

ZONAL MANAGEMENT

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Acknowledgements

The majority of the information presented in this module is drawn from the following publications:

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Francis, J., Johnstone, R., van't Hof, T., van Zwol, C. and Sadacharan, D. (Editors). Training for the Sustainable Management of Marine Protected Areas: A Training Manual for MPA Managers. CZMC/ WIOMSA. 267p.

IUCN 2004. *Managing Marine Protected Areas: A Toolkit for the Western Indian Ocean*. IUCN Eastern African Regional Programme, Nairobi, Kenya. 172p.

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Lafoley, D. 1995. Techniques for managing marine protected areas: zoning. In Gubbay, S. (ed) *Marine Protected Areas: Principles and Techniques for Management*. London: Chapman and Hall. Pp 103-117.

White, A.T. and A. Cruz-Trinidad. 1988. The values of Philippine coastal resources: Why protection and management are critical. Coastal Resources Management Project, Cebu City, Philippines. 96p.

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OVERVIEW

Zonal management is a way to delineate areas of the coastal and marine environment to specific allowable or prohibited activities in time or space.

Zonal management is very different from the longstanding concept of open access to the oceans. Different forms of zoning have occurred on land for thousands of years, and there have been traditional and customary marine tenure systems in certain locations throughout history as well. It is only more recently that formally planned zonal management systems are being applied to marine and coastal areas around the world.

One of the most famous examples of marine zonal management is the Great Barrier Reef Marine Park in Australia. There are numerous other models of zonation being used in MPAs, from simple to complex. Many MPAs incorporate a zone strictly restricting all resource exploitation to promote marine conservation and enhance fisheries. Whatever the particulars of the zoning scheme, it is important to design and plan zones to match the objectives of the MPA. It is also necessary to involve all stakeholders and user groups of the MPA in the zonal planning process.

IMPORTANCE OF ZONATION TO EFFECTIVE MPA MANAGEMENT

It is certainly difficult for MPA managers to juggle the interests and needs of the local community, the interests of tourism development, and objectives of species and habitat conservation – all in one area. Yet most of the time, this is what has to be done. Zonation is one way to do so, and when well-planned and implemented, can work. Although there are general principles of zoning, they are flexible and can be tailored to the needs of each MPA. Stakeholders are an essential part of the zone planning process. Maps of MPA zones can be created that summarize the MPA goals by making it clear what is and is not allowed in the MPA. Finally, MPAs can be incorporated into a wider coastal zoning scheme.

LEARNING OBJECTIVES

- ✓ to understand functions of zoning through spatial or temporal allocation of uses and activities within an MPA
- ✓ to understand how zoning can be used as a tool to address resource use conflicts
- ✓ to understand how priorities (biodiversity, sustainable fisheries) determine spatial and temporal distribution of no take zones.
- ✓ to understand the stages in the development of an MPA zoning plan

LINKS TO OTHER EFFECTIVE MANAGEMENT AREAS

Community-based Participatory Processes

Involving the community and stakeholders in the zonal planning process can lead to more effective implementation of zonation to balance multiple uses of the area within a MPA.

Management Planning Process

Acknowledging multiple uses of marine and coastal zones early on in the planning process and consideration of zoning as a tool in MPA management can minimize conflict between competing uses of the MPA.

Enforcement

Zonation can be used to balance multiple uses of a MPA, one of which is sustainable tourism that can generate income for the MPA management body to fund enforcement programs. In any zonation scheme for a MPA, law enforcement teams need to be made aware of the zones and which activities are and are not allowed in them.

Sustainable Tourism

Zonation in MPA planning and management is one way to incorporate tourism interests more sustainably with other activities, such as fishing, within the MPA.

Awareness Building

Informing the community and stakeholders of the MPA of potential ways of planning for multiple uses and objectives for the coastal zone can increase support for zonation in particular and the need for sound coastal resource management in general.

Marine Conservation

Effective zonation within a MPA can balance multiple and competing human uses of the area while still setting aside core zones for conservation purposes.

INDICATORS OF EFFECTIVE ZONAL MANAGEMENT

Zonal management that works in a MPA will follow a well-designed plan that was drafted with community input about the different zones. Competition and conflict between resource users, if it happened before zonation, should decrease. Effective zonal management relies on monitoring the zones to determine if they meet objectives.

LESSON PLAN

2.1 OVERVIEW OF ZONING

Discussion— Do You Zone?

After briefly reviewing yesterday's activities, discuss as a group the following questions:

- *Can you think of reasons why you might use zones in an MPA?*
- *Are there different zones set up in your MPA? If so, which ones?*

Purpose of Zonation

Zonation refers to the *spatial* or *temporal* allocation of specific uses and activities to well-defined areas within a larger area. In this case the larger area is a MPA. Many MPAs with zonation schemes are called marine parks, such as the large Bunaken National Marine Park in Indonesia or the Great Barrier Reef Marine Park in Australia. However, zoning is a management strategy that can be used by MPAs much smaller than the GBRMP.

The use of zoning in MPAs can often reduce competition or conflict between human uses of the area while still allowing for conservation purposes.

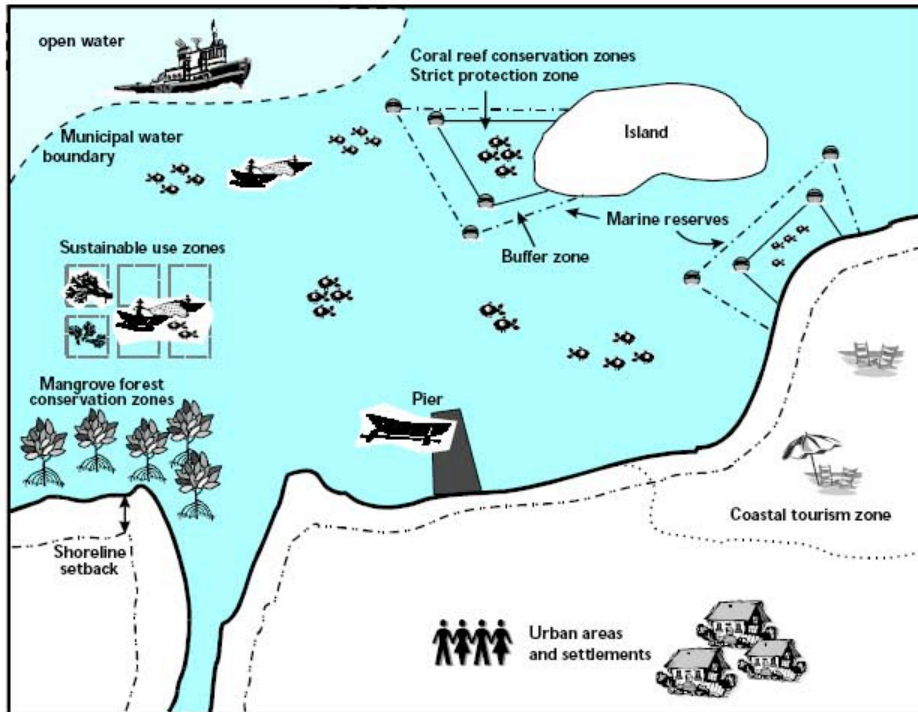
Zoning can be limited to within a MPA, or the MPA can be a part of a larger coastal and/or marine zonation scheme.

Custodial zoning is done within the MPA. Zonation establishes particular use allocation zones where fishing, scuba diving and snorkeling, other water sports or recreation and various other activities can and cannot occur

Regulatory zoning is when a MPA may be included in a larger coastal planning process that designates certain areas for particular uses, including commercial fishing, hotels or other tourist ventures, and nature reserves.

It is important to have *legislation* for zonation schemes. Legislation can be at the national level (such as a federal law or Act of Parliament) but it is especially helpful at on a local level. Local ordinances and/or regulations can have more flexibility and better enforcement possibility to meet the needs for a particular MPA or coastal zonation scheme.

Handout 2.1: Regulatory Zoning (criteria and guidelines for municipal coastal zoning in the Philippines)



Illustrative zoning plan for the coastal zone. (PH-3, 2001)

The Basis for Zoning

Before a zoning scheme can be developed, it is useful to consider the overall basis for zoning. Zoning in a MPA can be based entirely around protecting the ecological sensitivity of various habitats. Zoning in a MPA might also be based entirely on where various human use activities occur. Realistically, a zoning scheme will usually fall somewhere in between the two and aim to balance ecological need with user requirements.

Balancing Goals of MPAs with Objectives of Zones

A MPA often has multiple goals, and custodial use of zoning within a MPA can be implemented to address one or more of the following goals:

- Protect the ecosystem, species, or habitat critical to the survival of species
- Reduce or eliminate conflict between resource users
- Manage resource users

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- Provide a buffer between managed and unmanaged areas
- Reserve suitable areas for particular human uses while minimizing adverse impacts
- Reserve areas for specific purposes such as research and education

Setting up zones to achieve these goals requires consideration of specific and measurable objectives, including increasing fish abundance and diversity, stabilizing and improving living coral cover, increasing the fish catch of fishers operating in allowable zones or outside the MPA, attracting diving tourists, and producing and circulating the zoning plan for the MPA.

A generalized zoning scheme might include *one or more* of the following zones:

Tourist or marine park zone – fishing and collection are excluded so that visitors and the local community can appreciate reef life relatively undisturbed by human activities

Replenishing area – areas closed to use or extraction, even temporarily, to increase the productivity of the area or surrounding zones

Seasonal closures – a designated time when extraction within an area is prohibited to allow for spawning, breeding, etc.

Limited use zone – an area set aside for specific uses or where activities are regulated to a certain extent, for instance a zone where only artisanal fishing and no other extraction is allowed

Scientific research zone – areas set aside for scientific research

Preservation or conservation zone – areas set aside where very little or no human activity is allowed

A zonation design for a MPA is really a balancing act in spatial areas or throughout times or seasons. There is no definitive list of zones and what they may or may not achieve. The use of zonation in an MPA depends upon the site, its unique characteristics, and decisions of stakeholders. It is important to discuss zonation principles for MPAs early and often with stakeholders.

Lines on maps often polarize people and draw attention away from reaching the broader goals of the MPA. Avoid drawing any lines on maps until there is some agreement between stakeholders on the goals and objectives.

It is also important to be realistic about what is possible for a certain MPA. For instance, it is difficult to divide small MPAs into zones. Creating many zones within a MPA can lead to confusion and ultimately an ineffective MPA. On the other hand, zones can provide for a gradation of restriction of uses of the marine environment. Zoned MPAs with the goals of balancing multiple uses can therefore sometimes be easier to implement and enforce if they can satisfy the requirements of many resource-users.

Exercise 2.1— Prioritizing Goals and Objectives for Zoning

In small groups, brainstorm ways of setting priorities between multiple goals of an MPA, and how zoning can be used as a tool to do so. Consider the following questions:

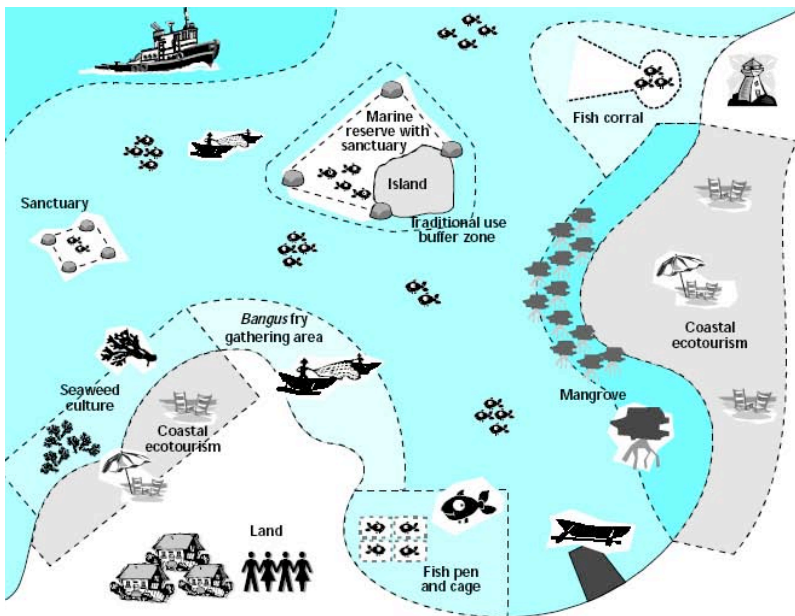
- Is there local or national legislation for the location or boundaries of your MPA?
- What are the goals for your MPA and what are your MPA priorities?

2.2 MULTIPLE USE ZONING DESIGN

General Model and Buffer Zones

When setting out to design new or to improve existing zonation within a MPA, it is useful to consider examples and models for multiple-use zoning schemes. One basic principle for zoning is to have one or more areas within the MPA strictly protected, *buffered* by areas with fewer restrictions.

For instance, one generalized zoning model for MPAs is to have a core “no-take” sanctuary surrounded by one or multiple buffer zones which each permit specific and/or regulated activities.



A sample multiple-use MPA schematic. (PH-5, 2001)

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A buffer zone provides a transition space between a highly protected area such as a no-take area and surrounding zones where heavier activity is allowed, as well as between the MPA and areas outside the MPA that are less managed.

It may be easiest to visualize buffer zones around islands, but they can also be applied along and out from coastal areas.

Handout 2.2: Use and Design of Buffer Zones

Handout 2.3: Schematic Zonation of a Biosphere

CASE STUDY—Biosphere Reserve Model: Hon Mun MPA

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Zone Names and Labels

Most zones in multiple-use MPAs fall into the general categories outlined in the first section – preservation, limited-use, scientific, and so on – but depending on the MPA there will be many different naming systems for zones. Zonation could be as simple as a marine reserve within a marine park. Or a MPA could be divided into scientific, water sport, and recreation zones. A slightly more expansive zoning system in a larger MPA could be:

- **C**—Core natural area – central strict conservation, or no-take area, with limited human access
- **B1**—Buffer around core managed for conservation with minimal research and diving allowed
- **C2**—Secondary core natural areas, recreation allowed
- **BR**—Buffer throughout the rest of the MPA that allows limited artisanal fishing and recreation

Handout 2.4 – A Sampling of Zone Names and Corresponding Restrictions

Labels, Signs, Buoys, Markings

No matter what the zones are called, multiple-use zoning schemes need clear markings of which zone is which and what activities can occur there, whether on the zoning plan map or out in the water. On paper, zoning maps in color or zones clearly labeled according to a legend need to be drawn and circulated to coastal users, stakeholders, and enforcement teams. Maps posted on signboards on beaches or in tourism brochures/ handouts inform or remind visitors and the community of the zoning scheme. Where possible, marker buoys or signs to label zone boundaries in the water are a good idea.

CASE STUDY: The Florida Keys National Marine Sanctuary Mooring Buoy Plan

Exercise 2.2— Zoning Scenarios

In small groups, you will be given hypothetical sites for zoning. Some of the groups will work on island-MPA sites, others coastal sites. The goal here is to quickly generate a few scenarios, or examples, of zoning for each site, sketch them so they can be understood, and compare tradeoffs between scenarios.

2.3 NO-TAKE ZONES

Discussion— Multiple-use Zoning

Briefly explain one of your hypothetical zonation schemes to the group, linking it to the objectives of the MPA.

- *Does your design include any no-take areas.*

No-take areas mean just that – they are areas closed to all forms of extraction, including fishing, gleaning, collecting, and so on. No-take areas are often called marine reserves or sanctuaries, depending within which country they are located. No-take areas are important tools for protecting biodiversity and can be useful in fisheries management, especially when designed and implemented in close consultation with the local community and stakeholders.

Protecting and Rebuilding Biodiversity

Multiple research studies have shown that species richness, biomass, and the size and amount of organisms are higher inside no-take areas than outside. This higher biomass and diversity might be because the area selected to be no-take had more fish to begin with, except that these trends have also been seen in areas selected to be no-take for other reasons such as reef recovery, sometimes in as little as three years.

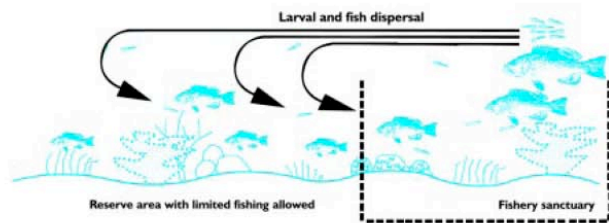
Increasing Fisheries Production

A basic principle linking no-take reserves to fisheries management is that of **spillover**. It is logical to think that no-take areas allow fish to grow older and bigger, which means that they should produce more eggs and juveniles. Fish density within the no-take area will increase, with the overall effect of export of larvae and movement of adults outside of the MPA and into 'fishable' waters. Some research studies have demonstrated a spillover effect from no-take areas, and often local fishers believe their catch has increased following the establishment of a

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no-take reserve.



A diagram showing the principle of spillover. Bohnsack 1990.

Design Principles

The benefits of an effective no-take reserve or zone within a MPA can be substantial after it is established, but there are many important points to consider in designing and establishing a no-take area. One of the most important considerations for a no-take area's success is that of stakeholder consultation.

Stakeholder consultation

Establishing a no-take area means closing an area to fishing and extraction, which in many cases displaces fishers or even puts them out of a job. Communities near to or reliant on proposed no-take areas may become more receptive to the idea if there are real possibilities of increased fish catches or future tourism revenue.

Ecological design- there are many considerations for no-take areas:

➤ *Size and shape*

The optimal area of a no-take area will depend on local conditions, but it should be large enough to allow for protection of target species. If it is too small or has overly-contoured boundaries, fish may migrate out too often into fishing grounds. A no-take area smaller than 10 hectares is unlikely to be very effective.

➤ *Location*

The objectives of the no-take area as well as the opinions of stakeholders should be considered when deciding the location. Areas that are important in the life cycle of target species, such as spawning areas, breeding sites or nursery grounds, are good locations to set up no-take areas for both fisheries enhancement and biodiversity conservation.

➤ *Habitats*

In an ideal situation, a no-take area will include a variety of habitats that are important to ecosystem health – reef, reef flats, seagrass beds, mangroves, algae beds, beaches and sand flats. It may also be possible to use adjacent habitats as a basis for a network of no-take areas, rather than just one.

➤ *Species*

A no-take area can be for a specific organism or species. For instance, an area can be

designated as a whale shark sanctuary, or a groundfish reserve. The species present and those targeted for protection will affect the size and location of the no-take area. Territorial reef species will benefit from a smaller area while more mobile species will need a larger no-take area.

➤ *Currents*

Locate no-take areas upstream of important habitats and fishing areas, so that larvae and juvenile fish will travel on the current to maximize the replenishment of waters outside the no-take area.

One final consideration for no-take areas is that of *time*. Although the benefits of a no-take reserve in the form of increased fish biomass and density can be seen within a few years in tropical areas, they are not immediate. Stakeholders and managers should be prepared to give a no-take area time to be effective before they expect results.

CASE STUDY: Dry Tortugas, FKNMS

CASE STUDY: Philippines

2.4 ZONING PLANNING

Zoning Plan Process

A zoning plan provides guidance whenever there is more than one allowable use of an area. A zoning plan does not replace the general management plan for a MPA, but can be a part of it or an annex to it. The plan should identify the boundaries of the different zones and explain how each area can be used. As with the outer boundaries of the MPA, it is essential that zones are clearly marked once agreed and approved. General principles to keep in mind for zoning are consultation, mapping, policy formation, and enforcement.

Stages in the development of an MPA zoning plan:

1. *Initial information gathering and preparation* – information about the nature and uses of areas to be zoned and materials for public participation produced, formulating the objectives of zoning for the MPA
2. *Public participation and consultation* – public comments on the accuracy and completeness of information gathered for zoning should be sought before drafting the zoning plan, evaluation by all of objectives of zoning for the MPA. Public participation is often in the form of scheduled and publicized meetings or hearings.
3. *Draft plan* – preparation of a draft zoning plan with explanation of the scientific rationale for each zone
4. *Public participation* – circulation of draft plan to the public for comment. It is a good idea at this point to hold more public meetings or hearings before finalization of zones.
5. *Zoning plan finalization* – MPA authority or executing agency incorporates public comments to produce a revised final plan. It is useful to have versions of the plan in both

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the local language and English or another widely spoken language so that tourists will understand the zoning regulations.

Zoning plan requirements:

- Compliance with all legislative requirements and any international obligations
- Based on adequate data and technically sound data
- Build upon existing use and resource management programs
- Capable of administration, including enforcement and surveillance
- Incorporate monitoring and enforcement for effective implementation and evaluation of policies
- Ensure fair treatment for users and efficient review of permits
- Consider local, regional and national interests
- Balance interests of competing user groups for political acceptability
- Balance public interests and private options
- Provide certainty for future use and have flexibility to modify allocation of areas
- Cost-effectiveness

CASE STUDY: Zoning Planning Process for GBRMP

Handout 2.5: Guidelines to Follow for Zonal Planning

Exercise 2.3 — Zoning Utopia

The Utopia Marine Park is a 100-hectare MPA off the independent island nation of Perfection somewhere in the Western Pacific. Some facts about Perfection and the Utopia Marine park:

- Utopia was established in 1989 with the goal to “conserve marine biodiversity while providing sustained economic and spiritual benefits to the local Perfect community.” Currently the park has limited regulations: no spear fishing, no blast fishing, no anchoring in coral, and tourist operators must have a license from UMP management.
- The population of Perfection is 100,000.
- Utopia’s barrier reef is in almost pristine condition with moderate fishing pressure, but its patch reefs are partly degraded by overfishing and tourist activities. Nearby seagrass beds are partly degraded by anchoring and seine fishing.
- Backpacker divers and adventure tourists have discovered Perfection, so tourism to the small island is increasing rapidly. There are no permanent guest structures, only souvenir and snack shops, and bars. Because of increased visitation, there is conflict developing between tour operators and artisanal fishers.

Utopia Marine Park has decided it is time to consider a zoning plan that will accommodate ‘acceptable’ uses and activities and minimize user conflicts. Divide into small groups and decide who in each group is an MPA manager, a fisher, and a tourist operator. Then:

- Overlay resource and use maps in different combinations to identify conflicts and incompatible activities
- Identify critical areas that require strict protection
- Develop a zoning scheme and specify regulations for each zone
- Be realistic – the plan needs to be acceptable to stakeholders