



Designing and Planning a
**Network of Community-Based
Marine Protected Areas**



PEW FELLOWS PROGRAM IN
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**Designing and Planning a
Network of Community-Based
Marine Protected Areas**

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PREFACE

DESIGNING AND PLANNING A NETWORK OF COMMUNITY-BASED MARINE PROTECTED AREAS is an educational manual designed for coastal resource management practitioners in the Philippines. In order to develop effective networks of marine protected areas, it is critical that such practitioners have access to the guiding principles of network governance and related science.

Ecosystem-based management (EBM) has emerged as a new paradigm in marine resource management. Developing networks of marine protected areas to achieve the goals of EBM is becoming a global effort. However, scaling up governance to encompass holistic ecosystems presents challenges to community-based management efforts in the Philippines and other tropical and decentralized contexts.

This manual was informed by and designed to aid the ongoing process of MPA and MPA network development in the Philippines. The MPA network design principles in the guidebook have wider applicability and could be extracted to apply to tropical marine ecosystems and management contexts elsewhere in the world.

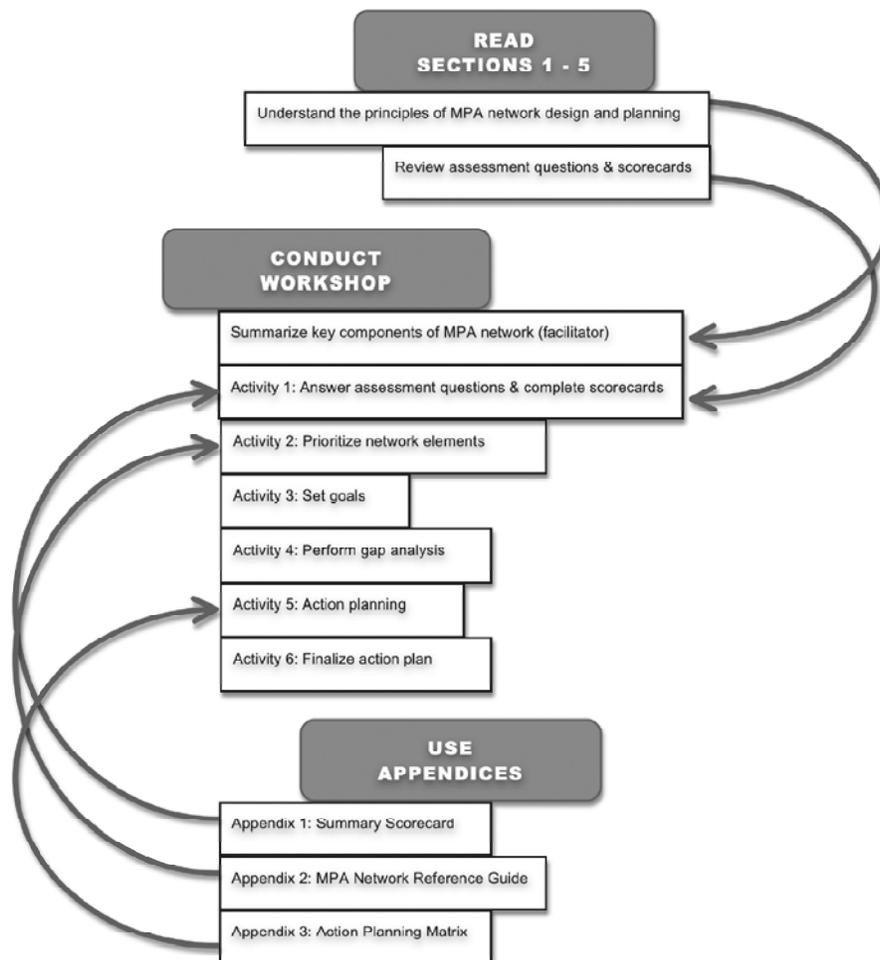
The content of this manual is based on research findings from the culmination of two years of research by a Filipino and international group of interdisciplinary researchers and graduate students in Bohol and Southeast Cebu, Philippines where early and advanced stages of developing a MPA network have been completed, respectively. The research included field activities such as interviews and workshops with MPA management teams, local government officials, fishers, agencies, NGOs, stakeholders, and enforcement officers. This research has been published (Armada et al. 2009; Christie et al. 2009; Eisma-Osorio et al. 2009; Lowry et al. 2009). The results of this research and learning are being made accessible through this manual to the community of MPA managers.

HOW TO USE THIS MANUAL

The first five sections of this manual provide **detailed information on the ecological, social, and institutional aspects of marine protected areas networks**. These sections examine the key concepts of marine ecological connectivity, and the essential considerations in institutional coordination and co-management with respect to designing, planning, and governing community-based marine protected area (MPA) networks.

Section 6 provides a **framework to conduct an MPA network-planning workshop**. The goal of such a workshop is to (1) bring together practitioners interested in designing and planning an MPA network, (2) facilitate conversations amongst practitioners through prioritization, goal-setting and gap analysis activities, and (3) develop action plans which form the foundation of an MPA network.

In order to solicit meaningful input for the workshop, Sections 2 - 4 include assessment questions and scorecards. Workshop facilitators and participants will jointly use these scorecards to evaluate the progress and status of each of the ecological, social, and institutional elements of MPA networks. **At the start of each section, a workshop guide is provided.** The following schematic provides a visual guide on how to most effectively use this manual. Additional tips for *workshop facilitators* are located in Section 6.1.



ACKNOWLEDGEMENTS

This manual has been made possible through the collaborations of many individuals and organizations. The Coastal Conservation and Education Foundation and the Southeast Cebu Coastal Resources Management Council led the implementation of the MPA network in SE Cebu with support from the David and Lucile Packard Foundation. The United States Agency for International Development Fisheries for Sustainable Harvest (FISH) Project provided technical support in the development of the manual. A Pew Fellowship in Marine Conservation to Christie and the National Center for Ecological Analysis and Synthesis supported the research that informed this manual. The Partnership for the Interdisciplinary Studies of Coastal Oceans (PISCO) along with the National Oceanographic Atmospheric Administration contributed photographs and graphics. Finally, the authors would like to thank Richard Pollnac, Katrina ole-MoiYoi, Jill Harris, Theresa Black, Rey Bendijo, Maretes Alenton, Jimmy Paguio, Sheryll Tesch, and Malcolm Hiponia and all of the staff of the Coastal Conservation and Education Foundation for their significant contributions to the content of this manual.

SECTION 1. INTRODUCTION

1.1 Philippine Context

The coastal ecosystems of the Philippines are regarded as a global hotspot of tropical marine biodiversity (Carpenter and Springer, 2005). Coastal communities are dependent on the high productivity of these unique coral reef, mangrove, and beach ecosystems. Unfortunately, a significant percentage of the nation's coral reefs are in a state of decline due to a rapid increase in coastal populations along with an increase in fishing pressure (World Bank, 2006). The historic and current open access fishing regime causes overfishing and encourages fishers to resort to destructive methods utilizing dynamite and cyanide to catch more fish. Over fishing combined with other human impacts such as coastal development, sedimentation, and pollution, is resulting in the degradation of coastal ecosystems (Wilkinson, 2008). This over-exploitation is threatening the social and economic stability of coastal communities where many artisanal fishers are dependent on the marine resources (World Bank, 2006; Luna et al., 2004).



Figure 1. A fisherman in Cebu, Philippines harvests his daily catch from his nets. Fine mesh gill nets remove small fish from the reef and exacerbate overfishing. Photo by Theresa Black.

1.2 Ecosystem-Based Management

Coastal resource management (CRM) is defined as a participatory process of planning, implementing, and monitoring the sustainable use of the coastal resources through collective action and sound decision-making (DENR et al., 2001a). In use for several decades in the Philippines, such approaches seek to control and mitigate coastal habitat degradation and overfishing. Although coastal resource management is often initiated by local governments and has wide support in the Philippines – two of the many factors needed for success – the productivity of ecosystems continues to decline in many areas (World Bank, 2006; White et al., 2006b). Emerging theories posit that such degradation might be attributed to a mismatch

between ecosystem functions and management approaches. As such, ecosystem-based management (EBM) is becoming an increasingly common approach to management that builds on CRM and considers ecosystem function explicitly.

One internationally recognized definition of EBM is:

Ecosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern.
(McLeod et al., 2009:4)

Ecosystem-based management complements CRM by increasing the emphasis on the function and dynamics of entire ecosystems. EBM is a holistic approach, encouraging management to take action at the whole ecosystem level. It requires CRM managers to gain knowledge of, and appreciation for ecosystem structure, function, and key processes (McLeod et al., 2009). The basis of EBM is that ecosystems are place-based, highly interactive and strongly linked. As such, they are affected by human impacts and natural forces on multiple scales and through a myriad of iterative feedback loops. For example, coral reefs are one highly valued ecosystem in the Philippines. EBM would consider not only the health of one coral reef, but also health of the neighboring mangrove and sea grass habitats which provide nursery and feeding areas for coral reef fish, or the health of distant coral reefs that supply coral larvae. As such, an EBM approach would recommend viewing coral reefs not as a singular entity, but as part of an entire integrated and connected coastal ecosystem.

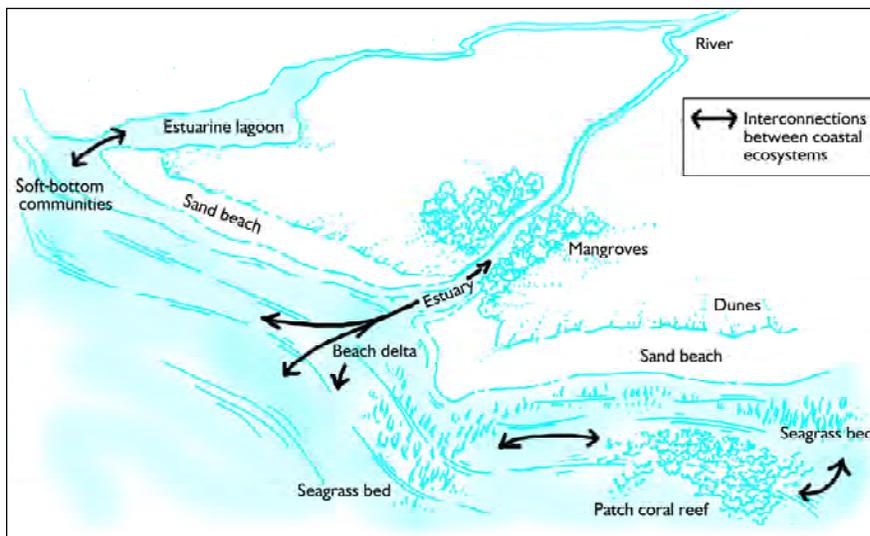


Figure 2. Interconnected coastal ecosystem. Figure courtesy of US AID Fisheries for Sustainable Harvest Project.

While an integrated ecosystem approach has been a part of CRM, EBM tends to further emphasize ecological connections and large scale management. EBM recognizes the interconnectedness of systems and encourages people to manage at the scale of whole ecosystems, taking into consideration ocean currents, larval dispersal, the varying habitat needs of key fish species, and the range of human impacts on the ecosystem.

1.3 Community-Based Marine Protected Areas

Marine protected areas (MPAs) have been a key instrument of coastal resource management in the

Philippines for several decades, and remain a critical tool for ecosystem-based management. MPAs, take many forms, and include marine reserves, sanctuaries, and parks, all of which are characterized by varying degrees of regulations. Used to protect well-defined areas and critical habitat (Agardy, 1997), MPAs globally serve many purposes and offer different levels of protection. One internationally recognized definition of an MPA is:

Marine Protected Area: a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (IUCN-WCPA 2008:3)

In the Philippines, MPAs typically take the form of ‘no-take’ areas with buffers or nearby zones in which extractive and non-extractive uses are regulated (White et al., 2002). Regulation of coastal resources is decentralized in the Philippines, setting the stage for small, locally-managed, and community-controlled MPAs (commonly known as community-based MPAs). Community-based MPAs are often established through the engagement of the local community, with municipal or city government support through ordinances. Local support of MPAs is typically based on (1) the belief that MPAs will eventually lead to increased fish yields by protecting fish and habitats from overfishing and destructive fishing methods, and (2) the potential for alternative income generation through tourism activities in the MPA (World Bank, 2006; Christie, 2002). For the purposes of this manual, the term MPA refers to community-based and locally managed no-take zones (also known as a ‘marine sanctuaries’ in the Philippines).



Figure 3. Researchers from the Coastal Conservation and Education Foundation (CCEF) and officials of a People’s Organization (PO) of Bantigue Island pose in front of the Bantigue Island marine sanctuary sign board, which was erected with funds from the USAID funded FISH Project and the Local Government Unit of the Municipality of Ubay, Bohol. Photo by Malcolm Hiponia.

Community-based marine protected areas require stakeholder engagement.

The current management schemes of most MPAs in the Philippines are rooted in bottom-up approaches, catalyzed by NGO community organizers and led by local government officials with support from government agencies and local stakeholders (White et al., 2006a). Community-based enforcement, financing, monitoring, and education characterize these bottom-up strategies, and work in concert to improve management capacity. Enforcement schemes rely mainly on citizen-organized groups, known as *bantay dagats* (sea wardens) (Eisma-Osorio et al., 2009). Financing mechanisms draw upon user fees and the allocation of municipal funds to support MPAs. Fishermen are frequently trained in biophysical monitoring techniques. Educational outreach oftentimes takes the form of training programs and cross-visits, both which raise awareness about coastal environments and explore management options. Cumulatively, all of these efforts serve as the foundation for, and have catalyzed the development of the management of community-based MPAs.



Figure 4. A community constructed guardhouse stands watch over the Sagasa Barangay marine sanctuary in the Danajon Bank region of the Philippines. Photo by USAID Fisheries for Sustainable Harvest Project.

Only 30% of established MPAs in the Philippines are optimally managed.

Despite the development of best management practices for MPAs, many communities struggle to consistently employ them. Challenges to management include conflicting notions over the use of a given MPA, lack of capacity to rollout trainings for managers and community members, lack of sustained funding, and wavering political support (Christie et al., 2007a; World Bank 2006; Milne et al., 2003). Of the 1,100 MPAs in the Philippines, a recent management effectiveness and rating system for MPAs suggests that management effectiveness is improving, yet only about 30% of these MPAs are achieving their management objectives (Coastal Conservation and Education Foundation MPA Database, 2008). This percentage shows that it is an ongoing challenge to effectively manage MPAs in the Philippines.

Small and scattered MPAs may not support bigger populations of fish

Beyond the management challenges of community-based MPAs, small MPAs are often unable to meet the goal of increased fish yields. Although small MPAs maintain fish abundance and diversity within their boundaries, when heavy fishing pressure exists beyond the boundaries, small and scattered MPAs alone often fail to maintain fish abundance (Botsford et al., 2009). Consequently, if MPAs are the only utilized EBM tool, small MPAs may not support fish and invertebrate populations large enough to sustain themselves (IUCN-WCPA 2008). In other words, maintaining reproduction rates at levels needed to guarantee replenishment and ensure sustained populations within MPAs requires areas of protection that are fairly large (IUCN-WCPA 2008). However it is difficult to implement large MPAs in the Philippines due to socio-economic constraints and management challenges (World Bank 2006; Christie et al., 2002).

Given the need to increase fish yields and overcome existing management challenges, MPA managers are becoming increasingly interested in MPA networks. MPA networks link individual MPAs, and are designed to optimize ecological and social connections resulting in improved management effectiveness and increased fish yields (Lowry et al., 2009; Palumbi, 2004).

1.4 MPA Networks: The Next Step for Improved Marine Resources

Marine Protected Area Networks: *A collection of individual MPAs operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels in order to fulfill ecological aims more effectively and comprehensively than individual sites could alone. The network will also display social and economic benefits, though the latter may only become fully developed over long time frames as ecosystems recover. /IUCN-WCPA 2008:12)*

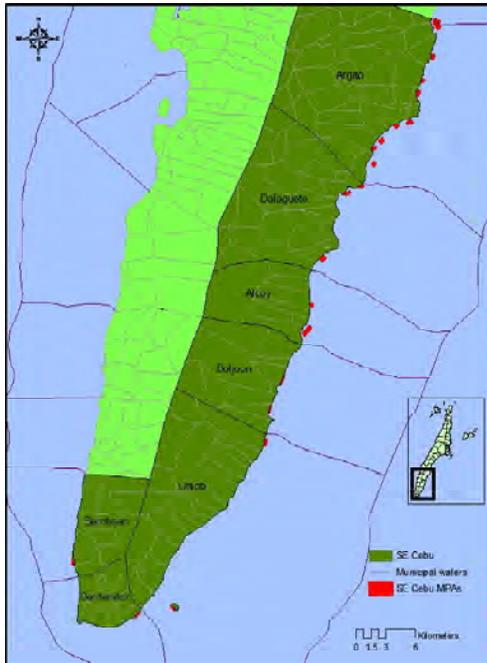


Figure 5. An emerging socio-ecological network of twenty-one community-based marine protected areas along the Southeast coast of Cebu Island, Philippines. *Map made by Theresa Black in coordination with the Coastal Conservation and Education Foundation, 2008.*

The twenty-one community-based MPAs of Southeast Cebu (shown in red in Figure 6) were individually established by each of the seven coastal municipalities located in Southeast Cebu Island. The region's MPA managers are increasingly interested in exploring how these individual MPAs might collectively achieve broader fishery goals. Realizing that they share similar issues and a common resource base, the municipalities are now integrating coastal management efforts through The Southeast Coastal Resource Management Council. This has allowed for the expansion of municipal management objectives so that municipalities are now planning at the ecosystem scale (Eisma-Osorio et al., 2009).

Networks operate on an ecosystem scale

MPA networks provide more protection than a set of individual, unconnected MPAs. MPA networks are designed based on local ecological processes, such as the location of species spawning areas, ocean currents, larval dispersal and recruitment, among others, thus leading to the protection of a holistic ecosystem (PISCO, 2007). MPA managers should carefully place MPAs based on size, spacing, replication, and habitat representation in respect to the ecology of the local species of interest. Planning a MPA network intended to support holistic ecosystem function and processes will help to achieve local fishery goals (IUCN-WCPA, 2008). In summary, networks can help maintain functional marine ecosystems when designed with consideration for the temporal and spatial scales of ecological systems (IUCN-WCPA, 2008).

MPA Networks operate socially and institutionally

In addition to geographic areas, MPA ‘networks’ also consist of groups of people who manage individual MPAs, and who are interested in coordinating management efforts (White et al., 2006a). A group of people with similar interests and goals who communicate with one another constitute a social network. As such, a ‘social MPA network’ can be considered the communities, stakeholders, and managers of MPAs who share collective goals and interests for their region. Social MPA networks provide a forum through which individual MPA stakeholders and communities can (1) coordinate efforts, and (2) share experiences and to enhance one another’s capacity to manage their respective MPAs. Management challenges, such as limited funding, sporadic enforcement, and resource-user conflicts in individual MPAs may benefit from the social and institutional collaboration inherent in an MPA network (Christie et al., 2009a; Lowry et al., 2009; Pietri et al., 2009). Furthermore, coordinated efforts can streamline opportunities to collaborate with local and provincial governments, a partnership important for improving enforcement activities, protecting habitats, and generating increased resources. A social and institutional MPA network can help to facilitate and resolve conflict in the use of natural resources (IUCN-WCPA, 2008).

1.5 Components of a Network of Marine Protected Areas

A network of MPAs consists of individual MPAs that share common ecosystem objectives and social MPA goals (such as increased fish yields). Such networks are reliant upon willingness for institutional collaboration, and a recognition that such coordination leads to more effective management. As such, an MPA network has an ecological, social, and institutional component, each consisting of important design and planning elements, as diagrammed in Figure 7.

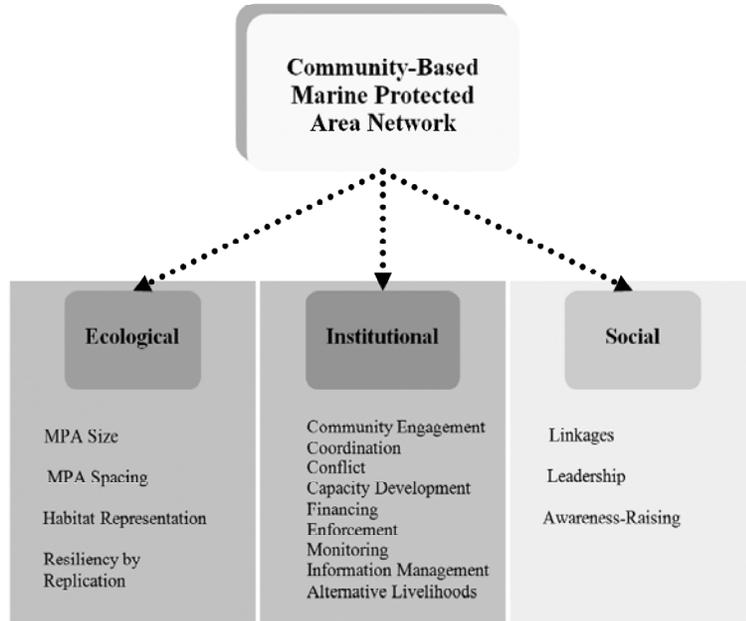


Figure 6. The three components of a community-based marine protected area network. Each component is based on important design and planning elements. Each of these elements is discussed in detail in this manual.

When designing and planning a MPA network, the ecological, social, and institutional components of the network are equally important. The following sections of the manual describe the ecological, social, and institutional elements for designing and planning a network of MPAs.

SECTION 2.

APPLYING ECOLOGICAL PRINCIPLES TO NETWORK DESIGN

A network of marine protected areas operates at the ecosystem level. To optimize the ecological connections of MPA networks, the network should be designed to support the basic ecological functions of the local species of interest such as the different stages of the lifecycle and corresponding habitat needs coupled with dispersal via ocean currents and adult movement. Four important design principles are described in the next section to assist managers in ensuring MPAs consider the holistic ecosystem. These four design considerations are: (1) Size, (2) Spacing, (3) Habitat Representation, and (4) Replication.

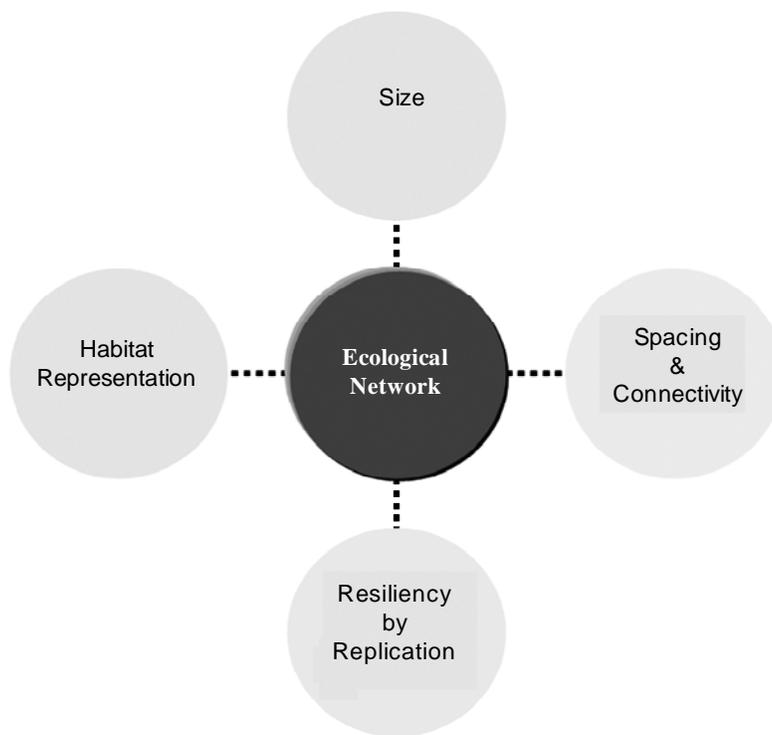


Figure 7. The four key ecological principles in MPA network design.

Section Two Workshop Guide

1. Read all sections.
2. Discuss and complete **Assessment Questions** and **Scorecard Activities** for the following sections:
 - 2.2 MPA Size/ 2.3 MPA Spacing
 - 2.4 Habitat Representation/ 2.5 Replication

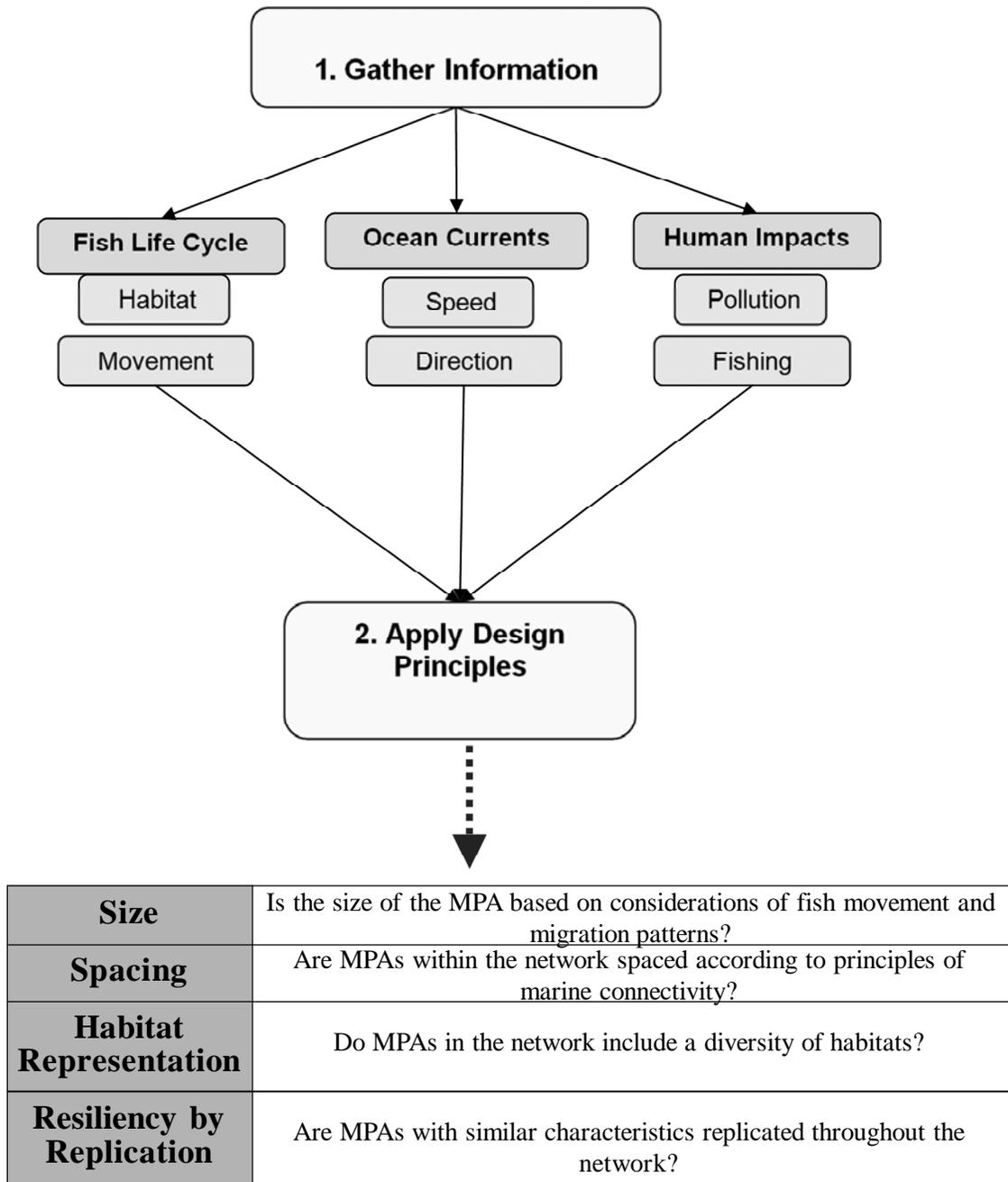


Figure 8. A suggested roadmap for planning and designing a network of MPAs based on ecological information. Step 1. Gather information of the local species of interest, such as the varied life cycle stages, movement patterns, and different habitat needs; local ocean currents; and areas of human impact to the ecosystem such as locations of heavy fishing pressure or major pollution sources.

Step 2. Apply the design principles in relation to the local information collected.

2.1 Marine Fish Life Cycle and Movement

Most fish have distinct life stages, during which they utilize different habitats. This has important implications on management, as will be discussed.

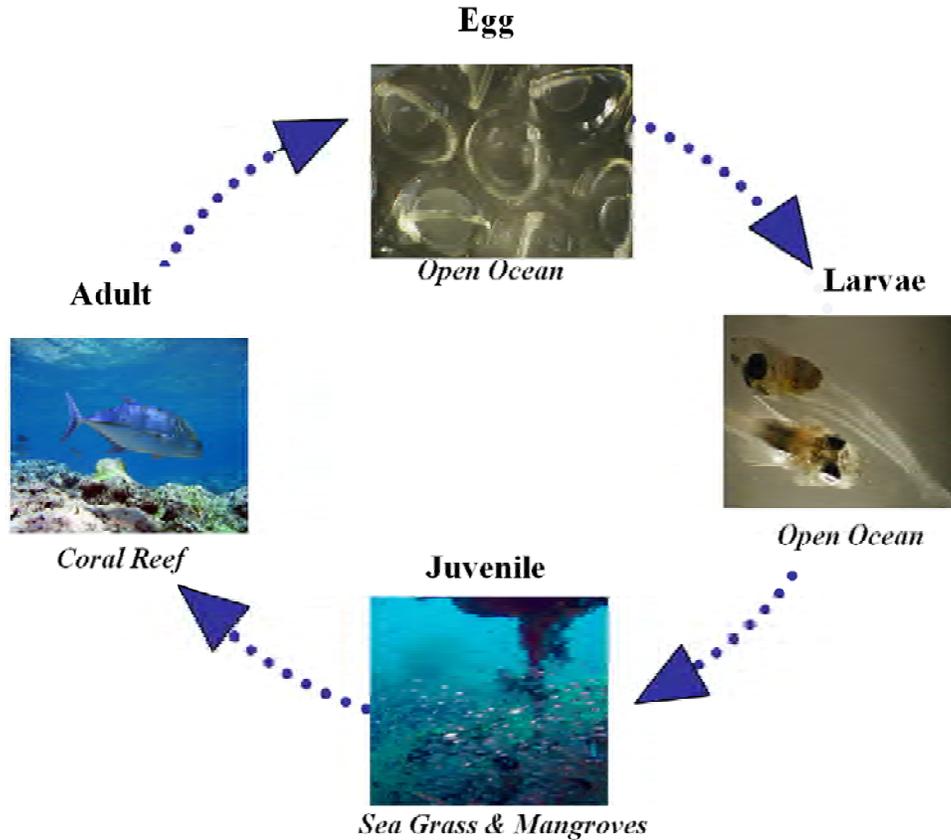


Figure 9. **Life Cycle of a Jack.** Jacks (or *Caranx* spp.) are commonly a species of interest in Filipino coral reef ecosystems. The lifecycle of the Jack is illustrated in Figure 9. A female Jack might release approximately 1 million fertilized eggs per spawning (Sudekum et al., 1991). Approximately 1,000 of those eggs may survive to become larvae (Bailey & Houde 1989). Only about 100 may become juvenile fish. On average, in a stable population only two individuals will reach adulthood out of all the eggs produced by one female. The eggs and larvae will travel on the ocean currents in the open ocean. Juveniles will most likely live in the protection of mangroves and sea grass habitats. Adults will live on coral reefs and travel long distances to feed, spawn, and sleep (Meyer et al., 2007). Photo Credits: NOAA.

Ocean Currents

Marine fish lifecycles often include a stage during which juveniles are dispersed by ocean currents. (Figure 10). During this stage, dispersal is the predominant means to connect spatially separated populations (Gaines et al., 2003). Larvae will spread out and diffuse into the surrounding waters in unique manners depending on the species as well as the speed and direction of local ocean currents. As such, the particulars of ocean circulation patterns can play a critical role in determining the placement of MPAs within a network. For example, in areas with strong currents, multiple MPAs can be more important than single MPAs of equivalent total size due to movement of species along currents (Gaines et al., 2003). Due to variation in ocean currents, certain locations may receive more larvae than others and become more important to the fish population. While the details of ocean circulation are complex and infrequently documented in full, it is important to consider the existing knowledge of local ocean currents in MPA network design.

2.2 MPA Size

The size of an MPA is an important consideration. MPA size decisions should be based on the movement

of adult fish and distances traveled while feeding and spawning as well as dispersal distances of larvae (Palumbi, 2004). The movement of an individual adult fish creates an ocean ‘neighborhood’ or spatial area in which it moves over the course of its life. Adult fish move for feeding, spawning, and sleeping purposes (Figure 11). Studies show that to attain optimal fish populations, an MPA should be at least twice the size of the adult’s neighborhood or home range. For some species, which are very mobile, establishing very large MPAs in highly populated coastal areas may not be socially feasible. However, for species that have a smaller home range, smaller MPAs placed closer together may result in higher yields (Botsford et al., 2009). Whereas exact size of MPA will differ, MPAs should protect at least 20-30% of critical fish habitat within the planning area of the network. (IUCN-WCPA 2008; Lowry et al., 2009; Kaplan et al., 2006).

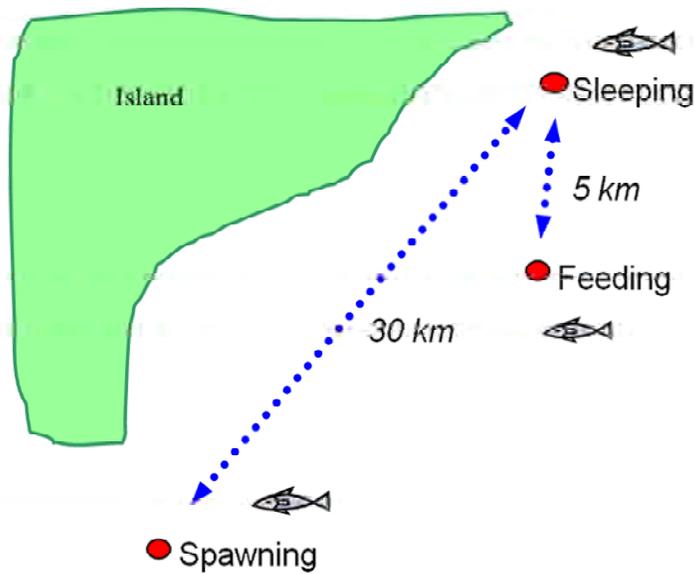


Figure 10. Adult home range may be larger than one sanctuary. Figure based on data in Meyer et al., 2007.

Understanding the migration patterns of highly mobile fish can also inform the size of MPAs. For example, some fish species may travel from the reef drop-off to shallow seagrass areas to feed during the night. If species of interest need to travel outside the MPA boundaries for feeding, then they will not be protected by the MPA. In these cases, expanding existing MPAs to become larger or replicating smaller MPAs to provide additional protection for species are recommended. For species which are highly mobile, small reserves or reserves that exclude adjacent critical habitats (such as seagrasses and mangroves) will be less effective because the species will only be protected for a small amount of time or during a limited part of their lifetime (Palumbi 2004).

Figure 11. Distances traveled and habitat needs of various coral reef species of interest. (Data from Girolamo et al., 1999; Lester et al., 2004; Meyer et al., 2007; Mumby, 2006) The home range is the distance the adult travels for feeding, sleeping, and spawning.

Species	Days spent as pelagic larvae	Home Range (distance traveled by adult)	Habitats
Parrotfish	30	100 m	Coral, Sea grass, Mangrove
Damselfish	10-30	1-10 m	Coral
Rabbitfish	20	100 m	Sea grass, Coral
Snapper	40	1 km	Mangrove, Coral, Shallows

2.3 MPA Spacing

Marine ecosystems are based on spatial, temporal and biological connections and therefore the spacing and distance between MPAs is a critical concern in MPA network design. Marine connectivity is illustrated, in part, by the movement of marine organisms between different habitats and locations along ocean currents. Marine organisms may travel passively as eggs and larvae carried along an ocean current or they may actively swim as adults or juveniles in pursuit of various habitats and resources, thus bridging the gap between seemingly separate habitats. Adult and juvenile fish may swim from MPA to MPA in order to utilize different habitats.

Connectivity in a network will be achieved in the following scenarios:

- Connections between adjacent or continuous habitats such as coral reefs and sea grass beds are protected within MPAs.
- Larvae move through the water column between and within MPA sites and either settle back inside of the MPA or in a MPA within the dispersal range of the species of interest.
- Adult fish move between sites because of habitat needs (Palumbi, 2004).

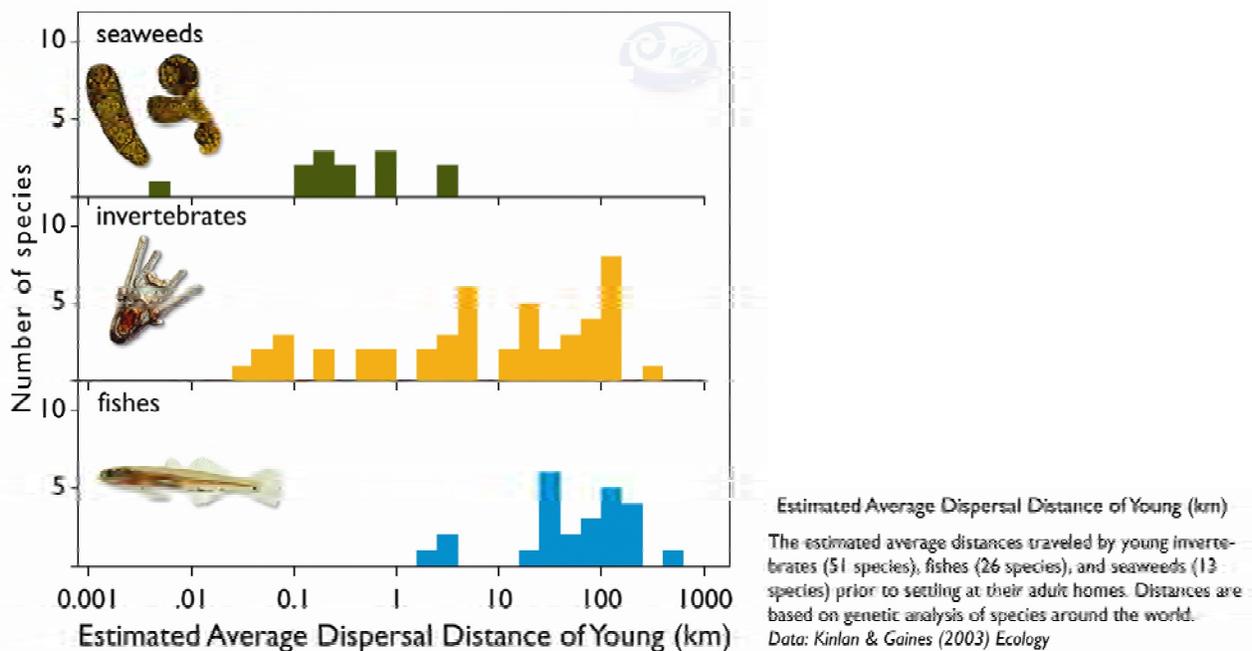


Figure 12. The figure above illustrates the various distances marine fish and invertebrate can travel during larval stages. Figure courtesy of the Partnership for Interdisciplinary Study of Coastal Oceans 2008.

Understanding the distance traveled by pelagic larvae based on the speed and direction of local and regional ocean currents will inform the design of connected MPAs in a given network. The MPAs should be spaced close enough together that they act as sources of larvae for one another (Mumby, 2006). Tropical marine fish larvae may travel distances of 5 – 100 kilometers depending on the species and oceanographic conditions (Cowen et al., 2006). While the specific rate of dispersal and distance traveled for many fish species is currently unknown, placing MPAs in range of 5 – 50 kilometers apart may increase the likelihood of larval exchange between MPAs (Cowen et al., 2006; Botsford et al., 2009). Within this range, it follows that for species with shorter distances of larval dispersal (distance traveled by larvae) smaller MPAs placed closer together may result in higher fish yields (Botsford et al., 2009).

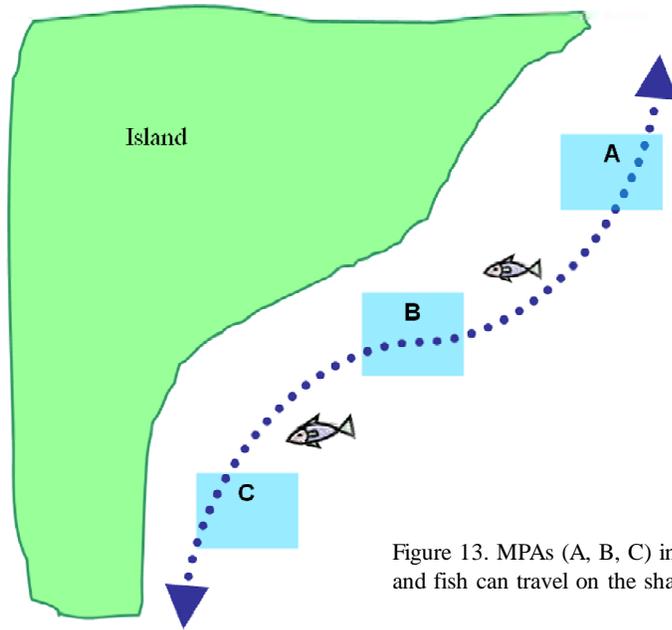


Figure 13. MPAs (A, B, C) in a network should be spaced so that larvae and fish can travel on the shared currents between MPAs.

Size and Spacing Assessment Questions

1. Is the size of each individual MPA in the network based on considerations of fish movement and migration?
2. Are the MPAs in the network spaced according the principles of marine connectivity? (For example, are the MPAs connected by an ocean current? Are they spaced according to the distance species of interest are thought to travel?)

Scorecard 1: MPA Network Size and Spacing

The size of individual MPAs are based on fish movement and migration needs. MPAs in network have been spaced or re-spaced (if previously established) to meet ecological goals of connectivity based on shared currents, larval dispersal, and degree of travel of species of interest.	3
Some but not all of MPAs in network have been spaced and sized based on notions of connectivity and fish movement.	2
MPA network has not considered the design principles of MPA size and spacing	1

2.4 Habitat Representation

Habitat representation ensures that all regional ecosystems and habitat types are represented within the network of MPAs. Key habitats utilized by the species of interest should be determined when considering habitat representation in a network. Key habitats such as rare habitats, high-quality habitats, and areas

that are used during spawning and at all other stages of the life cycle should be given priority for protection within a network (White et al., 2006a). Each different habitat supports a unique community and most marine organisms use more than one habitat during their lives (IUCN-WCPA, 2008). Jacks, for example, feed in coral reef habitat, but travel in the open ocean along ocean currents in larval form. As juveniles they spend time within the protection of sea grass and mangroves. Therefore, the life cycle processes of the Jack include dependence upon healthy mangrove, coral reef, sea grass, and open ocean habitats.

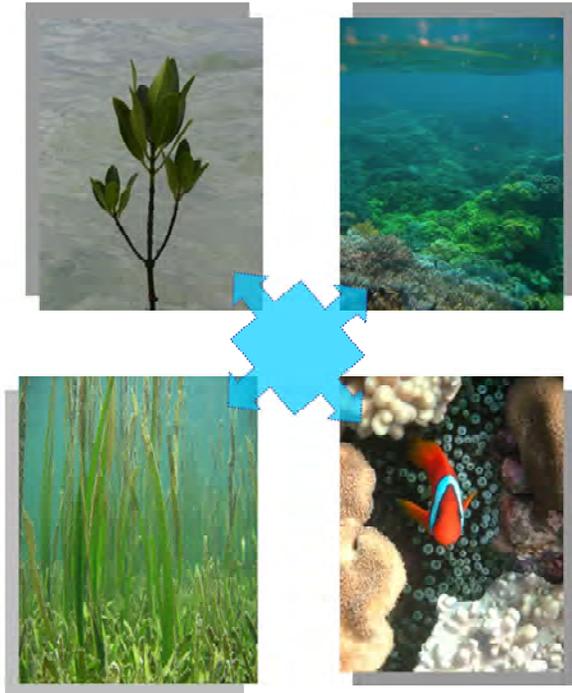


Figure 14. MPAs in a network should protect a diverse range of habitats, including sea grass, mangroves, and coral reefs as well as spawning grounds and rare habitats. Photos by Theresa Black and Anna Varney.

2.5 Resiliency by Replication

Resiliency is the capacity of social and ecological systems to cope with, adapt to, and shape change, as well as learn to live with uncertainty and surprise (Brand and Jax, 2007). Resiliency in a network is the ability for it to rebound from or withstand environmental fluctuations or unexpected catastrophes (IUCN-WCPA, 2008). It therefore follows that resilient systems can potentially replenish populations reduced elsewhere (IUCN-WCPA, 2008). Replicating MPAs or repeating MPAs with similar characteristics ensures that examples of critical habitats and fish species will persist in the event that areas elsewhere are damaged by a catastrophic event. In this context, a catastrophe may be a major unexpected event such as a tsunami, crown of thorns sea star population explosion, or a typhoon that disrupts and changes the habitats and organisms within the MPA. In the case of a catastrophe, coral reef and mangrove ecosystems may have to be colonized from larvae and adult organisms from other MPAs, (IUCN-WCPA, 2008), a process facilitated by the establishment of a resilient MPA network. An MPA network will be more resilient if:

- Risk is spread by replicating representative habitats within MPAs or MPA networks;
- Critical areas which might be reliable sources of larvae replenishment enjoy full protection;
- Biological and ecological connectivity is maintained within and between habitats (IUCN-WCPA, 2008).



Figure 15. A network of MPAs established off the coast of California achieves the goals of replication through the repetition of similarly sized and spaced MPAs. Image courtesy of Partnership of Interdisciplinary Studies of Coastal Oceans 2008.

Habitat Representation and Replication Assessment Questions

1. Have the MPAs in your network been designed to include many different habitats?
2. Does each municipality protect a diverse collection of habitats?
3. Have the MPAs in your network been designed to meet the goal of replication? For example, are MPAs with similar characteristics are repeated?

Scorecard 2: Habitat Representation and Replication

MPA network has considered the ecological principles of habitat representation and size in network design. 10-20% of key habitats in each municipality are protected. A diversity of habitats including coral, mangroves, and sea grass are represented in network. MPAs sharing similar characteristics are replicated to ensure resiliency.	3
Some but not all of the MPAs in the network have been designed to meet the goals of habitat representation and replication. Some municipalities meet ecological goals while others do not.	2
MPA network has not considered design principles of habitat representation or replication.	1

SECTION 3. MARINE PROTECTED AREA SOCIAL NETWORKS

Social networks encourage MPA stakeholders to share experiences and in the process, enhance each other's efforts in managing their respective MPAs (Christie et al. 2009a; Pietri et al. 2009; White et al., 2006a). A social MPA network is a group of MPA managers or citizen supporters who are linked through the network, and come together to share ideas, information, and experiences pertaining to MPA management. The elements of an MPA social network consist of (1) the linkages among and between MPA managers and citizens, (2) the opportunity to share information in a collaborative setting, and (3) collaborative learning through programs that raise awareness.

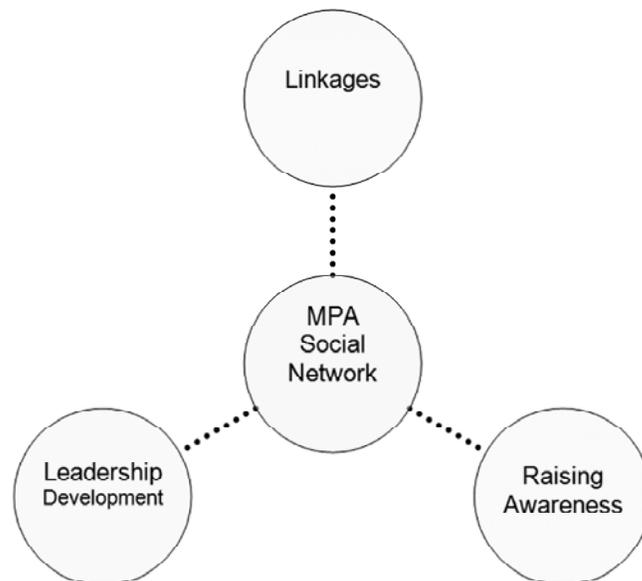


Figure 16. The three elements of a marine protected area social network.

Section Three Workshop Guide

1. Read all sections.
2. Discuss and complete **Assessment Questions** and **Scorecard Activities** for the following section:
 - 3.3 Raising Awareness

Social Network of Marine Protected Area Stakeholders

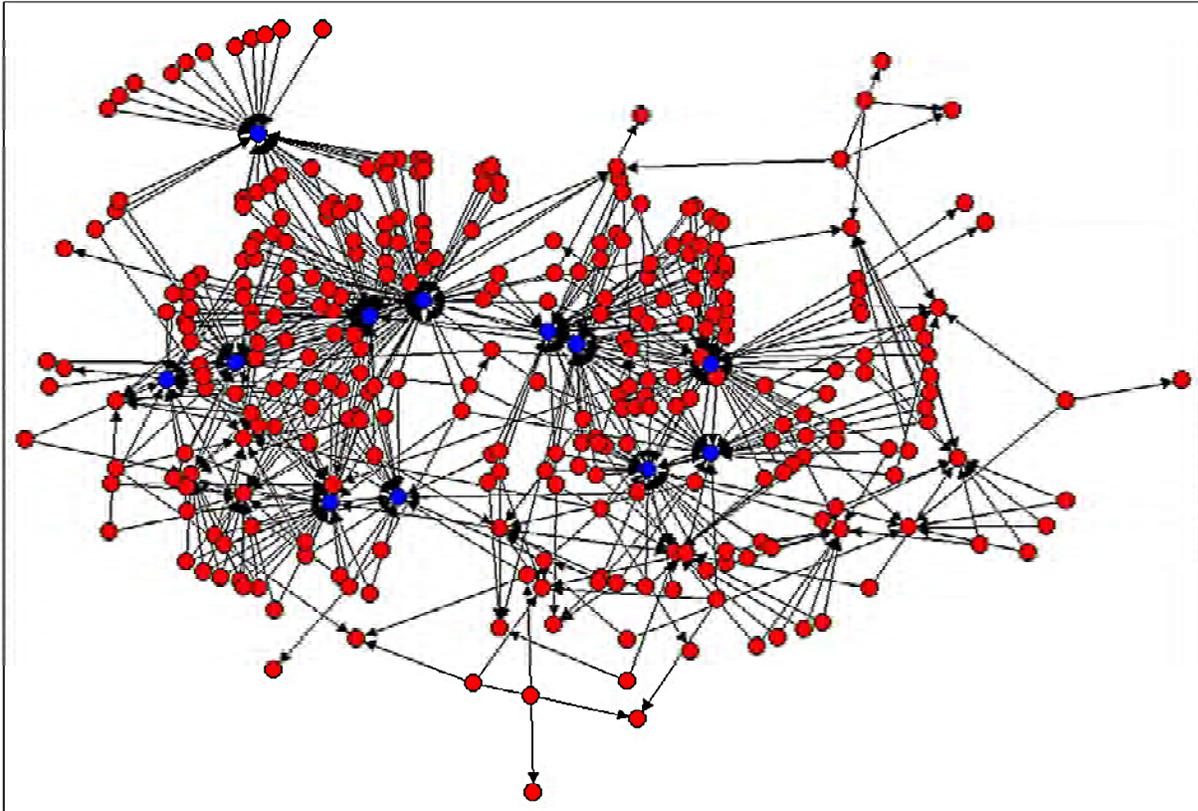


Figure 17. An MPA social network. Each node in this figure represents a person in a coastal community with an MPA in Southeast Cebu. Each line connecting nodes represents a communication link between people regarding the MPA. Influential actors, represented by the blue nodes with many connecting lines, are essential in diffusing information about MPAs. These influential actors are critical members in social networking component of an MPA network. (Christie, P. and C. Gonzalez. 2007b. Unpublished data).

3.1 Social Linkages

Communication is the basis of social networking. Communicating with other MPA managers may happen through emails, phone conversations, newsletters, or in-person via trainings, workshops, or cross visits to MPA sites. These linkages and relationships encourage the sharing of information, ideas, attitudes, and values regarding MPAs. By linking different communities, MPA networks have the ability to promote diverse communications, exchange new ideas, and ultimately change behaviors (Pietri et al., 2009), potentially leading to new innovations and attitudes regarding MPA management. Linkages can occur locally at the inter-community and inter-municipal level. It is also possible to form vertical linkages by linking municipalities with national MPA network initiatives (Lowry et al., 2009).

Linking disparate MPA management groups can also instill a sense of solidarity over common management challenges (Christie et al., 2009a). Shared issues and concerns can motivate different groups to work together to tackle issues faced at the individual MPA level. Legal help and other services can be more accessible to larger, coordinated groups at a lower cost than to individual MPA managers (Lowry et al., 2009). These are a few of the benefits of creating linkages among MPA managers.

Different formal and informal MPA networks exist throughout the Philippines (Lowry et al., 2009). These networks take the form of local, informal information exchange to national, formal organized social networks, such as the National Alliance of Small Fishers and Communities Managing the Coast and Marine Sanctuaries of the Philippines also known as PAMANA Ka Sa Philippines, Inc. PAMANA Ka Sa is a national alliance of community based MPA managers. It is composed of local representatives (fisher leaders and community level local government units) of 120 municipal marine sanctuaries. This organization aims to strengthen the national network of community-based marine protected area managers through capacity-building initiatives, networking and alliance-building, policy advocacy and participatory action research (Lowry et al., 2009).

3.2 Leadership Development

Strong leaders play a key role in the success of coastal resource management projects, including management of individual MPAs and formation of MPA networks (Christie et al., 2009a and b; Milne et al., 2003; White et al., 2002). MPA leaders act as opinion leaders and local champions of MPAs within their communities (Pietri et al., 2009). They can promote the ecological goals and objectives of a network, as well as increase community support for the network by spreading positive information about the MPA. MPA leaders are essential in network development because they play central roles in inter-institutional collaboration (Christie et al., 2009a). Thus the development of strong leaders through education and trainings will support the development of a MPA network. Leadership trainings or experiences should stress the role of leaders as hubs for information about the MPA, and encourage leaders to continue to spread the word about MPAs and MPA networks throughout the community (Pietri et al., 2009).

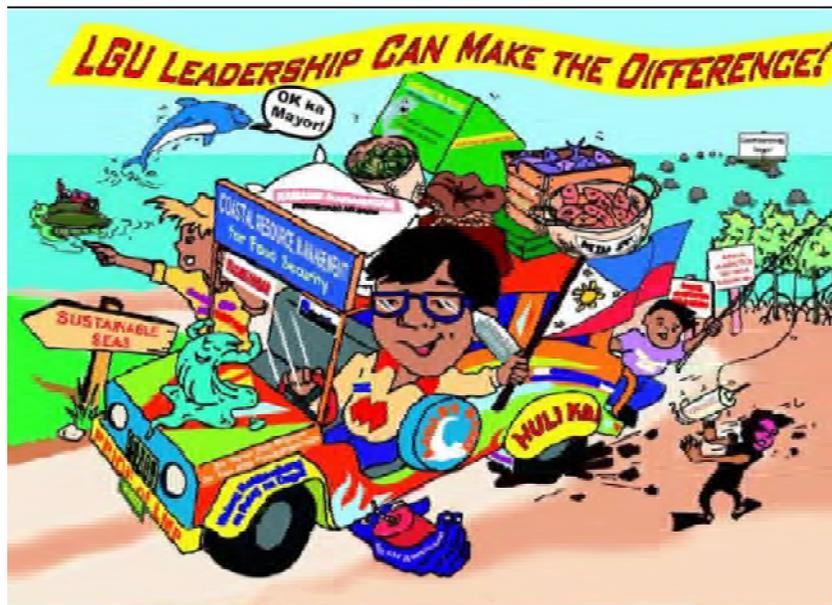


Figure 18. Elected officials can play key roles as leaders in the support of a MPA network. Image courtesy of US AID Fisheries Improved for Sustainable Harvest Project.

3.3 Raising Awareness

Formal and informal community environmental education and capacity building trainings play an important role in a MPA network. These programs not only provide new information to managers, but can also encourage managers to spread this new information throughout their respective communities. Social networks are sustained and increased as MPA leaders and their peer groups gather together to learn new

skills and information and to raise awareness about the MPAs and the network. These educational trainings increase capacity and improve MPA management at the individual level, contributing to a stronger MPA network overall (Lowry et al., 2009). For example, ongoing environmental education programs continue to educate managers and community members on the broad ecological principles of a network leading to an increased understanding of the large-scale ecosystems processes. A broad ecological understanding is necessary for network managers and local citizens to appreciate and support a network (White et al., 2006a).

Additionally, MPA leaders and managers who participate in these programs can spread awareness by acting as hubs to transmit information to other community members (Pietri et al., 2009). This process, called 'information diffusion' communicates innovations over time to others (Rogers, 1995). This process of raising awareness and information diffusion helps to achieve the goal of a social MPA network by transferring useful MPA management innovations and information within the social network.



Figure 19. Workshop participants from a municipality and two state agencies discuss habitats and MPA location utilizing local maps during an educational workshop. Photo by Anna Varney.

Cross visits are a tool whereby local MPA managers visit other MPAs in the network (or beyond), meet fellow managers, and have an opportunity to see and discuss their MPAs (Eisma-Osorio et al., 2009). MPA managers have asserted that cross visits are the best way to convince community members of the potential benefits (Pietri et al., 2009). During these visits, MPA managers can tell stories, share concerns, and learn from one another's management innovations first hand. Various local management innovations such as MPA user fees and enforcement techniques may be easily learned and shared by managers via cross visits. When possible, networks should find ways to institutionalize cross visits by providing sustainable financing for transportation to other MPAs within the network at regular intervals. Cross visits provide a means of strengthening communication between individuals in an MPA network, and consequently, strengthening the network itself (Pietri et al., 2009).

Awareness Raising Assessment Questions

1. Do community education programs exist on MPAs and MPA networks? If so please describe them.
2. How is information from education programs transferred to communities or important people not directly involved in education programs?
3. Describe other methods of raising awareness within your network.
4. In what ways are MPAs linked to other MPAs with the network?

Scorecard 3: Raising Awareness

Formal and informal community education programs on ecological and social MPA networks are in place at community, municipal, and inter-municipal levels. Cross visits between MPAs occur. Efforts are made to diffuse information learned in education programs to communities and within MPA management institutions	3
Community education programs are infrequent or do not address ecological or social principles of MPA networks. Cross visits are uncommon. Information learned in education programs is not actively diffused to communities or within network institutions.	2
Community education programs are not in place. Cross visits have not occurred within MPA network.	1

SECTION 4.

COORDINATING A NETWORK OF INSTITUTIONS

An MPA network commonly involves a large geographical area, multiple sites, and various ecosystems. Given the geographic scale of an MPA network, it is likely that management is beyond the capacity of a single community, and instead, multiple management bodies will need to coordinate efforts. This collaborative approach is the foundation of an MPA institutional network. The following section discusses a few key considerations for coordinating management to develop and implement a successful network of MPAs.

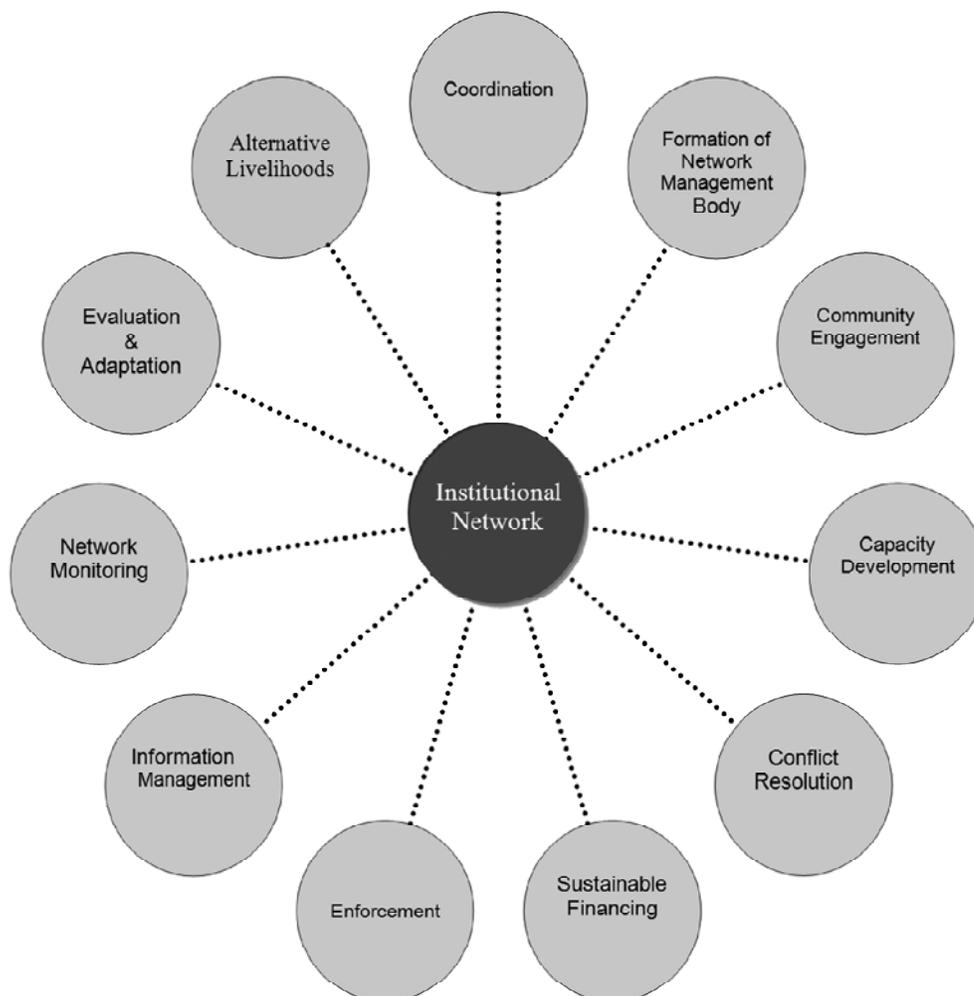


Figure 20. The eleven main elements of a MPA institutional network

Institutional Coordination Assessment Questions

1. List groups that coordinate with one another. Indicate the groups that coordinate with one another about MPA network management.
2. List groups that are involved in some way with the MPA network yet are not integrated with other groups.
3. Describe the current state of coordination activities in your MPA network

Scorecard 4: Institutional Coordination

Institutions are vertically and horizontally linked, and include inter-community, inter-LGU, provincial and external group involvement. Coordinated institutions meet regularly to discuss the MPA network.	3
Some institutional coordination exists. Coordination is not vertical and horizontal and necessary institutions are not involved. Institutions do not meet regularly.	2
Little to no coordination exists.	1

4.2 Formation of an integrated network management body

Actions at the network level will require group deliberation and decision-making involving various institutions. New skills will be required such as the ability to create shared plans, mobilize agreements between disparate groups, and coordinate resource sharing. These necessary actions can be guided and implemented by the formation of a formal network management body.

The following are critical enabling conditions for the formation of a network management body:

- Commitment of municipalities and local groups
- Enabling legal and policy framework
- Perceived need for collaborative management of a shared resource.

The Southeast Cebu Cluster was formed with a history of municipal collaboration, and an acknowledgement of the need to co-manage shared fishing stocks and other marine resources (Eisma-Osorio et al., 2009). The Cluster meets monthly to discuss joint management concerns of their shared coastal ecosystem. The Cluster’s enabling legal framework is outlined in the Philippine Constitution, which states that Local Government Unit Alliances may be formed in order to consolidate efforts, services, and resources (Eisma-Osorio et al., 2009). This mandate allows for collaborative agreements between Local Government Units, and interested municipalities can formalize a network management body by signing a Memorandum of Agreement. While commitment and the legal framework are imperative to collaborative agreements, network management bodies will need to facilitate participatory processes, transparent decision making, conflict resolution mechanisms, and continued coordination in their creation of a network management plan in order to lay the groundwork for a successful network (Christie et al., 2009b).

4.3 Community Engagement

In the context of coastal management, community engagement refers to the utilization of participatory processes in decision-making and planning. Participatory processes that engage stakeholders in assessing, planning, and implementing coastal management projects are considered fundamental to overall coastal

management success (DENR et al., 2001c). MPA network planning and management decisions should be made transparently with input from all levels of government and community groups. Transparency is achieved when stakeholders are informed and knowledgeable of the decisions impacting their livelihoods. The network management body should strive to engage local communities in ecosystem level management decisions.

In the Philippines, it is frequently local communities and peoples' organizations that ensure not only the effectiveness of planning and program design, but also the actual implementation of coastal management strategies and plans (Eisma-Osorio et al., 2009). High-level governance decisions need to be made after consultations with local communities (or smallest political units), in order to maintain community support and improve implementation. It is the responsibility of the network management body to engage community members in management decisions for shared fisheries ecosystems.



Figure 22. The network management body is responsible for engaging community members during the planning and implementation of an MPA network. Figure courtesy of US AID Project Fisheries for Sustainable Harvest.

Community Engagement Assessment Questions

1. Indicate what levels of government are involved in network management decisions (you may select more than one level)
Community___ Municipal___ Provincial___ Other _____
2. What kinds of network management decisions are made at each level of government? State one example for each level if possible.
3. What levels of government are most involved in network decisions?
Least involved?
4. Describe the steps of a typical decision-making process used to manage the MPA network. Are community groups consulted?
5. Is the level of engagement within the community adequate? Please explain.
6. To what extent are participatory processes utilized in the MPA network?

Scorecard 5: Community Engagement

Network management decisions are transparent. Consultations are conducted at all levels, including with community members. Participatory processes are utilized in network decisions and planning.	3
Network decisions are not always transparent. Community is occasionally, but not always consulted or engaged in decision-making. Participatory processes are utilized occasionally.	2
Network decisions are not transparent. Community engagement is low, and communities are not consulted or engaged in dialogue. Participatory processes are not used in planning or decisions.	1

4.4 Conflict resolution

Conflict between stakeholders while developing and implementing an MPA network is likely to arise due to new limitations on fishing grounds, new regulations, and increased engagement of disparate groups. MPA managers should be prepared to encounter conflict (Christie et al., 2009a; Milne et al., 2003). For example, the Southeast Cebu Cluster regularly addresses issues such as banning compressor fishing, reducing fishing effort, and regulating municipal tourism activities. These issues are controversial and the network management body needs conflict resolution skills to resolve ensuing disagreements within the network. The network management body may catalyze conflict resolution by facilitating discussions, collaborations, and participatory processes with relevant parties. For example, the Southeast Cebu Cluster helped resolve a conflict arising from the restriction of municipal fishers to their own municipal waters. The seven municipalities agreed to allow municipal fishers from cluster member municipalities to fish within the shared municipal waters, but agreed to exclude fishers from outside (Eisma-Osorio et al., 2009). Mechanisms to enable conflict resolution should be utilized during participatory processes; if not successful, however, the involvement of external mediators should be considered.

Conflict Resolution Assessment Questions

1. What are the main conflicts experienced within the MPA network?
2. What kinds of strategies or methods have worked to resolve conflicts?
3. Is there a conflict resolution mechanism in place at the network level?

Scorecard 6: Conflict Resolution

Network management body has a mechanism for conflict resolution in place, such as an external mediator. Existing conflicts are identified and resolved in network decision-making and planning process.	3
Network management body has not considered a conflict identification or resolution mechanism. Conflicts are often left unaddressed.	2
Conflicts within network exist and are not identified or resolved.	1

4.5 Capacity Development

The lack of human and institutional capacity continues to be a challenge in planning and implementing coastal management projects in the Philippines (White et al., 2006a; Milne et al., 2003). Examples of human and institutional capacity development needs include the following:

- Environmental education
- Information management
- Social and ecological monitoring
- Leadership
- Conflict resolution
- Enforcement procedures.

Developing a management system for a network of MPAs will likely increase the need for human and institutional capacity (Lowry et al., 2009). Network management and associated institutions will need to be actively strengthened through technical training and education. For example, technical training in ecosystem monitoring, multi-institutional information management, and the facilitation of inter-institutional collaboration will smooth the network management and implementation processes (Christie et al., 2009a and b). Outside technical assistance should be sought for monitoring and evaluation efforts, conflict resolution, and continued mentorship of MPA management bodies (Lowry et al., 2009). Additionally, it is critical that individual MPA management bodies receive continuous support throughout the network development process to ensure effective individual marine protected areas (White et al., 2006a). Capacity needs for the MPA networks will change over time and require continuous reassessment.

Capacity Development Assessment Questions

1. Do human and institutional capacity building activities occur in your MPA network? If yes, what are they?
2. Has the network collectively agreed upon capacity development needs?
3. Describe a few capacity development needs of the network that are currently unmet.

Scorecard 7: Capacity Development

Network management body actively participates in technical and skill development exercises on such topics as monitoring, information management, and enforcement. Technical working groups of the network receive technical trainings. Leadership development is an aspect of capacity development.	3
Network management group identifies capacity development needs, yet few skill development exercises have occurred	2
Network management group has not identified or planned for skill or capacity development needs.	1

4.6 Alternative and Supplemental Livelihood

A MPA network may require the establishment of additional MPAs or the expansion of existing MPAs to meet overall ecological goals. Fishers may be negatively impacted in the short-term as some fishing

grounds become designated no-take zones. Alternative and supplemental livelihood programs aim to provide additional and diversified income to such fishers, and in doing so, can support the success of no-take zones (Beger et al., 2004). However, alternative livelihoods schemes do not always result in reduced fishing pressure or become successfully adopted by the local communities and fisher folk (Pollnac et al., 2001; Sievanen et al., 2005). Therefore a gradual community-based consultation process with local fisher folk should form the basis of any alternative livelihood interventions.

In order to increase the likelihood of success of alternative livelihood programs, a multi-sectoral effort jointly managed by community stakeholders, organized groups, and local/provincial governments is recommended (Kuhlmann, 2002). The network management body can play an important role in this process, as it occupies a sentry position and can relatively easily solicit input from its diverse members (such as local and provincial government officials, fisher folk, local organizations [i.e. people’s organizations] and NGOs). Alternative livelihood schemes facilitated through the network management body can expose community groups to the various options available for alternative sustainable employment through trainings or education programs. Community groups should be able to choose options after learning the advantages, work requirements, investment, revenues, and risks involved in each scheme. This information should be supplied through an expert or a community organizer (Beger et al., 2004).

While alternative livelihood schemes may exist at a local MPA level, a network-wide approach has several benefits. More specifically, investigating existing alternative livelihood options, and identifying educational and funding opportunities at this level will likely mean increased resources and influence.

Alternative and Supplementary Livelihood Assessment Questions

1. Does the MPA network management body implement programs for alternative or supplementary livelihoods?
2. Do local organizations, such as the people’s organization, implement livelihood programs?
3. Is alternative livelihood development identified as a need by the MPA network management body or the local communities?

Scorecard 8: Alternative and Supplementary Livelihood

MPA network implements, coordinates, and manages a network-wide livelihood development program, and/or supports mechanism to improve livelihoods such as marketing assistance, the provision of market information or financing, etc.	3
People's organizations and/or MPA management bodies implement livelihood projects individually.	2
Alternative livelihood projects are not established. Plans for establishment are absent.	1

4.7 Sustainable financing

MPAs and MPA networks in the Philippines are constrained by the availability of long-term financing (White et al., 2006a; Milne et al., 2005). Network management incurs costs, as well as creates opportunities for cost-sharing and generating revenue.

Recurrent costs in network management may include:

- Network management meetings

- Law enforcement/patrolling
- Enforcement apprehensions
- Technical trainings (Eisma-Osorio et al., 2009).

Financial support of the network management body will require cost sharing from participating municipalities, and sustainable financing from external sources and the government. The network management body should pursue funding opportunities through those agencies involved. The network management body may have more leverage as a collective group in seeking funds from the private sector, such as tourism operators and provincial and national governments (Armada et al., 2009). Coordinating local MPA user fee systems is also a potential source of revenue for a network management body (White et al., 2006a).

For example, each municipality in the Southeast Cebu Cluster contributes funds annually for the operations of the council; this inter-institutional commitment to cost-sharing presently sustains the monthly meetings of the cluster. In addition, external funding sources support the funding needs of the cluster.

Sustainable Financing Assessment Questions

4. Describe current financing of the MPA network. Is this funding allocated annually?
5. Do other sources of funding exist? If so, have they been pursued?
6. Are cost-sharing mechanisms involving local and external sources in place?

Scorecard 9: Sustainable Financing

MPA network has a sustainable funding mechanism in place. Institutions have committed to annual cost sharing.	3
MPA network institutions identified possible funding mechanisms, but they are not secured. Institutions have agreed to but do not contribute to annual cost sharing.	2
MPA network has neither obtained funding nor identified potential sources of funding. Institutions have not committed to cost sharing.	1

4.8 Coastal Law Enforcement

MPA networks present coastal law enforcement challenges as well as opportunities. Individual MPAs within the network often lack sufficient enforcement within their own boundaries (DENR 2001d). Therefore scaling up enforcement efforts to a broader region presents challenges for effective and efficient enforcement. Effective network enforcement depends on institutional collaboration (Christie et al., 2009a). Patrolling, prosecution, and apprehensions must be integrated, and coordinated to the full scale of the region (Eisma-Osorio et al., 2009). A network joint enforcement team, based on committed and financially supported local institutions such as the *bantay dagat*, should be established. The network joint enforcement team should have agreed upon fair and strict enforcement protocols standardized throughout the network. The enforcement team should also be consistently funded and capacitated with necessary trainings. Coordination efforts of the network joint enforcement team should build upon and support local enforcement of MPAs.



Figure 23. A patrol boat is one of the shared resources of the Southeast Cebu Coastal Resources Management Council. Photo by Theresa Black.

Coastal Law Enforcement Assessment Questions

1. Does the network have a joint enforcement team that works across jurisdictions?
2. Are enforcement teams active? Do enforcement teams use standardized procedures?
3. Do enforcement bodies receive sustainable funding?

Scorecard 10: Coastal Law Enforcement

MPA network has a joint enforcement team that is coordinated and crosses municipal jurisdictions. Patrolling, apprehensions, and prosecution are active and ongoing. Network-level enforcement team has sustainable funding to support activities. Enforcement has clearly defined and standardized procedures throughout network.	3
Enforcement exists at individual MPA level only. Little to no network-level coordination of enforcement or prosecution exists. Individual MPAs have various levels of enforcement, and funding for enforcement varies between MPAs.	2
Individual MPAs are poorly enforced. There is inadequate funding for enforcement. No network coordination exists for enforcement.	1

4.9 Network Monitoring

Monitoring the biophysical and socioeconomic conditions of coastal management intervention (such as MPAs) is necessary to ensure management responsiveness and improvement (Uiychiaoco et al., 2002).

Monitoring an MPA network includes assessing the social and biophysical state of individual MPAs as well as reflecting on how well the MPA network functions as a whole.

Standardization of indicators across multiple MPAs in the network will encourage a more holistic approach to evaluating how such networked sites interact, and determine success in meeting goals and objectives of the network overall (Pomeroy et al., 2004).

The **MPA Report Guide** and the **MPA Management Effectiveness Rating System** (located in Appendix 3 and described in the *Creating and Managing Marine Protected Areas in the Philippines*) are established systems for measuring MPA management in the Philippines (White et al 2004; White et al., 2006a). This management effectiveness rating system helps to analyze the degree to which management actions are achieving the goals and objectives of an MPA (Pomeroy et al., 2004). This system has an established history in the Philippines and should be used as the standard when monitoring and evaluating individual MPAs and MPAs within a network.



Figure 24. A community member and fisher prepares to monitor the health of the coral reef. Photo by Theresa Black.

Network Monitoring Assessment Questions

1. Describe the network monitoring activities in your MPA network. Have biophysical monitoring activities taken place? Socio-economic monitoring activities?
2. Are the monitoring protocols standardized and consistent throughout the network?

Scorecard 11: Network Monitoring

MPA network has established standardized protocols for social and ecological monitoring throughout network. MPAs are regularly monitoring for biophysical and socio-economic indicators such as fish biomass, coral cover, and human perceptions of the MPA	3
Individual MPAs are monitored, but monitoring protocols are not standardized throughout network. Ecological and socio-economic data is collected inconsistently for each MPA	2
Information is not collected or organized for individual MPAs. There is little to no information available to network management body.	1

4.10 Information Management

MPA-relevant social, biological and management effectiveness information should be collected throughout the network, standardized, synthesized, and maintained in an accessible format for network managers as well as for each community. Comprehensive information management at the network scale will require commitment and coordination from each municipality and the network management body. Well-managed information that covers all aspects of the MPA network is valuable to MPA network planning and design, as well as to evaluating and adapting the MPA network. MPA network design and planning should utilize the collective information when making implementation decisions.

Collective information can be stored, maintained, and represented spatially in a Geographic Information System (GIS). A GIS allows a user to enter various layers of information from multiple communities and sites into a database and produce informative and accurate maps displaying the results.

Information management occurs at the individual MPA level as well as at the MPA network level. Many MPAs have already been documented and corresponding information on the MPA synthesized in the Philippines Marine Protected Coast, Reef, and Management Database, which is maintained by the Coastal Conservation and Education Foundation located in Cebu City, Philippines. This database contains management and biophysical information on hundreds of MPAs in the Philippines. It is a tool to store information on MPAs and to observe trends in MPAs over time. More information on the MPA database and the database user guide can be found at www.coast.ph.

While each community would benefit from collecting and managing local information, the network management body should be responsible for synthesizing all information (and making it accessible) for the benefit of the network. This requires a technical capacity within the network management body to accumulate, organize, and present large amounts of information across varying locations and time scales.

The methods used for gathering information are as important as the presentation and organization of the information. For example, careful attention should be paid to the audience and to the goals of information management. Each distinct constituency has different needs and abilities to assimilate information. Various resources are available to improve MPA information gathering, analysis, and management such as *Coral Reef Monitoring for Management* by Uychiaoco et al., 2002, and *How is your MPA doing?* by Pomeroy et al., 2004, and the *MPA Report Guide* (see Appendices). See the References section for more information on these resources.

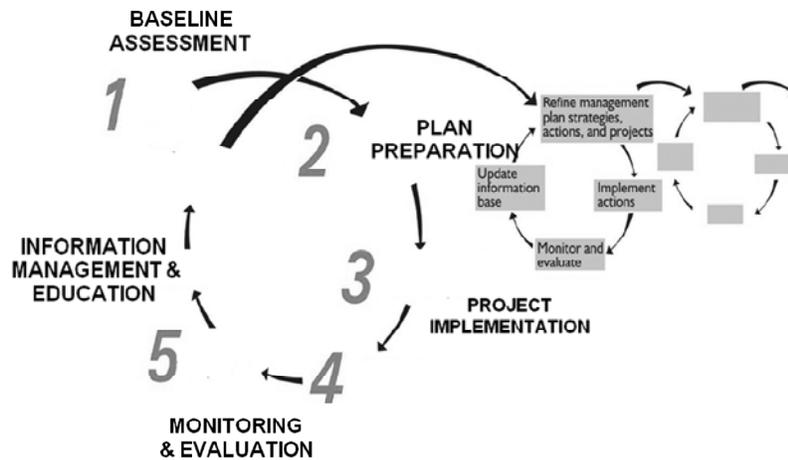


Figure 25. Information Management and Monitoring & Evaluation play a key role in feeding information back into MPA network management and planning. As illustrated, planning for the network is a cyclical process. Figure courtesy of US AID Project FISH.

Information Management Assessment Questions

1. Do individual MPA management bodies gather and organize information? Is the Philippine MPA database utilized in this process?
2. Describe the network information management activities.
3. Does one database exist that collects information for the whole network?
4. Is the information within the database accessible to the management body? Is it accessible to other stakeholders and communities? If yes, how?

Scorecard 12: Information Management

Network information including monitoring data is organized and stored in a network level database. Information is synthesized and accessible to network management, individual communities, and stakeholders. Network information is organized graphically in a GIS database.	3
Information on each individual MPA is collected but not stored in a network level database. Information is occasionally made available to network management and communities through presentations	2
Information is not collected or organized for individual MPAs. There is no information available to network management body.	1

4.11 Advanced Planning: Evaluating & Adapting MPA Networks

After several years of operations, it may be time to consider evaluating network programs and identifying opportunities to adapt and improve the network.

Evaluating an MPA network requires reflection on the goals and objectives set forth by the MPA network management body. This process should occur at the network level, not the individual MPA level. An internal or external evaluation team should agree upon and assess biophysical, socio-economic, and governance indicators to document progress toward attaining network goals. (Socio-economic and biophysical information for each MPA and MPA network will be available through network monitoring and information management activities discussed earlier in this manual.) Indicators can be based on *outcomes* such as increased protection of mangrove habitat, or *process* indicators such as participatory processes utilized in decision-making. Program evaluations should actively engage relevant stakeholder groups in evaluative processes, as one of the goals of the evaluation is to (1) provide feedback on effectiveness of management strategies and (2) provide recommendations to improve current practices. Utilizing network management evaluative criteria (such as the self-assessment scorecards given in this manual) will assist the network management body in defining areas for future program development.

The results of the evaluation can inform the adaptation of network management programs. Adaptation of network programs depends on the flexibility of those programs (Christie et al., 2009b). If programs have guiding goals and are willing to experiment in methods to reach those goals, network programs will have the potential to improve and grow. Evaluating MPA network programs, once operational for a number of years, will provide insights to improving and adapting existing programs to better meet the overarching goals of the MPA network.

Evaluating and Adaptation Assessment Questions

1. Have the MPA network programs been established and operational for a number of years? If yes, complete the questions and scorecard below.
2. Describe any evaluation activities of the MPA network programs. For example, what specific programs have been evaluated or need to be, in your opinion? What was the outcome of the evaluation?
3. Describe ways in which the MPA network programs have adapted or improved over time.

Scorecard 13: Evaluation and Adaptation

Multiple MPA network programs have been evaluated to measure progress towards goals and objectives of the network. MPA network management programs adapt and change based on evaluation results.	3
Some of the MPA network programs have been evaluated. MPA network programs have been in place for multiple years and could benefit from an evaluation. Few programs have been adapted or improved over the years of operation.	2
MPA network programs have been in place for multiple years, yet have not yet been evaluated or adapted	1

4.12 Individual Marine Protected Areas

Well-managed individual MPAs are the foundation of a functional network (Lowry et al., 2009). Without well-managed and community-supported MPAs, a network will be ineffectual. At the initial planning stages of an MPA network, it is necessary to assess the current management effectiveness of each individual MPA. The

inclusion of an individual MPA within a network should not discount local efforts to maintain and strengthen the MPA's management; alternatively both local and inter-municipal management efforts should be maintained.

In the Philippines, a **MPA Report Guide and Management Rating System** has been established by the Coastal Conservation and Education Foundation to assist in organizing community-based MPA-level information for hundreds of MPAs. The MPA Report Guide provides information on (1) the status and quality of management, (2) the status and quality of the environment, and (3) benefits derived from the MPA. For further information on the MPA Report Guide and please see Appendix 3.

The **MPA Management Rating System** (located within the MPA Report Guide) sets benchmarks and rating levels to assess the progress of MPA management. The benchmarks include elements of a successfully run MPA, such as enforcement, community support, education programs, legal status, and infrastructure to name a few. For example, an MPA with a rating of “Level 3” (well established) would have:

- An active management body;
- An allocated budget for the MPA;
- Structures and outposts that are maintained;
- Regular patrolling;
- Community education programs (White et al., 2004).

The benchmarks set through the MPA Management Rating System provide a standard for assessing the current state of individual MPAs prior to and during the implementation of a network. Generally, MPAs that meet the basic management goals as illustrated in a “Level 3 MPA” are considered to have the necessary attributes of enforcement, management, and infrastructure to contribute to overall network goals. MPAs that do not meet a “Level 3” standard will likely require further capacity building and assistance before they can be considered a functional part of the network. The utilization of the existing MPA management rating system will assist in determining the state of each individual MPA and provide valuable information to the network planning process.

In addition to the MPA Report Guide and Management Rating System, various other publications contain important information and specific planning steps to successfully establish and manage MPAs in the Philippines. For an illustrative list, see *Table 1. Useful publications on MPA Management in the Philippines* in the publication *Creating and Managing Marine Protected Areas* by White et al., 2006. While these tools help assess MPA management (White et al., 2004; White et al., 2006a), others serve as repositories for collected information. The existing tools and information on MPA establishment and management should be an integral part to building a network of MPAs.

Individual MPA Assessment Questions

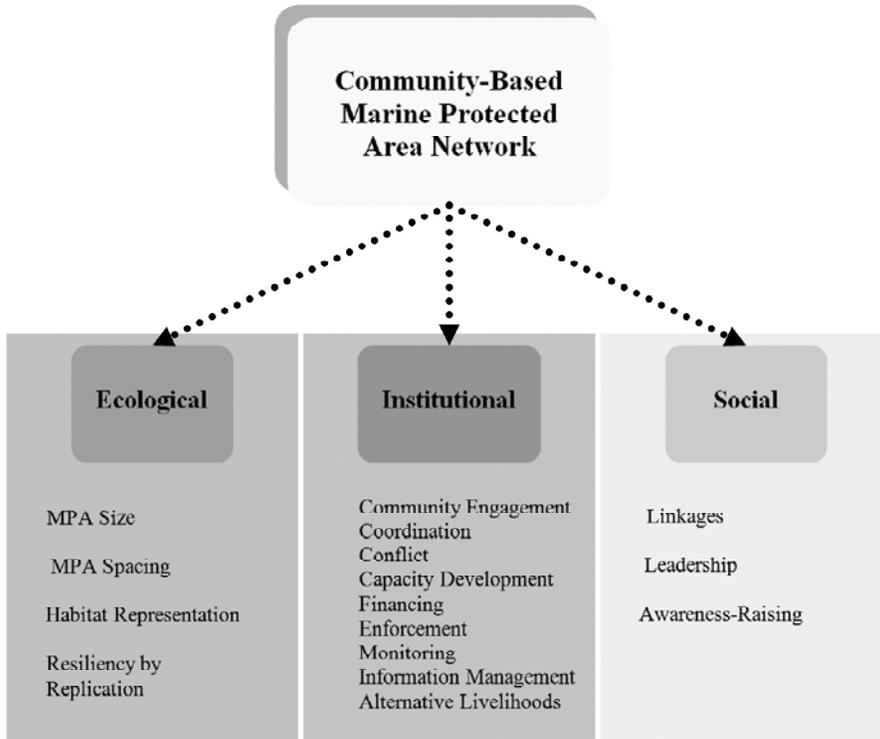
1. Based on the MPA management system contained within the MPA Report Guide (located in the appendix) at what level rating would you describe the majority of the individual MPAs within the network? (Using the best information available to you).
2. How many MPAs within the network are at rating Level 1? Level 2? Level 3?

Scorecard 14: Individual MPAs

Most of the MPAs within the network meet rating level 3, as defined by the MPA Management Rating System.	3
About half of the MPAs within the network meet rating Level 3.	2
Less than half of the MPAs within the network meet rating Level 3.	1

SECTION 5. CONCLUSION

Community-based MPA networks have ecological, social, and institutional components.



A network can support ecosystem functions through protection of key habitats based on considerations of fish life cycle, movement patterns, local ocean currents, and overall ecosystem health. An ecological network will be achieved when MPAs within the network are designed based on appropriate size, spacing, habitat representation, and replication principles.

A MPA social network consists of people working together to improve MPA management. Raising awareness and leadership development established through formal and informal education and capacity building programs will strengthen and sustain a social network of MPAs. Encouraging information exchange and communication across multiple MPAs and different elements of management are necessary to developing a successful social MPA network.

An institutional MPA network requires collaboration and coordination across multiple MPA management bodies. Horizontal and vertical coordination of all interested parties and stakeholders, from provincial (and in some cases national) to local community groups are necessary to form a MPA network. The inter-institutional network management body should utilize participatory processes to engage stakeholders in the development of enforcement teams, conflict resolution, information management, network monitoring, and in all other areas of network management. An institutional network of MPAs will result in standardized monitoring, information management, and enforcement procedures, among others, to benefit individual MPA management as well as achieve overall network goals.

Planning a community-based MPA network follows the traditional phases of coastal resource management in the Philippines. Refer to Figure 27 and the MPA Network Visioning & Planning Reference Guide in Appendix 2 for more information. Planning and managing a community-based MPA network should utilize the established tools and frameworks for managing community-based MPAs. MPA networks can be developed after careful consideration of the key indicators of successful social, institutional, and ecological networks, as presented in this manual.

SECTION 6.

MPA NETWORK PLANNING MODULE

This manual provides description of the ecological, social, and institutional elements of a MPA network. Sections 1-5 include assessment questions and scorecards in order to evaluate the progress and status of each of the ecological, social, and institutional elements of MPA networks. The workshop module in this section provides activities based on participant responses to the assessment questions and scorecards.

The following module provides as a roadmap for planning improvements to your MPA network. Specifically, this process will entail completing:

- An assessment checklist to improve the understanding of how individual elements of the network are functioning,
- A goal setting exercise to determine possible future directions of the network;
- A gap analysis exercise to identify the gaps between your goals and your current state;
- An action plan to identify the ‘who, what, when, and how’ each of your goals will be accomplished.

This roadmap strives to be a tool that provides MPA and resource managers the opportunity for reflection, collaboration, and learning.

6.1 MPA Network Module Facilitation Guide: Tips for Workshop Facilitators

- **Manual Content**
Each section of the manual describes an element of an MPA network. The facilitator should read and understand each section before working with group to complete the workshop activities. The facilitator should have a working knowledge of each element in order to guide discussion and engage the group participants. In cases where the participants are not familiar with the element, reading the section out loud to the group may be helpful.
- **Time Frame**
All workshop activities can and should be adapted to your unique time constraints and interests. For example, grouping different elements together into similar categories is one way to encourage discussion of many elements within a limited time frame.
- **Group Dynamics**
The participants in the workshop will represent diverse groups with different interests and hold different degrees of power within the communities and government. In order to create a supportive environment where participants feel comfortable sharing an honest assessment of issues, consider grouping people who share levels of power with one another. For example, Vice Mayors grouped with Vice Mayors and fishermen and community leaders together may encourage a more candid discussion on sensitive topics.
- **Adapt Activities to Current Stage of Network**
Facilitators should have a general understanding of the current status of the MPA network. Gauge activities and questions and plan to avoid elements or topics that are irrelevant based on the current stage of the network. For example, if this workshop serves as the initial introduction to

MPA networks, discussing network evaluation/adaptation would not be appropriate.

- **Incorporate Local & Existing Plans**

If local coastal management or MPA co-management plans already exist, integrate the MPA network goal setting, and action planning activities into the existing plan.

- **Scoring Elements in the Scorecards**

Participants may struggle with the limited scoring options in the Scorecard Assessment Activity. The scores of 1, 2, and 3 are designed to assist groups in choosing an appropriate and brief description of the current state of affairs. The purpose of scoring is to help the participants set goals and identify issues of concern within the network. Facilitators should request that the group elect the most appropriate score that best describes the current reality, while also acknowledging that the score is limited and not an enduring rating.

6.2 MPA Network Planning Module: Activity Overview

Below is an overview and flow of activities for the planning module. Specific instructions for each activity are in the following pages.

Introduction: Refresher presentation on the key components of an MPA Network

30 minutes

PowerPoint presentation on 14 main elements of an MPA network

Activity 1: How is your MPA Network?: Self-Assessment Scorecards

1 hour

In this activity, facilitators guide small groups through each of the network elements by reading through the corresponding sections in the manual. The small groups answer the provided assessment questions in each section. They then rate themselves in the scorecards provided at the end of each section. The scoring of element sets the stage for future goal setting activities by providing a general assessment of the current state of that element.

Activity 2: Prioritizing Elements of Network

30 minutes

In this activity small groups present to the larger group a quick recap of their discussions and how they scored each element. The large group then begins a discussion to prioritize what elements of the network they would like to focus on for the remaining planning activities of the workshop. The large group draws on the suggestions from each small group's discussion in choosing which elements they consider a priority for the workshop. Alternatively, if time is not an issue, the large group can choose to address each of the elements in later workshop activities, and prioritizing will not be necessary.

Activity 3: Element Goal Setting

1 hour total per element, 30 min in small group, 30 min in large group

Small groups are assigned one element simultaneously (if only a few elements were prioritized in the previous activity) or elements are divided up amongst small groups. For example, one small group can work on goal setting for the elements of coordination, conflict resolution, and capacity building while another group works on enforcement and alternative livelihoods OR all groups work on the same elements at one time. Using various methods, small groups set goals for that element of the MPA network.

Activity 4: Gap Analysis Brainstorm

1 hour for five elements or ten minutes per element

In a large or small group, a facilitator guides participants to identify gaps they anticipate in reaching the goals that have been set. Suggestions are listed on the board, visible to everyone, so that each small group may consider them in the development of their action plans.

Activity 5: Action Planning

1.5 hours per element

Small groups complete the action-planning matrix for one element at a time. Small groups suggest and agree upon strategies, a funding source, a timeline, and a person or group responsible for completing each action. When possible, actions should correspond or build upon pre-existing coastal management or MPA plans. Once matrices are completed, the larger group should walk around for a ‘gallery viewing’ of each action planning matrix. Each action plan is then presented to the large group and facilitator notes shared and possible actions. Note taker documents all suggested planning activities for use in writing the action plan.

Activity 6: Writing Action Plan

Note taker and facilitator summarize action planning activity matrices into an official document. A committee, which is tasked with writing the action plan, reviews the notes and suggestions from the workshop and writes a clear action plan. See *Coastal Resource Management Planning, Guidebook 3*, by DENR, 2001, for instructions on writing an action plan. When possible, integrate action plans into pre-existing coastal management plans. Written action plan is presented to council and communities at a later meeting for support and verification.

6.3 MPA Network Planning Module

Activity 1: Self-Assessment Scorecards: How is your MPA Network?

Self-Assessment Scorecard Activity Instructions:

Materials: MPA Network Manual and Appendix 1 to summarize scores.

Format: Small group with one discussion facilitator per group.

An MPA network consists of social, institutional, and ecological elements. Throughout the manual each section describes one element of the network. Following most sections are Assessment Questions and a Scorecard. The scorecards are designed to help small groups assess and score their progress of that element. For a complete list of scorecards, see Appendix 1.

Step 1. Read each section of the manual that contains assessment questions and a scorecard to your small group. Sections can be read completely out loud or summarized by the facilitator, but it is important that each facilitator comprehend the content of each section in order to facilitate discussion and ideas.

Step 2. Facilitator then reads aloud the assessment questions and the group discusses an answer for each question. Questions are not designed to be tests, but instead should encourage reflection and comments. The reflection and comments should then guide groups in a discussion on how to score their progress in the scorecard.

In each scorecard, three different stages of implementation are described (for each element) and assigned a score of 1, 2, or 3. The score of “3” suggests an element under consideration is being implemented and is in an advanced stage of development in the network. A score of “2” suggests that activities may have been initiated, but are not consistently implemented. A score of “1” suggests that little or no attention was given

Step 3. Facilitators should guide the group in choosing an appropriate score. Scores are general, and can be broadly interpreted.

Step 4. Repeat this process, until a score is given for each of the elements in the scorecard summary table (Appendix 1). This scorecard summary will help groups identify priority areas in the network, and inform the remaining workshop activities.

Activity 2: Prioritizing Elements of the Network

Prioritizing Elements of Network

30 minutes

In this activity small groups present back to the larger group a quick recap of their discussions and how they scored each element. The large group then begins a discussion to prioritize what elements of the network they would like to focus on for the remaining planning activities of the workshop. The large group draws on the suggestions from each small group's discussion in choosing which elements they consider a priority for the workshop. Alternatively, if time is not an issue, the large group can choose to address *each* of the elements in later workshop activities, and prioritization will not be necessary. In other words, if time permits, *all of the subjects listed on the scorecards* could be discussed.

Step 1. Small groups present Summary Scorecards to the larger group. Small groups mention what elements they consider a priority for planning activities.

Step 2. Facilitator keeps track of the priority elements mentioned by each small group. Facilitator guides large group to a consensus on which elements should be the sole focus for the following workshop planning activities.

Activity 3: Goal Setting: Where would you like your MPA Network To Go?

The priority elements of the MPA network (identified in the previous activity) are the subject of this goal setting activity. This activity asks participants: where would you like your MPA network to be? What are your goals for each element? Refer to the MPA Network Planning Reference Guide in the Appendix for suggestions on planning steps and achievable goals for each element. This table is a suggested series of planning steps and does not need to be followed exactly. Keep in mind that the planning steps in this table may happen out of order or simultaneously. The end result of this activity is a list of 1-3 goals for each priority area.

Goal Setting Activity Instructions:

1 hour total (30 mins for small group exercise, 30 mins for large group exercise)

Materials: MPA network planning reference guide (Appendix 2), large blank paper or whiteboard

Format: Small group (30 mins with facilitator); large group (30 mins with facilitator).

Part I: Small group exercise – 30 minutes

Step 1: The facilitator announces the element of focus for this visioning activity.

Step 2: Each member reflects on how they scored each element and the reasons why. (It will be helpful to have the Summary Scorecard nearby to refresh memories) Each group member considers the goals they envision for each element. Then the member writes down one to two goals on a card. Members are encouraged to be specific in writing their goals.

Step 3: Members tape their goals on a wall or white board. The group spends a few minutes reading all of the goals and then begins the process of grouping them into similar categories.

Step 4: The facilitator guides the group to craft a few sentences for each category or main idea.

Step 5: The group further narrows down the suggested goals into a one to three achievable goals on a large piece of paper for display and presentation to the large group.

Part II: Large group exercise – 30 minutes

Step 1: Once the small groups have completed articulating their goals for one element, the large group reconvenes.

Step 2: The small groups present their goals for one element. A note taker writes the small groups' goals onto a whiteboard. At the end of the small group presentations, the large group will have a list of goals from each group on the board.

Step 3: The large group facilitator guides the large group to combine the different goals into one goal that is inclusive of all ideas. By putting it all together, specific goals are crafted for each element of the network.

Documenting Goals

The note taker of the workshop is responsible for creating a clean copy of the goals for each element of the MPA network. This list will be used to inform the remaining activities of the workshop.

Activity 4: Gap Analysis Brainstorm

A gap analysis helps identify potential problems that may inhibit the attainment of MPA network goals. The goals represent future directions, and certain challenges and impediments likely exist in getting there. A gap analysis brings out those gaps in order to help account for them in the planning process more effectively. A gap analysis brainstorm activity engages the large group by drawing out ideas of the anticipated gaps and problems in achieving the goals set in the previous activity. A brainstorm session is a facilitated group discussion where everyone's ideas are acknowledged. The end result of this activity will be a list of anticipated gaps in achieving each element's goals.

Gap Analysis Activity Instructions:

30 minutes

Materials: Index cards or whiteboard, vision statements for each element

Format: Large group with discussion facilitator

Step 1: Facilitator announces the element of concern and reads the goals to the group.

Step 2: Facilitator encourages participants to call out all of the potential problems that may exist in reaching the goals. Lack of funding? Coordination challenges? Lack of travel funding? Or travel time? The facilitator allocates 10 minutes for each element brainstorm.

Step 3: Note taker writes suggestions on a white board or index cards and posts them on the wall.

Step 4: The facilitator then reads out the second list of goals for the next element, and so on. The suggested gaps and problems remain on the board or wall for groups to revisit during the action planning.

Step 5: Facilitator reminds group that the purpose of this activity is to identify gaps that may exist in accomplishing identified goals. The point is to be able to develop action plans in the next activity, which addresses these gaps.

Activity 5: Action Planning: Who, What, When, & How?

An action plan uses your goals and gap analysis to generate practical steps to address management challenges. It is designed to be a concrete list of activities that will help attain the goals. An action plan indicates the *who*, *what*, *when*, and *how* of your visioning and gap analysis worksheets. It identifies a funding source to support the actions, establishes a timeline, and assigns a lead person, committee, or group to each action. When possible, the action plan should be integrated into action plans that may already exist for communities, local governments, or network management bodies.

Action Plan Activity Instructions:

1.5 hours

Materials: Blank action plan matrix (Appendix 3), gap analysis index cards, and goal statements for each element

Format: small groups with one facilitator per group, note taker; large group with main facilitator

The matrix located in Appendix 3 lists the main components of an action plan (goal, gaps, strategy, who, timeline, funding source). Please use the matrix in Appendix 3 to complete this activity.

Small group – 1 hour

Step 1: Facilitator announces the element of concern for the activity. The note taker writes the pre-existing goal stated for the element in the matrix, under the heading ‘Goal’

Step 2: The gaps identified in the previous activity (should be posted on the wall) are written into the matrix, under the heading ‘Gaps.’

Step 3: Facilitator encourages group to consider and discuss strategies to achieve the vision statement, while accounting for gaps. Strategies should be specific, concrete actions. The note taker lists and organizes the strategies in the matrix under the heading ‘Strategy.’

Step 4: Members discuss and agree upon whom will be responsible for the action. Be specific as possible, identifying groups, committees, and individuals. Note taker lists the responsible party under the heading ‘Who.’

Step 5: Members discuss and agree upon a clear and realistic timeline for the action. Note taker lists the timeline under the heading ‘Timeline.’

Step 6: Members discuss and agree upon a funding source for the action. Note taker lists the funding source under the header ‘Funding source.’

(Activity 5: Action Planning Activity — Continued)

Large Group – 30 minutes - gallery viewing & action plan presentations

A gallery viewing allows the small groups to walk around the room and view other groups’ action plan matrices.

Step 1: Participants walk around and view each small group action plan matrices during the time allotted for the gallery viewing.

Step 2: Large group reconvenes.

Step 3: One member from each small group presents their action plan matrix to the large group.

Step 4: Main facilitator and note taker document and point out the common and shared actions in each of the action plans. Shared actions are highlighted in summary of the activity by the facilitator. Facilitator informs the group that their ideas and suggested actions will form the basis of an action plan for the MPA network.

Activity 6: Documenting and Writing an Action Plan

The MPA network-planning module generates goal statements and suggested action plans for each element of the network. The ideas generated from the workshop should form the foundation of an action plan for the MPA Network. When pre-existing coastal management or marine protected area plans are in place, the MPA network action should be integrated to the greatest extent possible. The main facilitator and note taker should work with a committee or assigned working group to organize the notes and ideas from the workshop into a final action plan. For a complete description of how to write an action plan see Chapter 4, *Coastal resource management plan preparation and adoption – Phase 2, in Coastal Resource Management Planning*, Guidebook No. 3 by DENR 2001. The action plan document should be presented to the appropriate community or council at a later meeting for verification and support.

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APPENDIX 1: MPA NETWORK ELEMENTS SUMMARY SCORECARD

ELEMENT OF NETWORK	SCORE
<i>Scorecard 1: MPA Size and Spacing</i>	
<i>Scorecard 2: Habitat Representation & Replication</i>	
<i>Scorecard 3: Awareness Raising</i>	
<i>Scorecard 4: Institutional Coordination</i>	
<i>Scorecard 5: Community Engagement</i>	
<i>Scorecard 6: Conflict Resolution</i>	
<i>Scorecard 7: Capacity Development</i>	
<i>Scorecard 8: Alternative & Supplemental Livelihoods</i>	
<i>Scorecard 9: Sustainable Financing</i>	
<i>Scorecard 10: Coastal Law Enforcement</i>	
<i>Scorecard 11: Network Monitoring</i>	
<i>Scorecard 12: Information Management</i>	
<i>Scorecard 13: Advanced Planning: Evaluating & Adapting</i>	
<i>Scorecard 14: Individual MPA Management</i>	

APPENDIX 2. MPA NETWORK VISIONING & PLANNING REFERENCE GUIDE

The basic approach to improving the management of MPAs, identifying and planning for new MPAs and eventually forming a network of MPAs for a given planning area will generally follow the coastal resource management and MPA planning process being implemented in local governments in the Philippines (White et al., 2006) The *Coastal Resource Management Guidebooks* (DENR 2001) and *Creating and managing marine protected areas* by White et al 2006, are essential references to guide communities through the process of establishing and managing new individual MPAs and complete the planning process of a MPA network. The five main steps of CRM have been adapted in the table below to include considerations and references for each step for planning and implementing a MPA Network.

Planning an MPA Network adapts the five key steps of coastal resource management planning: 1. Issue identification and baseline assessment; 2. MPA Network Plan Preparation and Adoption; 3. Action Plan and Project Implementation; 4. Monitoring and Evaluation; and 5. Information Management and Education and Outreach. (DENR 2001) The following table has been created as a planning reference and idea generator only. Please use this table as a suggested guide only for your own unique planning and visioning process.

Phases of Coastal Resource Management Planning	MPA Network Application
Issue identification and baseline assessment	
Program preparation	<ul style="list-style-type: none"> ▪ Secure local commitment to participate in network ▪ Secure funding for network program; potential sources include Local Government Units, NGOs, provincial government, and external groups, etc. ▪ Determine network coverage and what municipalities and MPAs will be included and involved ▪ Recruit network management staff, e.g., network secretariat, chair, LGU representatives, etc. ▪ Develop a work plan with sequence of activities, timeline, and individual responsibility
Field assessment/participatory coastal resource assessment (PCRA)	<ul style="list-style-type: none"> ▪ Utilize PCRA techniques to gather socio-ecological additional data (Deguit et al., 2004) ▪ Gather network-wide habitat data ▪ Gather network-wide socio-economic and management data on individual MPAs
Network database and profile development	<ul style="list-style-type: none"> ▪ Compile PCRA data for each municipal into a coastal profile (see Deguit et al., 2004 for further explanation) ▪ Combine municipal 'profiles' into a network 'profile' or graphic explanation of habitat distribution, resource conditions, and socioeconomic conditions. ▪ All information should be stored and organized in one location or database (GIS).
Prioritization of issues and analysis of causes	<ul style="list-style-type: none"> ▪ Key issues should be identified and prioritized per municipality ▪ Key issues identified collectively as a network ▪ Identify root causes of issues
MPA Network plan preparation and adoption	
Establish network management body	<ul style="list-style-type: none"> ▪ Form a network management body consisting of members of local and national government agencies and citizen groups, NGOs, and other community members as necessary
Define goals and objectives of the network	<ul style="list-style-type: none"> ▪ Create goals which are positive statements of issues identified in previous steps

	<ul style="list-style-type: none"> ▪ Create objectives, which are measurable targets in order to achieve the network’s aims, strategies, and actions. ▪ Example goal: protect key spawning grounds in a marine protected areas
Develop network strategies and action plan	<ul style="list-style-type: none"> ▪ Identify and evaluate alternative strategies for addressing each objective, select best strategy ▪ Explicit description of steps that would be needed to implement each strategy ▪ Example: To achieve goal: ‘protect key spawning grounds in a marine protected area’ Steps include: 1. use PCRA techniques to map spawning areas; 2. generate network consensus on need for protection of these areas; 3. consult communities of respective areas; 4. establish MPAs.
Action plan and project implementation	
Network plan implementation	<ul style="list-style-type: none"> ▪ Activities identified in action plan are carried out in daily planning, enforcement decisions, and activities by network members: local government officials, enforcement team, resource users, and NGOs ▪ Adequate coordination, funding, and commitment of each activity and stakeholder supports implementation of actions
Legislation and regulation	<ul style="list-style-type: none"> ▪ Legislation and legal framework, governing coordination activities, and enforcement protocols understood and implemented
Coastal Law Enforcement	<ul style="list-style-type: none"> ▪ Network-wide clear and fair enforcement protocols established ▪ Funding for network enforcement activities secured ▪ Shared resources such as a patrol boat organized and maintained ▪ Legal assistance and training for illegal fishing apprehensions made available to all network members ▪ Network-wide <i>bantay dagat</i> and other enforcement capacity building trainings are scheduled as needed
Revenue generation	<ul style="list-style-type: none"> ▪ Member Local Government Units annually allocate funds for network ▪ Network management body seeks grants or outside funding, i.e., network management body approaches provincial government or external sources for funding assistance
Annual program preparation and budgeting	<ul style="list-style-type: none"> ▪ Annual levels of investment secured to sustain network plans ▪ Network considers establishing a network unit or office with budget and dedicated staff and equipment ▪ Network conducts regular strategic planning workshop with all partners to articulate network program directions and funding requirements
Monitoring and Evaluation	
Monitoring and evaluation	<ul style="list-style-type: none"> ▪ Identify necessary information for network management body to improve management effectiveness ▪ Develop specific indicators that will measure effects of programs, i.e. individual MPA management effectiveness ratings or a percentage of mangrove habitats protected ▪ Utilize the self-assessment checklist in this manual to assess network development ▪ Develop network-wide consistent monitoring protocols for administrative, socio-economic, and biophysical data ▪ Assign committee of network management body to complete monitoring ▪ Disseminate results of monitoring to network management body and stakeholders ▪ Identify capacity needs that inhibit management plans

Refine management plan	<ul style="list-style-type: none"> ▪ Adapt goals and strategies based on monitoring and evaluation data
Information Management, Education, and Outreach	
Information management	<ul style="list-style-type: none"> ▪ All network and individual MPA information gathered should be compiled and managed in a database that facilitates information retrieval and analysis ▪ Consider GIS as one tool that summarizes socio-economic, ecological, and management data graphically
Education and Outreach	<ul style="list-style-type: none"> ▪ Implement formal and informal community education programs on the ecological and social aspects of networks ▪ Implement network-wide trainings on leadership development, conflict resolution, ecosystem dynamics, monitoring techniques, and GIS skills among other topics ▪ Assess impacts of education programs and refine programs ▪ Institutionalize cross visits as a methods to share learning across MPAs

APPENDIX 3: ACTION PLANNING MATRIX

Goal	Gaps	Strategy	Who	Timeline	Funding Source

APPENDIX 4: MARINE PROTECTED AREA REPORT GUIDE
AND THE MARINE PROTECTED COAST, REEF, AND MANAGEMENT DATABASE

The Marine Protected Area Report Guide and the Marine Protected Coast, Reef, and Management Database were created and are maintained by the Coastal Conservation and Education Foundation (CCEF) along with other partners. Please contact CCEF for the most recent updates to the database and for more information at www.coast.ph.

MPA REPORT GUIDE

This **MPA Report Guide** can assist in organizing information on individual MPAs and the environment that the MPA protects. If completed yearly, it will provide MPA managers, local governments, non-government organizations, academe or other interested parties with information on the status and quality of management, the status and quality of the environment and benefits being derived from the MPA. It will also provide feedback on how the MPA is rated compared to other MPAs and on how to improve management of the MPA.

I. MPA DESCRIPTION & STATUS

Items marked with “*” should be completely filled-up. Attach MPA legal documents and other relevant supporting documents (e.g. Ordinance or proclamation document, map).

MPA name*: _____

Region: _____ Province*: _____

Municipality/City*: _____

Barangay*: _____

Date of survey*: _____

MPA size (hectares)*: _____

Habitat/ecosystem(s) within MPA:

- Coral reef Seagrass bed Sandy bottom Rocky intertidal
 Mangrove Macro-algal bed Soft bottom Open water

Type of coral reef:

- Fringing Barrier Pinnacle rock
 Patch Atoll Offshore reef / Shoal

Boundary coordinates (deg-min-sec)*

Point	Latitude (e.g. N 9° 41' 11.4")	Longitude (e.g. E 123° 30' 25.4")
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

Year legally established*: _____

Basis for legal establishment*: Municipal/City Ordinance No. _____

NIPAS Act _____

Others, specify: _____

Other laws affecting the area: _____

MPA establishment history (brief chronological order of events): _____

MPA objectives/reasons for establishment*: _____

OPERATIONS MANAGEMENT

Indicate classification of group (Select letter to indicate classification)

- | | |
|--|--|
| <input type="checkbox"/> [a] People's organization (PO) | <input type="checkbox"/> [f] Non-government organization (NGO) |
| <input type="checkbox"/> [b] Barangay government | <input type="checkbox"/> [g] Dive shop/Resort owner |
| <input type="checkbox"/> [c] Municipal government | <input type="checkbox"/> [h] Others, specify: _____ |
| <input type="checkbox"/> [d] Provincial government | |
| <input type="checkbox"/> [e] Government agency (e.g. BFAR) | |

Current managing group* (*The main group directly managing the MPA*)

Current assisting group/s* (*Groups providing technical assistance or support for effective implementation of the MPA*)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

Presence of marker buoys? [] Yes [] No

Number of moorings/anchor buoys? _____

Number of signs posted? _____

Date MPA management plan was approved? _____

Management zones*:	Size (has)	Regulations
<input type="checkbox"/> [] Core zone	_____	_____ _____ _____
<input type="checkbox"/> [] Buffer zone	_____	_____ _____ _____
<input type="checkbox"/> [] _____	_____	_____ _____
Other zone	_____	_____

FINANCIAL MANAGEMENT

Sustainable financing mechanism in place?

Policy, guidelines, system*

User/entry fee _____

Sharing scheme: Beneficiary _____	:	% share _____
_____	:	_____
_____	:	_____
_____	:	_____

Gov't budget allocation _____

Trust fund _____

 Others, specify _____

Who manages the funds?

- Municipal gov't
- Barangay gov't
- Others, specify: _____

How much is the estimated annual gross income of the MPA? PhP _____

How much was spent on annual MPA management/operations? PhP _____

Expenditures covered what items?	Amount (PhP)
<input type="checkbox"/> Trainings / seminars / meetings	_____
<input type="checkbox"/> Monitoring and evaluation	_____
<input type="checkbox"/> Honorarium/salary	_____
<input type="checkbox"/> Enforcement support (e.g. buoys, billboard, guardhouse, pumpboat)	_____
<input type="checkbox"/> Repairs and maintenance	_____
<input type="checkbox"/> Materials and supplies (e.g. office supplies, gasoline)	_____
<input type="checkbox"/> Communication equipment	_____
<input type="checkbox"/> IEC/Promotions	_____
<input type="checkbox"/> Others, specify: _____	_____

Supplemental or alternative livelihood created as a result of establishing MPA: _____

ENFORCEMENT

Penalty imposed? Yes No

Apprehensions recorded

Nature of violation	Date committed	Final outcome (e.g. Fined, imprisoned, dismissed)

Reference/s*: _____ _____ _____
Name of assessor/s, position and affiliation*: _____ _____ _____
Contact information: Phone: _____ Fax: _____ Email: _____ Address: _____ _____ _____

II. MANAGEMENT RATING

The MPA rating system is intended to assist local governments and communities to improve the management of their MPA. This simple rating system is dynamic and is not a definitive statement on the status of any MPA rated. *Put a check mark (?) on the box provided if the criterion is fully satisfied or accomplished. Carefully consider MPA age in assessment.*

Date of survey*: _____

Level 1: MPA is initiated - Passing (Year 1 since legal establishment) (6 points required)

1a	MPA concept accepted <i>(MPA started through local initiative or social acceptance sought through public consultations by external groups. Consulted members of affected stakeholders: fishers, other resource users and social groups, both men and women)</i>	
1b	Site surveyed using standard/accepted methods with baseline assessment complete, preferably conducted in a participatory process <i>(Reports completed on fish abundance, coral cover and profile on community and coastal management)</i>	
1c	Site selected <i>(Site chosen based on baseline assessment results and public consultations)</i>	
1d	Education program raising awareness about MPA functions and benefits started <i>(Conducted a series of public education activities)</i>	
1e	Management body membership tentatively determined <i>(Management core group starting to conduct regular meetings with proper documentation)</i>	
1f	Preliminary management plan drafted	

Level 2: MPA is established - Fair (Year 1 or 2 since legal establishment) (16 pts required)

2a	Community acceptance gained and documented <i>(Documented through public consultation documents e.g. Barangay Resolutions and/or signature campaigns)</i>	
2b	Ordinance passed and approved by the Municipal Council <i>(Ordinance should be well-drafted and enforceable and should be consistent with the concepts of sustainable use and equitable sharing of resources)</i>	
2c	Management body formally organized and recognized <i>(Management group has legal mandate and is recognized by the local government; For POs – registered with Securities and Exchange Commission or Dept. of Labor and Employment)</i>	
2d	Management plan adopted by community and LGU or PAMB <i>(Management plan initially implemented and endorsed by LGU/PAMB)</i>	
2e	Management activities started <i>(Conducted initial MPA activities such as: installation of enforcement support structures, patrolling and surveillance, apprehension of violators, etc.)</i>	
2f	Biophysical monitoring includes local participation <i>(Locals were trained to do biophysical survey using standard/accepted method)</i>	

2g	IEC activities conducted to raise understanding on MPA rules and regulations <i>(MPA rules & regulations disseminated using appropriate & practical means to target all direct users and other stakeholders; initial stakeholder knowledge assessment conducted)</i>	
2h	Anchor buoys, marker buoys and/or boundary markers installed	
2i	MPA rules and guidelines posted at strategic locations	
2j	MPA outpost or other structures constructed <i>(Guardhouse and/or other MPA-related structures constructed)</i>	

Level 3: MPA is enforced - Good (Only applies for 2 years or older) (24 pts required)

3a	Education program sustained public awareness and compliance <i>(A long-term IEC program exists and is currently being implemented in support of enforcement and the general MPA objectives)</i>	
3b	Regular biophysical monitoring measuring habitat condition and changes conducted <i>(Documented surveys conducted at least once annually using standard/accepted method)</i>	
3c	Collaborative patrolling and surveillance conducted by mandated enforcement group and local community volunteers <i>(Fish wardens on rotation assigned to guard and patrol the MPA, day and night with assistance from local community volunteers)</i>	
3d	MPA billboard signs, boundary markers and anchor buoys maintained <i>(Funds allocated for maintenance of enforcement support structures. May be part of the municipal CRM budget)</i>	
3e	Management body active <i>(Implements the management plan; Coordinates enforcement activities; Members attend meetings regularly; Coordinates and participates in regular monitoring activities)</i>	
3f	Budget from local gov't or from other sources allocated and is accessible for MPA mgmt <i>(There is a legal document by the local government or an agreement with the private sector allocating budget for MPA mgmt)</i>	
3g	Fishing effectively stopped inside of sanctuary zone <i>(No fishing-related violations in the sanctuary reported during the past year)</i>	
3h	Illegal and destructive fishing reduced outside of MPA <i>(Violations reported w/in 500m from the MPA boundary was reduced by 50% for the past year)</i>	

Level 4: MPA is sustained - Very good (Only applies for 3 years or older) (30 points)

4a	MPA management plan updated in a participatory process <i>(Mgmt plan amended with the participation of various stakeholders: fishers, resort and diveshop operators, local government units, other resource users, both men and women)</i>	
4b	Annual biophysical monitoring and feedback of results supervised by the managing body and implemented for 2 years or more <i>(Documented surveys using standard/accepted method. Reports are available)</i>	

4c	Budget from government or from other sources allocated and was accessed for 2 or more consecutive years <i>(There is a legal document made by the local government or an agreement with a funding group allocating budget for MPA operations; Financial report available)</i>	
4d	Management body trained and capacitated to run the MPA independently <i>(Management body supervises management activities {implementation of plans, enforcement, budgeting, monitoring and evaluation} and coordinates activities with partners)</i>	
4e	Enforcement system fully operational <i>(Enforcement group with mandate and workplan; Enforcement support structures maintained and patrolling activities sustained over the years)</i>	
4f	Illegal and destructive activities stopped inside and within the vicinity of MPA <i>(No violations reported inside and w/in 500m from the MPA boundary in the past year)</i>	
4g	Environment friendly enterprise and/or user fees collected as a sustainable financing strategy <i>(Sells environment friendly products/goods to tourists; Imposes collection of user-fees; etc.)</i>	

Level 5: MPA is institutionalized - Excellent (Only applies for 4 years or older) (40 pts)

5a	Information and education program on MPAs maintained over the years <i>(Information dissemination activities sustained according to long-term IEC program)</i>	
5b	Ordinance passed by the Provincial Council giving MPA stronger political support <i>(Gives MPA institutional support to strengthen enforcement and collaboration)</i>	
5c	Management plan refined for adaptive management <i>(Incorporates further refinements after gaining much experience and lessons to improve management strategies)</i>	
5d	Management plan incorporated in the LGU development plan <i>(MPA incorporated within the long-term LGU area-wide development plan)</i>	
5e	Evaluation of impacts on ecology & socio-economy conducted & feedback of results completed <i>(Assessment of resource status and long-term trends conducted. Analysis of change in local economy and long-term-trends of user groups conducted. Reports of these studies have been completed and reported back to stakeholders)</i>	
5f	Revenues from enterprise and/or user fees sustained and accounted for <i>(Existing sustainable financing mechanisms are well-managed and well documented; Financial reports easily accessible)</i>	
5g	Management body capacitated for financial management and fund sourcing <i>(Management body is well-trained to manage funds effectively {Facilitates proper handling, wise use & proper documentation}; They are also trained to seek for financial assistance {Formulated and submitted proposals})</i>	
5h	MPA emphasizes on public education and is being used as a study tour site, residents advocate for MPA <i>(After much experience, members are ready to share lessons and impart knowledge. Presence of an identified group that conducts tours & is capable of giving talks on MPA; Paper/s written on their success stories published)</i>	

5i	Expansion strategies or enhancement programs initiated <i>(MPA coverage is expanded e.g. from a sanctuary to a park, or; Scope of conservation activities is heightened e.g. coral reef restoration, re-seeding of clams, etc.)</i>	
----	--	--

Total points accumulated: _____

- Total possible points: 40
- All points are cumulative
- Points from higher levels can be used to satisfy lower rating levels
- Adapted from the work of the Coastal Resource Management Project team of Negros Oriental (William Ablong and Erwin Dolumbal, with assistance from Dr. Alan White, January 2001.)

Priorities for improved management: <i>(Choose top 3 answers)</i>	<input type="checkbox"/> Lack of community awareness and support <input type="checkbox"/> Weak government support <input type="checkbox"/> Weak law enforcement <input type="checkbox"/> Lack of a sustainable financing mechanism <input type="checkbox"/> Need for management capacity development <input type="checkbox"/> Politics <input type="checkbox"/> Multiple resource use conflict <input type="checkbox"/> Lack of supplemental and alternative livelihood <input type="checkbox"/> Others, specify: _____
--	---

Name of assessor/s, position and affiliation*: _____	

Contact information:	
Phone: _____	Fax: _____
Email: _____	
Address: _____	

III. MPA SITE SURVEY INFORMATION, BIOPHYSICAL STATUS

Data in this section can be generated through the methods described and the forms provided in *Coral Reef Monitoring for Management* by Uychiaoco *et al*, 2001 and Reef Check by Hodgson *et al*, 2003.

3.1. MPA site description

Date of survey*: _____ Time of survey: Start: _____ End: _____

Distance from shore (km): _____

Is this site sheltered? _____ Always _____ Sometimes _____ Exposed

Season: _____ Northeast monsoon (*Amihan*) _____ Southwest monsoon (*Habagat*)

Water temperature (°C, Depth:0-3 m): _____

Distance from nearest river (km)*: _____

River mouth width (km): _____ <10m _____ 11-50m _____ 51-100m _____ 101-500m

Distance to nearest population center (Municipality/City, km)*: _____
 Population size (thousand)*: _____ Population density (persons/km²)*: _____

Number of resident fishers w/in 1km*: _____
 Presence of mariculture w/in 500m: _____ No _____ Yes
 % of coast build up with structures: _____
 Presence of factories/industries/mining w/in 5km*: _____ No _____ Yes (# observed _____)

3.2. Human activities and natural disturbances within the vicinity of MPA

Major coral damaging storms	No: _____ Yes: _____	Date of storm: _____
Mass coral bleaching	No: _____ Yes: _____	Date of bleaching: _____
Overall anthropogenic impact	None: _____ Low: _____	Med: _____ High: _____
Is siltation a problem?	Never: _____ Occasionally: _____	Often: _____ Always: _____
Dynamite fishing	None: _____ Low: _____	Med: _____ High: _____
Poison fishing	None: _____ Low: _____	Med: _____ High: _____
Aquarium fishing	None: _____ Low: _____	Med: _____ High: _____
Harvest inverts for food	None: _____ Low: _____	Med: _____ High: _____
Harvest inverts for curio sales	None: _____ Low: _____	Med: _____ High: _____
Tourist diving/snorkeling	None: _____ Low: _____	Med: _____ High: _____
Sewage pollution	None: _____ Low: _____	Med: _____ High: _____
Industrial pollution	None: _____ Low: _____	Med: _____ High: _____
Commercial fishing	None: _____ Low: _____	Med: _____ High: _____
Fish for the live food fish		
restaurant trade	None: _____ Low: _____	Med: _____ High: _____
Artisinal/recreational	None: _____ Low: _____	Med: _____ High: _____
How many yachts are typically present within 1km of this site?	None: _____ Few (1-2): _____	Med (3-5): _____ Many (>5): _____
Level of poaching in protected area?	None: _____ Low: _____	Med: _____ High: _____

Other impacts: _____

Check which activities below are banned: _____ Spear fishing _____ Commercial fishing
 _____ Recreational fishing _____ Invertebrate or shell collection
 _____ Anchoring _____ Diving
 _____ Others, specify _____

Plastics				
General				

Cont.

	SHALLOW		DEEP	
	Inside	Outside	Inside	Outside
Bleaching (% of population) (% of colony)				
Other causes (specify)				
Reference/Survey team, affiliation/institution*: _____				
Contact information: Phone: _____ Fax: _____ Email: _____				
Address: _____				

3.4. Mean fish diversity and density (See Annex 2)

	Inside	Outside
Date of survey*		
Survey method used *		
Mean depth (m)*		
No. of transects (n)*		
Length of transect (m)*		
Reef zone (e.g. flat, slope, crest)		
Mean slope ^a (degrees)		
Mean topography ^b (m)		
Mean horizontal visibility (m)		
Fish diversity		
All 19 families ^c (# of species/ 500 m ²)		
Target families ^c (# of species/ 500 m ²)		
Fish density		
All 19 families ^c (# of individuals/ 500 m ²)		
Target families ^c (# of individuals/ 500 m ²)		
No. of species of butterfly fish observed in the area		
Pelagics and large marine life (Approximate number observed in the area)		[] No data available
Tuna / mackerel		
Sharks		
Manta rays		
Stingrays		
Sea turtles		
Whales		
Dolphins		
Others (specify)		

Reference/Survey team, affiliation/institution*: _____

Contact information:

Phone: _____ Fax: _____

Email: _____

Address: _____

- a - Approximate steepness of site (angle of slope)
- b - Mean distance between lowest and highest point on the horizontal transect lines
- c - List of fish – all 19 families and target families are listed on Annex 2

IV. PERCEPTION SURVEY ON MPA MANAGEMENT & BENEFITS

Since a big part of MPA implementation is regulating human activities. It is crucial to understand the perception of the people. Their attitude translates to behaviors. This information could provide valuable insights for adaptive management (See Annex 3).

Date of survey	
Barangay, Municipality/City	
No. of respondents	
No. of male and female respondents	_____ Male _____ Female
Years living in community	_____ 1-5 years - recently migrated _____ > 6 years _____ Since birth
Education attainment	_____ Elementary _____ High school _____ College
Top 3 main occupation	
Top 3 additional source of income	
Average combined monthly income/household	
Common affiliation of respondents	
Aware of existence of MPA?	_____ Yes _____ No _____ Undecided/No answer
What is the primary purpose of MPA? (Check answer/s)	_____ Breeding place for fish _____ For preservation of organisms _____ For preservation of habitats _____ Protection from fishing _____ Eco-tourism site _____ Others, specify _____
How did you learn these things? (Check 3 most common answers)	_____ Attended assembly meetings _____ Attended seminars and trainings _____ IEC materials (e.g. brochures, posters) _____ Word of mouth _____ Others, specify _____
In favor of presence of MPA?	_____ Yes _____ No _____ Undecided

You and your community benefiting from the establishment of MPA?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Undecided
--	---

How do you gauge the change in fish catch adjacent to the MPA?	<input type="checkbox"/> Increased <input type="checkbox"/> Decreased <input type="checkbox"/> No change <input type="checkbox"/> Too early to tell / Undecided
--	--

Perceived cause of change	<input type="checkbox"/> Because of MPA <input type="checkbox"/> Reasons not related to MPA
---------------------------	--

Types of tourism-related activities (Check answer/s)	<input type="checkbox"/> Scuba diving and snorkeling <input type="checkbox"/> Land-based guided tours <input type="checkbox"/> Others, specify _____ <input type="checkbox"/> None
--	---

Have your family or anybody from the community benefited from tourism?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Undecided
--	---

If yes, how?	
--------------	--

Aside from fishing, what other income activities exist? (Choose 3 answers)	<input type="checkbox"/> Farming <i>i.e.</i> crop planting, livestock raising <input type="checkbox"/> Construction work labor <input type="checkbox"/> Carpentry labor <input type="checkbox"/> Services <i>e.g.</i> tailoring, parlor <input type="checkbox"/> Public utility vehicle driving <input type="checkbox"/> Engaging in small store business <input type="checkbox"/> Others, specify _____ _____
--	---

Assessment of how MPA is being managed?	<input type="checkbox"/> 0 – Non-existing <input type="checkbox"/> 1 – Poor <input type="checkbox"/> 2 – Average <input type="checkbox"/> 3 – Good <input type="checkbox"/> 4 – Excellent
---	---

Problems/difficulties in management (short answer)	
--	--

Suggestions to improve management (short answer)	
--	--

How is the community involved? (short answer)	
---	--

<p>Since the beginning, what linkages have been established? (name of groups/organizations supporting MPA)</p>	
--	--

<p>Encountered problems in sustaining linkages?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Undecided</p>
<p>What problems/issues does your community experience in coastal resource conservation and management? (Choose top 3 answers)</p>	<p><input type="checkbox"/> Weak law enforcement <input type="checkbox"/> Lack of institution support <input type="checkbox"/> Politics <input type="checkbox"/> Budget <input type="checkbox"/> Lack of community awareness and support <input type="checkbox"/> Multiple resource use conflict <input type="checkbox"/> Waste management <input type="checkbox"/> Others, specify _____</p>
<p>What do you foresee as possible threats to your fishery resources? (Choose top 3 answers)</p>	<p><input type="checkbox"/> Exploitation of resources <input type="checkbox"/> Commercial fishing <input type="checkbox"/> Illegal/destructive fishing (e.g. dynamite, cyanide) <input type="checkbox"/> Illegal foreshore development <input type="checkbox"/> Lack of community awareness and support <input type="checkbox"/> Increasing population <input type="checkbox"/> Others, specify _____</p>

<p>Reference/Survey team, affiliation/institution*: _____ _____</p> <p>Contact information: Phone: _____ Fax: _____ Email: _____ Address: _____ _____ _____</p>

V. REFERENCES

Hodgson G., L. Maun, and C. Shuman. 2003. Reef Check Survey Manual for Coral Reefs of the Indo Pacific, Hawaii, Atlantic/Caribbean, Red Sea and Arabian Gulf. Reef Check, Institute of the Environment, University of California, Los Angeles, CA. 33p.

Pomeroy, R.S., J.E. Parks and L.M. Watson. 2004. *How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management effectiveness*. IUCN, Gland, Switzerland and Cambridge, UK. Xvi + 216 pp.

Staub, F. and M.E. Hatzios (Adapted). 2003. *Score Card to Assess Progress in Achieving Management Effectiveness Goals for Marine Protected Areas*. The World Bank. Washington, U.S.A., 28 p.

Uychiaoco, A.J., S.J. Green, M.T. dela Cruz, P.A. Gaithe, H.O. Arceo, P.M. Aliño, and A.T. White. 2001. *Coral Reef Monitoring for Management*. University of the Philippines Marine Science Institute, United Nations Development Programme Global Environment Facility-Small Grants Program, Guiuan Development Foundation, Inc., Voluntary Service Overseas, University of the Philippines Center for Integrative and Development Studies, Coastal Resource Management Project, and Fisheries Resource Management Project. 110 p.

ANNEX 1

(Adapted from Reef Check Manual 2004)

Impacts: Indicate if the site is sheltered or exposed and if there have been recent coral damaging storms. It is important to provide the date of the storm if known. Please estimate the overall anthropogenic impact at your site and indicate if siltation is a problem.

The following definitions should be used to fill out the Site Description Form.

BLAST FISHING

Low — Known blast fishing in area, but no evidence seen or heard during survey

Med — Blast crater observed anywhere on reef, no blasts heard during survey

High — One or more blasts heard during survey and/or dynamite crater on transect

POISON FISHING

Low — Less than one incident per month

Med — More than one incident per month, but less than one per week

High — One incident a week or more

AQUARIUM FISHING

Low — Less than once per month

Med — More than once per month, but less than once per week

High — Once a week or more

HARVEST INVERTS FOR FOOD

Low — Harvest less than once per week

Med — Harvest more than once per week, but less than daily

High — Daily harvest

HARVEST INVERTEBRATES FOR CURIO SALES

Low — Harvest less than once per week

Med — Harvest more than once per week, but less than daily

High — Daily harvest

TOURIST DIVING/SNORKELING (PEAK SEASON AVE. /DAY WITHIN 100m OF TRANSECT AREA)

Low — 1-5 individuals per day

Med — 6-20 individuals per day

High — More than 20 individuals per day

SEWAGE POLLUTION (OUTFALL OR BOAT)

Low — Sewage, irregular or rare discharge

Med — Source of discharge > 100 m but < 500m from transect

High — Source of discharge < 100 m from any point on transect

INDUSTRIAL POLLUTION

Low — Source > 0.5 km

Med — Source between 0.1 and 0.5 km

High — Source less than 100 m

COMMERCIAL FISHING (FISH CAUGHT FOR FOOD TO SELL NOT INCLUDING LIVE FISH

RESTAURANT TRADE)

Low — Less than once per month

Med — Less than once a week and more than once a month

High — Once a week or less

FISHING FOR THE LIVE FOOD FISH RESTAURANT TRADE

Low — Less than once per month

Med — Less than once per week and more than once per month

High — Once per week or less

ARTISANAL/RECREATIONAL FISHING (PERSONAL CONSUMPTION)

Low — Less than once per week

Med — More than once per week, but less than daily

High — Daily artisanal fishing

LIST THE NUMBER OF YACHTS TYPICALLY PRESENT WITHIN 1 KM OF REEF

Few — 1-2

Med — 3-5

Many — More than 5

PROTECTION

Indicate if the area has any sort of protection from human usage (legal or otherwise) and if the protection is enforced. Please estimate the level of protection if an area is protected and check the listed activities that are banned at your site.

POINT INTERCEPT FORM

MPA/Site name: _____
 Barangay: _____
 Municipality: _____
 MPA? Inside Outside
 Coordinates: N E
 Date: _____
 Time: _____
 Team leader: _____

Observers: _____
 Transect #: _____ Snorkel / Scuba: _____
 Depth (m): _____
 Visibility (m): _____
 Reef zone: flat crest slope
 Reef slope (D°): _____
 Topography (m): _____
 Habitat notes: _____

HC Hard Coral	DC White Dead Coral	A Algae	SG Seagrass
CB Branching Coral	DCA Dead Coral w/ Algae	TA Turf Algae	SP Sponges
CM Massive Coral	R Rubble	MA Fleshy Algae	OT Other Animals
CE Flat/Encrusting Coral	RCK Rock & Block	CA Coralline Algae	
CF Foliose/Cup Coral	SD Sand		
SC Soft Coral	SI Silt		

m	0	0.25	0.50	.75
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

m	0	0.25	0.50	.75
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				

Invertebrates				
# of inverts within 5m width	20m	5m	20m	5m
Diadema urchin				
Pencil urchin				
Tripeustes urchin				
Crown-of-thorns star				
Giant clam				
Triton shell				
Lobster				
Sea cucumber (edible)				
Banded Coral Shrimp				
Rare other animals (type/#)				

Causes of coral damage				
	20m	5m	20m	5m
Sediment				
Blasting/dynamite				
Boat/anchor damage				
Other breakage				
Seaweed overgrowth				
Coral disease				
% of population				
Trash:				
fish nets				
plastics				
general				
Bleaching				
% of population				
% of colony				
Other causes (specify)				

BENTHIC LIFEFORMS & INVERTEBRATES DATA FORM (Snorkel Survey)				
Site name:		Municipality & Province:		
Transect no.:	Scuba:	Snorkel:	Coordinates:	
Date (mo/day/yr):		Benthos observer:	Invertebrates observer:	
Horizontal water visibility (m):		Depth (m):	Reef zone:	Topography:
Habitat notes:				Slope:
BENTHIC LIFEFORMS		Tally number of points or est. % occupied by each lifeform e.g. 1111-1111-1111-11 or 12%+34%+22%+...	Total Count	% Cover
Coral	HC live hard coral			
	branching (CB)			
	massive (CM)			
	flat/encrusting (CE)			
	foliose/cup (CF)			
	SC soft coral			
Dead coral	DC white dead coral			
	DCA dead coral w/ algae			
Other animals	SP sponges			
	OT other animals			
Plants	TA turf algae			
	MA fleshy macroalgae			
	CA coralline algae			
	SG seagrass			
Non-living	R rubble			
	RCK rock & block			
	S/ SI sand/silt			
TOTAL				
INVERTEBRATES		# within 100 m ²	Causes of coral damage:	
<i>Diadema</i> urchins; <i>tuyom</i>			Rating: None=0, Low=1, Medium=2, High=3	
Pencil urchin			___ sediment	
<i>Tripneustes</i> urchin			___ blasting/dynamite	
Crown-of-thorns starfish; <i>dap-ag</i>			___ boat/anchor damage	
Giant clam; <i>taklobo</i>			___ other breakage	
Triton shell; <i>tambuli</i>			___ seaweed overgrowth	
Lobster; <i>banagan</i>			___ coral disease (___% of population)	
Sea cucumber; <i>balat</i> (edible)			___ trash: fish nets	
Banded coral shrimp			___ plastics	
Rare other animals (type/#)			___ general	
			___ bleaching (___% of population)	
			(___% of colony)	
			___ other causes (specify): _____	

ANNEX 2

FISH ABUNDANCE DATA FORM						
Site name:		Municipality/City & Province:				
Transect no.:	Depth (m):	Coordinates:				
Date (mo/day/yr):	Time:	Left observer:		Right observer:		
Habitat notes:		Horizontal visibility:	Angle of slope:	Transect orientation:		
FAMILY	Species	Record number of fishes per size class				
		1-10 cm	11-20 cm	21-30 cm	specify sizes for >30 cm	
<EPINEPHELINAE> * groupers; <i>lapu-lapu</i>		Barramundi cod; <i>señorita</i>				
<LUTJANIDAE>* snappers; <i>maya-maya</i>						
<HAEMULIDAE>* sweetlips; grunts; <i>lipti</i>						
<LETHRINIDAE>* emperors; <i>katambak</i>						
CARANGIDAE* jacks; trevallies; <i>talakitok</i>						
CAESIONIDAE* fusiliers; <i>dalagang-bukid</i> ; <i>solid</i>						
NEMIPTERIDAE* coral breams; <i>silay</i>						
MULLIDAE* goatfishes; <i>timbangon</i>						
BALISTIDAE Triggerfishes; <i>pakol</i>						
CHAETODONTIDAE butterflyfishes; <i>alibangbang</i>						
POMACANTHIDAE angelfishes; <i>adlo</i>						
LABRIDAE Wrasses; <i>labayan</i>		Humphead wasse; <i>mameng</i>				
[SCARIDAE]* parrotfishes; <i>molmol</i>		Bumphead parrotfish; <i>taungan</i>				
[ACANTHURIDAE]* surgeonfish; <i>indangan</i>						
[SIGANIDAE]* rabbitfishes; <i>kitong</i> ; <i>danggit</i>						
[KYPHOSIDAE]* rudderfishes; <i>ilak</i>						
POMACENTRIDAE Damsel fishes; <i>palata</i>						
ANTHIINAE fairy basslets; <i>bilang-bilong</i>		Moorish idol; <i>sanggowanding</i>				
Zanclus cornutus						
Sharks						
Rays						
Sea turtles						
others: e.g. tunas						

Legend: <fishes> = major reef carnivores; [fishes] = major reef herbivores, **fishes** = fishes which are indicators of hard corals, * = fishery target families

ANNEX 3

Perception Survey Form

Date: _____
Respondent no.: _____
Barangay, Municipality/City: _____

Profile of respondents:

Name: _____
Sex: Female Male
Years living in this community: _____

Education attainment: _____
Main occupation: _____
Other source of income: _____
Combined household income: daily average: _____ or monthly average: _____

Organization affiliation
Name of organization: _____
Present position: _____

KNOWLEDGE ABOUT MARINE SANCTUARY/RESERVE

1. Are you aware of the existence of a marine sanctuary/reserve in your community?
YES _____ NO _____

If yes, do you know the location and boundaries of the sanctuary/reserve?

What are the rules and regulations to be observed for the marine sanctuary/reserve?

_____ No fishing and extractive activities allowed (no take zone)

_____ No human activity allowed (e.g. tourism, boat entry)

_____ User-fee system imposed

_____ Others, specify _____

2. What is the primary purpose of the marine sanctuary/reserve? (**Check answers**)

_____ Breeding place for fish

_____ For preservation of organisms

_____ For preservation of habitats

_____ Protection from fishing

_____ Eco-tourism site

_____ Others, specify _____

3. How did you know or learn about these things? (**Check all answer/s**)

_____ Attended assembly meetings

_____ Attended seminars and trainings

_____ IEC materials (e.g. brochures, posters, newsletters)

_____ Word of mouth

_____ Others, specify _____

4. Are you in favor of having a marine sanctuary/reserve in your community?

YES _____

NO _____

PERCEIVED BENEFITS DERIVED FROM MARINE SANCTUARY/ RESERVE ESTABLISHMENT

Do you think that you and your community has benefited from the establishment of the marine sanctuary/reserve?

YES _____ NO _____

If yes, what are these? _____

PERCEIVED CHANGES IN FISH CATCH SINCE MARINE SANCTUARY/ RESERVE ESTABLISHMENT

1. In your own observation and experience, do you think that the fish catch adjacent to the MPA has:
INCREASED _____ DECREASED _____ NO CHANGE/THE SAME _____

Why? _____

2. Do you think that the marine reserve/sanctuary has something to do with this increase/decrease?

YES _____ NO _____

Why? _____

TOURISM AND OTHER INCOME-GENERATING ACTIVITIES

1. What are the existing tourism related activities in the area?

2. Have your family or anybody from your community benefited from these tourism activities?

YES _____ NO _____

If yes, how? _____

3. Aside from fishing, what other income – generating activities are engaged in by the residents in your community?

MARINE SANCTUARY/RESERVE MANAGEMENT SYSTEM

1. What is your assessment on how the marine sanctuary/reserve is currently being managed?
(Choose one and explain a little)

_____ 0 – Non-existing (No management effort observed)

_____ 1 – Poor (Management effort is minimal. Damage and exploitation still occurs)

_____ 2 – Average

_____ 3 – Good (Management is active and protection is achieved)

_____ 4 – Excellent (Management activities exceed normal expectations; habitat and marine-life are well-protected)

2. What problems /difficulties are encountered in managing the marine reserve/sanctuary?

3. Do you have any suggestions to improve management of the marine sanctuary/reserve?

4. How is the community involved in the management of the marine sanctuary/reserve?

External and institutional linkages (For those involved in management only)

1. Since the beginning of MPA establishment, what linkages have your organization, *barangay* established?

	Name	Time	Nature of Linkage
Academe	_____	_____	_____
	_____	_____	_____
NGOs	_____	_____	_____
	_____	_____	_____
NGAs	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

2. Have you encountered any problem(s), difficulties in sustaining your linkages with these institutions/organizations?

COASTAL RESOURCE MANAGEMENT PROBLEMS/ISSUES

1. What problems/issues does your community experience in coastal resource conservation and management? (**Choose top 3 answers**)

- Weak law enforcement
- Lack of institution support
- Politics
- Budget
- Lack of community awareness and support
- Multiple resource use conflict
- Waste management
- Others, specify _____

2. What do you foresee as possible threats to your fishery resources? (**Choose top 3 answers**)

- Exploitation of resources
- Commercial fishing
- Illegal/destructive fishing (e.g. dynamite, cyanide)
- Illegal foreshore development
- Lack of community awareness and support
- Increasing population
- Others, specify _____

