# adequacy connectivity representativity planning 2012 resilience



National and Regional Networks of Marine Protected Areas: A Review of Progress

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Since 1981 UNEP-WCMC has compiled the World Database on Protected Areas (WDPA), a joint project of UNEP and IUCN, produced by UNEP-WCMC and the IUCN WOrld Commission on Protected Areas (IUCN WCPA). The WDPA is the largest assembly of data on the world's terrestrial and marine protected areas. The database holds spatial and attribute information from governments and NGOs on over 120,000 national and international protected areas. Increasingly, the WDPA also holds information on private, community and co-managed reserves. It is also the basis for the UN List responding to the United Nations General Assembly resolution in 1962 to record the status of the world's protected areas.

In January 2005 an online and searchable database on marine protected areas, MPAGlobal, was launched as a collaborative effort to improve the marine specific contents of the WDPA. This effort was managed within the *Sea Around Us* Project, an activity initiated and funded by the Pew Charitable Trusts, and hosted by the University of British Columbia's (UBC) Fisheries Centre. In late 2008, the data improvements made through the MPA Global process were fully re-integrated into the WDPA, which had undertaken a two year process of redesign and redevelopment.

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### **EXECUTIVE SUMMARY**

Most of the marine protected areas (MPAs) around the world, estimated to number about 5000, have been established both on an ad hoc basis and through systematic planning processes. The Convention on Biological Diversity (CBD) requires that Party states establish, by 2012, comprehensive, effectively managed, and ecologically representative national and regional systems of protected areas, and that there should be effective conservation of at least 10% of each of the world's ecological regions by 2010. Many countries have established their own national targets which provide an incentive for the introduction of a systematic conservation planning approach to the establishment of MPAs, and there are now many initiatives to develop ecologically representative MPA networks. This report reviews the progress being made, using information from the literature, MPA practitioners and planners, and conservation experts. The objectives of the report are to:

- Disseminate experiences and lessons learned from initiatives under way at regional, national and sub-national levels;
- Promote a better understanding of the underlying principles and concept of, the scientific basis for, and the issues to be considered when developing MPA networks, as laid out in the guidelines prepared by the World Commission on Protected Areas (WCPA)-Marine and the CBD;
- Recommend actions needed to promote the establishment of effective MPA networks.

#### NATIONAL ECOLOGICAL MPA NETWORKS

The report describes 30 national and 35 sub-national ecological MPA network initiatives. Most are still under development with very few formally gazetted, and even fewer fully managed. Those that have been declared and are being implemented are primarily networks that cover small areas, or that are part of large management initiatives or multiple-use MPAs. Comparison is difficult because of the wide range of approaches and different spatial or geographical

scales, but the many initiatives underway provide much experience on how MPA networks can be established in practice, and how they can be adapted to different needs and priorities. As the CBD Programme of Work for the protection of marine biodiversity recognises, there are at least three levels of spatial planning for MPAs within a country: a core system of no-take areas (NTAs) within a large MPA; a larger system of multiple-use MPAs, including fishery management areas; and a national MPA system embedded within a national integrated coastal management programme and overall management framework for the Exclusive Economic Zone (EEZ). This will inevitably result in a degree of complexity.

Most national ecological MPA networks being planned comprise a range of different types of MPAs including both NTAs and multiple use sites. In several countries, such as Belize, Cuba, and Mexico, MPAs are part of a broad conservation planning process to develop a national protected area system plan. In other countries and territories, such as South Africa. Tanzania, Rodrigues (Mauritius), USA and Canada, MPA networks are being developed separately from, although sometimes in coordination with, the process being used to establish terrestrial protected area systems. Where MPA management is devolved to state or local-level governments, MPA networks are generally being planned using a hierarchical approach, with small networks nested within larger national networks, as in Mexico, Indonesia, Australia, and the USA. This approach can however lead to a lack of harmonisation, as seen in Australia, where the state of Victoria is establishing a system of NTAs only, whereas other states and the Commonwealth are including multiple use MPAs in their networks.

Increasingly, NTA networks are being developed as part of the zonation of multiple use MPAs, particularly large ones such as the Great Barrier Reef Marine Park in Australia, the SeaFlower MPA in the San Andrés Archipelago, Colombia, the Channel Islands Marine Sanctuary in California, or as an integral part of a broader coastal management plan as on Socotra Island in Yemen. The South-east Region MPA System Plan in Australia demonstrates how an MPA network can be integrated into a range of broader measures, such as recovery plans for listed species, fishery management closures and regulations for oil and gas activities. Belize demonstrates how a national MPA network can be part of not only a national integrated coastal management plan but also a regional MPA network (the Mesoamerican Barrier Reef), which incorporates international protected area designations, such as World Heritage Site (WHS).

#### **REGIONAL MPA NETWORKS**

20 regional MPA networks (i.e. networks involving two or more countries) are described in the report. Regions with a strong co-ordinating framework and with a supportive treaty or agreement tend to have progressed furthest in terms of planning, including Europe through its Natura 2000 programme in the EU states, and the North-East Atlantic and Baltic through the Commission for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and Helsinki Commission (HELCOM) respectively. The UNEP Regional Seas Programme (RSP) regions for East Africa, the North-east Pacific, South-East Pacific, and Wider Caribbean have Protocols specifically aimed at promoting the establishment of MPAs, and are starting to address the need to promote the establishment of ecological MPA networks. The more recently created RSPs, such as the North-West Pacific and South Asian Seas. plan to address MPAs in the near future or have MPA related activities under development. Discussions are underway through the relevant regional mechanisms concerning the urgent need for MPA networks in the Antarctic and Arctic. Regional MPA networks are also being planned through direct agreements between countries, as in the case of the WWF ecoregion based programmes (such as the East African Marine Ecoregion (EAME) and Western Indian Ocean Marine Ecoregion (WIOMER) programmes in the Western Indian Ocean, and the Regional Network of MPAs in West Africa (RAMPOA) programme) and the Conservation International (CI) seascape based programmes (such as Birds Head Seascape in Indonesia and the Eastern Tropical Pacific Seascape). South-East Asia for example, has several nested regional and national network programmes that are being supported and co-ordinated through the Coral Triangle Initiative (CTI) which involves six countries.

Issues of sovereignty mean that regional MPA networks will be made up of their constituent national MPA networks, but there is demonstrated added value in countries collaborating in the process, to ensure that principles such as connectivity are fully addressed, and an ecosystem-based approach taken. At present there are no guidelines for regional MPA networks and it may be useful to look at how the different types of regional groupings (such as UNEP RSPs, ecoregions, seascapes) can be used for systematic conservation planning, and whether there is need for further harmonisation.

#### APPLICATION OF ECOLOGICAL PRINCIPLES FOR MPA NETWORKS

Some of the best examples of the application of theory and science are at sub-national level, and are non-governmental being undertaken by organisations (NGO) and academic institutions, with the involvement of local communities and other stakeholders, as in Kimbe Bay in Papua New Guinea, and the Gulf of California in Mexico. Several regions and countries have developed their own sets of criteria and principles, such as Australia, the North-East Atlantic and Baltic, through the OSPAR and HELCOM processes, and the Sulu-Sulawesi Marine Ecoregion (SSME) programme. These reflect the generic principles that have been developed over the last decade and that are now encapsulated in the guidelines available from WCPA-Marine. This reports looks particularly at four of these: adequacy, representation, resilience and connectivity.

The principle of representation is proving relatively easy to address, provided adequate classifications and biodiversity distribution (or suitable proxies) are available. However, the principles of adequacy, resilience and connectivity are proving more difficult to incorporate, since there are few specific guidelines on applying them due to a lack of clear scientific understanding. 'Rules of thumb' are being used where possible and the rapid growth of research in this field means that new information is constantly becoming available.

**Representativity:** A fully ecologically representative network requires one or more MPAs to be established for each example of the full range of biological diversity (from genes to ecosystems) and the associated oceanographic environment within the given area. Most MPAs are on the continental shelf and in coastal waters, and offshore and deep-sea habitats are grossly under represented at present, although important steps are now being taken to address this shortcoming. For example, MPAs have been established for hydrothermal vents in Canada and the Azores, seamounts in Australia and the UK, and deep-water cold coral reefs in Norway, and a process is underway to develop a mechanism for establishing MPAs on the High Seas. Representation at the ecoregion level has been analysed in a recent study, using the Marine Ecoregion of the World (MEOW) classification. Global level analyses are available that show representation of reefs and mangroves has already surpassed the 10% target for protection, but for such vulnerable ecosystems, much higher conservation targets are needed. In most case studies in the report, conservation targets for protection of different marine ecosystems and biodiversity within a network are often 20% or above for example: Belize has conservation targets of 30% for reefs; 80% for spawning aggregations; and 60% for turtle nesting sites, and is making good progress in meeting these. However, at the national and smaller regional level, and for other less high profile ecosystems and habitats, the necessary data are often lacking to assess representation.

Adequacy: This refers to the need to ensure that the individual components of the network are of sufficient size and appropriate shape and distribution to maintain the ecological viability and integrity of populations and species. Globally, the estimated total of 5045 MPAs cover about 2.59 million km<sup>2</sup>, or 0.72% of the world's ocean surface, with only 12.8% of the total MPA area (or 0.08% of the world's oceans) in NTAs. For most countries, data are still insufficient to carry out a full analysis of adequacy. Although size, shape and spatial distribution should be easy to measure, in practice it has proved difficult to collate accurate data for several reasons, including variations in definitions of MPAs (e.g. extent to which inter-tidal or terrestrial areas is included), lack of information on boundaries, and poor reporting. Provisional analyses, including those undertaken by individual countries, or through global assessments using the World Database on Protected Areas (WDPA), indicate that few if any countries have adequate MPA networks at present. Some countries and regions are however, starting to make good progress towards planning for protection of their territorial waters and EEZs, for example, in Kenya, Mexico, and several European countries. There is a growing tendency to designate large MPAs covering several linked ecosystems. Most research on optimal MPA size has been in relation to NTAs and recommended sizes range from 10 to 100 km<sup>2</sup>. A separate global analysis suggests that about 35-60% of the world's MPAs are in this size range; to assess adequacy at national and regional levels, similar analyses would need to be undertaken.

**Resilience:** Also referred to as replication or redundancy, resilience describes the ability of a natural system, or MPA network, to survive natural catastrophes and major impacts. It has been used relatively little in the planning of MPA networks, perhaps because scientific understanding of it in the marine environment is still incomplete, although good progress has been made in relation to coral reefs and spawning aggregations, for which guidelines are being tested at sites in Papua New Guinea, Indonesia, and Belize. Given the importance of this principle, efforts must be made to accelerate its adoption in MPA network design.

**Connectivity:** This refers to the linkages between sites in a network created through larval dispersal, migration of organisms and the mixing of waters through currents and other oceanic physical processes. Mechanisms for ensuring and maintaining good connectivity in an MPA network have yet to be fully demonstrated, and may require a variety of innovative approaches such as dynamic sites. National or even regional level MPA networks may not be able to protect all the key sites for particular species, and this emphasises the need for ensuring that appropriate transboundary linkages are made. Research is suggesting that there is more localised retention of propagules than previously thought, and sites within a network may need to be within 10-100 km of each other.

#### METHODOLOGIES FOR MPA NETWORK ESTABLISHMENT

The methods and processes being developed for designing MPA networks range from simple, as in Tanzania where sites were selected based on the knowledge of experts, to the more sophisticated where decision-support tools such as the software package Marxan are used. Where resources are available, as in the Bahamas, detailed interdisciplinary studies can be undertaken. A key lesson from the case studies is the length of time needed to develop a MPA network, if stakeholders are to be fully involved and scientific design principles applied. Although some MPA networks are being designed to be implemented as a single package, as in some states in Australia, USA and Canada, a step-wise process is often more practical. Pilot areas can be implemented, lessons learnt, and the network progressively built up, the plan being refined as information, funding and capacity becomes available.

The establishment of clear goals and objectives for the network is essential. The main issue is often deciding whether the network is primarily for biodiversity protection or for resource management for human use (such as fisheries management), since different approaches may be required. The International Union for Conservation of Nature (IUCN) Protected Area Management Categories can be used to ensure that MPAs with a range of objectives are incorporated into a network, as demonstrated by Cuba and Australia. An MPA network will also often consist of sites under different forms of governance. Although individual MPAs need to work together so that overall goals and objectives are achieved, if an MPA network is to function fully, the sites do not necessarily have to be managed in the same way. The IUCN typology of governance types (divided into four categories: Government managed; Co-managed; Private; and Community managed) may provide a useful tool for the development of MPA networks.

#### SOCIAL NETWORKS

Social and learning networks, comprising managers and other MPA practitioners and linking different institutions, are essential catalysts and facilitators for the development of ecological networks of MPAs. At the global level, WCPA-Marine provides an umbrella network of experts, and numerous social networks are being established at regional and national levels. Examples include the Locally Managed Marine Area

#### RECOMMENDATIONS

These reflect Resolution CGR4.MOT067, passed at the World Conservation Congress in Barcelona, October 2008:

Clarify terminology and harmonise 1. approaches: Common terms need to be agreed and clear definitions and standardised nomenclature should be developed to facilitate monitoring of progress. WCPA-Marine, with The Nature Conservancy (TNC), has already started this process through the production of its guidelines, and other organisations such as the CBD Secretariat should be consulted to ensure an agreed approach. For example, use of terms such as 'marine and coastal protected areas' (MCPAs) and 'fully protected' MPAs need clarification. Further guidance is needed on how the different types of MPA network, such as those comprising NTAs only or those that exclude sites with very little sub-tidal habitat, can contribute to broader marine spatial planning approaches.

2. Strengthen capacity for MPA network establishment: Capacity building is needed at both individual and institutional levels. Technical support, training, and the development of tools and resources must be expanded, methodologies for MPA network and systematic conservation planning should be promoted and disseminated, and additional guidelines and materials produced where necessary. Greater awareness of the benefits of and reasons for MPA networks will increase support from all stakeholders. The compilation of case studies and lessons learned should be encouraged and facilitated, and shared between countries and regions. Social networks facilitating the sharing of experiences, challenges and successes amongst regions should be enhanced through workshops, study tours and twinning arrangements, and electronic networking. Organisations including IUCN, the CBD, UNEP-RSP, international NGOs, and donors

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