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RESPONSIBLE
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4

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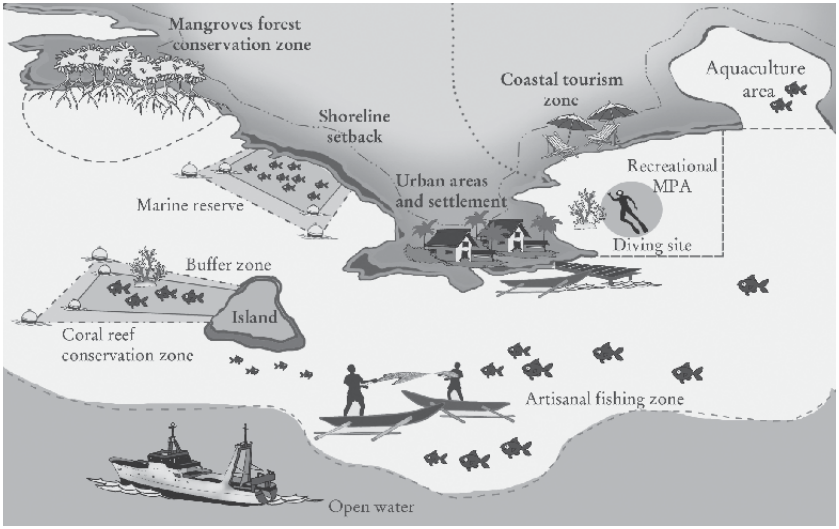
FISHERIES MANAGEMENT

4. Marine protected areas and fisheries

PART 1

What are MPAs and what do they do?



1. MPA DEFINITION AND CONTEXT

The term 'marine protected area' or MPA has gained prominence in the dialog on fisheries management and biodiversity conservation since the early 1990s. The concept and its application continue to evolve and recent developments – particularly with regard to rapidly increasing recognition of the threat of climate change and the related focus on ecosystem resilience – have brought MPAs to the forefront of discussions in global marine conservation and management strategies. But what exactly is an MPA and why do we set up MPAs or MPA networks?

This chapter attempts to answer these basic questions paying particular attention to the fisheries perspective. The concepts of fisheries management and EAF are discussed in the following chapter.

While the Code of Conduct for Responsible Fisheries does not refer explicitly to MPAs, their use is implied in the recommendation for management measures – including closed areas, seasons and reserved zones – to minimize waste, discards, bycatch, lost or abandoned gear, catch of non-target species (fish and non-fish species), and negative impacts on associated or dependent species, in particular endangered species. The FAO technical guidelines for The ecosystem approach to fisheries (FAO 2003a) recognize that MPAs can contribute to achieving sustainable fisheries.

1.1 WHAT IS AN MPA?

These Guidelines do not propose a single definition for MPAs, but explore the full range of spatial management measures and area closures in a broader sense with relevance to fisheries – and generally refer to them as MPAs. For the purposes of this document, **any marine geographical area that is afforded greater protection than the surrounding waters for biodiversity conservation or fisheries management purposes will be considered an MPA**.[5]

[5] This broad characterization includes very large areas, such as exclusive economic zones (EEZs) at the extreme, but the term MPA is usually understood to apply to areas specifically designated to protect a particular ecosystem, ecosystem component or some other attribute (e.g. historical site).

However, the MPA concept is applied diversely around the world, and with different names for similar policies. MPAs can range from small village-level community-managed areas to large, zoned national parks. The specific rules associated with an MPA vary by context and names are not used consistently. A 'reserve' in one country may prohibit fishing, while a 'reserve' in another country may allow non-destructive fishing. Other terms used, to name a few, are fully protected marine areas, no-take zones, marine sanctuaries, ocean sanctuaries, marine parks, fishery closed areas, fisheries refugia and locally managed marine areas (LMMAs).

Probably the most widely accepted definitions of MPAs have been the ones established by the International Union for Conservation of Nature (IUCN) and the CBD (Box 2). Other organizations and individual countries have also established definitions of MPAs, with a biodiversity conservation or fisheries management focus (Box 3).

Commonly, there are also different categories of MPAs attached to established definitions. These Guidelines are intended to provide guidance relevant to all of them, especially at the interface between fisheries management and biodiversity conservation. IUCN recognizes six different categories of MPAs, classified according to their objectives and ranging from fully protected areas (no-take zones where no extraction is permitted) to multiple-use areas (where a range of resource uses are allowed) (Table 1).

TABLE 1
IUCN categories of protected areas

Category	Description
I	Protected area managed mainly for science or wilderness protection (Strict Nature Reserve/Wilderness Area)
II	Protected area managed mainly for ecosystem protection and recreation (National Park)
III	Protected area managed mainly for conservation of specific natural features (Natural Monument or Feature)
IV	Protected area managed mainly for conservation through management intervention (Habitat/Species Management Area)
V	Protected area managed mainly for landscape/seascape conservation and recreation (Protected Landscape/Seascape)
VI	Protected area managed mainly for the sustainable use of natural ecosystems (Managed Resource Protection Area)

Sources: IUCN, 1994, and Dudley, 2008.

(Box 3 cont.)

to a range of habitats, and an MPA classification scheme results in a great variation in purpose, legal authorities, management approaches, level of protection and restrictions on human uses.

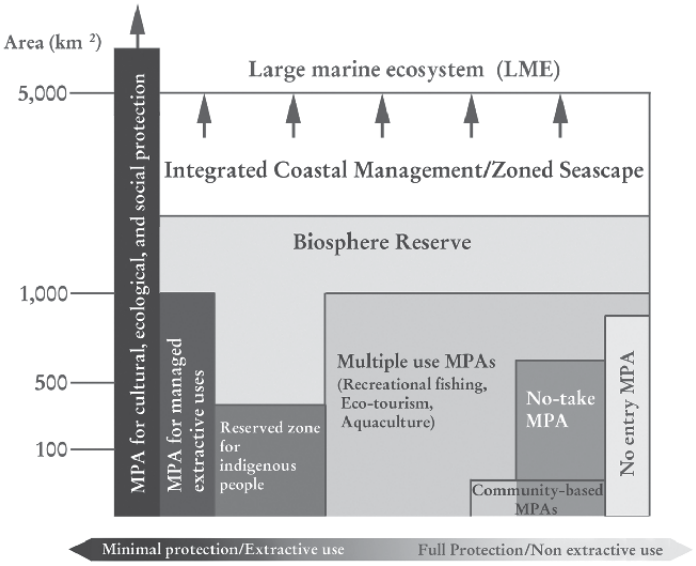
Sources: Kalikoski and Vasconcellos, (forthcoming); Christie and Eisma-Osorio, (forthcoming); Breuil, (forthcoming); National Marine Protected Areas Center (www.mpa.gov /welcome.html).

forms of MPAs (see Figure 1). Size and degree of environmental or fisheries protection are two important scales influencing MPA effects. According to this, any MPA can be characterized along a gradient of size and protection.

1.2 WHAT ARE THE PRIMARY REASONS FOR ESTABLISHING MPAs?

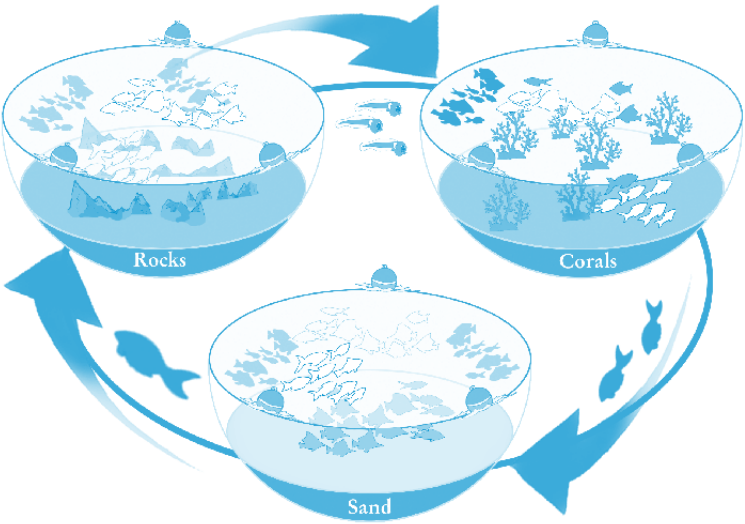
MPAs are generally designated with biodiversity conservation objectives, to protect fishery resource species or habitat, or with a broader ecosystem purpose

FIGURE 1
World Bank MPA classification scheme



Source: Based on World Bank, 2006.

FIGURE 2
Protecting different life stages through network connectivity



A network of smaller MPAs may have more flexibility to mitigate undesirable social impacts than a single large MPA. The protective benefits of MPAs, as well as the costs incurred through access and usage limitations, are often more easily distributed among coastal communities and other user groups of marine ecosystems in an MPA network than in a large, single MPA. It may also offer opportunities to spread costs and disadvantages across multiple communities, rather than concentrating them in one community – as could be the case with a single large MPA. This could be particularly relevant in tropical developing countries, where the entire coastal zone is being exploited by the communities located along that coast.

Fishers may benefit more from a network than from a single MPA if it increases the number of adult fish that migrate across the boundaries of the protected areas (the spillover effect that makes fish available to fisheries). This is a result of the normally greater amount of boundary per unit area protected than in a single MPA. It will, however, increase the vulnerability of fish

KEY CONCLUSIONS AND RECOMMENDATIONS No. 1

With a view to facilitating understanding of the purpose of MPAs and MPA networks and their effects, the meaning and characteristics of this conservation and management tool must be clearly defined within a particular context. In spite of its popularity and frequent use in international fora, there is no universal definition of the term MPA. It may be necessary to define different types of MPAs according to local needs and circumstances.

- Clear terminology will facilitate understanding of the MPA and related concepts. For the purpose of these Guidelines, an MPA is any marine geographical area that is afforded greater protection than the surrounding waters for biodiversity conservation or fisheries management objectives. These Guidelines consider all types of MPAs, including no-take areas and areas with sustainable use arrangements.
- MPAs are established with a variety of objectives. Moreover, in most cases, they will produce cross-sectoral outcomes, some of which may be undesired, even when not designated for multiple objectives. The main objectives for establishing an MPA should be clearly defined, and the likely additional impacts, positive/negative social effects and other unintended effects must also be identified and considered. The process by which an MPA is planned and implemented greatly influences its outcome. Applying a participatory approach involving concerned resource users and other stakeholders is fundamental for successful MPA planning and implementation.
- MPA networks are composed of two or more MPAs that are linked in diverse ways (e.g. biological or institutional) and complement each other. If properly designed, they may offer benefits over single MPAs.

2. FISHERIES MANAGEMENT AND THE ECOSYSTEM APPROACH TO FISHERIES (EAF)

In relation to fisheries management, MPAs have variously been characterized as a new name for spatial-temporal fishing closures and as a necessary new approach to replace fisheries management measures that have failed. Worldwide recognition is given to the need to take a broader, integrated ecosystem approach to fisheries management, including both environmental and human dimensions. Approaches such as EAF are increasingly being promoted. But what are fisheries management and EAF, and what role do MPAs and area closures play in this context?

This chapter discusses some of these important concepts and how MPAs and MPA networks relate to them. It also offers an introductory consideration of how they can bridge pure fisheries management and biodiversity conservation objectives. Subsequent chapters will look more specifically at the effects of MPAs on the biological, ecological and human dimensions of fisheries.

The Code of Conduct for Responsible Fisheries emphasizes that fisheries management shall promote maintenance of the quality, diversity and availability of fishery resources and that management measures shall also take wider ecosystem considerations into account.

2.1 WHAT IS FISHERIES MANAGEMENT?

The FAO Technical Guidelines on Fisheries Management series defines fisheries management as the "integrated process of information gathering, analysis, planning, consultation, decision-making, allocation of resources and formulation and implementation, with enforcement as necessary, of regulations or rules which govern fisheries activities in order to ensure the continued productivity of the resources and accomplishment of other fisheries objectives" (FAO, 1997, p. 7).

Fisheries management aims to achieve the optimal and sustainable utilization of the fishery resource for the benefit of humanity, while maintaining biodiversity. Biodiversity is an integral part of ensuring future generations the

same choices for resource use that current generations are allowed – and hence an important aspect of sustainable fisheries management.

Conventional fisheries management is largely informed by scientific information, which is used to develop the rules under which a fishery operates to ensure its sustainability. Management approaches using sources of information such as indigenous and local knowledge are also increasingly being applied.

Fisheries management generally regulates fishers' use of fishery resources by controlling the fish mortality generated by the fishery. Fish mortality is a way of expressing the fraction of the fish population removed by the fishery annually. Typically, management is directed towards maintaining fish stock abundance and a size and age structure that give the maximum average yield or catch sustainable over the long term. This is achieved through various management rules and regulations aimed at controlling, either directly or indirectly, the level of fish mortality for different size or age groups of the population. This is sometimes summarized as maximum sustainable yield (MSY). When regulating the use of fishery resources, economic efficiency and the social dimensions of the fishery must also be factored into management analysis.

Many types of fisheries management tools exist, including:

- Input controls: access controls and fishing effort limits (e.g. restrictions on the number of boats/licenses, gear or trips);
- Output controls: catch limits such as total allowable catch (TAC) quotas;
- Technical measures: restrictions on the size of fish that can be caught or retained, or gear restrictions;
- Spatial-temporal measures: zoning and area-time-gear type closures.

Successful fisheries management is not simply the result of applying rules and regulations to control how much, where, when and how fishers fish. Indeed short-term input or output controls (be they spatial, temporal, or gear-based) are best considered as complementary measures. The fundamental issue is to develop fisheries management arrangements that capture the social and economic forces that allow and motivate fishers to operate efficiently and flexibly within the limits of resource and ecosystem sustainability. This means, in one way or another, fisheries management needs to be premised on providing fishers with secure tenure systems and addressing the management of fishing capacity through proper incentives.[9]

[9] To address the issue of overcapacity in world fisheries, an International Plan of Action (IPOA) for the management of fishing capacity was agreed in 1999. See also FAO, 2008c.

Fisheries management arrangements can be implemented under various governance systems. While centralized, state-controlled command-and-control systems are still common, there has been a trend towards increasingly decentralized fisheries management during the last decades. Various forms of co-management governance systems are applied in many parts of the world, based on partnerships between governments and resource users with shared responsibility and authority for fisheries management.[10] These governance systems are often combined with rights-based approaches to fisheries management, that is, property rights in the form of access or management rights are allocated to individuals, groups of individuals or communities[11] (e.g. individual transferable quotas [ITQs], days at sea allocations, community access quotas, or territorial use rights in fisheries [TURFs]).

In spite of the availability of a variety of fisheries management tools, many fishery resources are in a precarious state due to overfishing and, in the case of some coastal and diadromous species,[12] environmental degradation. Fisheries management fails for many reasons. Common causes are the open-access nature of fishery resources, insufficient capacity to apply and enforce appropriate management systems, and subsidies. In addition, an increased understanding of the interactions among diverse ecosystem components has led to a growing recognition of the need to manage fisheries in a broader environmental perspective. The scope of fisheries management has widened in recent years to consider aspects beyond the abundance, size and age structure of the target fishery resource. The principles for and approach to effective, integrated and responsible fisheries management contained in the CCRF reflect this wider scope and thus also relate to EAF.

2.2 WHAT IS THE ECOSYSTEM APPROACH TO FISHERIES?

EAF[13] has evolved based on an appreciation of the interactions that take place between fisheries and ecosystems, taken in a broader perspective. The purpose of an EAF is "to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services

[10] See also Part 2, Chapter 6, Section 6.8, "What are the key MPA design considerations?"

[11] See Glossary, "Use, management and property rights".

[12] Fish that migrate from fresh water to salt water, or vice versa.

[13] For more information on EAF, see FAO, 2003a, 2003b and 2009a. It should also be noted that there are several approaches similar to EAF applied by diverse organizations and countries (see Glossary, "Ecosystem approach [EA]").

provided by the aquatic ecosystems" (FAO, 2009a, p. 6). Accordingly, fisheries management according to EAF "strives to balance diverse societal objectives by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems and their interactions, and applying an integrated approach to fisheries within ecologically meaningful boundaries" (FAO, 2003a, 14). Thus EAF requires the inclusion in the management paradigm of interactions between the core of the fishery – fish and fishers – and the other elements of the ecosystem, including the human system relevant to management (see Figure 3).

EAF is closely linked to other approaches in the field of development, natural resource and spatial area management, for example the sustainable livelihoods approach and integrated management. These approaches are complementary to EAF and, indeed, there is a substantial overlap in terms of their underlying principles, philosophy and methods. MPAs and other spatial management tools can support EAF, while EAF, in turn, can be used as a management approach to implementing an MPA. EAF represents a more explicit bridging mechanism between fisheries management and biodiversity conservation, bringing together bioecological and human considerations.

It should be remembered that EAF is still an evolving practice and, at least in the short term, will be an extension of the current approach to fisheries management. The evolution is occurring now: today's fisheries management captures more of the elements of an ecosystem approach than it did a decade ago, but less than will be captured a decade from now. The pace at which this is happening varies in different parts of the world and in diverse situations, but conventional fisheries management is changing shape. It should also be noted that EAF does not replace or diminish the need to assess and control fish mortality on target and bycatch species in order to sustain fisheries, nor the need to control fishing capacity in order to avoid economic waste.

When referring to fisheries management in the Guidelines, this situation of evolution is generally intended, and the term 'fisheries management' implies fisheries management as it is developing with EAF (even when EAF is not explicitly mentioned).

2.3 WHAT ABOUT THE PRECAUTIONARY APPROACH?

The precautionary approach is a basic principle of the CCRF, involving the application of prudent foresight in dealing with uncertainties in fisheries systems. It implies the explicit consideration of possible undesirable outcomes and the inclusion of appropriate contingency and mitigation measures.

FIGURE 3
Moving towards EAF – examples of the shifting focus

Source: Based on FAO 2009a.

Undesirable outcomes include not only overexploitation of fishery resources and negative environmental consequences, but also unacceptable social and economic consequences. Hence, both long-term and short-term costs and benefits are involved and should be considered in the adoption of the precautionary approach.

Because uncertainty can be expected to be greater when widening fisheries management to include ecosystem considerations, the precautionary approach frequently gains even greater importance within EAF. One objective in establishing MPAs can be to provide a hedge against such uncertainty, constituting a sort of 'conservation insurance'.[14] At the same time, there is the possibility that an expanded ecosystem focus can help explain trends in fish stocks and hence contribute to less uncertainty.

2.4 HOW ARE MPAs AND OTHER SPATIAL MANAGEMENT TOOLS USED IN FISHERIES MANAGEMENT?

Definition of space is a fundamental concept in fisheries management, applying to management units with geographical specifications that – to the extent practicable – correspond to the geographical range of the fishery being managed. At the largest scale, the international regime of oceans is based on defined areas as set out in the United Nations Convention on the Law of the Sea (UNCLOS).[15] These include the EEZ – within which a coastal state has sovereign rights and responsibilities with regard to, inter alia, fisheries management – and the high seas and the Area[16] – beyond national jurisdiction. There are international and regional agreements regulating certain aspects of marine areas beyond the limits of national jurisdiction, as well as of some areas cutting across these and EEZs or parts of EEZs.

Some states apply zoning in their EEZs as a basic measure for directing where different types of fishing or other activities may take place. A typical example is a coastal area reserved for small-scale or artisanal fishing only, banning larger fishing vessels and trawlers. Closures (spatial-temporal-gear or spatial-temporal-fishing types) are one of the oldest forms of fisheries management. Some common reasons for establishing such measures were

[14] See also Chapter 3, Section 3.4, "How do MPAs work as a hedge against uncertainty?"

[15] The United Nations Convention on the Law of the Sea of 10 December 1982 is the fundamental instrument establishing international regimes for the oceans. Institutional and legal aspects of MPAs are discussed further in Part 2, Chapter 5.

[16] See Glossary.

given in Chapter 1, section 1.2, "What are the primary reasons for establishing MPAs?".

Box 4 gives examples of various fisheries management measures based on the zoning and spatial considerations used in India.

Certain allocations of use rights, such as the TURFs mentioned earlier, are also area-specific, and the management objective here is to allocate use rights in specific locations in order to reduce competition among user groups, to enhance opportunities for certain groups of users or to improve management and compliance with fisheries rules and regulations by providing users with increased responsibility for and authority over fishery resources (see example from Chile in Box 5).

With the move of fisheries management towards EAF – that is, a broader conception of ecosystem well-being – the use of spatial management tools will probably become more prevalent. In line with the principles of EAF, it is likely that it will become more common to designate and implement MPAs with multiple objectives, covering both fisheries management and biodiversity conservation considerations.

2.5 IN WHAT SITUATIONS ARE MPAs USEFUL AS A FISHERIES MANAGEMENT TOOL?

MPAs should not be viewed as a solution for all fisheries management problems. They do not address key issues for the overall management of the area beyond the boundary of an MPA. Nor do they redress past unsuccessful fisheries management that has, in many cases, led to overcapacity, overfishing and economic loss. Moreover, if MPAs were to be used as the sole mechanism for limiting the amount of fish to be caught, with a view to sustaining fish populations, the extent of the area to be protected might be unrealistically large, particularly for mobile fish species, even if successful in meeting ecological objectives, the approach would waste a large portion of potential economic benefits. In many circumstances, MPAs will be inferior to an appropriate mix of other fisheries management tools in terms of the combined protection offered, potential yield and economic performance, as long as these tools are effectively implemented.

With the move towards an ecosystem approach in the management of the world's oceans, however, MPAs can be a very useful component within the fisheries management toolbox. In several situations, there is a need for a greater consideration of MPAs as a main management measure, although the best results may still be achieved with a combination of fisheries and

ecosystem management tools. Multiple tools are available for achieving fisheries objectives and these should be selected and balanced within the relevant policy and management frameworks.

Used wisely, MPAs can generate both bioecological and socio-economic benefits. However, not all MPAs have the same benefits, which will depend on the specific local circumstances (both natural and human), the type of MPA and the protection it offers, and legal and governance attributes. In coastal areas where local communities are directly affected by the declaration of MPAs, it is particularly important to involve communities as early in the process as possible. In situations where complete or partial closure of the fishery is required, long-term sustainable alternative livelihood options should be identified and developed in consultation with the affected communities. Where the benefits of MPAs accrue elsewhere or could be gained by other stakeholders, mechanisms must be established to ensure that benefits (economic and sociocultural) flow directly back to the community, guided by the principle of equitable benefit-sharing and internalization of costs and benefits.

Within this context, some situations in which MPAs can be useful in fisheries management and can create sustainable benefits include:

Controlling fish mortality of sedentary species in data-poor situations

For fisheries targeting relatively small stocks of sedentary fish or invertebrate species (i.e. organisms whose movements are short-range), MPAs can be an effective management tool. The use of an MPA as a tool for controlling fish mortality does not require a reliable estimate of population size, as do some alternative management tools (e.g. TACs). For this reason MPAs can be particularly useful in some data-poor contexts. MPAs may also be useful in situations where the capacity to implement other forms of management is lacking. However, establishing effective MPAs would still require effective enforcement as well as reliable information on population distribution densities and habitat preferences.

Assisting management of multispecies fisheries

It may be difficult to manage a multispecies fishery with numerous species-specific rules and regulations, particularly if information is limited on a large number of species. In this case, MPAs might afford protection to assemblages of species associated with particular types of habitat. A combination of species-

specific management measures and MPAs to protect multiple species may be a useful approach.

Minimizing bycatch

The places and seasons in which bycatch occurs are generally reasonably consistent from year to year and thus can be predicted. Experienced fishers know where and when to expect large amounts of bycatch. They usually want to avoid unwanted bycatch because they recognize it as wasteful, and it creates additional work in sorting the catch. However, there are many cases in which both the retained bycatch and discarded bycatch are abundant, in which case, fishers may consider discards an acceptable 'cost'. Nevertheless, MPAs may be an effective fisheries management tool for addressing a bycatch problem if they are located in areas and seasons of high bycatch and discards.

Protecting habitat and biodiversity

The unintended effects of fisheries on habitat and biodiversity have become a greater concern in recent years. Habitat changes potentially have an adverse affect on the future productivity of fisheries (e.g. loss of shelter of juvenile fish from predators). In addition, habitat and biodiversity protection are often desirable in relation to the direct and indirect services such preservation provides to society, regardless of its effect on fish productivity and fisheries, and MPAs may be used to protect areas of particular concern in terms of habitat and biodiversity.

Buffering against uncertainty

MPAs may be used in combination with other fisheries management tools as a hedge against uncertainty to make management more robust. In case conventional management fails – due, for example, to assessment errors – MPAs can provide a buffer against the consequences of failure. However, the effectiveness of the MPA in the context of fisheries management – for example the degree to which it achieves its objective to sustain fish populations – will be dependent on its design and the characteristics of the fish populations being protected. Knowledge of these characteristics will be essential for an adequate design, but crucial processes such as larval dispersal patterns, for example, are generally poorly known.[17]

[17] See also Chapter 3, Section 3.5, "How do MPAs work as a hedge against uncertainty?"

Delegating management responsibilities or tasks

In certain areas, co-management arrangements[18] provide a way to share the management burden between government and local communities or users. MPAs can circumscribe the area in which this divestment of management responsibility or management tasks can be accomplished. Such tasks include patrolling and surveillance; monitoring (and sometimes even scientific research); maintenance of buoys, signage and other controls; enforcement; and public outreach and education associated with fisheries management and biodiversity conservation. The benefits of co-management approaches include increased participation of stakeholders, empowerment of local communities and users through participatory management, and a lightening of the burden of management for the government.

Protecting traditional and cultural use rights and practices

Although it is often assumed that MPAs will be in conflict with the rights and traditional practices of indigenous peoples, formal protected areas can provide a mechanism for recognizing and protecting traditional fishing grounds and places of cultural importance and practices. In some cases, indigenous peoples may need support in having such areas and practices protected from external threat. The CBD encourages "the establishment of protected areas that benefit indigenous and local communities, including by respecting, preserving and maintaining their traditional knowledge" (CBD, 2004b). A joint policy statement to this effect has been issued by IUCN, WCPA and WWF (Principles and Guidelines on Indigenous and Traditional Peoples and Protected Areas), calling for "the development of policies for protected areas that safeguard the interests of indigenous peoples, and take into account customary practices ...".[19] When indigenous communities are concerned about the conservation and maintenance of traditional and customary practices, MPAs can be employed to protect customary use rights and practices, as well to achieve fisheries management and biodiversity conservation objectives. The involvement of the indigenous peoples concerned in the planning and implementation of the MPA will be critical to its success.

[18] See above and also Chapter 6, Section 6.8, "What are the key MPA design considerations?" in Part 2.

[19] Available at http://assets.panda.org/downloads/pa_princguide_en.pdf.

Protecting and enhancing local livelihoods

The declaration of MPAs in coastal areas where local communities depend on marine resources for food and income is often associated with negative impacts and the loss of livelihoods. In other instances, however, the declaration of MPAs can lead to the protection of small-scale fishing areas (for example, demarcation of an exclusive coastal area for small-scale fishers) and enhancement of local livelihoods where fishery resources recover and catches improve over time, in the MPA and in surrounding waters.

Resolving user conflicts

In areas where user conflicts occur, zoning through the establishment of MPAs with different use patterns can help resolve such conflicts. In this way, diverse user groups can be assigned different areas for their activities. These use rights can be combined with delegation of responsibilities (see also "Delegating management responsibilities or tasks" above).

2.6 HOW CAN MPAs BE USED TO BRIDGE FISHERIES MANAGEMENT AND BIODIVERSITY CONSERVATION?

MPAs will generally have both biodiversity conservation and fisheries outcomes, whether or not they have been established explicitly for both purposes. To date, however, the entities using MPAs for the purpose of biodiversity conservation have often worked independently from fisheries managers, who look to MPAs to supplement conventional fisheries management. But there is great potential in having these approaches planned in concert, or at least in ways in which they can complement one another. Bridging the two worlds not only eliminates duplication of effort and overlap (and possible conflicts that arise from overlapping initiatives), but can also lead to enhanced efficacy of management. Biodiversity conservation is vital to fisheries management, especially so when it is implemented according to EAF. At the same time, fisheries management considerations are critical in effectively conserving biodiversity.

However, the two objectives can be viewed differently by diverse groups of people, and reconciling these priorities can be difficult. The goals and objectives of an MPA are established by individuals and institutions, and many MPAs address biological, socio-economic and governance needs. Strong conservation objectives, that is, focusing on maintaining biodiversity through protecting areas from most human interventions, and yield maximization for fisheries management purposes can be contradictory.

To gain maximum benefit, both the fisheries management and biodiversity conservation effects must be considered and taken into account in MPA planning and implementation processes, which requires appropriate processes. MPAs should be considered in a wider perspective, and planning and implementing them in a holistic and integrated spatial management framework is the ideal. The need for integrated coherent management frameworks is discussed further in Chapter 5 in Part 2.

KEY CONCLUSIONS AND RECOMMENDATIONS No. 2

MPAs and MPA networks can constitute an important management tool, especially for achieving both biodiversity conservation and direct fisheries management objectives. However, there are many management options in addition to MPAs that may produce better effects. The management context needs to be understood and combinations of appropriate measures implemented accordingly.

- Fisheries management aims to achieve optimal sustainable utilization of fishery resources, generally focusing on limiting fish mortality to sustainable levels, while also taking broader ecosystem considerations into account. EAF expands the conventional fisheries management framework to explicitly consider a wider range of aspects of the fishery and its ecosystem, including its human dimensions.
- A precautionary approach to the management of marine resources should be adopted, promoting the use of the best tools and measures available according to defined objectives and case-specific circumstances.
- Spatial-temporal-gear closures are historically some of the most common fisheries management measures. In the broadened context of EAF, it is likely that spatial management measures and MPAs with multiple objectives, for example for fisheries management and biodiversity conservation, will increase in importance.
- MPAs are not always the preferred management measure, but can be very useful in a number of contexts, e.g. for fisheries targeting relatively small stocks of sedentary fish or invertebrate species, in some data-poor contexts and for addressing bycatch problems when in discrete areas or specific seasons. For MPAs to generate maximum benefit, stakeholders must be involved.
- MPAs will generally have both biodiversity conservation and direct fisheries management outcomes, whether or not they have been established for both these purposes explicitly. To gain the most benefits, the two concepts need be bridged when planning and implementing MPAs.