; deep-water species. *Vulnerability of habitats* • Ice-covered areas susceptible to ship-based pollution. • Ocean acidification can make deep sea habitats more vulnerable to others, and increase susceptibility to human induced changes.	• Interactions between vulnerability to human impacts and natural events • Existing definition emphasizes site specific ideas and requires consideration for highly mobile species • Criteria can be used both in its own right and in conjunction with other criteria.

Criteria	Definition	Rationale	Examples 2/	Consideration in application
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.	Important role in fuelling ecosystems and increasing the growth rates of organisms and their capacity for reproduction	• Frontal areas • Upwellings • Hydrothermal vents • Seamounts polynyas	• Can be measured as the rate of growth of marine organisms and their populations, either through the fixation of inorganic carbon by photosynthesis, chemosynthesis, or through the ingestion of prey, dissolved organic matter or particulate organic matter • Can be inferred from remote-sensed products, e.g., ocean colour or process-based models • Time series fisheries data can be used, but caution is required

Criteria	Definition	Rationale	Examples 2/	Consideration in application
Biological Diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.	Important for evolution and maintaining the resilience of marine species and ecosystems	• Sea-mounts • Fronts and convergence zones • Cold coral communities • Deep-water sponge communities	• Diversity needs to be seen in relation to the surrounding environment • Diversity indices are indifferent to species substitutions • Diversity indices are indifferent to which species may be contributing to the value of the index, and hence would not pick up areas important to species of special concern, such as endangered species • Can be inferred from habitat heterogeneity or diversity as a surrogate for species diversity in areas where biodiversity has not been sampled intensively.
Naturalness	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation.	• To protect areas with near natural structure, processes and functions • To maintain these areas as reference sites • To safeguard and enhance ecosystem resilience	Most ecosystems and habitats have examples with varying levels of naturalness, and the intent is that the more natural examples should be selected.	• Priority should be given to areas having a low level of disturbance relative to their surroundings • In areas where no natural areas remain, areas that have successfully recovered, including reestablishment of species, should be considered. • Criteria can be used both in its own right and in conjunction with other criteria.

Appendix to Annex II

EXAMPLES OF FEATURES THAT WOULD MEET THE SCIENTIFIC CRITERIA FOR IDENTIFYING ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS OR SPECIES 4/

Benthic features

- Seamount communities
- Cold water coral reefs
- Coral, sponge and bryozoan aggregations
- Hydrothermal vent ecosystems
- Gas hydrates
- Cold seeps
- Pseudo abyssal depressions (basin-like structure)
- Canyons
- Submerged atolls, bank and guyot communities
- Carbonate mounds
- Trenches

Pelagic habitats

- Upwelling areas
- Fronts
- Gyres
- Recurrent or persistent polynyas

Vulnerable and /or highly migratory species

- Whales and other cetaceans
- Seabirds,
- Sea turtles
- Sharks
- Highly migratory fish
- Discrete deep-sea fish populations

4/ This list is not exhaustive.

Annex III

SCIENTIFIC CRITERIA AND GUIDANCE FOR SELECTING AREAS TO ESTABLISH A REPRESENTATIVE NETWORK OF MARINE PROTECTED AREAS, INCLUDING IN OPEN OCEAN WATERS AND DEEP-SEA HABITATS

Participants agreed on the following objective of a global representative network of marine protected areas:

> ***Maintain, protect and conserve global marine biodiversity through conservation and protection of its components in a biogeographically representative network of ecologically coherent sites.***

Participants further agreed that the coherence of the network of marine protected areas (MPAs) can be attained by diverse mechanisms that promote the genetic flow, through connectivity, among populations of marine organisms with planktonic life history phases. Amongst other are ocean currents providing homogeneity within a dispersal area and geographical distance and barriers that promote isolation and associated biological diversity.

Recognizing that:

- ecological and biological criteria are necessary in the identification and selection of areas to protect biological diversity of the open oceans and deep seas;
- other criteria, such as social and economic ones, are likely also necessary, but outside of the terms of reference of this Expert Workshop;
- effective protection of biological diversity in the open ocean waters and deep sea habitats will require enhanced management throughout the marine environment; and
- marine protected areas are a necessary component of such enhanced management, but the implementation of other management measures is also required.

The Expert Workshop recommends that the following four initial steps be taken:

- **Scientific identification of an initial set of ecologically or biologically significant areas.** The criteria in annex II should be used, considering the best scientific information available, and applying the precautionary approach. This identification should focus on developing an initial set of sites already recognised for their ecological values, with the understanding that other sites could be added as new / better information comes available.
- **Develop / choose a biogeographic habitat and/or community classification system.** This system should reflect the scale of the application, and address the key ecological features within the area. Usually, this will entail a separation of at least two realms –pelagic and benthic.
- **Drawing upon steps 1 & 2 above, iteratively use qualitative and/or quantitative techniques to identify sites to include in a network.** Their selection for consideration of enhanced management should reflect their recognised ecological importance, vulnerability, and address the requirements of ecological coherence through:
    - representativity
    - connectivity
    - replication
- **Assess the adequacy and viability of the selected sites.** Consideration should be given to their size, shape, boundaries, buffering, and appropriateness of the site management regime.

Table 2. SCIENTIFIC CRITERIA AND GUIDANCE FOR SELECTING AREAS TO ESTABLISH A REPRESENTATIVE NETWORK OF MARINE PROTECTED AREAS, INCLUDING IN OPEN OCEAN WATERS AND DEEP-SEA HABITATS

Required network criteria	Definition	Applicable site-specific considerations (inter alia)
Ecologically and biologically significant areas	Ecologically and biologically significant areas are geographically or oceanographically discrete areas that provide important services to one or more species/populations of an ecosystem or to the ecosystem as a whole, compared to other surrounding areas or areas of similar ecological characteristics, or otherwise meet the criteria as identified in annex II.	• Uniqueness or rarity • Special importance for life history stages of species • Importance for threatened, endangered or declining species and/or habitats 5/ • Vulnerability/ fragility/ sensitivity/ slow recovery • Biological productivity • Biological diversity • Naturalness
Representativity	Representativity is captured in a network when it consists of areas representing the different biogeographical subdivisions of the global oceans and regional seas that reasonably reflect the full range of ecosystems, including the biotic and habitat diversity of those marine ecosystems.	A full range of examples across a biogeographic habitat or community classification*;* relative health of species and communities; relative intactness of habitat(s); naturalness
Connectivity	Connectivity in the design of a network allows for linkages whereby protected sites benefit from larval and/or species exchanges, and functional linkages from other network sites. In a connected network, individual sites benefit one another.	Currents; gyres; physical bottlenecks; migration routes; species dispersal; detritus; functional linkages. Naturally unconnected sites may also be included (e.g., isolated seamount communities)
Replicated ecological features	Replication of ecological features means that more than one site shall contain examples of a given feature in the given biogeographic area. The term *features* means "species, habitats and ecological processes" that naturally occur in the given biogeographic area.	Accounting for uncertainty, natural variation and the possibility of catastrophic events. Features that exhibit less natural variation or are precisely defined may require less replication than features which are inherently highly variable or are only very generally defined.
Adequate & Viable sites	Adequate & viable sites indicate that all sites within a network should have size and protection sufficient to ensure the ecological viability and integrity of the feature(s) for which they were selected.	Size; shape; buffers; persistence of features; threats; surrounding environment (context); physical constraints; scale of features/processes; spillover/compactness;

5/ Declining defined accordingly with the criteria of the Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention)

Annex IV

BIOGEOGRAPHICAL AND ECOLOGICAL CLASSIFICATION SYSTEMS FOR DELINEATING OCEAN REGIONS AND ECOSYSTEMS AND RECOMMENDATIONS FOR FURTHER WORK

In discussing the role of biogeographical and ecological systems for delineating ocean regions and ecosystems, the meeting adopted the use of the term 'bioregionalization' to cover all existing systems for ease of communication.

The Workshop:

CONSIDERED

Classification and bioregionalization systems that are currently in use, under development or have been developed in the past, including several novel methods being undertaken at regional and sub-regional levels, and their outputs (Appendix 1 provides a list of classifications that were considered at various levels of detail)

NOTED

The importance of bioregionalizations at the global, regional and subregional levels as a key data layer in the identification and selection of components of a representative network of marine protected areas, including in open oceans and deep sea habitats.

Gaps in existing efforts

- Agreement on a unitary set of principles to underpin the ongoing development and adoption of a global bioregionalization;
- The need for further work to align and nest existing and developing regional and subregional bioregionalizations;
- A widely available mechanism to consolidate existing data, maps and coverages of bioregionalizations, biogeographic features, and geopolitical information;
- A broader understanding and dissemination of numerical classification methods at regional scales in relatively data rich regions;
- Consider the connectivity between the benthic and pelagic realms in a second step; and
- Wider adoption of emerging statistical prediction techniques for interpolating point biological data.

Outputs of Mexico City Workshop

- Ongoing work on a Global Open Oceans and Deep Sea-habitats bioregionalization (GOODS regionalisation) as an output from the Scientific Experts' Workshop on Biogeographic Classification Systems in Open Ocean and Deep Seabed Areas Beyond National Jurisdiction, held from 22-24 January 2007, at the National University of Mexico, Mexico City, (under the auspices of a joint expert effort under the co-sponsorship of UNESCO, IOC, IUCN, Australia, Canada, Mexico and the J.M. Kaplan Fund); and
- That a detailed method paper on the GOODS bioregionalization was required;

AGREED

- That there is an urgent need to complete the GOODS bioregionalization as one of the key base layers at the global level for the development of a representative network of marine protected areas beyond areas of national jurisdiction;
- To request that the GOODS Steering Committee make clear the date expected to deliver the final report and maps, and establish a clear process for delivery of products from the Mexico City Workshop;

- That the use of the global system allows more detailed subregional classification systems to be nested within any global system and utilised to provide greater understanding of biological patterns and processes at the regional and subregional level;
- That the use of the global system be integrated effectively with biogeographic classification systems developed covering areas within national jurisdictions; and
- To provide guidance in appendix 2 to encourage an appropriate balance between scientific robustness and classification stability for management purposes.

RECOMMENDED

- That a set of principles for the ongoing development and adoption of a global bioregionalization be finalized, building on the work of the Mexico City Workshop, as listed in appendix 3;
- The urgent completion of the GOODS bioregionalization, requesting the authors to prepare a summary of the current activities that have been completed and those that are yet to finish, including strategies to fill in the gaps and methods to finish the work;
- That further work need to be done to align and nest existing and developing regional and subregional bioregionalizations within a global context;
- The application of appropriate global or regional bioregionalization scheme in selecting representative sites for networks of MPAs; and
- That the results of this Workshop as well as the GOODS bioregionalization be presented at the thirteenth meeting of SBSTTA, the ninth meeting of the Conference of the Parties to the CBD (as a side-event for the case of GOODS bioregionalization), and the next meeting of the United Nations Ad Hoc Open-ended Informal Working Group of the General Assembly to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction.

Appendix 1 to Annex IV

EXISTING GLOBAL AND REGIONAL/SUBREGIONAL MARINE REGIONALIZATIONS

- Zoogeography of the Sea (Ekman 1953)
- Marine Biogeography (Hedgpeth 1957)
- Marine Zoogeography (Briggs 1974)
- Classification of Coastal and Marine Environments (Hayden et al. 1984)
- Large Marine Ecosystems (Sherman and Alexander 1989)
- A Global Representative System of Marine Protected Areas (Kelleher et al. 1995)
- Ecological Geography of the Sea (Longhurst 1998)
- Ecoregions: the ecosystem geography of the oceans and continents (Bailey 1998)
- Biogeography of the OSPAR Maritime Area (Dinter, 2001)
- Marine Ecoregions of the World (MEOW) (Spalding et al 2006)
- Development of an Ecologic Marine Classification in the New Zealand Region (Snelder et al 2006)
- Integrated Marine and Coastal Regionalization for Australia (Commonwealth of Australia, 2006)
- Marine Bioregionalization in the Russian Arctic (Ivanov and Spiridonov, 2007)
- Perspective scheme of the coastal and marine protected natural areas and other types of reserves for the Seas of Russian Far-East (North-West Pacific) (WWF Russia, in preparation)
- Biogeographic Criteria for the Classification of Open and Deep Ocean Areas (A joint expert effort under the co-sponsorship of UNESCO, IOC, IUCN, Australia, Canada, Mexico and the J.M. Kaplan Fund, 2007)

Appendix 2 to Annex IV

GUIDANCE FOR FINALIZING GOODS REGIONALIZATION SUPPORTING PAPER

- Compile a table on methodologies, tools used and a review of the existing classifications.
- Define the data in the databases used for the different regions;
- Describe the nesting strategy considering from the finest classification scale to the global scale;
- Describe the level of robustness used to define what is being done on the classification system and if needed follow the terrestrial biological planning tools;
- Describe steps related to produce the maps;
- Provide a set of variables with adequate set of data and environmental drivers
- Use as a principle data if these are available and if not use proxies;
- Define synergies and overlaps with any existing subregional classifications;
- Provide a brief overview of the general principles for the two realms (pelagic/benthic) and the different classification systems;
- Make explicit which criteria were used by the benthic group to separate the two bathyal zones: the upper and lower bathyal; and
- Make explicit the role of biological data leading to the results.

Appendix 3 to Annex IV

DRAFT SET OF PRINCIPLES FOR GLOBAL BIOREGIONALIZATION

(*building upon the results of the Mexico City Workshop*)

Overall:

- To approach benthic and pelagic systems separately;
- To use information as large a set of taxa as possible or as are available;

- Use the province level (include definition);
- Try to reflect processes not just patterns; and
- Nest systems hierarchically

The pelagic realm:

- The use of fuzzy boundaries for each province;
- Consider the description of transition zones, boundary currents, upwelling systems as main features in the pelagic realm; and
- Recognize the importance of hotspots and migratory species

The benthic realm:

- Start with a habitat/functional classification system and then overlay available species composition and distribution patterns;
- Consider the connectivity between the benthic and pelagic realms in a second step; and
- Focus on cores of provinces because boundaries are poorly known and controversial

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