

# MPA NETWORKS

## MODULE 2

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White, A.T., P.M. Aliño, and A.T. Meneses. 2005. *Creating and Managing Marine Protected Areas in the Philippines*. Fisheries Improved for Sustainable Harvest Project, Coastal Conservation and Education Foundation, Inc. and University of the Philippines Marine Science Institute, Cebu City, Philippines. 83 p.

**OVERVIEW**

*Individual Marine Protected Areas (MPAs) benefit from making connections through biophysical and social linkages. In addition, creating networks of MPAs increases ecological effectiveness and administrative efficiency.*

MPA networks can greatly enhance MPA effectiveness. Ecological networks are based on shared or complementary biological or oceanographic features of MPAs, and enhance each MPA's ability to meet ecological/biodiversity goals. Social networks result in increased administrative effectiveness via unified management efforts and shared information.

**LEARNING OBJECTIVES**

- ✓ Learn about the ecological & social benefits of different types of MPA networks
- ✓ Study the practicalities of scaling up from individual MPAs to networks of MPAs
- ✓ Learn how to design MPA networks, including the pitfalls and advantages

**INDICATORS OF EFFECTIVE KNOWLEDGE**

During Day 2, participants will develop skills and knowledge to:

- Recognize oceanographic, ecological, social and management features of MPAs that make them suitable for inclusion in an effective MPA network
- Assist MPA managers in development of a social/administrative network
- Build a framework for scaling up from individual MPAs to networks of MPAs

## LESSON PLAN

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### *Discussion —Understanding MPA Networks*

Please discuss the following questions with the group:

- *Do you know of any existing MPA networks?*
- *What are the different kinds of “connectivity” that might define a network?*
- *Do you see a value in scaling up from individual to networks of MPAs?*

### 2.1 INTRODUCTION TO MPA NETWORKS

Worldwide, MPAs are recognized by nations as a valuable science-based resource management tool supporting ecosystem-based conservation. The Fifth World Parks Congress meeting in Durban, South Africa, called upon the international community to establish, by 2012, **a global system of effectively managed representative networks** of marine and coastal protected areas. The Congress recommended these MPAs be extensive and include strictly protected areas that amount to at least 20-30% of each habitat.

A MPA network is a system of individual marine protected areas defined by connectivity and operating cooperatively, at various spatial scales, with a range of protection levels that fulfill biodiversity goals and objectives more effectively than individual sites could alone. Additionally, social, economic and fisheries benefits should be realized over time from the scaling up of individual sites to networks of MPAs. Networks take various forms. There are **social networks** formed by communication and sharing of results and coordination of administration and planning. There are **ecological networks** formed by ensuring that natural connections between and within sites enhance ecological functions and benefit of one or more MPAs. There are **management-based networks** formed by creating consistency and efficiency in areas such as enforcement, monitoring and awareness building. All three types of networks, social, ecological and management-based need to be integrated and coordinated to maximize their potential benefits. But to form effective social, ecological and/or management-based networks of MPAs, we must consider factors that will ensure the networks created will add value to existing conservation efforts.

### **Biophysical and Ecological Advantages of a MPA Network**

There are biophysical and ecological advantages of a MPA network over individual MPAs that are randomly placed or MPAs that simply maximize habitat protection. These advantages include:

- Ensuring that the most valuable and representative marine habitats are at least partially protected as reflected by habitat quality and species richness;

- Ensuring that migratory and wide-ranging species are protected by continuous corridors of MPAs;
- Ensuring that upstream/downstream impacts on living and marine resources are managed at the appropriate scale so as not to displace impacts from one MPA to the next (e.g., water quality, introduced species)
- Ensuring that threatened, vulnerable or overexploited species of a given area will have adequate habitat space to support their life history and be able to continue reproducing and to disperse larvae into surrounding areas as a result of the MPA network (e.g., giant clams, grouper, lobsters etc.); and
- Enhancing fisheries production for a given management area because the larval production and dispersal, and fish spillover effects are maximized through planning to the benefit of both fisheries and conservation.

The administrative and pragmatic advantages of a MPA network over MPAs that are randomly placed and not coordinated in any way might include knowing that the investment in the establishment and management of the MPA network is maximizing its potential return to local stakeholders. Also, in forming a network, an information base for the MPAs in an area is created that helps develop logical choices in how to expand MPAs effectively and how to efficiently manage them based on the network design. Finally, a network provides a rationale for individual MPA stakeholders or communities and MPA managers to coordinate with each other to share their experiences and to enhance efforts in managing and protecting their respective MPAs.

## 2.2 TYPES OF MPA NETWORKS

### Social/Administrative MPA Networks

The communication age has facilitated the sharing of information and experiences across many borders and among diverse groups of people. For example, in the Philippines, this is occurring within the marine-associated communities through newsletters, email and a growing list of loose organizations that form a “network”. There is the Philippine Coral Reef Information Network and others operating nationally. Locally, the networking efforts of several site-based peoples’ organizations (POs) are effective.

Benefits of social MPA networks include building consensus for common approaches to improved marine conservation through law enforcement, unified fisheries ordinances, and establishing new MPAs.

Processes that have led to good practices and scaling up governance derived from networking efforts are:

1. Consensus building on common issues;

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2. Information sharing and identification of stakeholder-based core groups;
3. Institutionalizing mechanisms for administration;
4. Sustainable financing, and
5. Adaptive management (i.e., performance and impact monitoring and incentive systems).

Social MPA networks are motivated by financial and administrative benefits since one of the major constraints to MPA sustainability is long-term financing. Local area networks can collect user fees and receive institutional support from their local municipality or city. Local government support also attracts private sector buy-in from tourist resorts, landowners or others concerned about coastal protection. Valuation studies, research on willingness to pay and user fees together with cost-benefit analyses of networking arrangements are showing large potential benefits and mechanisms for collection and management through networking arrangements.

Networks are also driven by fisheries benefits to fisher people resulting from spillover, larval recruitment and protection of reproductive potential. Monitoring of the biophysical, social and economic outcomes of MPA networking becomes the reason for demonstrating incentives for good stewardship and at the same time buy-in that promote public-private partnerships. Recognition awards and tax deductions for contributions to MPA networks are some options that can be used to stimulate network level collaboration.

Management of individual MPAs is enhanced with the shared knowledge from experiences of MPA network partnerships. MPA networks are being mainstreamed through provincial or local task forces, or simply MPAs within larger ICM efforts that include good governance practices. But one of the greatest challenges in the implementation of a network of MPAs is the action undertaken by local governments to sustain network efforts within a region-wide ecosystem management framework. Demonstrating that the ecosystem that is being managed is important enough to capture the imagination of separate management bodies to work together at the larger scale is not easy. This requires sharing of results from assessments and the correlation between MPA network protection and benefits to natural resources and human communities

Local communities that have endorsed the stewardship of their MPAs are encouraged if they see the linkage of their village life with that of their ecosystem stewardship role at a larger scale. The larger scale demonstration of spillover potential and connectivity applies at both the local village scale and the larger ecosystem and ecoregion scales. The establishment of a combination of village level MPAs in combination with municipal and multi-municipal level management is crucial to create synergistic benefits.

### Ecological MPA Networks

An ecological MPA network is a collection of MPAs carefully chosen to achieve either (1) biodiversity conservation or (2) biodiversity conservation and fisheries enhancement. We can

better understand “ecological network” by noting the basis of these objectives. An ecological network designed to conserve *biodiversity* is a group of MPAs selected on the basis of:

- biogeographic and habitat representation; and
- presence of species or populations of special interest (e.g., threatened and vulnerable species).

A network designed to enhance *fisheries* is a group of MPAs selected on the basis of:

- size of reserves necessary to protect viable habitats;
- presence of exploitable (target) species;
- vulnerable life stages of selected species;
- connectivity among reserves and links among ecosystems; and
- provision of ecosystem services to people.

A key premise of a network is that the MPAs interact through ecological linkages. These connections may include:

- connections of adjacent or continuous habitats such as coral reefs and seagrass beds;
- connections through regular larval dispersal in the water column between and within the MPA sites;
- regular settlement of larvae from one MPA to inside another MPA; and
- movements of mature marine life in their home range from one site to another dependent on habitats or because of regular or random spillover effects from MPAs.

### **Management-based MPA Networks**

A management-based MPA network is comprised of a collection of MPAs that have been chosen to achieve increased efficiency, consistency and coordination to enhance management effectiveness on a larger ecosystem-based spatial scale than can be achieved by an individual MPA. In order for a management-based MPA network to be successful, it must be built on a strong foundation incorporating both the concepts of social/administrative MPA networks and ecological MPA networks. Management-based MPA networks use management tools such as program areas (research and monitoring, education and awareness building), and regulatory tools (regulations, permits, enforcement) across the entire network. The benefits of management-based MPA networks include:

- consistent monitoring protocols across a network of MPAs means that data can be shared and compared across all sites to determine trends, status of the resources and measure effectiveness of management actions across the entire network;

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- ability to develop a consistent and coordinated communications plan across all sites building awareness and stewardship throughout the broader region to build community, stakeholder and government support for the network;
- develop legal and institutional frameworks needed to deliver and sustain MPA networks; and
- identify the management actions needed to address ecological processes that operate, and negative impacts that occur, beyond the boundaries of any single MPA.

*Handout 2.1: Canada's Federal MPA Strategy*

*Handout 2.2: Blueprint for the South Australian Representative System of Marine Protected Areas*

*Handout 2.3: A Regional Conservation Programme for the Coastal and Marine Zone of West Africa*

### **CASE STUDY— A Regional Approach to MPA Development in West Africa**

## 2.3 FROM SINGLE MPAs TO NETWORKS

### Criteria for Selection of MPAs

As a prerequisite to establishing and improving MPAs and networks of MPAs, we should understand what design features of a MPA will make it effective biodiversity by conserving ecosystems and species in a given area in relation to the social and cultural context. In short, the site must have relatively intact, natural, representative and diverse resources. In addition, if the site has social economic values associated with it, the likelihood of good management will be enhanced.

Considering these criteria it is important to help ensure sustainability for any MPA since it will exist in the broader social and cultural context of a community and local government, and must achieve multiple objectives to succeed. There are additional factors that need to be considered to try and maximize the fisheries value of a MPA. The criteria that may weigh a decision towards an area with more potential for conservation enhancement are:

- **habitat quality:** Areas with generally superior habitat quality or better than the average for the general area (e.g., coral cover, seagrass, water quality, etc);



- **fish habitat:** Areas that maintain higher than average abundance, density and species richness of fishes or contain spawning aggregations of fish;
- **oceanography:** Areas with favorable currents that tend to aggregate larvae and organisms inside the sanctuary but with periodic flushing to the outside;
- **biodiversity:** Areas with higher than average biodiversity and range of animals on the food chain from large to small;
- **size:** Areas that cover a significant range of the habitat that is important to the life history of the priority species to be protected;
- **social acceptance:** Areas that will not arbitrarily remove the most desired fishing ground from a community and do not create unnecessary social conflicts;
- **practicality of management:** Areas where zones can be effectively established and enforced given the resources that will be available for protection; and
- **quality of management:** Areas where management programs and regulatory frameworks can be effectively implemented and sustained over time.

The above criteria, if met, will provide relative assurance that a single MPA will contribute significantly to the general conservation in its area of operation. Additional factors must be considered if more than one MPA is being planned to form a network. And, although a network will have both social and environmental dimensions that can be defined separately, these may become intertwined in the practical implementation of a network.

Attributes of a functional network of MPAs are:

1. Individual MPAs will meet minimum criteria for MPAs in general and collectively provide added value to conservation efforts.
2. The broad management area shall be analyzed from the perspective of critical habitats, critical species, oceanography, human use impacts and existing MPAs as a first step in planning an area-wide network of MPAs.
3. Site specific areas should be analyzed for what they contribute in terms of increasing resiliency, adding additional habitat representation, and linking corridors.
4. MPA management bodies will be capacitated to improve the management of their MPA and linked to other MPA management bodies in the network area.
5. MPA management bodies, including local communities and stakeholders, together, with their local governments and other assisting organizations will be engaged in planning and implementing their MPA network for area of concern.
6. A MPA network will be within the context of ICM plans and regimes of one or more legal authorities.

In summary, the basic attributes of a MPA network include MPAs that are effective in their own right, protect important habitats, contribute to fisheries enhancement, and enhance biodiversity conservation following the criteria noted above. The MPAs should cover a critical minimum area

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of the larger ICM planning area. MPA management bodies must be effective and linked to larger planning area through a network of some sort. The management system needs to be both horizontal and vertical for sustainability with local governments playing key roles with supporting partners. Finally, network links should consider their interrelated facets—both environmental and social.

#### ***CASE STUDY— California: Moving from Individual National Marine Sanctuaries to Networks in California***

### 2.4 CONNECTIVITY IN MPA NETWORK DESIGN

#### **Role of Connectivity in Network Design**

Southeast Asia contains the highest marine biodiversity in the world. Its role in a global network of MPAs is crucial to the protection of global biodiversity. A good starting point for MPA network design is the context of the linkages of geomorphology (or structure) of the basins and the role of bottom topography (or features) in current circulation among basins. The positions of the major marine corridors are found in the transition areas of the major biogeographic regions or inland sea basins. Along these areas critical nesting, nursery and feeding grounds for important marine species are found. These habitat functions facilitate gene flow, spawning and larval exchange. Connectivity of ecosystems as facilitated by marine corridors is an important criterion to facilitate network linkages among priority biogeographic areas.

Marine corridors must be designed to consider how conservation targets can be optimally achieved. In the Philippines, areas that serve as sources and sinks - e.g., spawning and larval dispersal pools - are linked together in networks, such as the Calamianes Islands, the Visayas and the Sulu-Tawi-Tawi Islands, among others. Such areas must receive special attention through intensive localized management as well as protection through broader provisions that regulates shipping (e.g., transport, fishing, others) within the overall management framework of the MPA network.

#### **Exercise 2.1 — "Connectivity and MPA Networks"**

#### ***PRESENTATION: Oceanographic Connectivity in the Gulf of Mexico and Caribbean Region***

## 2.5 DEVELOPING NETWORKS

### Lessons Learned in Developing Networks

MPA network planning must always be done in connection with the local governments and communities of concern, and in coordination with other projects and stakeholders operating in the area. This will result in quite different forms of participation and roles from one planning area to another. The protocols for assisting communities and local government with the planning and implementation of MPAs have been tested in many projects. Several lessons to guide projects on how to effectively assist with improving MPA effectiveness and forming MPA networks are:

1. Most MPAs, once planned and operating, will need to strengthen their management body through a community level intervention that helps the management body develop and implement a MPA management plan together with the local MPA authority. This MPA plan may ultimately amend the ordinance that established the MPA with refined rules.
2. Areas of connectivity will have to be identified.
3. The project will need to identify partners working in the area and coordinate work accordingly. Assisting groups will build a strategic plan, and agree on common objectives that are consistent, and develop an implementation plan for the network.
4. Common goals and objectives, based on individual site priorities, will have to be identified for the network.
5. Priority resource management issues, based on individual site priorities, will have to be identified for the network.
6. Cross-cutting management strategies that are applicable to all MPAs in the network will have to be identified.
7. Each MPA that will ultimately be part of an effective network will require some level of assistance in some portion of its planning and implementation process. Successful MPAs will need assistance to help them become sustainable in their own right.
8. Sharing of resources and contributions can synergize to produce cost-effectiveness and biomass accumulation.

#### ***Creating MPA networks that are sustainable***

MPA networks are not created rapidly, but evolve over time. The above guidelines can assist to improve MPA networks, make them more functional, and provide guidance towards building a context that will allow MPAs and the organizations that assist them to link and support one another so that a network can evolve. Both biophysical and socioeconomic factors must be considered and tested when planning a network. Strategic interventions are always required to push the process along and might include:

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- Provide support for MPA monitoring and evaluation that addresses biophysical and management needs using existing protocols.
- Summarize all relevant data in a geographical (maps) and graphic manner for feedback to communities and for use in planning and education through simple reports and visual means to keep the data useful at the local level.
- Train and capacitate local stakeholders to perform the tasks of planning, implementing, monitoring and evaluating a MPA.
- Conduct targeted research studies on the effectiveness of MPAs, locating new MPAs, social acceptability of MPAs, oceanography of area and location of priority species as deemed relevant for planning and education.
- Mentor all targeted MPA management bodies in a systematic but strategic manner to ensure that management is progressing to a higher level per the MPA rating system.
- Sponsor workshops and informal meetings among MPA managers, management bodies and other important stakeholders to help establish social networks for MPA implementation and support.
- Link all existing and future MPA work (data, results, MPA establishment, etc.) with national programs to support MPAs.

#### ***MPA networks—final key points***

A MPA network is also a network of people managing the component MPAs, benefiting from the network and promoting the networks' viability and longevity. Not just any collection of MPAs can be called a MPA network. A MPA network is a collection of MPAs that interact in some *meaningful* manner (e.g., source or sink of larvae and propagating organisms, protection for quality habitat and threatened or endangered species, etc.) that enhances biodiversity conservation. An effective MPA network is composed of individual MPAs that each satisfies the requirements of an effective MPA as highlighted herein and has both ecological and social components.

#### **CASE STUDY — A *Transboundary Network in the Eastern Tropical Pacific***

#### **VIDEO — *Creating Networks of MPAs in Africa***

**2.6 DEVELOPING A NETWORK PROPOSAL*****Exercise 2.2 - Design a MPA Network***

Working as a large group, the class will discuss and identify a specific MPA network that would be useful and effective, specific to the South China Sea region (this could be the entire region represented by the participants, or sub-regions).

The whole group will then discuss in greater detail how to implement the new network, considering the following questions:

- *What benefits that might accrue from such a network?*
- *What are the obstacles to its development?*
- *How those obstacles might be overcome?*
- *How might the network be maintained over the long run?*
- *How could the continued effect of the network be evaluated over time?*

Finally, each small group will develop a short proposal for development of their new network, and present its findings to the group.