MPA

Issue Briefs for the Caribbean

Lessons learned for building and sustaining effective marine protected areas

MPA NETWORKS

The whole is better than the parts

WHAT IS THE ISSUE?

Scholars define MPA networks as a collection of MPAs of different sizes, located in critical habitats, containing components of a particular habitat type or portions of different kinds of important habitats, and interconnected by the movement of animals and plant seeds. Connection is essential for the replenishment and recovery of populations after disturbance. In isolation, MPAs may not accomplish the goal of restoring species populations, but in synergy, several MPAs of different degrees of protection may do more. MPAs must be appropriately placed, sized and spaced to function collectively as an ecological network and successfully achieve biodiversity goals.

Additionally, a network implies a coordinated system of MPAs, linked through biological levels, as well as administrative levels, reflecting a consistent approach to design, finance, management and monitoring. Assuming all the ecological and biological factors are considered and maximized, MPA networks will only be resilient through time if the management regime is capable, effective and sustainable.

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Components of a resilient MPA network include:

- Effective management
- Risk spreading through inclusion of replicates of representative ecosystems in the different MPAs
- Full protection of critical areas that help replenish ecological functions
- Maintenance of biological and ecological connectivity among and between habitats

Understanding the connection of marine biological populations can only be acquired through scientific research. In the Caribbean, the scientists began to understand connectivity patterns in the 90's with a proxy approach: the delineation of biogeographic units (ecoregions) and smaller spatial units (“coastal systems”) using existing information on the distribution

of marine currents, coastal habitats and main species populations. This project included the ranking of the conservation status and biodiversity value of the ecoregions in order to prioritize conservation investments by international organizations. Many projects followed to improve the delineation of the ecoregions in the Wider Caribbean, in many regions of the Americas, namely: the Mesoamerican Reef region and the Pacific coast of South America, as well as in Cuba, Colombia, Venezuela, Puerto Rico, South Florida, etc... Later, research studies on ocean current patterns, and of fish, conch, corals and lobster breeding sites and larval dispersal, as well as the tracking of turtle movements across the ocean, contributed to a better understanding of the complexity of the biological connectivity of many key species in the Caribbean.

This information, although incomplete, has helped experts to understand gaps in protection and thereby inform the development of national MPA systems across the Caribbean. Currently, there are several projects supported by national and international financial institutions committed to assist governments to accomplish the Protected Areas Program of Work of the Convention of Biological Diversity, most of them funded by GEF which aims at developing effective and resilient national MPA networks. This effort will contribute significantly to the restoration and sustainable used of marine resources in the Wider Caribbean.

Key scientific findings and application of biological connectivity principles that inform MPA development include the following:

■ Adults and juveniles of coral reef and coastal pelagic fish species have home ranges of different sizes. While some species do not move very far, others move long distances.

■ Scale of larval dispersal is much smaller than previously thought. Although coral reef fishes can move large distances during their larval stages (tens to hundreds of kilometers), larval dispersal tends to be more in the order of 5-15km with many recruits returning to their natal area. This has big implications to marine resource management: countries with high rates of "self recruitment" (like Cuba and Mexico, for example) can use it for their advantage if proper management is in place; in countries where larvae highly dispersed (and lost) or come from other islands in the Caribbean sea (like in the islands in Eastern Caribbean) are more vulnerable to overfishing and species populations restoration may take longer.

■ No-take areas have proven to restore size, biomass and reproductive potential of deteriorated populations of fisheries species within and outside the fished areas than the managed areas open to fishing.

WHAT IS NEEDED TO BUILD A NETWORK OF MARINE PROTECTED AREAS TO ADDRESS FISHERIES MANAGEMENT, BIODIVERSITY CONSERVATION AND CLIMATE CHANGE?

Represent 20-40% of each habitat in no-take areas. If fishing pressure is high and fisheries regulations (or their enforcement) are weak the only protection to the biological resource is closing areas to fishing or other resource extraction (no-take areas). The portion of each habitat in no-take areas should be 30-40%, which can be calculated trough a complicated "gap analysis" or "modeling" or a more simple consultation process where stakeholders with knowledge of the coastal habitats (fishers, tour operators, researchers) can delineate habitats in an aerial photograph. If effective fisheries management is in place outside of no-take areas, or if fishing pressure is low, then lower levels of protection (20%) can be applied.

1. **Represent habitat complexes.** Include a combination of habitats that are connected through cross-shelf movement of different life-history stages (like coral reef-mangrove seagrass complexes) of key species. In addition, if mangrove habitats are rare in the country, include the entire mangrove stand in the MPA.

2. **Replicate protection of habitats** by including at least three widely-separated examples of each habitat in no-take areas.

3. **Ensure no-take areas include critical habitats**, including important aggregation sites (e.g. spawning, feeding and nursery areas). Predator fish species such as snappers and groupers spawning aggregations are essential as they are greatly depleted or "commercially extinct" in many Caribbean islands. Include nesting areas of sea turtles or other rare or threatened species. Allow regulated fishing of invasive species such as lionfish.

4. **Ensure marine protected areas are in place for the long-term (20-40 years), preferably permanently.** This applies to all types of marine protected areas, including no-take areas and areas with other fisheries restrictions.

5. **Create a multiple use marine protected area that is as large as possible.** This includes, but is not limited to, no-take areas. Combine no-take areas with "areas of responsible fishing" where fishers and other local stakeholders are actively involved in management.

6. **Separate no-take areas by a variety of distances from 1 to 20 km (with a mode of 1-10km).** Consider no-take areas that are in nearby islands and potentially connected.

7. **Prohibit destructive activities throughout the management area.** Fishing methods such as blasting and poison fishing, spearfishing on SCUBA, bottom trawling, gill netting, coral mining, fishing on hookah, and night time spearing, are destructive and need to be banned.

8. **Have marine protected areas in more square or circular shapes**, subject to considerations of compliance.

9. **Include resilient sites in no-take areas**, including areas most likely to survive climate change impacts *(refugia)*.

10. **Locate more protection upstream.** If connectivity patterns are unknown, and currents are known, strong and consistent; if currents are not known or consistent, then this principle does not apply.

11. **Engage stakeholders early.** Representative of different user groups are important to delineate national systems of MPAs, including government and non-government institutions.

12. **Appropriate legislative and regulatory frameworks are fundamental.** Few countries have a strategic legislative framework or institutional arrangements for a representative MPA network. Unless clarity is achieved, a poorly integrated array of legal and institutional responsibilities can lead to problems such as competing mandates, overlaps, gaps and inefficiencies, all of which undermine an effective MPA network.

13. **Incorporate the MPA network to a broader Integrated Coastal Zone Management scheme.** Consider the influence of areas outside the MPA network (fishing grounds, ports and marinas, industries, rivers and other freshwater drainages, industries, agricultural lands) to locate the areas and design the network.

Countries or territories	Source of information (bibliographic reference and web link Of the relevant project or report
Belize	http://biological-diversity.info/Downloads/NPAPSP/NPAPSP_2005.pdf
Colombia	http://cinto.invemar.org.co/samp/images/documentos/2012%20seguraquintero%20et%20al%20-%20anlisis%20gap%20spnnamp%20colombia.pdf www.coralina.gov.co/intranet/index.php?option=com_docman&Itemid=88889127&lang=en; www.thegef.org/gef/node/3635 www.parquesnacionales.gov.co/PNN/portel/libreria/php/decide.php?patron=01.11
Cuba	www.edf.org/sites/default/files/3692_mpasCubaIngles.pdf
Honduras	www.cayoscochinos.org
British Virgin Islands	www.bvinationalparkstrust.org/downloads/%0bNPT_Protected-Area-System-Plan-2008.pdf http://ess-caribbean.com/wp-content/uploads/2011/08/British-Virgin-Islands-Protected-Areas-System-Plan-2007-2017.pdf
Dutch Caribbean	www.dcnanature.org
French Caribbean	www.guadeloupe-parcnational.fr
US	www.mpa.gov/nationalsystem/framework
Haiti	www.foprobim.org/uploads/3/1/6/6/3166555/mpa_data_chart_foprobim_2000.pdf
Guadeloupe	www.guadeloupe-parcnational.fr

WHERE TO FIND MORE INFORMATION?

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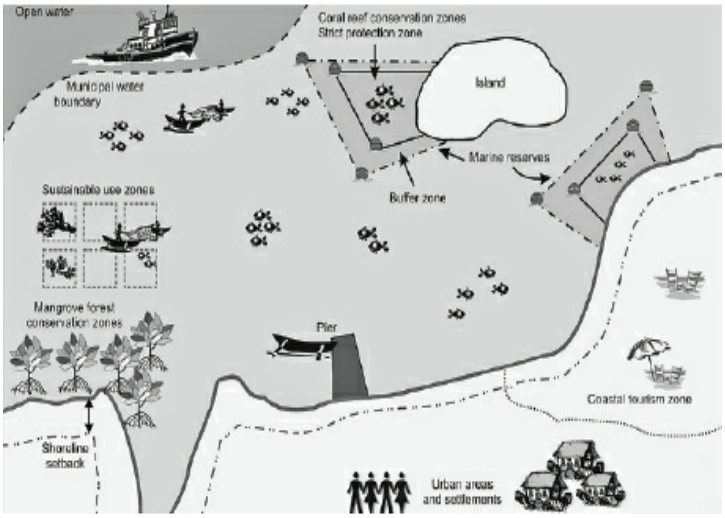

Integrated coastal management in Philippines. With various spatial management tools, including MPAs (White et al. 2006).