LEGAL AND MANAGEMENT FRAMEWORK FOR THE SUSTAINABLE MANAGEMENT OF MARINE PROTECTED AREAS IN THE MESOAMERICAN BARRIER REEF SYSTEM: AN ANALYSIS FOR THE MEXICAN APPROACH

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Abstract

Four nations are part of the Mesoamerican Barrier Reef System (MBRS) region, Mexico, Belize, Guatemala and Honduras, sharing the world's second longest barrier reef system which has a length of 1000 km. and protects and stabilize several coastal, and marine ecosystems. Furthermore, this region provides alternative livelihoods for approximately one million people living in coastal communities focused on tourism and fishing activities. After recognizing the importance of this region, the four nations signed the Tulum Declaration on the "Mesoamerican Barrier Reef System Initiative". This initiative has promoted the establishment of marine protected areas (MPAs) as one of the key strategies for managing human activities in the region. Despite the regional actions that have been taken, such as, research, monitoring, and capacity building, there remain significant lacunae at the national level through to the local level. These continue to lie in the lack of legislative frameworks, programmes and means, as well as challenges in getting the stakeholders, national policies, regulations and institutions to coordinate for the conservation and the sustainable use of the MBRS. After providing an overview of institutional and management frameworks and legal instruments related to MPAs in the MBRS region, this paper provides an analysis of legal frameworks and suggestions for the Mexican approach.

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Acronyms

ABM	Area Base Management
AHTEG	Ad Hoc Technical Expert Group
CAMPAM	Caribbean Marine Protected Areas Network
CARICOM	Caribbean Community
CBD	Convention on Biological Diversity
CEP	Caribbean Environmental Programme
CCAD	Comision Centroamericana de Ambiente y Desallorro
CLME	Caribbean Large Marine Ecosystem
CONANP	Comision Nacional de Areas Naturales Protegidas
CONAP	Comision Nacional de Areas Protegidas
COP	Conference of the Parties
CSC	Caribbean Sea Commision
DFO	Department of Fisheries and Oceans
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization
FCG	Fundacion para la Conservacion de los recursos naturales de Guatemala
FMCN	Fondo Mexicano para la Conservacion de la Naturaleza
GEF	Global environment Facility
GBRMP	Great Barrier Reef Marine Park
ha	hectares
ICARM	Integrated Coastal Area and River Basin Management
ICF	Instituto Nacional de Conservacion y Desarrollo Forestal, Areas Protegidas y Vida Silvestre
IUCN	International Union for Conservation of Nature
LME	Large Marine Ecosystem
LEGEEPA	Ley General de Equilibrio Ecologico y Proteccion al Ambiente
LOSC	Law of the Sea Convention
MAR Fund	Mesoamerican Reef Found
MBRS	Mesoamerican Barrier Reef System
MBC	Mesoamerican Biological Corridor

MCPAs	Marine Coastal Protected Areas
MEAs	Multilateral Environmental Agreements
MPAs	Marine Protected Areas
NGOs	Non-Governmental Organizations
PACT	Protected Areas Conservation Trust
PGR	Procuraduria General de la Republica
PROFEPA	Procuraduria General de Proteccion al Ambiente
RANP	Reglamento de la Ley General de Equilibrio Ecologico y Proteccion al Ambiente en material de Areas Naturales Protegidas
RCU	Regional Caribbean Unit
SAGARPA	Secretaria de Agricultura, Ganaderia, Desarrollo Rural, Pesca y Alimentacion
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SEMAR	Secretaria de Marina
SEMARNAT	Secretaria de Medio Ambiente y Recursos Naturales
SICA	Sistema de la Integracion Centroamericana
SIGAP	Sistema Guatemalteco de Areas Protegidas
SINAPH	Sistema Nacional de Areas Protegidas de Honduras
TNC	The Nature Conservancy
UN	United Nations
UNCED	United Nations Conference on Environmental and Development
UNCLOS	United Nations Conference on the Law of the Sea
UNEP	United Nations Environmental Programme
UNESCO	United Nation Educational, Scientific and Cultural Organization
USD	US Dollar
WCPA	World Commission on Protected Areas
WCR	Wider Caribbean Region
WRI	World Resource Institute
WSSD	World Summit on Sustainable Development
WWF	World Wildlife Found

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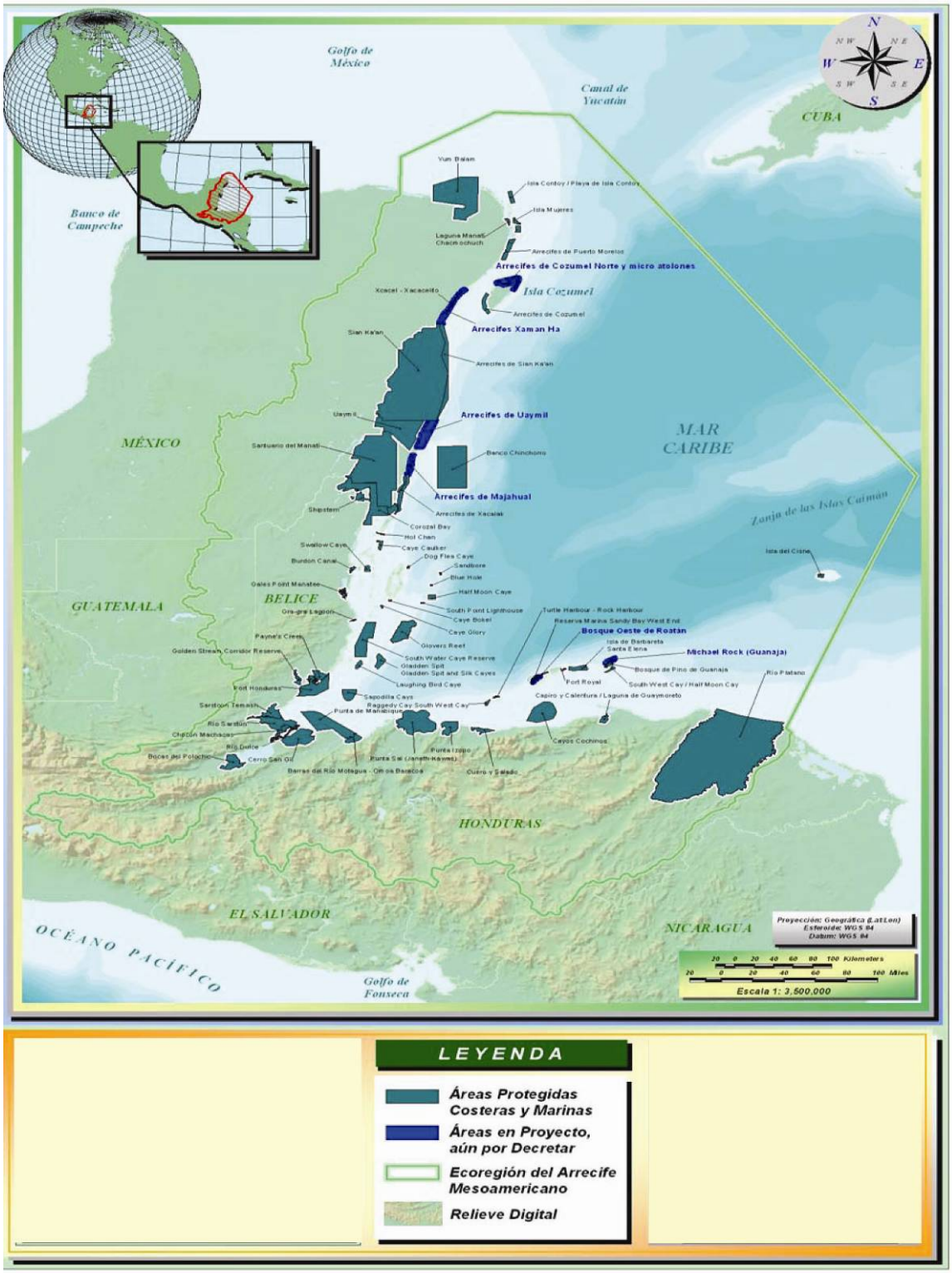
I. INTRODUCTION

The Mesoamerican Barrier Reef System MBRS is the world's second longest barrier reef system at 1000 km in length and extending from the southern half of the Yucatan Peninsula (Mexico) to the Islands of the Bay (Honduras)[1]. See map 1 bellow. MBRS stabilizes and protects coastal landscapes; maintains coastal water quality; sustains species of commercial importance; serves as breeding and feeding grounds for marine mammals, reptiles, fish and invertebrates; and offers employment alternatives and incomes to approximately one million people living in coastal zones adjacent to the reefs[2], especially on tourism and fishing activities; for instance in Belize alone, the reef was estimated to contribute approximately $395 - $559 million US dollars in goods and services each year[3].

Associated with the coral reefs of the MBRS are extensive areas of relatively pristine coastal wetlands, lagoons, sea grass beds and mangrove forests; these sustain exceptionally high biodiversity and provide critical habitat for threatened species. The outstanding ecological and cultural significance of the MBRS has resulted in the designation of World Heritage sites within its boundaries[4].

[1] Healthy Reefs for Healthy People (2010) Report card for the Mesoamerican Reef: An Evaluation of Ecosystem Health.
[2] Silva, Mauricio et. al. (2000) Análisis Social del Área de Influencia del Sistema Arrecifal Mesoamericano (SAM). 22-31pp.
[3] *cf. supra:* Healthy Reefs for Healthy People (2010), P.2.
[4] The World Heritage Convention and the World Heritage sites are describe in the chapter I (2 Regional Framework) of this document.

Figure 1, Map of the Mesoamerican Barrier Reef System[5]



[5] Lopez-Galvez I. C. (2007) Prioritization of Coastal and Marine Protected Areas in the Mesoamerican Reef Region. The Summit Foundation. The Ocean Fundation. MAR Fund. Pp.94. P.86.

Despite the well recognized importance of the MBRS to its four littoral States (México, Belize, Guatemala and Honduras), the wider Caribbean and beyond, many socio-environmental threats persist. These are rooted in, amongst others, a lack of legislative and administrative frameworks, low levels of compliance with existing legislation, difficulties in enforcement, lack of funding for implementation of Government mandates, lacunas in regional and local planning, and boundary conflicts between neighboring States[6]. Not only do these factors threaten the MBRS ecosystem functions and services, food security at the sub-regional level, and climate change adaptability, but they also represent significant lapses in the coastal States obligations under international law (i.e. UNCLOS and the IMO Regime) and commitments through international and regional instruments (i.e. WSSD targets and the MDGs).

In an attempt to address these threats, in 1997 the leaders of the four nations: México, Belize, Guatemala and Honduras signed the Tulum Declaration "The Mesoamerican Barrier Reef System Initiative" (MBRS initiative). The main purpose of the MBRS initiative is to promote the conservation of the reef system through its sustainable use, contributing in this way to the well-being of the present and future generations and to instruct to the authorities responsible for the Environment and the Natural Resources of the countries so that counting on the support of the Executive Secretary of the Central American Commission of Environment and Development (SE-CCAD), elaborates the Action Plan[7].

[6] The World Bank (2001) Project appraisal document on a proposed project for US$15.2 million, including a grant from the Global Environment Facility Trust Fund in the amount of US$11.0 equivalent to the Central American Commission on Environment and Development for a Regional Project for the Conservation and Sustainable Use of the Mesoamerican Barrier Reef System. P.5.

[7] Tulum Declaration (5 July 1997) signed by Ernesto Zedillo Ponce de Leon President of Mexico, Carlos Roberto Reina President of Honduras, Manuel Ezquivel Prime Minister of Belize, Alvaro Arzu Irigoyen President of Guatemala.

Under this commitment, in 1999, Mexico, Belize, Guatemala and Honduras approved a 15-year Action Plan focus on the promotion and sustainable development of the MBRS.

> The main objective of this Action is to safeguard the integrity and productivity of the MBRS by outlining a set of regional and national activities. Regional activities focus on four thematic areas: a) research and monitoring; b) legislation; c) capacity building; and d) regional coordination. Similarly, four thematic areas for the national level include: a) Monitoring and research; b) Sustainable use; c) Capacity building of national institutions; and (4) inter-sectoral coordination. They are designed to be tailored to member country circumstances while still remaining consistent with the overall framework[8].

In 2000, focused on goals and objectives for the long term implied in the Action Plan, the Central American Commission of Environment and Development (CCAD) proposed to the Global Environment Facility (GEF) a project entitled Conservation and Sustainable Use of the MBRS, which was approved in the 2001 with the aim of impelling the protection of the marine ecosystems that includes the MBRS, as well as helping the participant countries to fortify and to coordinate their national policies, regulations and institutional agreements for the conservation and the sustainable use of the MBRS[9].

Some of the regional activities implemented thus far include the establishment of bi-national and tri-national commissions to facilitate policy dialogue, harmonization of legislation and the management of natural resources in trans-border areas; designation of new marine protected areas (MPAs) to increase ecosystem representation; creation of legal instruments to facilitate the co-management of MPAs and the creation of the legal and institutional frameworks to ensure the sustainable management of fisheries and tourism, including enforcement mechanisms for existing laws[10].

[8] GEF (2011) Mesoamerican Barrier Reef System II. GEF full sized project. Implementation start June 2011.
[9] Comision Centroamericana de Ambiente y Desarrollo (CCAD) (2005) Informe Tecnico sobre Tulum + y Plan de Accion SAM.
[10] *cf. supra:* GEF (2011), P.4.

While this initiative begins to address some of the challenges at the multilateral level, there remain significant lacunae at the national level through to the local level. These continue to lie in the lack of legislative frameworks, programmes and means, as well as challenges in getting stakeholders to coordinate.

For example, the maritime space and activities within the MRBS jurisdiction of Mexico are currently primarily managed through the Federal legislative framework for protected areas. Administratively, the National Commission of Natural Protected Areas (CONANP) was created in 2000 as a decentralized agency of the Ministry of Environment and Natural Resources (SEMARNAT) to be in charge of the management of these Natural Protected Areas (NPA's). The areas are created by Presidential Decree and managed in accordance with the General Act of Ecological Equilibrium and Environmental Protection, its Regulations, the Management Programme and the programs for land-use planning. They are subject to special protection, conservation, restoration and development, according to categories defined in the Act[11]. Clearly this is a foundation which needs further development and extension both through the vertical levels of law and management as well as across the relevant sectors.

The purpose of this research is to address the problematic from a legislative and administrative perspective, both at the sub-regional and national levels, so as to inform the current development of laws, policy and management plans in Mexico. It will examine the current status of the sub-regional initiatives so as to establish their contribution to the effectiveness of the governance of this transboundary shared maritime area. Lessons learned at the regional level will be compared with similar approaches taken in other relevant regions, particularly through the experiences of Regional Seas Programmes and the Large Marine Ecosystems, so as to extract policy recommendations.

At the national level, a comparative analysis of the MBRS littoral States' legislative and management frameworks will be undertaken so as to provide a clear picture of the current

[11] Mexico. Camara de Diputados del H Congreso de la Union (1988) Ley General del Equilibrio Ecologico y Proteccion al Ambiente. *Últimas Reformas DOF 28-01-2011.*

status and challenges in the management of the maritime areas of the MBRS. In addition to providing a status overview for each State, this section will provide observations which will serve as a basis for additional policy recommendations in the Mexican context.

Through this comprehensive analysis of the legislative and management frameworks, the study will provide Mexico with the unique opportunity to take stock of the current approaches, assess their effectiveness and systematically consider various options for the development of its own approaches.

An overview of the Marine environment

The marine environment and its resources have been overused over the last years. Such environment contains unique ecological systems that are closely inter-connected and it has been facing several threats such as overexploitation of resources, unsustainable upstream activities leading to pollution, invasive alien species, indiscriminate settlement, infrastructure and other economic development.

Such degradation of coastal and marine resources represent a significant economic loss as ecosystem services, including fisheries catches, protection against storms and recreational and tourism revenue, decline.

According to the Millennium Ecosystem Assessment, ecosystem services are defined as: "the benefits people obtain from ecosystems"[12]. Such services could be describe as presented in the following (Table 1), emphasizing that services include "provisioning, regulating, and cultural services that directly affect people and supporting services needed to maintain the other services"[13].

[12] Millennium Ecosystem Assessment (2005) Ecosystems and Human Well being: A Framework for Assessment. P.49.
[13] Ibid., 57.

Table 1, Ecosystem Services[14]

Provisioning Services *Products obtained from ecosystems* ▪ Food ▪ Fresh water ▪ Fuel wood ▪ Fiber ▪ Biochemicals ▪ Genetic resources	**Regulating Services** *Benefits obtained from regulation of ecosystem processes* ▪ Climate regulation ▪ Disease regulation ▪ Water regulation ▪ Water purification ▪ Pollination	**Cultural Services** *Nonmaterial benefits obtained from ecosystems* ▪ Spiritual and religious ▪ Recreation and ecotourism ▪ Aesthetic ▪ Inspirational ▪ Educational ▪ Sense of place ▪ Cultural heritage
Supporting Services *Services necessary for the production of all other ecosystem services* ▪ Soil formation ▪ Nutrient cycling ▪ Primary production		

Marine ecosystems include: wetlands (marshes and grasslands), mangroves, sea-grass beds and alga beds, atolls and lagoons, coral reef and coral communities, soft subtidal bottoms and seamounts; depending one on the other.

Wetlands are usually dominated by grass and succulents and the destruction of these can cause an overload of organic matter and pollutants to flow directly towards mangroves, sea-grass and coral reefs[15].

Mangroves can refer to a single tree, or many trees/bushes that thrive on mudflats, sandbars, estuarine environments and rocky coastal areas and have the ability to support saline environments[16]. This ecosystem has several benefits, some of the most important include: nursery areas of fish, invertebrates, birds and other animals; protects the coastal communities by dampening the effects of waves and high wind action; reduce erosion and counter-balance erosion by trapping sediments from adversely impacting adjacent habitats. For instance, according to the World Resources Institute (WRI) Belize's

[14] Ibid
[15] William J. Mitsch, et al. (2009) Wetland Ecosystems. John Wiley & sons. Inc., Hoboken New Jersey
[16] Morales J. J. (1992) Los humedales, un mundo olvidado. Amigos de Sian Ka'an, 1 ed edition. Pp.87

mangroves protect the coastline from both waves and storm surge, providing an estimated US$111 million to US$167 million in protection annually[17].

Despite the valuable importance of the mangrove ecosystems, there is still a lack of conservation actions mostly because of the muddy substratum and associated smells, the infestations of biting insects, and their image as "wasted land". Therefore, it is used as a waste disposal site, encroached upon for residential, tourism or industrial development and aquaculture activities. It is estimated that approximately 35% of mangrove worldwide has been lost in the past two decades[18]. In addition, destruction of mangrove ecosystems can cause fish numbers (inshore and offshore) to decline, with serious consequences to food supply. Furthermore, coastal impacts causes by erosion affect properties, infrastructure and tourism.

Sea-grass beds are also primary producers providing nursery habitats for fish and invertebrates, including commercially important species such as rose conch (*Strombus gigas*) in the Mesoamerican Barrier Reef System for instance. Sea-grasses are themselves a source of food for marine animals, such as manatees and turtles. Sea-grass beds also trap sediments causing reduction of turbidity in the water, providing an important service for coral reef.

Atolls are typically found in oceanic locations, away from continental shelves. Atolls are rings of reef, often encircling an island. The isolation from mayor human developments may give a sense of pristine and untouched ecosystem. In reality, atolls often suffer from many impacts such as ship-groundings and over fishing. Atoll-like structures are found in Belize, the Bahamas, and Colombian waters. Small atoll-like reefs, more commonly

[17] Cooper, E., L. Burke, and N. Bood (2009) Coastal Capital: Belize. The Economic Contribution of Belize's Coral Reefs and Mangroves. WRI Working Paper. World Resources Institute, Washington DC. Pp53.
[18] Valiela I, J. L. Bowen y J. K. York (2001) Mangrove forests: one of the World´s threatened major tropical environments. *BioScience* 51, 10: 807-815

known as basin or cup reefs, are found in Puerto Rico, Bermuda, and off the coast of Mexico[19].

The ecosystem of coral reefs is build by living organisms, and is made of calcium carbonate (limestone) and algae, mostly located in shallow clear water, warm and saline seas. Coral reefs support a variety of sponges, sea whips, sea anemones, worms, tube worms, shrimps, crabs, lobsters, snails, clams, starfish, brittle-stars, feather-stars, sea urchins, sea cucumbers and fish. About 14% of the area of the world's coral reefs is found in the Caribbean region[20].

It is estimated that 20% of the coral had been destroyed with no immediate prospect of recovery[21] and an additional 24% of the world's reefs are under imminent risk of collapse largely due to human pressures and activities causing high carbon dioxide emitions to the atmosphere for instance replicated in the sea as CO. This leads to increase seawater acidity, which in turn affects the availability of dissolved calcium and carbonate in the water column. Global change is causing equal or even greater threat to coral reefs than anthropogenic impacts, such as coral bleaching[22] and mortality due to elevated temperatures.

[19] Stanley S. (2003) Marine Region 7, The Wider Caribbean, A Global Representative System of Marine Protected Areas

[20] Ibid

[21] Wilkinson, C.R. (2004). Status of Coral Reefs of the World: 2004. Vol. 1. Australian Institute of Marine Science, 2004. 301p.

[22] Coral bleaching causes corals to appear white or just pale due to the loss of their symbiotic algae (which give corals their characteristic colour) due to environmental stress. When corals bleach, they expel their symbiotic algae (zooxanthellae), or the zooxanthellae lose their pigments. Coral bleaching is a physiological response and has frequently been observed after episodes of unusually high sea surface temperature. Because corals get the majority of their energy from the photosynthetic zooxanthellae (the rest comes from feeding on plankton), bleached corals are operating on only a fraction of the energy they would normally have for their life functions. The bleached corals can soon become covered in turf algae, and subsequently die if the situation is not remedied (i.e. if seawater temperature is not reduced). If the situation that caused corals to bleach is removed, then corals may survive through the re-establishment of their association with expelled zooxanthellae. Survival will depend on a number of factors, including the length of the bleaching episode. National Ocean Service. National Oceanic and Atmospheric Administration. Available at: http://oceanservice.noaa.gov/facts/coral_bleach.html (2011).

Annex 1 illustrates the 2010 Mesoamerican Report Card a decline in the health of the region's coral reef ecosystem. Of the 130 reefs which shows surveyed, evaluated through four indicators (coral cover, fleshy macroalgal cover, herbivorous fish abundance, and commercial fish abundance) an alarming 31% of these were found to be in "critical: conditions, 38% in "poor", 24% in "fair", 6% "good" and 1% in "very good" condition. Threats to the reef, as outlined above come primarily from overfishing, coastal development, inland land clearing and agriculture, and climate change[23].

In addition to this, environmental events such as cyclones, volcanoes, earthquakes, tsunamis and fresh-water flooding can cause major damage to coral reefs, though recovery is usually prompt if the situation is normalised. These short-term events have helped built resiliency in coral reefs and related ecosystems. As well as mangroves, coral reefs protect coastal properties from erosion and wave-induced damage. The WRI has estimated that Belize's coral reefs provide approximately USD$120 million to USD$180 million in avoided damages per year[24].

The WRI has also estimated the annual economic value of coral reef and mangrove associated with tourism in Belize to be between USD$150 million and USD$196 million, accounting for between 12% and 15% of the Caribbean nation's GDP, and from USD$14 million to US$16 million[25] of its fishing value.

"The goods and services offered by coral reefs and mangroves are frequently overlooked or underappreciated in coastal investment and policy decisions;"[26] hence the human factor, a recent phenomenon from a geological perspective, has added more pressure to the coral reef ecosystem. Humans' impact the ecosystem not only through direct physical impacts, such as over-exploitation of resources and destructive fishing activities, but also indirect actions such as in-land agricultural and other practices, and global warming.

[23] *cf. supra:* Healthy Reefs for Healthy People (2010), P.3.
[24] *cf. supra:* Cooper, E., L. Burke, and N. Bood (2009).
[25] Ibid
[26] World Resources Institute (2008) News, Belize's Reefs and Mangroves Tagged with High Economic Value.

Therefore, marine protected areas are widely hailed as an example of forward thinking in marine conservation. Even though great efforts have been made in the decreed of MPAs, management and implementation still remain due to low funding, resulting in insufficient staff, fuel and equipment, which makes it difficult to curb illegal fishing as well as ensure effective monitoring.

II. Marine Protected Areas: Develop and Implementation

The MBRS Initiative has promoted the establishment of marine protected areas as one key strategy for managing human activities on the MBRS. This section will define the term marine protected area and explain why marine protected areas exist, how they are being implemented and who benefits from them. Understanding how marine protected areas are designed, established and managed can give us a better idea of how are they working, what benefits they provide and how they can be successful.

To understand what MPA means, a protected area has to be defined first. In this regard, members of the International Union for Conservation of Nature (IUCN) have established a definition which has been redefined and revised in 2007 together with the World Commission on Protected Areas (WCPA) as:

> 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[27].

Protected areas are divided in categories depending on their objectives and it helps to standardize descriptions of what constitutes a particular protected area. The following are the descriptions of each category presented by IUCN:

> **Category Ia: Strict nature reserve,** are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring[28].
>
> **Category Ib: Wilderness area,** protected areas are usually large unmodified or slightly modified areas, retaining their

[27] Dudley, N. (Editor) (2008). Guidelines for Applying Protected Area Management Categories. Gland, Switzerland: IUCN. x + 86pp.
[28] Ibid., 13.

natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition[29].

Category II: National park, protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities[30].

Category III: Natural monument or feature, protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, and submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value[31].

Category IV: Habitat/species management area, protected areas aim to protect particular species or habitats and management reflects this priority. Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category[32].

Category V: Protected landscape/seascape, A protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values[33].

Category VI: Protected area with sustainable use of natural resources, A protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and

[29] Ibid., 14.
[30] Ibid., 16.
[31] Ibid., 17.
[32] Ibid., 19.
[33] Ibid., 20.

> sustaining the area and its associated nature conservation and other values[34].

IUCN has defined MPAs since 1999 as:

> Any area of intertidal or sub-tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment[35].

According to IUCN, any of the categories listed above can be applied in marine environments as some can be more appropriate than others given the objectives sought. It is also import to consider the extent of extractive activities and the level to which they are regulated so as to determinate the appropriate IUCN category of an MPA. In this respect, is it worthy to emphasize that: the extractive use including any type of fishing is not consistent with the objectives of categories Ia and Ib, and unlikely to be consistent with category II[36].

On the other hand, the Convention on Biological Diversity (CBD) through the Ad Hoc Technical Expert Group on Marine and Coastal Protected Areas, proposed the following definition for MPAs:

> Any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna, and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings[37].

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[34] Ibid., 22.
[35] Kelleher, G. (1999) Guidelines for Marine Protected Areas. *IUCN, Gland, Switzerland and Cambridge, UK. xxiv +107pp.*
[36] *cf. supra:* Dudley, N. (Editor) (2008), P.58.
[37] Secretariat of the Convention on Biological Diversity (2004) Technical Advice on the Establishment and Management of a National System of Marine and Coastal Protected Areas, SCBD, 40 pages (*CBD Technical Series no. 13*), P.7.

As it has been seen, all of the definitions above include natural as well as cultural features, mostly reserved by legislation; even though within different categories and levels of protection MPAs are focused in conservation and regulated uses. There is a growing number of MPAs worldwide, increasing at approximately 5% annually[38] from 1984 to 2006 and increasing even more rapidly since[39].

Examples of marine protected areas can be found all over the world, and all established for different purposes[40]. For instance, in the United States, National Marine Sanctuaries have been established to manage multiple uses in a site while protecting marine resources. In Canada, marine protected areas are designated by the Department of Fisheries and Oceans (DFO) to conserve resources, habitats and biodiversity. The Great Barrier Reef Marine Park in Australia was established to protect biodiversity while allowing for reasonable use. In the Caribbean, the marine protected areas were established for conservation and sustainable use.

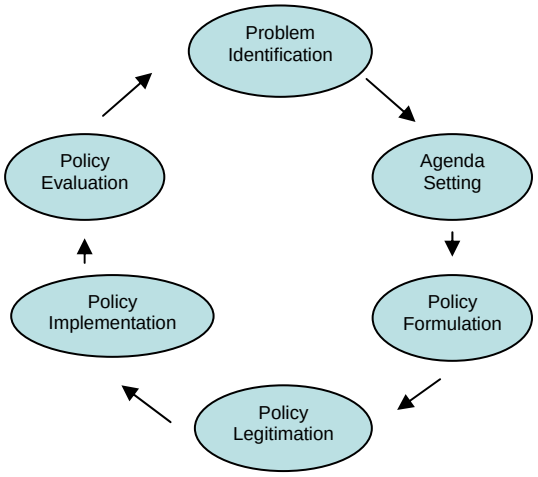
This Chapter II will focus on existing laws and policies managing human interactions with marine and coastal ecosystems as well as the establishment and management of marine protected areas, and the tools used for their implementation and the actors that could be involved in the process.

[38] Wood L, J., Fish L, Laughren J, Pauly D. (2008) Assessing progress towards global marine protection targets: shortfalls in information and action. Oryx; 42:340–51.
[39] Wood L. (2011) Global marine protection targets: How S.M.A.R.T. are they? *Environmental Management 47:525-535,* P. 530.
[40] Dalton T. (2004) An approach for integrating economic impact analysis into the evaluation of protected area sites. *Journal of environmental and management 70, P. 333-349.*

A. Existing laws and policies managing human interactions with marine and coastal ecosystems

Knowing a policy process will let us know how policies are made, identifying activities that occur during the political system by identifying issues, setting an agenda, formulating policy proposals, legitimating, implementing and evaluating their effectiveness.[41]

Figure 2, Policymaking as a Process[42]



In the context of MPAs, understanding the international, regional, national and local policy process will increase the sound management of the area by following the commitments for the protection of the marine environment and its resources.

Within the following sub-sections (1 and 2), the MPA international, legal and policy instruments as well as the regional agreements will be describe.

[41] Dye, Thomas. 2005. Chapter 3: The Policy Making Process. in Understanding Public Policy. P.31.
[42] Adapted from: Dye, Thomas. 2005. Chapter 3: The Policy Making Process. in Understanding Public Policy. P.32.

1. International legal and policy instruments

a) Legal instruments

Several international legal instruments have been elaborated for the protection and conservation of the marine environment, the principle one being the "Constitution of the Oceans"; the United Nations Convention on the Law of the Sea (UNCLOS), which entered into force on 16 November 1994 and had 162 parties as of June 3, 2011[43]. It has a comprehensive legal framework for activities in the world's oceans and seas, establishing rules governing the uses of the ocean and its resources. Furthermore, State Parties are obligated to comply with the provisions set out in this instrument.

Part XII of UNCLOS, specifically article 192, establishes a general obligation for States to protect and preserve the marine environment. Furthermore, article 145 of UNCLOS stipulates rules, regulations and procedures to ensure the effective protection of the marine environment, the protection and conservation of the natural resources of the Area and the prevention of damage to its flora and fauna from harmful effects that may arise from activities in the Area[44].

An other legal instrument is the Convention on Biological Diversity (CBD) which entered into force in 1993. The main objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources[45]. It is important to note that this legal instrument focuses on "equitable sharing of the benefits" emphasizing the human uses of the marine resources.

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[43] United Nation Convention on the Law of the Sea, Division for Oceans Affair and the Law of the Sea (2011) Chronological lists of ratifications of, accessions and successions to the convention and related agreements as at 03 Jun 2011.

[44] United Nations, Division for Ocean Affairs and the Law of the Sea Office of Legal Affairs. (2001) The Law of the Sea, official texts of the United Nations Convention on the Law of the Sea and of the Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea with Index and excerpts from the Final Act of the Third United Nations Conference on the Law of the Sea. United Nations, New York, (sales No. E.97.V.10) (here after: UNCLOS). Art. 145 and 192.

[45] *cf. supra:* Secretariat of the Convention on Biological Diversity (2004), P.6.

On the subject of MPAs, Article 8, on *in situ* conservation, describes relevant information for the establishment and management, including:

> a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;
>
> (b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;
> […]
> j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyle relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices[46].

The Conference of the Parties (COP) is the governing body of the CBD, and advances implementation of the CBD through the decisions it takes at its periodic meetings. It is important to mention that Marine and Coastal Biological Diversity (COP 2), Protected Areas (COP 7), Ecosystem approach (COP 9) have been relevant themes of the COPs.

To get assistance in its task, the COP relies on its subsidiary bodies, especially the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) which provides advice relating to the implementation of the CBD.[47] There for a Working Group on article 8(j) and related provisions was established in 1998 by the fourth meeting of the Conference of the Parties (COP4). At its fifth meeting in 2000, the COP adopted a programme of work to implement the commitments of article 8, (j) of the CBD and to

[46] United Nations (1992) Convention on Biological Diversity, P.6.
[47] UNEP/CBD/COP/2/5 (1995) Conference of the Parties to the Convention on Biological Diversity, Second meeting, Jakarta, 6-17 November 1995, P.1.

enhance the role and involvement of indigenous and local communities in the achievement of the objectives of the CBD[48].

COP V decided to establish an Ad Hoc Technical Expert Group (AHTEG) to consider issues relating to Marine Coastal Protected Areas[49]. In addition, at its seventh meeting, the COP adopted in its decision VII/28the the target of developing just MCPAs including representative networks by the year 2012 and the establishment of integrated networks of MCPAs in a programme of work on protected areas with the following objective:

> Establishment and maintenance by 2010 for terrestrial and by 2012 for marine areas of comprehensive, effectively managed, and ecologically representative national and regional systems of protected areas that collectively, *inter alia* through a global network contribute to achieving the three objectives of the Convention and the 2010 target to significantly reduce the current rate of biodiversity loss[50].

b) Policy instruments

Policy instruments are political declarations, a relevant one is the Johannesburg Plan of Implementation adopted by the World Summit on Sustainable Development (WSSD)[51] held in South Africa in 2002. The WSSD focused on the commitment according to chapter 17 of Agenda 21, promote the conservation and management of the oceans through actions at all levels, giving due regard to the relevant international instruments to, among others:

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[48] UNEP/CBD/COP/4/27 (1998) Conference of the Parties to the Convention on Biological Diversity, Fourth meeting, Bratislava, 4-15 May 1998, Paragraph 126 P.33. Available at: http://www.cbd.int/doc/meetings/cop/cop-04/official/cop-04-27-en.pdf

[49] *cf. supra:* Secretariat of the Convention on Biological Diversity (2004), P.40.

[50] UNEP/CBD/COP/DEC/VII/28 (2004) Conference of the Parties to the Convention on Biological Diversity, Kuala Lumpur, 9-20 and 27 February 2004, Agenta item 24, P.3. Available at: http://www.cbd.int/doc/decisions/cop-07/cop-07-dec-28-en.pdf

[51] United Nations (2002) Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August-4th September 2002. United Nations, New York, USA, P.6

> a) Maintain the productivity and biodiversity of important and vulnerable marine and coastal areas, including in areas within and beyond national jurisdiction;
>
> c) Develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive fishing practices, the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012 and time/area closures for the protection of nursery grounds and periods, proper coastal land use and watershed planning and the integration of marine and coastal areas management into key sectors; and.
>
> d) Develop national, regional and international programmes for halting the loss of marine biodiversity, including in coral reefs and wetlands[52];

As mentioned above, these commitments were made to follow up the ones made by the United Nations Conference on Environment and Development (UNCED)[53] kwon as the "Earth Summit", held in Rio de Janeiro, Brazil in 1992, which adopted the Rio Declaration and an action plan (Agenda 21). Chapter 17 of Agenda 21 emphasise the conservation and management of the oceans, and as a whole Agenda 21 is developed from the 27 principles[54] set in the Rio Declaration, all related to the environmental protection and responsible development.

It is important to highlight that some of this ideas and principles came reaffirming the "Stockholm Declaration" name that was given to the United Nations Conference on the Human Environment[55], held in Stockholm in 1972, which also emphasise the right of the humankind to use the natural environment for its development but also the need to preserve it.

[52] Ibid., 25.
[53] United Nations (1992) Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992 (United Nations publication, Sales No. E.93.I.8 and corrigenda). vol. I
[54] Ibid.
[55] United Nations (1972) Report of the United Nations Conference on the Human Environment, Stockholm, 5-16 June 1972, New York, 1973, USA

Even though there have been many declarations, resolutions, conventions and protocols adopted since the United Nations Conference on the Human Environment in 1972, deterioration of the marine environment continues. Table 2 provides an overview of the instruments and declarations outlined above.

Table 2, Summarising the scope, target, and deadlines[56]

Target name	Date Adopted	Deadline	Target pertains to:	Original target text, and additional notes
World Summit on sustainable Development	2002	2012	Global ocean	Section IV, paragraph 32(c): ''the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012''
World Parks Congress	2004	2012	Global ocean	Recommendation 5.22: ''Establish by 2012 a global system of effectively managed, representative networks of marine and coastal protected areas….. these networks should be extensive and include strictly protected areas that amount to at least 20-30% of each habitat''[57]
Convention on Biological Diversity				
Seventh Conference of the Parties (COP7)	2004	2012	Areas under national jurisdiction	Decision VII/28 (Goal 1.1 Target): ''By 2010, terrestrially 6/ and 2012 in the marine area, a global network of comprehensive, representative and effectively managed national and regional protected area system is established…''
Eighth Conference of the Parties (COP8)	2006	2012		Suggested activity 1.1.1 of the Parties under this target was to ''By 2006, establish suitable time-bound and measurable national and regional level protected area targets and indicators.'
Tenth Conference of the Parties (COP10)	2010	2020		Decision VIII/15: ''at least 10% of each of the world's ecological regions [including marine and coastal be] effectively conserved [by 2012]'' Decision X/2 (Target 11): ''By 2020, at least … 10 per cent of coastal and marine areas…are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.''

[56] *cf. supra:* Wood L. (2011), P.527.
[57] IUCN (2003) WPC Recommendation 5.22: building a global system of marine and coastal protected area networks. IUCN, Durban, South Africa.

c) Other instruments related to biodiversity

This section emphasises some instruments (conventions or agreements) related to biodiversity. One of them is the Convention on Wetlands (Ramsar, Iran, 1971) called the "Ramsar Convention", this is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the "wise use", or sustainable use, of all of the wetlands in their territories[58]. Unlike the other global environmental conventions, Ramsar is not affiliated with the United Nations System of multilateral environmental agreements (MEAs), but it works very closely with the other MEAs and is a full partner among the "biodiversity-related cluster" of treaties and agreements. The number of contracting parties is 160 which include Mexico, Belize, Guatemala and Honduras[59].

The Convention concerning the protection of the World Cultural and Natural Heritage, commonly known as the "World Heritage Convention" was adopted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) General Conference at its seventeenth session in 1972[60]. The World Heritage Convention was designed to assure the conservation and protection of the world's natural and cultural heritage and entered into force in 1975[61].

The World Heritage Convention recognizes the way in which people interact with nature, and the fundamental need to preserve the balance between the two; thereof it defines the kind of natural or cultural sites which can be considered for inscription on the World heritage list and sets out the duties of States Parties in identifying potential sites and their role in protecting and preserving them. By signing the Convention, each country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect

[58] The Ramsar Convention on Wetlands, http://www.ramsar.org
[59] Ibid
[60] United Nations Educational, Scientific and Cultural Organization (1972) Convention concerning the protection of the World Cultural and Natural Heritage. Adopted by the General Conference at its seventeenth session, Paris 16 November 1972.
[61] Ralph O. Slatyer (1983) The Origin and Evolution of the World Heritage Convention. Vol. 12, No. 3/4, World Heritage, pp. 138-140. Published by: Springer on behalf of Royal Swedish Academy.

its national heritage. The States Parties are encouraged to integrate the protection of the cultural and natural heritage into regional planning programmes[62].

The World Heritage Committee is responsible for the implementation of the World Heritage Convention, defines the use of the World Heritage Fund and allocates financial assistance upon requests from States Parties. It has the final decision on whether a property is inscribed on the World Heritage List.[63] A number of marine areas have been included in the list some of them part of the MBRS, like: Sian Ka'an (Mexico) and Belize Barrier Reef Reserve System (Belize)[64].

2. Regional frameworks

Most of the conventions have protocols addressing different types of marine degradation and some protocols are specifically for protected areas, the regional protocols of protected areas specify the type of activities subject to regulation. Several regional conventions and agreements have been set for the protection and preservation of the marine environment to implement the provisions of UNCLOS. Some of these have been established under the auspices of the United Nations Environmental Programme (UNEP).

UNEP was established to "serve as a focal point for environmental actions and coordination within the United Nations System"[65]. The Regional Seas Programme (RSP) was initiated by UNEP in 1974[66]. This programme aims to address the accelerating degradation of the world's ocean and coastal areas through the sustainable management

[62] *cf. supra:* United Nations Educational, Scientific and Cultural Organization (1972),
[63] Ibid., P.4.
[64] United Nations Educational, Scientific and Cultural Organization, World Heritage Convention list. Available at: http://whc.unesco.org/en/list/
[65] General Assembly resolution XXVII, 15 December 1972.
[66] UNEP (1982) Guidelines and principles for the preparation and implementation of comprehensive action plans for the protection and development of marine and coastal areas of regional seas. UNEP Regional Seas Report and Studies No. 15.

and use of the marine and coastal environment, by engaging neighboring countries in comprehensive and specific actions to protect their shared marine ecosystem[67].

More than 143 countries participate in 13 Regional Seas programmes established under the auspices of UNEP: Black Sea, Wider Caribbean, East Asian Seas, Easter Africa, South Asian Seas, ROPME Sea Area, Mediterranean, North-East Pacific, Northwest Pacific, Red Sea and Gulf of Aden, South-East Pacific, Pacific and Western Africa. Six of these programmes are directly administered by UNEP[68]. The Wider Caribbean Region includes 28 Island and continental States. It covers tropical and subtropical ecosystems from coral reefs, mangrove forest to see-grass beds.

The Wider Caribbean Region comprises the insular and coastal States and Territories with coasts on the Caribbean Sea and Gulf of Mexico as well as waters of the Atlantic Ocean adjacent to these States and Territories[69]. In 1976, UNEP was urged to launch the Caribbean Environment Programme (CEP), an unparalleled joint endeavor, which embraces the region's diversity in its efforts to advance economic prosperity and environmental health[70].

In 1981, the Caribbean Action Plan was adopted at the First Intergovernmental Meeting held in Montego Bay, Jamaica. Twenty two States of the Caribbean adopted the Action Plan for the Caribbean Environment Programme[71]. The Plan outlines programmes of assistance, institutional strengthening, and technical co-operation, and in 1983 led to the adoption of a legal framework: the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention)[72]. This entered into force on 11 October 1986 and is facilitated by the Regional Coordinating

[67] UNEP Environment for development, Regional Seas, Available at: http://www.unep.org/regionalseas/about/default.asp
[68] Ibid
[69] UNEP/ECLAC (1984) The state of marine pollution in the Wider Caribbean Region. UNEP Regional Seas Reports and Studies No. 36. UNEP 1984.
[70] UNEP (1983) Action Plan for the Caribbean environmental programme. UNEP Regional Seas Reports and Studies No. 26. UNEP 1983.
[71] Ibid
[72] UNEP (2003) Wider Caribbean Region, available at: http://www.unep.org/regionalseas/programmes/unpro/caribbean/instruments/r_profile_car.pdf

Unit of (CAR/RCU). Three protocols on oil spills, specially protected areas and wildlife, and pollution from land-based sources and activities supplement the Cartagena Convention. Today, the activities of the CEP focus mainly on implementation of the protocols, on information management and exchange, and on environmental education and training[73].

In 1990, the Specially Protected Areas and Wildlife Protocol was adopted, and it entered into force in 2000. It stresses, *inter alia*, the importance of establishing regional co-operation to protect and, as appropriate, to restore and improve the state of ecosystems, as well as threatened and endangered species and their habitats in the Wider Caribbean region by, among other means, the establishment of protected areas in the marine areas and their associated ecosystems[74].

Great efforts have been made on the establishment of regional agreements and protocols regarding the preservation of the marine environment in the Wider Caribbean Region. Nevertheless, as well as mentioned in the International level, deterioration of the marine environment still remains. For example UNEP emphasizes that threats to coral reefs persist, due to marine and land based pollution, overfishing and more. Also mentioned is the need for: greater community empowerment and involvement; sustained and extensive consultation between stakeholders; proactive and innovative education and public awareness campaigns; improved communication and transparency between all involved members; strong management partnerships to secure long term financial stability; development of management plans based on ecological as well as socio-economic data and linked to regular monitoring programmes; implementation of clearly defined zoning regulations to reduce conflicts between stakeholders; and enhanced enforcement efforts[75].

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[73] Ibid

[74] Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (1990) Adopted in Kingston, Jamaica by the member governments of the Caribbean Environment Programme on 18 January 1990. Available at: http://www.cep.unep.org/cartagena-convention/spaw-protocol/spaw-protocol-en.pdf

[75] UNEP (2004) People and reefs: successes and challenges in the management of coral reef marine protected areas. UNEP Regional Seas Reports and Studies No. 176. UNEP 2004. P.7.

The following section focuses on some of the tools use for the management of marine protected areas, as well as the interaction of the managers and stakeholders involved in the process.

B. Area Base Management

As mentioned in the introduction of this paper, there is a close interconnection between all marine ecosystems but also with non-marine ecosystems where agricultural, farming and forestry activities occur, producing nutrients, pesticides and sediments that can wash into rivers, which subsequently flow and deposit pollutants and sediments onto sensitive marine ecosystems.

Therefore, this inter-connectivity can be fully appreciated *in situ* and the recognition has paved the way to a new concept called "integrated coastal area and river basin management" (ICARM). ICARM recognises the need to develop a new management approach that takes into account the functional linkage between the coast and the river basin.

According to IUCN, more than 60% of the human population now lives on or near coastlines and 80% of tourism is concentrated in coastal areas[76]. Therefore there is a big concern to find ways to protect the marine and coastal biodiversity; marine protected areas seam to be an effective way to do accomplish this. In any event, appropriate management is needed to reach such objectives.

MPAs are considered a tool of area base management (ABM) which is defined as a geographically area designed and management to achieve specific environmental, social, socio-economic or other objectives, and reduce the pressure of human activities on coastal and marine ecosystem by managing one or multiple human uses and user

[76] IUCN, International Union for Conservation of Nature. Available at: http://www.iucn.org/knowledge/news/focus/marine_2010/marine_protected_areas.

conflicts. It is also consider being a useful tool to implement ecosystem approach and precautionary approach[77]. A great example of this is the Great Barrier Reef Marine Park (GBRMP) in Australia that represents the first establishment of a large scale of marine protected area based on an ecosystem approach to management (see Table 3).

Table 3, Case study from Australia

Case study - an ecosystem approach to the management of the great barrier reef marine park

The Great Barrier Reef Marine Park (GBRMP) in Australia was the world's first declaration of a large-scale marine protected area based on an ecosystem approach to management.

Integrated management measures for the GBRMP include:

1. A single independent agency (i.e. the Great Barrier Reef Marine Park Authority (GBRMPA)) with an Act which, if necessary, provides overriding powers;

2. Strong cooperation between relevant Government agencies, industry, research institutions; and

3. Complementary legislation for most adjoining State waters; and strategic zoning plans and site-specific management plans.

The Amalgamated Great Barrier Reef Section was divided into eight zones:

1. The Preservation Zone is a "no go" area for the general public. Extractive activities are strictly prohibited. A permit is required to conduct research in this zone.

2. The Marine National Park Zones are "no-take" areas and extractive activities, like fishing or collecting, are not allowed without written permission.

3. The Scientific Research Zone facilitates scientific research in areas relatively undisturbed by extractive activities.

4. The Buffer Zone provides for the protection and conservation of areas of the GBRMP in their natural state, while continuing to allow the public to appreciate and enjoy the relatively undisturbed nature of the area.

5. The Conservation Park Zone allows for increased protection and conservation of areas of the GBRMP, while providing opportunities for reasonable use and enjoyment,

[77]DOALOS, United Nations (2007) Training Manual on the Development, Implementation and Management of Marine Protected Areas, developed by DOALOS as part of the Train-Sea-Coast Programme. P.3.

including limited extractive use.

6. The Habitat Protection Zone provides for the conservation of areas of the GBRMP by protecting and managing sensitive habitats and ensuring they are generally free from potentially damaging activities.

7. The General Use Zone is to provide opportunities for reasonable use of the GBRMP, while still allowing for the conservation of these areas.

8. The Commonwealth Island Zone is comprised of those areas of the GBRMP that are above the low water mark; namely, Commonwealth islands or parts of commonwealth islands. This zone can be used or entered without permission for low impact (non-extractive) activities, photography, filming, sound recording and limited educational programmes. Traditional use of marine resources is allowed with written permission or in accordance with an accredited Traditional Use of Marine Resources Agreement.

Environmental impact assessments are required for all major developments within the GBRMP, and potential environmental impacts associated with major developments are controlled.

Source from: Day J. C. (2002) Zoning lessons from the Great Barrier Reef Marine Park. *Ocean and Coastal Management 45: 139–156*

As is well known, an MPA is not isolated, species can transcend its boundaries, in this context a representative network of MPAs is considered to offer the best way of protection and States have committed to this approach through the 2002 at the World Summint on Sustainable Development[78], "*i*ncluding representative networks by 2012"

The following sub-sections 1 and 2 focused on the different tools and approaches established and developed for the protection of the marine and coastal environment; as well as the interaction and efforts between stakeholders (policy makers, NGO's, marine scientists, local community) involved in the process.

[78] Paragraph mentioned in the sub-section b), chapter II of this paper. P.20.

1. Tools helping People in Nature

People in nature face natural disasters which play a critical role in maintaining the high biodiversity of the tropical systems, so much, that changes in the natural regime of disturbance will have adverse impacts. Nevertheless, human impacts (such as pollution and overfishing) that lower the resilience of an ecosystem may affect the ability of that ecosystem to recover from natural and human-induced disturbances.

In this context, networks of MPAs can build resilience[79] and assist recovery following natural disturbance if they could have an equal system of regulations and combine efforts controlling overfishing and tourism activities (e.g. similar time of fishing seasons, local training and interchange of experiences between communities or user of each MPA). Rarely, MPAs are designed to ensure connectivity between each other, even though such areas enhance the conservation status of target species, and better meet the ecological requirements of those species through different life history stages[80]. Therefore, consideration of actions including the biological, social and management aspect of a MPA network is important.

MPA networks have been defined as:

> A collection of individual marine protected areas 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[81].

[79] Resilience refers to the ability to absorb or recover from disturbance and change, while maintaining ecosystems function and services. Grimsditch, G. and R. Salm. (2005) Coral reef resilience and resistance to bleaching. IUCN, Gland, Switzerland.
[80] Agardy T, Notarbartolo di Sciara G, Christie P, (2011) Mind the gap: Addressing the shortcomings of marine protected areas through large scale marine spatial planning. *Marine Policy 35:226–232*. P.227.
[81] World Commission on Protected Areas andWorld Conservation Union (WCPA-IUCN). (2007) Establishing Networks of MPAs; Making it Happen. A guide for Developing National and Regional Capacity for Building MPA Networks. Non-technical summary report.

Thereby, MPA Networks are considered as two or more MPAs that complement each other, through linkage such as geographic distribution and connectivity, habitat types or species distribution. Nevertheless different factors have to be considered for the selection of the MPA sites such as complementarity, flexibility and irreplaceability[82].

On the other hand, large MPAs are considered to benefit conservation as they cover complete marine ecosystems which allow for the protection of mobile species. In a marine reserve networks, young and adults traveling out of one reserve may end up being protected in another reserve. Marine reserve networks provide more protection than a set of individual, unconnected reserves[83]. In this context, it has been said that large MPAs could be more difficult to implement than small ones, and may be harder to enforce. Therefore networks consisting of many smaller MPAs may be better then a few very large protected areas. They will spread benefits more widely over a management area[84].

As well, MPA networks can be developed at different levels: local, national, regional or global. An important example of regional networks of MPAs is presented in Table 3. Regional initiatives have been set through agreements between countries for cooperation regarding conservation of certain rich biodiversity areas within Large Marine Ecosystems[85]; such as the Caribbean Large Marine Ecosystem.

[82] Brunckhorst, D.J. (2000) Bioregional planning: resource management beyond the new millennium. Harwood Academic Publishers: Singapore, 162 p. *In: MPA news* Vol. 1, No. 9 June 2000.
[83] Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO). (2007). The Science of Marine Reserves (2nd Edition, International Version). Available at www.piscoweb.org
[84] Roberts, C. M. and J.P. Hawkings. (2000) Fully-protected marine reserves: a guide. WWF Endangered Seas Campaign and Environment Department, University of York, York, UK.
[85] *cf. supra:* DOALOS, United Nations (2007) P.14

Table 4, Examples of regional networks of MPAs[86]

Region	Countries
Mesoamerican Barrier Reef	Mexico, Belize, Guatemala, Honduras
Gulf of Mexico 'Islands in the Stream'	USA, Mexico, Belize
Tropical Eastern Pacific Marine Corridor Network	Colombia, Costa Rica, Panama, Ecuador
Baja California to the Bering Sea	USA, Canada, Mexico
Eastern African Marine Ecoregion Programme	Somalia, Kenya, Tanzania, Mozambique, South Africa
MPA Network for the Countries of the Indian Ocean Commission	Madagascar, Mauritius, France (Reunion), Comores, Seychelles
Western Africa Regional Network	Mauritania, Senegal, Gambia, Guinea-Bissau, Guinea, and Cape Verde
PERSGA MPA Network	Djibouti, Egypt, Jordan, Saudi Arabia, Somalia, Sudan and Yemen
Caspian regional MPA Network	Azerbaijan, Islamic Republic of Iran, Kazakhstan, the Russian Federation and Turkmenistan
South-east Asian MPA network	ASEAN and other countries
Sulu-Sulawesi Marine Ecoregion	Indonesia, Malaysia, Philippines
Natura 2000	Member countries of the EU

a) Ecosystem Approach

The term "ecosystem" was introduced in 1935 by Alfred George Transley, he defined it as a biotic assemblage and its associated physical environment in a specific place.[87] This term has been use in several international instruments using basically this same connotation. e. g. the CBD defines ecosystem in Article 2, as "a dynamic complex of plant, animal and micro-organism communities and their non living environment interacting as a functional unit."

Humans and ecosystems are related as several social-economic activities depend of the natural environment. The health of ecosystems is being affected by coastal development activities, pollution, overfishing, invasive alien species, and also climate change has had significant impact in many coastal areas and all of these together have impaired good and services for their livelihoods and poverty alleviation in some coastal communities that

[86] UNEP-WCMC (2008) National and Regional Networks of Marine Protected Areas: A Review of Progress. UNEP-WCMC, Cambridge.

[87] Major, J., "Historical Development of the Ecosystem Concept", V.G.M. Dyne (ed.), *The Ecosystem Concept in Natural Resource Management* 9, New York and London, Academic Press, 1969, pp. 9-22; Christensen, N.L., et al., "The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management," *Ecologic al Applications* 6, 1996, p. 665 at p. 670.

directly rely on the ecosystems.[88] Healthy ecosystems are not only essential for the environment but also important to the existence and the development of human society, since ecosystems are life support systems and critical to the survival of the human beings.

The health of the ecosystems continue to decline despite traditional methods of marine resource management that are usually based in species-specific, sectoral and zonal approaches, which typically ignore the integrity of the ecosystem and the interaction between ecosystem components. These management systems have often not achieved desired outcomes and have resulted in a patchwork of legislation, policies, programmes and management plans at the local, national and international levels. Such traditional methods of management involve dividing sea areas into maritime zones within which States exercise different jurisdictions and adopt different management systems in accordance with UNCLOS[89].

In this context, ecosystem approaches seam to be a potentially useful tool since the assessment and management of the marine environment and its resources are addressed through multiple perspectives, involving natural science, technology, socio-economic, law and policy. The report from the Third Global Conference on Oceans, Coasts and Islands, proposed that the ecosystem approach is an evolution of integrated coastal and ocean management, with a greater emphasis on ecosystem goals and objectives and their outcomes[90].

The Ramsar Convention has been suggested that the goal of an ecosystem approach is thus to restore and sustain the functions of ecosystems, based on their health, productivity and biological diversity, and the overall quality of life, through management systems that are fully integrated with social and economic goals.[91] It also allows for marine-related

[88] United Nations (2010) Ecosystem approaches to the management of ocean-related activities, Training manual. United Nations, New York, P.7.
[89] Ibid., 9-12.
[90] Reports from the Third Global Conference on Oceans, Coasts, and Islands, The Ecosystem Approach to Integrated Ocean and Coastal Management, UNESCO, Paris, January 23-28, 2006, at p. 3, see www.globaloceans.org.
[91] *cf. supra:* United Nations (2010) P.13. The Ramsar Convention on Wetlands, Strategic approaches to freshwater management: Background paper − The ecosystem approach.

sectors to work in partnership in the protection and management of the marine environment from a multi-sectoral perspective. Coordination of efforts of various agencies helps to reduce duplication of work, reconciles conflict among management entities with different mandates, and maximizes limited resources[92].

Besides the multiple advantages for implementing an ecosystem approach according to what has been said in the conferences or conventions, the Consultative Process agreed at its seven meting that ecosystem approaches should, among others, seek to minimize the adverse impact of human activities on marine ecosystems and biodiversity, in particular, rare and fragile marine ecosystems[93].

The meting further agreed that the implementation of an ecosystem approach could be achieved through, *inter alia*, inclusion in the development of national policies and plans, encouraging and supporting marine scientific research, identifying and engaging stakeholders to promote cooperation, effective integrated management across sectors an on a variety of levels, and conducting assessments in relation to marine activities likely to have a significant impact in the marine environment[94].

As mentioned above, human activities are very connected with the natural environment, in this context good governance plays a big role in influencing human behavior through tree key mechanisms: government, marketplace and civil society. Therefore governance is important for the process of transition towards the development and implementation of an ecosystem approach.

In such areas where the biogeographic ecosystem crosses international boundaries, it is important for States to pursue bilateral or regional cooperation,[95] and this seams to be, among others a big challenge in the development and implementation of an ecosystem

[92] *cf. supra:* United Nations (2010) P.21.
[93] See, Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its seventh meeting, 17 July 2006, at http://documents.un.org.
[94] Global Environment Facility, Operational Programme # 12: Integrated Ecosystem Management, April 20, 2000, see http://207.190.239.143/Operational_Policies/Operational_Programs/OP_12_English.pdf.
[95] *cf. supra:* United Nations (2010) Ecosystem approaches to the management of ocean-related activities, Training manual. P.21.

approach. Therefore, concentrated efforts are needed by relevant sectors and parties at local, national, regional and global level.

b) Benefits and livelihoods

> Livelihood is never a matter of finding or making shelter, transacting money, and preparing food to put on the table or exchange in the market place. It is usually a matter of the ownership and circulation of information, the management of relationships, the affirmation of personal significance and group identity, and the interrelation of each of those tasks to the other. All those productive tasks together constitute the work of livelihood[96].

Marine protected areas encompass areas that have important coastal and marine resources that provide sustenance for people living in the area. Coral reefs, mangroves, seagrass beds and the open sea, for example, provide food, building material and items of cultural significance to the local communities.

Within the establishment of an MPA, there is always mention of providing "alternative livelihoods", referred to an alternative source of income and new occupations that must be found to satisfy the well-being of the people, local communities will generally be more supportive of management strategies that could improve the well-being. Such alternative livelihoods can be: fishing, aquaculture, tourism, handicrafts, MPA management, research and monitoring, surveillance, micro-enterprises. However, such activities have to be established and managed in a sustainable context, taking into account that the conservation of the environment is the purpose of the establishment of MPAs.

Just to mention some examples: commercial fisheries (considered as an extractive activity) sometimes compete with existing subsistence fisheries, mostly when inadequate regulation persist and there is a lack of enforcement. This also poses a serious threat to the biological diversity and productivity of an area, and puts at risk the livelihoods of

[96] Wallman, S. (1984). Eight London households. London, Tavistock

people engaged in potentially sustainable activities, such as fisheries, aquaculture and tourism[97].

On the other hand, income is generated from the tourism industry (considered as a non-extractive activity) as locals are employed as guides, boat assistants, cooks, etc. Nevertheless, when activities such as diving and snorkelling in the coral reefs are not well managed, direct damage is caused by tourist such as kicking, trampling or holding onto corals. Even thought it is considered that MPAs in the vicinity of a tourism destination are more likely to provide direct recreational use benefits than an isolated one, tourism activity has to be controlled in MPAs. This requires an integrated plan that is well implemented.

Thereby "alternative livelihoods" projects are just part of several projects managed by the MPA which could contribute to successful conservation.

2. People as managers

People play a very important role in the natural environment, which provides them food and shelter. Even in their phase of users, managers or simply by recreation. The marine environment has a great impact, therefore it is imperative for managers to identify the users of areas and their activities and the sectors involved in the decisions while developing and implementing marine protected areas.

Some of the sectors include: marine scientists (engaged in the development of knowledge), policy makers (legislators and managers who have the authority to regulate human conduct), local communities (local users who can contribute local knowledge, and could have a major role in determining the success on failure of MPA), non-

[97] PERSGA (Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden). 1998. Strategic Action Programme for the Red Sea and Gulf of Aden. The World Bank, Washington D. C.

governmental organizations (NGOs) and donors.[98] These groups of people also have an interest or "stake" in the area and therefore called "stakeholders"[99].

Identifying stakeholders is important since it can determinate their relationships and for instance provide the basis for valuing resources in different uses, whether the value is economic, social or cultural.

Nevertheless, the multiple users have different interests in the coastal and ocean areas and this can lead to conflicts. Conflicts among agencies and conflicts among users are often interrelated, and coalitions may pit particular users and agencies against other users and agencies[100]. Coastal managers often must intervene for resolution due to conflicts involving the preservation of ocean and coastal resources.

According to Pomero and Rivera, the use of natural resources is also susceptible to conflicts for the following reasons:

- ✓ Natural resources are embedded in an environment or interconnected space where actions of one group of individual can have effect on the other;
- ✓ Natural resources are embedded in a shared social space where complex and unequal relations are established among a wide range of social actors – fishers, fish traders, boat owners, government agencies, etc;
- ✓ Natural resources are subject to increasing scarcity due to rapid environmental change, increasing demand and their unequal distribution; and
- ✓ Natural resources are used by people in ways that are defined symbolically. Aquatic species and coral reefs are not just material resources people compete over, but are also part of a particular way of life, an ethnic identity and a set of gender and age roles. These symbolic dimensions of natural resources lend themselves to ideological, social and political struggles that have enormous

[98] Ibid
[99] Stakeholders are people, groups or organizations that use, interact with and depend on the resource, whose activities affect the resource or who have an interest or stake in these activities.
[100] Cincin-Sain, B., Knecht, R. (1998). Integrated Coastal and Ocean Management. Island Press. Washington, USA.

practical significance for their management and the process of conflict management[101].

Conflicts arising at the beginning stage of any MPA project will be different than conflicts at the implementation stage. Knowing the root causes of the conflict and the type of conflicts is important to determine the approach for its management.

Therefore, there are several tools and techniques that can help in analysing the conflicts, such as t*imelines* which show in chronological order the history of a conflict. The aim in resolving the conflict is to reach the point where the parties in a conflict can accept that the other may have valid perceptions even if they oppose each other. *Conflict mapping*[102] represents conflicts graphically by placing the parties in relation to the problem and to each other, people with different view points have the opportunity to map their situation together and they can learn about each other's experience and perceptions. A *conflict tree*[103] is an excellent tool to use with community groups as a collective to identify the issues that each member sees as important and then sort them out into three categories: core problem, causes and effects. The stem of the tree can represent the core problem, the roots the causes and the branches the effect of those causes.

What ever the conflict is, resolutions can vary depending on the socioeconomic and political context of the situation. In most cases, a neutral mediator is needed to assist coastal managers in bringing the parties together and to negotiate a solution[104]. Annex II outlines the tasks a mediator must undertake during each phase of conflict resolution.

It is important to make information available to all stakeholders to make appropriate decisions; and keep good communication strategies between all sectors involved. There

[101] Pomeroy, R. S. and R. Rivera-Guieb (2006). Fishery Co-management: A Practical Handbook, IDRC, Ottawa.
[102] *cf. supra:* DOALOS, United Nations (2007) P.148.
[103] Ibid., P.149.
[104] Susskind L., and Cruikshank J. (1987). *Breaking the impasse. Consensual Approaches to Resolving Public Disputes.* Basci Books, Inc. USA.

are different mechanisms to accomplish this. The Nature Conservancy (TNC)[105] and the World Wildlife Found (WWF) have been use strategies such as newsletters, email groups, discussion groups and regular meetings discussing these issues. Workshops and training programmes where MPA management issues are explained is also a good strategy.

a) Community participation

Community, according to Willmott (1986), means "having something in common", and this commonality is anchored in three key elements: place, interest and attachment.[106] Therefore, community participation is a crucial element that contributes enormously while designing and implementing marine protected areas, as local knowledge may be just as important as scientific knowledge, since local communities often have an in-depth understanding of their ecosystems base on generations of interaction with the resources. Several factors from the community have to be taken into account, including: culture, tradition, religion, informal institutions, formal regulations, attitudes, perceptions and beliefs; so as to understand their connection with their natural resources and the environment, and predict the effects of the MPA on the community and how they would be engage with the management.

Managers of MAPs should have a good relationship with the community and include it in the management and decision making processes; since empowering communities always works better then commanding them[107] it is important than they feel committed to comply with regulations. Involvement may include advising the public, information

[105] An example of TNC conflict resolution is the help to establish Tonga's future roundtable in a study "From conflict to conservation in Alaska's Tongass. Highlighting important issues: 1) Alaska's Tongass National Forest has been plagued by bitter conflict over timber practices there. 2) The Nature Conservancy helped establish a roundtable to bring Tongass stakeholders together. 3) The roundtable helps participants chart a sustainable future for the Tongass. Available at: TNC. http://www.nature.org/ourinitiatives/habitats/forests/explore/from-conflict-to-conservation-in-alaskas-tongass.xml.

[106] Willmott, P. (1986). Social Networks, Informal Care and Public Policy. London: *Policy Studies Institute*

[107] Coklin, C., Craw, M., and McAuley, I. (1998). Marine reserves in New Zealand: use rights, public attitudes and social impacts. *Coastal Management* 26: 213-231.

sharing, joint decision-making and shared management. In this context, community participation can compromise the conservation objectives to archive public support and develop a sense of responsibility for the operation of the MPA.

There are different types of community participation model:
Collaborative management serves to achieve mutual agreement among the majority of stakeholders. In this case, the government retains responsibility for overall decisions and their implementation, socio-economic and cultural objectives are an integral part of the management.
Community-base management: the local community or particular user groups are empowered with responsibility to manage some or all aspects of the MPA management programme. In this approach, stakeholders incorporate environmental, socio-economic and cultural considerations in decision making[108].
Public education and awareness, where people are aware of their rights and responsibilities under the management plan and that the community supports the goal of the legislation.

When a community is involved in the planning process, the agency providing planning and technical assistance to the community should continue to provide services to the community during implementation and after the MPA is established. This suggests that a co-management approach to community based MPA is preferred.[109]

Limited genuine community participation may arise to a limited success of an MPA since people do not feel they will have benefits from it or on the other had have high expectations from it. In that case, alternative employment opportunities, alternative fishing opportunities or payment for preservation of resources could be great incentives. Nevertheless, managers should take into account that for the best management and operation of an MPA, a full understanding of socio-economics in terms of people's expectations, values, behaviors and attitudes is very important.

[108] Kay, R., and Alder, J. (1999). Coastal Planning and Management. London. EF and N Spoon.
[109] Pollnac R. B., Crawford B. R., Gorospe M. L.G. (2001) Discovering factors that influence the success of community-base marine protected areas in the visayas, Philipines.

Different tools and techniques are very useful to understand the socio-economic and environmental situation of the community as seen by the people, using participatory rural approaches[110]. Some of these techniques are described in Annex III.

Even though most of these techniques could be use at the beginning of the design of the MPA management plan, it is very important to continuously monitor to achieve success in the implementation of the MPA, since socio-economic and environment aspects are changeable.

In this context, involving the community in marine environmental monitoring activities could be very significant and can lead to improved adaptive management[111] within an MPA, it also could be very significant in raising awareness of issues impacting the reserve.

A good example of the engagement of the community in monitoring is Reef Check, this is an international programme that works with communities, Governments and business to scientifically monitor, restore and maintain coral reef heath[112].

It is also important to recognize that socio-economic criteria is an aspect that has to be taken into account in detail while designing an MPA, since community support is vital to the success of the MPA. Therefore, MPAs which contribute to economic activity are easier to create and manage than those which do not. In this context, ecologically and socially sustainable ventures in tourism, fishing, biotechnology and aquaculture can generate a great income for local communities and for the management of the MPA itself,

[110]Anyaegbunam C., P. Mefalopulos, and T. Moetsabi, (2004). Participatory Rural Communication Appraisal: starting with people. Food and Agriculture Organization of the United Nations, Rome.
[111] *Adaptive management* is a process of continual learning and improvement, it incorporate research into conservation actions. In other words is a tool designed after the scientific research process which requires a measureable objective, monitoring to determine the effectiveness of the management practices in achieving the objective, evaluation to determine if the objective is being reached, and adaptation based on the results. Salafsky, N., R. Margoluis, and K. Redford (2001) Adaptive Management: A Tool for Conservation Practitioners. Biodiversity Support Program, Washington, D. C. Available at: www.worldwildlife.org/bsp.
[112] Reef Check. Conservation, Coral Reef management program. More information can be found in www.ReefCheck.org.

through mechanisms for collecting revenues from these activities such as annual rent, permit fees, visitor entrance fees.

Managers of the MPAs can also establish partnerships with national or international NGO's whose primary goal is the protection of the coastal marine ecosystems and the support of the MPAs. An example of some international NGOs engage in marine conservation is provided in Annex IV.

On the other hand, goals and objectives of the MPA have to be extremely clear while developing an MPA management plan, since they must be the guiding statement for all decision-making relating to the regulation of human activities within the MPA and the management activities related to conservation of its natural value. Therefore, it is important to mention some of the watchwords that according to Kelleher (1999) are important to follow for an effective MPA:

> Be clear about the objectives, seek local support, build partnerships, plan for financial sustainability, don't prohibit more than necessary, build for the unforeseen, put in place structures for conflict resolutions, establish self-enforcement as much as possible[113].

In this context, environmental education and public awareness play a significant role in the successful operation of the MPA, since managers need to ensure that the long-term goals are explained and that the sustainable benefits of conservation are clearly stated and understood. Therefore education and public awareness are excellent tools to involve and make people aware about the conservation of the area and will make them well informed to make decisions about the use of their resources. All stakeholders need to be involved , including planers, managers, local communities, scientific communities and politicians.

On the other hand, it is also important to note that the staff selected to manage and operate the MPA have to have the ability to manage human resources as well, and their needs must correspond with the objectives established for the MPA. Even though in

[113] Kelleher, G. (1999). Guidelines for Marine Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK, xxiv +107pp.

community based management or co-management approaches, managers have the responsibility to recruit and select staff; develop teams, individuals and themselves to enhance performance; plan allocate, monitor and evaluate work carried out by teams, individuals and themselves; create, maintain and enhance effective work relationships; and maintain a safe work environment.

b) Management for compliance

Setting and implementing policies in the MPA have a direct impact of levels of compliance with the regulations and management measures.[114] For example, an individual who believes that complying with regulation is the "right thing to do" will feel a moral obligation to comply. An individual who disagrees with the regulation or management procedures, may believe the opposite, and actually feel obligated to violate the regulation.[115] Of course there is going to be a part of the community that does not comply, due to, among others, lack of understanding of the purpose of the management initiatives, complete disagreement with them or economic motives.

For those who are not complying, regulation and enforcement is used along with other mechanisms such as awareness raising and monitoring, as mentioned in the community participation section. Ttherefore, enforcement[116] is one of many mechanisms available to managers to encourage compliance with legislative management provisions, but it is generally temporary and short term. Most of the MPAs are "paper parks" due to, i*nter alia*, a lack of enforcement on the part of management agencies[117].

[114] Olsen, S.B., et al., (2006) A Handbook on Governance and Socioeconomics of Large Marine Ecosystems. Kingston, University of Rhode Island, Coastal Resources Center. Available at: www.iwlearn.net/abt_iwlearn/pns/learning/lme-govhandbook.
[115] *cf. supra:* United Nations (2010) Ecosystem approaches to the management of ocean-related activities, Training manual. P.157.
[116] Enforcement is a management tool used to effect compliance with acts, regulations, permits, licenses, policies or plans with a legislative basis.
[117] Jameson S. C, Tupper M. H, Ridley J. M, (2002) The three screen doors: can marine protected areas be effective? *Marine Pollution Bulletin 44 1177-1183.*

Non-enforcement could be due to a lack of resources such as financial and humans. Staff may lack the expertise needed to undertake various enforcement activities, or it may be culturally difficult to act as enforcers. Hence the importance of staff selected to manage and operate the area, as outlined in the community participation section above. There may also be a lack of political support to prosecute offenders and previous efforts to prosecute may have been unsuccessful, resulting in a reluctance to undertake further enforcement activities. Of course, the most common reason is simply a poor understanding of what it actually takes to effectively enforce the various "rules" prescribed by law and policy[118].

Therefore, effective compliance could be to integrate enforcement communications strategies aimed at pointing out to those who infringe the rules as to what the consequences of their actions are, and most importantly why the rules were established.

In this regard, studies on stakeholder participation in environmental and resources management indicate that compliance is greater and far less costly when users are meaningfully involved in the development and implementation of a compliance programme and they are aware of the rules. It can also reduce the cost of regulation by encouraging voluntary compliance, and establish the supportive constituency to further ecosystem governance measures[119].

Compliance has been used as one of several success measures in an empirical analysis of five community-based marine protected areas in the Philippines[120]. Compliance was correlated with a number of variables that included context factors such as a smaller village population size, a perceived crisis in fishery resource abundance, higher levels of democratic decision making, and dependence on fishing. Compliance was also related to a number of project variables such as the ability to obtain continuing advice from an

[118] Kay R, Alder J, (1999) Coastal planning and management. *London, New York: E & FN Spon*
[119] Viteri, C. and C. Chávez, (2007) "Legitimacy, Local Participation, and Compliance in the Galápagos Marine Reserve", *Ocean & Coastal Management* 50, pp. 253-274.
[120] Pollnac, R. B., B. R. Crawford, and M. Gorospe (2001) Discovering factors influencing the success of community-based marine protected areas in the Visayas, Philippines. *Ocean and Coastal Management 44:683–710*.

external facilitating organization, successful alternative livelihood projects, formation of a core planning group, the amount of training received, and visits from Government officials[121].

Important results of a study of Compliance and Enforcement of Community-Based Coastal Resource Management Regulations in North Sulawesi, Indonesia are as follows:

> • Community-based enforcement can be effective for intracommunity compliance of rules. While probability of detection is an important factor in community-based management, community members must feel that the illegal behavior is morally wrong so they are willing to report violations of fellow community neighbors. In this regard, public education programs and participatory planning to develop community consensus on rules are needed.
> • Community-based enforcement will be less able to address noncompliance by fishers from neighboring villages. However, semiformal village-to-village interactions through the village heads can be an effective strategy to address noncompliance by outside fishers.
> • Where illegal fishers are not from the community and where village-to-village mediation fails, involvement by more centralized and formal enforcement institutions (e.g., police) is needed.
> • Community-based enforcement will only provide adequate compliance levels within a limited range of approximately 2 km from a village settlement area. Therefore, enforcement beyond this range must be undertaken by other means and must be the responsibility of more centralized enforcement institutions such as the police[122].

[121] Ibid.
[122] Crawford Brian R., Siahainenia A., Rotinsulu C., Sukmara A. (2004) Compliance and Enforcement of Community-Based Coastal Resource Management Regulations in North Sulawesi, Indonesia. *Coastal Management, 32:39–50.*

c) Legislation of MPA's

With regards to law and regulations for the implementation and management of MAPs, a World Bank study showed that communities perceive national laws, which have been adopted locally, as more acceptable that either indigenous ("bottom up") or national legislation ("top down")[123].

National law should provide either a detailed framework of administrative matters or only the broad basis for a management regime. The law should protect management from unreasonable local pressures by including a sufficiently detailed statement specifying clear objectives and a process for achieving them. The simpler the national rules are, the most likely it is that they will be followed at the local level. Therefore, legislation and regulation should be clear and concise with simple descriptions of prohibited activities or types of activities in order to facilitate control and enforcement; and should also include arrest and detention for more serious violations, when appropriate[124].

According to the U. N. manual on the development, implementation and management of marine protected areas, national legislation of MPA's should be structure around the following headings:

- ✓ Use of terms;
- ✓ Management and zoning plans;
- ✓ Public participation;
- ✓ Preliminary research and survey;
- ✓ Research, monitoring and review;
- ✓ Compensation;
- ✓ Financial arrangements;
- ✓ Regulations;
- ✓ Enforcement, incentives and penalties; and
- ✓ Education and public awareness.

[123] The World Bank research. www.worldbank.org
[124] *cf. supra:* United Nations (2010) Ecosystem approaches to the management of ocean-related activities, Training manual. P.197.

Even though national legislation has to take into account international perspectives, there is no instrument at this level that specifies how the parties should organize the distribution of powers among their respective national entities when setting up and managing MPAs. Therefore, coordination should exist between the different institutions that have jurisdiction in the MPA and this mechanism needs to be effective, in particular between the fishery department and the ministry of environment. Furthermore, the mechanism must be clearly recognized by the communities (users of the MPAs).

In this context, legislation should provide for coordination of planning and management by all relevant agencies with statutory responsibilities affecting the MPA, whether the responsibilities apply within the MPA or outside, with the aim of firmly anchoring the MPA in broader context of coastal planning.

It is also important to highlight that legislation should include provisions to control activities that occur outside the MPA which may potentially affect the natural resources within the MPA. In this respect, all organisms involved in the jurisdiction of the MPA have to participate in the development of the objectives of the MPA. When jurisdictional boundaries occur between States, there needs to be a collaborative and interactive approach between the Governments or agencies with adjacent jurisdictions.

With respect to monitoring ecological processes, habitats and human activities, the legislations should specify the continuity of this so as to update applicable regulations and management plans, and must ensure that the information is well distributed to all users so that they have access to data defining restrictions and restricted areas. Encouraging voluntary compliance with rules is important rather than enforcement so the community supports the rules and self-manages itself, particularly at sea where sometimes monitoring and control is harder than on land[125].

[125] Secretariat of the Convention on Biological Diversity (2004) Technical Advice on the Establishment and Management of a National System of Marine and Coastal Protected Areas, SCBD, 40 pages (*CBD Technical Series no. 13*).

Nevertheless, there are always users that do not follow the rules and enforcement has to be managed as an integral part of management. In that case, involving the community in the enforcement process in crucial by training them with specific information on how to warn/educate first time offenders, and acting as a voluntary wardens.

In this context, enforcement activities must be clearly assigned, there has to be a good cooperation and coordination between the enforcement bodies, mostly on transboundary MPAs when authorities from different countries have to act and the authorities must have the necessary resources to undertake the tasks, such as financial resources, equipment, awareness raising and training. Most importantly, well trained human resources who are able to operate in an appropriate manner to maximize the compliance and the community support.

In this regard, managers of MPAs should concentrate on gaining support from members of the community with an open-mind about MPAs rather than trying to convince those that are stringently opposed to MPAs.

In the context of licensing procedures, these need to be effective, transparent and centrally administered for all activities allowing the coordination of management and flexible enough to implement management decisions.

Definitively legislation and management plans are only successful if planning is carried out systematically using a holistic, interdisciplinary approaches and supported by most of the users and neighbours of MPAs.

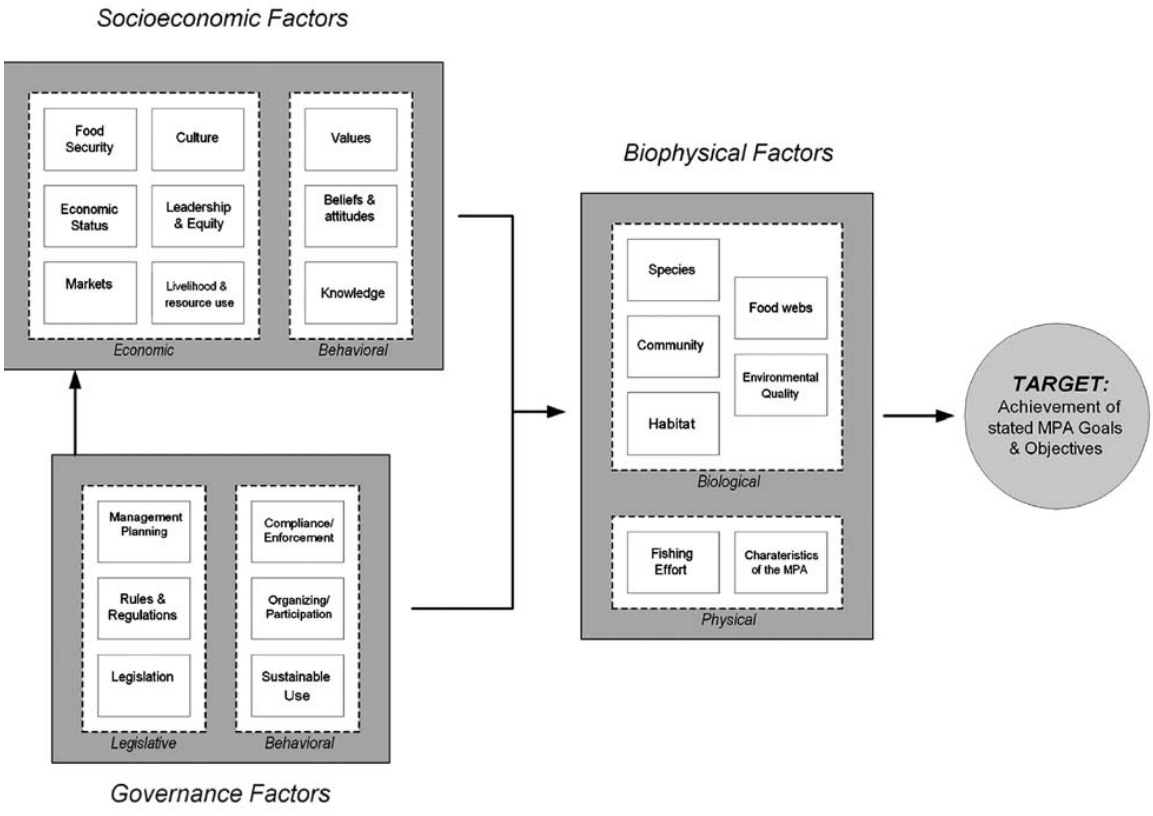
d) Evaluation of the management of MPAs

Evaluation of MPAs should not consist only of the evaluation that managers can obtain from their technical support staff members, as MPAs are often challenged in their ability to achieve their objectives due to small management staff size, insufficient financial, logistical, and technical support, lack of scientific information, and insufficient

institutional, decision-making, and political support. Such factors are known to inhibit the ability of MPAs to fully achieve their objectives and provide for informed management decision-making[126].

Therefore, implementing a management evaluation process is needed so as to know how effective the management plan has been, to know the achievement of stated of MPA goals and objectives, by analyzing indicators such as, socio-economic, biophysical and governance. The following table outlines factors that could be analyzed from each indicator.

Figure 3. Conceptual framework of the operating conditions within and around marine protected areas[127].



[126] Kelleher G., Bleakley C., Wells S. (1995) A global representative system of marine protected areas, vol. I–IV. Gland, Switzerland and Cambridge, UK: The Great Barrier Reef Authority, The World Bank and the World Conservation Union, IUCN. Sited on Pomeroy (2005).

[127] Pomeroy, R., J. Parks and L. Watson (2005) How is your MPA doing? A methodology for evaluating the management effectiveness of Marine Protected Area. *Ocean & Coastal Management 48: 485–502.*

It is important to note that in the evaluation process a planning process is required so as to provide a record and structure to follow during the evaluation. When results are obtained, an adaptive management strategy could be developed as to identify ways to adapt management practices to improve MPA management efforts. Communicating the results from the evaluation is also very important as the stakeholders can contribute to the management efforts.

However, there are different types of methodologies to evaluate the management effectiveness of MPAs, as different situations and needs of MPAs required different methods of evaluation[128]. Annex V outlines different methodologies to evaluate MPA management effectiveness. But the most important thing is to keep evaluating the MPA regularly as MPAs are continuously changing.

As discussed above, MPAs are a key tool for managing human activities in sensitive areas, particularly following international and legal instruments and the efforts of regional agreements and protocols focused on the conservation of the marine environment. Furthermore, features that could lead to the success of MPAs were described, including: community involvement, compliance, policy, management tools and evaluation. As noted by UNEP,[129] features that could fulfill the necessities of for greater community empowerment and involvement, sustained and extensive consultation between stakeholders proactive and innovative education and public awareness, development of management plans based on ecological and well as socio-economic data, regular monitoring programmes, implementation of clearly defined zoning regulation to reduce conflict between stakeholders and enhanced enforcement efforts as to reduce threats to coral reefs.

[128] Leverington F., Hockings M., Pavese H., Lemos Costa K., and Courrau J. (2008) Management efectiveness evaluation in protected areas – A global study. Supplementary report No.1: overview of approaches and metodologies. The University of Queensland, Gatton, TNC, WWF, IUCN-WCPA, Autralia. p.188.

[129] *cf. supra:* UNEP (2004) People and reefs: successes and challenges in the management of coral reef marine protected areas. UNEP Regional Seas Reports and Studies No. 176. UNEP 2004. P.7.

Chapter III of the present research will lead the information described above to the regional level (the MBRS) and those features described above will be illustrated in a table so as to provide an overview of the criteria for the sustainable management of MPAs within the MBRS.

III. Regional and National implementation of Marine Protected Areas within the context of ocean policy (the Caribbean perspective)

All conservation efforts are the result in which positive factors have been combined. The emerging concept of the Biosphere Reserve, with the creation of, UNESCO's Man and Biosphere (MAB) programme was an important factor at the beginning of the Seventies. This concept gave a new impulse to the establishment of protected areas with scientific criteria (biological) and a social vision of the conservation of the ecosystems and the establishment of a world-wide network of reserves[130]. This triggered regional processes of great importance as it is the case of the Latin American Network of Technical Cooperation in National Parks, other protected areas, wildlife flora and fauna created in 1987, that allowed sharing experiences to generate strategies and to unify policies of conservation in the region[131].

The continuity of the efforts on the administration and management of natural protected areas was lacking and unequal in the region until the Earth Summit in Rio de Janeiro in 1992 appears[132]. The Earth Summit meant a great impulse in the fortification of the national policies natural areas protected in the region in the region and the formal incorporation of the conservation of the biodiversity. Many countries formed Ministries of Environment, reinforced the normative frame and developed a programmatic platform[133].

With respect to conservation, the Convention of Biological Diversity incorporates conservation within its objectives and stipulates the obligation of the countries to

[130] Brabin, Howard; Hadley Malcom (1989) Man and the Biosphere (MAB) Programme: biennial report, 1987-1988. P.10
[131] Ibid., 61.
[132] *cf. supra:* United Nations (1992) Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992
[133] Ibid.

elaborate Strategy of Country and the Study of Country[134]. This lead to a greater attention in the administration and the management of protected areas and the establishment of new areas under protection, the creation of an *ad hoc* legislation in the majority of the countries and the establishment of national systems of protected areas[135].

The complexity of political relations within the Caribbean region is such that regional governance appears to be more challenging there than in most other regions. Even thought there are many organizations at the regional and sub-regional levels already engaged in many aspects of marine resources management, they appear to work sometimes in collaboration, sometimes in competition and sometimes in complete isolation[136].

Therefore, unsustainable exploitation of living resources, habitat degradation and destruction, and pollution of the marine environment are interlinked, not only because of their synergistic impacts on living marine resources, but also because they often have underlying socioeconomic, legal and political root causes. Weak governance, for instance, inappropriate national and regional arrangements, low political will, lack of supporting legislation, inadequate enforcement; are defined as major factors in all sub-regions at the regional level[137]. Communication at all levels and the sharing of information is also necessary to fill the gaps in conservation efforts. However, where information exists, it is often not easily or readily accessible or available for region-wide decision-making[138].

In this regard, the Caribbean marine environment has been a concern to several agencies[139]. In recent years, there have been systematic attempts to conduct region-wide reviews of the status of marine ecosystems and the impacts of human use upon them[140].

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[134] *Cf. supra:* United Nations (1992) Convention on Biological Diversity, P.6.
[135] Ibid.
[136] Fanning L, Mahon R, McConney P, (2009) Focusing on Living Marine Resource Governance: The Caribbean Large Marine Ecosystem and Adjacent Areas Project. *Coastal Management*, 37:219–234.
[137] Ibid., 226.
[138] Ibid.
[139] List of some agency efforts: The Global International Waters Assessment (GIWA) (UNEP, 2004a, 2004b, 2006); The Caribbean Sea (CARSEA) Subassessment of the Millennium Ecosystem Assessment

Chapter II, section 2 of the present thesis, presents information on the Wider Caribbean Region (WCR), and in additions to this, it is important to note that the WCR is also divided in four large Marine Ecosystems (LME) which are: the Gulf of Mexico LME, the Southeast U.S. Continental Shelf LME, the Caribbean Sea LME and the North Brazil Shelf LME[141].

With regards of the Caribbean Sea LME, a project was approved in 2008 by the Global Environmental Facility (GEF) for the "Caribbean Sea LME and Adjacent Area" (CLME Project)[142]. The CLME Project Area region includes 26 countries and 19 dependent territories of the USA, UK, France and the Netherlands. Within the 26 countries, Mexico, Belize, Guatemala and Honduras are included. The project goal is the sustainable management of the shared living marine resources of the Caribbean LME and adjacent areas through an integrated management approach that will meet World Summit on Sustainable Development targets regarding fisheries, particularly those pertaining to restoration of stocks to levels that can produce maximum sustainable yield by 2015 and introducing an ecosystem-based approach to the assessment and management of marine resources by 2010[143].

The Caribbean Sea and adjacent regions include a wide variety of tropical ecosystems, as detailed in the introduction above. The area encompasses a large proportion of the world's coral reef resources, including the second longest barrier reef in the world: the Mesoamerican Barrier Reef System (MBRS).

(Agard et al., 2007); Caribbean Coastal Marine Productivity Program (CARICOMP) (Linton and Fisher, 2004); Atlantic and Gulf Rapid Reef Assessment (AGRRA) program (Lang et al., 2003); The preliminary Transboundary Diagnostic Assessment (TDA) of the CLME and Adjacent Areas Project (Heileman, 2007; Martinez, 2007; Phillips, 2007; CLME 2007b); The Working Groups of the Western Central Atlantic Fisheries Commission (WECAFC); the Reefs at Risk assessment of the World Resources Institute (Burke and Maidens, 2004); the Ecoregional Planning Initiative of The Nature Conservancy (Huggins et al., 2007).

[140] *Cf. supra:* Fanning L., Mahon R., McConney P. (2009) P.225.

[141] Ibid., 220.

[142] The Faculty of Pure and Applied Sciences, Center for Resource Management and Environmental Studies (2008) Caribbean Large Marine Ecosystem (CLME) Project. Available at: http://www.cavehill.uwi.edu/cermes/clme_eng.html.

[143] Ibid.

Chapter III will focus on the regional and national implementation of marine protected areas, emphasizing that for the purpose of this study, regional, is considered as the Mesoamerican Barrier Reef System region, specifically four countries: Mexico, Belize, Guatemala and Honduras; and national, at the Mexican level, is considered as the Mexican Caribbean region, specifically the State of Quintana Roo.

Section A and B of this chapter describes the regional and national frameworks of the implementation of marine protected areas in the Mesoamerican Barrier Reef System. So as to know how Government agreements at the regional level and institutional and legal instruments work for the management of marine protected areas. A case study is presented from each country, specifically those located on the border, due to the trans-boundary relations between countries.

A. Regional and National Framework, Mesoamerican Barrier Reef System approach

In the MBRS, as well as in the whole Caribbean region, the planktonic larval dispersal of reef organisms including commercially important species such as conch, lobster and small coastal pelagic, is very common. This larval dispersal may last many weeks (conch) or many months (lobster) and may result in transport across EEZ boundaries[144]. The early stage of these larval organisms has been impacted by habitat destruction and pollution as well as overfishing, hence, the importance of improving knowledge and the cooperation and coordination in the implementation and management of MPAs and the legal and policy instruments between the countries of this Region.

The Mesoamerica (Mexico, Belize, Guatemala, Honduras and El Salvador) in the cosmology of the Mayan culture was centered on the relation between society and nature. It used the natural space for the satisfaction of its needs, without destructing it; that is to say, what today we described as sustainable. The practices are well documented,

[144] FAO (1999) Report of the Ninth Session of the Western Central Atlantic Fishery Commission and of the Sixth Session of the Committee for the Development of management of Fisheries in the Lesser Antilles. FAO Fisheries Report No. 612.

including the use of the regeneration of the vegetation, the handling of useful species of the forest and the handling of fauna in bordered spaces, among others these approaches allowed for productive systems to be compatible with environmental conservation.

1. Instruments for the management of MPAs: governance agreements

Concerns over the protection and conservation of the marine environment have led to the creation or decree of many marine protected areas in the Caribbean region, which vary widely in their effectiveness[145]. With regard to this, UNEP-CEP through its Regional Coordinated Unit (RCU) has dedicated important efforts to create and coordinate the Caribbean Marine Protected Areas Network (CaMPAM) which serves as a forum for the exchange of information and dissemination of best practices within the Caribbean MPA community[146]. UNEP-CEP RCU has also played an important role in establishing key conventions, protocols and action plans that are specific to the WCR; as was outlined in the Regional Frameworks (Chapter 1) above.

The Caribbean Sea Commission (CSC) established in 2006 under the Association of Caribbean States (ACS). The ACS is the organization for consultation, cooperation and concerted action in trade, transport, sustainable tourism and natural disasters in the Greater Caribbean[147].

CSC is an initiative that augers well for regional environmental governance. It is tasked with promoting and achieving the preservation and sustainable use of the Caribbean Sea,

[145] Apeldoom, R. S., and Linderman C. K. (2003) A Caribbean-wide survey of no-take marine reserves: Spatial coverage and attributes of effectiveness. Gulf and Caribbean Research 14(2):139-154.
[146] CaMPAM, Network and Forum. Available at: http://campam.gcfi.org/campam.php
[147] The member States of the ACS are: Antigua & Barbuda, The Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Mexico, Jamaica, Nicaragua, Panama, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Suriname, Trinidad & Tobago and Venezuela. Its Associate Members are Aruba, France on behalf of French Guiana, Guadeloupe, and Martinique, and the Netherlands Antilles. Association of Caribbean States (2007) Caribbean Sea Commission. Available at: http://www.acs-aec.org

through the formulation of guidelines for coastal and marine management[148]. This initiative is still in its early stages and requires substantial political will, institutional development and maturity. If successful, it could marry regional and international legal, scientific and governance resources needed to adequately protect and preserve the marine environment. It is submitted that many of the tasks of the regional agency for the Caribbean Region outlined in the preceding section may be carried out by the CSC. It is posible that its cause is strengthened by the existence of growing international, regional and domestic sensitivity towards the protection of the environment[149].

Furthermore, several intergovernmental organizations have been operating to address living marine resources governance through their various subsidiary bodies. An example of this is the Caribbean Community (CARICOM) and the Sistema de la Integracion Centroamericana (SICA). However it has often been said that those institutions overlap and have competing mandates and memberships that lead to inefficiency and ineffectiveness[150].

These issues have been discussed in many fora and point to a clear need for a coordinated regional effort on shared resources[151]. For instance, UNCLOS, the UN Fish Stock Agreement, The FAO Compliance Agreement and the FAO Cod of Conduct for Responsible Fisheries. National – level implications have been explored by Caribbean countries, and include:

> The need for capacity building at the national level to take part in the international and regional level management of shared resources; and
> The need for strengthening and expanding regional institutions to undertake this function[152].

[148] Francis Anselm (2006) The World Today. The Caribbean Sea Initiative. Senior Lecturer, The UWI Graduate Institute of International Relations, The University of the West Indies, St Augustine Campus. Available at: http://sta.uwi.edu/iir/news/theworldtoday/Article43.pdf.
[149] Scobie Michelle (2010) Protecting the Caribbean Sea: International Environmental Law and Governance Challenges for Caribbean SIDS. PhD, LLB, LEC, Dipl. Int. Rel (Hons) P.17.
[150] Chakalall, B., R. Mahon, P. McConney, L. Nurse, and D. Oderson (2007) Governance of Fisheries and other living marine resources in the Wider Caribbean. *Fisheries Research* 87:92–99.
[151] Haughton, M., R. Mahon, P. McConney, G. A. Kong, and A. Mills. 2004. Establishment of the Caribbean Regional Fisheries Mechanism. *Marine Policy* 28:351–359.
[152] *cf. supra:* Fanning L., Mahon R., McConney P. (2009) P. 223.

Regionally, declarations have been made, such as the Campeche Declaration on Mesoamerican Strategy of Sustainable Environment (EMSA) (Campeche, Mexico) in 2008; with Ministers from Belize, Costa Rica, El Salvador, Guatemala, Honduras, México, Nicaragua and Panamá[153].

The EMSA tries to serve as a foundation for a structured and flexible scheme of cooperation that props up a participating strategy of sustainable development of the Mesoamerican region, able to be translated in an improvement in the conditions of life of their inhabitants. In addition, the EMSA rescues and looks to give continuity to important regional experiences of cooperation in environmental matters, such as the Mesoamerican Biological Corridor (English acronym MBC; Spanish: Corredor Biológico Mesoamericano, CBM) and the Mesoamerican Barrier Reef System (English acronym MBRS; Spanish: Sistema Arrecifal Mesoamericano SAM). Also, it picks-up the experience of cooperation in environmental subjects obtained by the Central American nations through the Central American Commission of Environment and Development (CCAD)[154].

With regards of the MBRS region, several organizations and foundations have put their energies together for the conservation of this area. One of these is the Mesoamerican Reef Found (MAR Fund), created in 2004 to protect the region's reefs from threats such as land contamination and over-exploitation of living resources. It was established as a long-term financial mechanism to provide support to activities such as protection and management of natural resources in a network of coastal and marine protected areas of high biodiversity[155].

[153] Declaracion de Campeche sobre la Estrategia Mesoamericana de Sustentabilidad Ambiental (2008) firmada el 10 de Junio de 2008 en la ciudad de Campeche, Campeche, Mexico.
[154] Secretaría de Medio Ambiente y Recursos Naturales Unidad Coordinadora de Asuntos Internacionales (2008) Estrategia Mesoamericana de Sustentabilidad Ambiental. Tlalpan, México D.F. P.9.
[155] Lopez-Galvez I. C. (2007) Prioritization of Coastal and Marine Protected Areas in the Mesoamerican Reef Region. The summit foundation. The Ocean Fundation. MAR fund. Pp.94.

The MAR Fund operates as a participatory, privately managed fund with a Board of Directors comprised of regional funders, experts, the CCAD, the in-country funds from each of the Mesoamerican Reef countries [156] and international donors.

The World Wildlife Fund (WWF), started to operated in Central America in 1986, from then, it has dedicated efforts to the protection and conservation of the ecosystems in this area. Currently, WWF is putting its efforts in the conservation of the MBRS[157].

The Nature Conservancy (TNC), considered as the leading conservation organization around the world to protect ecologically important lands and waters for nature and people, has been working in the Caribbean and also in Mexico since 1988. It has focused on working with communities, creating management plans for protected areas, controlling the spread of invasive species and helping manage uncontrolled fires[158].

a) Institutional and management frameworks

As described above, the political framework for marine protected areas includes principles at the international and regional levels. At the international level, the Jakarta Mandate (Convention on Biological Diversity) recognizes the critical necessity to manage the conservation and sustainable use of the marine and coastal biological diversity[159]. At the regional level, the Convention of Cartagena declares that,

> Each Party shall, when necessary, establish protected areas in areas over which it exercises sovereignty, or sovereign rights or jurisdiction, with a view to sustaining the natural resources of the Wider Caribbean Region, and encouraging ecologically sound and appropriate use, understanding and

[156] Protected Area Conservation Trust (Belize), Fundación para la Conservación de los Recursos Naturales y Ambiente en Guatemala (FCG), Fundación Biósfera (Honduras), and Fondo Mexicano para la Conservación de la Naturaleza (Mexico). MAR Fund. Mesoamerican Reef Found prospectus. Available at: http://www.marfund.
[157] WWF Building a future in which people thrive. Available at: http://central-america.panda.org/about.
[158] The Nature Conservancy (2011) Available at: http://www.nature.org/ourinitiatives/regions/northamerica/mexico/index.htm.
[159] *cf. supra:* United Nations (1992) Convention on Biological Diversity, P.6.

> enjoyment of these areas, in accordance with the objectives and characteristics of each of them[160].

With regards to the MBRS region, not all the countries that have a homogeneous institutional agreement with respect to the Governmental agencies in charge of the management of MPAs, however all of them have an organized administration[161]. As a comparative analysis, it is important to highlight that all of them have a Ministry of Natural Resources and Environment (an agency of the public administration structure of each Government) most of them sharing a mission focused on the protection, restoration and conservation of the ecosystems, natural resources and environmental goods and services, looking forward towards a sustainable development.

Nevertheless, not in all cases are the MAPs attached to this ministry. The mandate for the management of MPAs in most of the MBRS countries lie in sub-secretaries or decentralized agencies specifically in charge of protected areas. For example, Guatemala and Mexico. In some cases, the management of the MPAs is part of a project of a Fisheries Department or Forest Department, such as is the case of Belize and Honduras.

Comparative description of each country

Belize. Belize has 115 protected areas, statutory and private, covering a total of 34% of the national territory. This compares with 13% in the marine zone[162]. Protected areas are currently the responsibility of the Forest Department, Fisheries Department and National Institute of Culture and History (NICH), each operating under a different Ministry[163]. MPAs are managed by the Ministry of Agriculture and Fisheries, within the Fisheries

[160] *cf. supra:* Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (1990) Adopted in Kingston, Jamaica by the member governments of the Caribbean Environment Programme on 18 January 1990. P.4.
[161] De la Maza Elvira J., Cadena Gonzalez R., Pigueron Ruiz C. (2003) Estado Actual de las Áreas Naturales Protegidas de América Latina y el Caribe (Versión Preliminar). Programa de las Naciones Unidas para el Medio Ambiente, Oficina Regional para America Latina y el Caribe. *Quercus Consultoria Ecologica S. C.* P.42.
[162] Ministry of Natural Resources and the Environment (2005) The Belize National Protected Areas System Plan. Task force on Belize's Protected Areas Policy and System Plan. P.29.
[163] Ibid P.40.

Department in a project called Ecosystem Management Unit (EMU) which consist of "management of the marine reserves, marine environmental assessments, CITES marine related matters and regional fisheries policy formulation." [164]. Management priorities and management effectiveness differ across the three bodies and the need for close coordination has been long recognized but remains deficient.

Guatemala. National Council of Protected Areas (Spanish: Consejo Nacional de Areas Protegidas CONAP) is a Governmental institution responsible for the administration of the protected areas. As an institution related directly to the Presidency of the Republic it is also vulnerable to the political processes. CONAP administers the Guatemalan System of Protected areas (SIGAP). SIGAP is in charge of 219 protected areas, covering 40% of the national territory[165]. CONAP has jurisdiction in all the national territory, its marine coasts and their airspace. It has functional autonomy and its budget comes from an annual allocation of the State and of donations by friendly countries, international organisms and organizations[166].

Honduras. The National Institute of Conservation and Forest Development, Protected Areas and Wildlife (Spanish: Instituto Nacional de Conservación y Desarrollo Forestal, Areas Protegidas y Vida Silvestre, ICF) is a decentralized entity, relying directly on the Presidency of the Republic, which acts with technical, administrative and financial independence as an executor of the national policy of conservation and forest development, protected areas and wildlife. It has the faculty to develop programs, projects, plans and to create administrative, technical and operative units necessary to fulfill the objectives and aims of the law[167]. Honduras has 107 protected areas, but just 57 are legally constituted, covering 17% of the national territory. The information related to protected areas (data base, surface, etc.) lies on the National Protected Areas System of Honduras (Spanish: Sistema Nacional de Areas Protegidas de Honduras, SINAPH).

[164] Ministry of Agriculture and Fisheries. Belize. Available at: http://www.agriculture.gov.bz.
[165] Sistema Guatemalteco de Areas Protegidas (SIGAP) (2010). Available at: http://www.conap.gob.gt/biodiversidad/sigap.
[166] Consejo Nacional de Areas Protegidas (CONAP) (2010). Guatemala. Available at: http://www.conap.gob.gt.
[167] Instituto Nacional de Conservación y Desarrollo Forestal, Areas Protegidas y Vida Silvestre (ICF) (2011). Honduras. Available at: http://www.icf.gob.hn.

Mexico. The National Commission of Natural Protected Areas (Spanish: Comisión Nacional de Áreas Naturales Protegidas, CONANP) is a decentralized agency of the Ministry of Environment and Natural Resources (Spanish: Secretaria de Medio Ambiente y Recursos Naturales, SEMARNAT). It is responsible for the management and operation of 174 Federal[168] Natural Protected Areas (NPAs) which represents 12% of the whole Mexican territory[169]. CONANP has a central administration and is divided into nine regions distributed throughout the country. The State of Quintana Roo is part of the Yucatan Peninsula and the Mexican Caribbean Region, which manages 12 MPAs. These regions represent different ecosystems and natural capital, which have not been largely affected by human activities[170].

b) Legal Instruments

The regulatory framework that governs to the protected areas in the region defers much between countries. Nevertheless, common tendencies exist that they respond largely to the international context arisen first from the conference from Stockholm on Environment and Human Development (1972), and later of the Earth Summit on Environment and Development (1992).

The Constitutions of all the States have been reformed, adding new language regarding the State and the society as a whole to protect the environment; to the right to an appropriate environment and guarantees the exercise that right; and the explicit reference to the promotion of sustainable development[171].

[168] In the context of Mexico it must be noted that there are Federal protected areas and there are also protected areas manage at the State level called "State Protected Areas".
[169] Comision Nacional de Areas Protegidas (2011). Mexico. Available at: http://www.conanp.gob.mx.
[170] Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT) (2011) Brochure. Mexico. Available at: http://www.semarnat.gob.mx.
[171] Constitucion politica de los Estados Unidos Mexicanos (1917) Ultima reforma publicada en el Diario Oficial de la Federacion DOF 17-09-2011. Camara de Diputados del H Congreso de la Union. Constitucion Politica de la Republica de Guatemala (1985) Aplicada en fallos de la Corte de Constitucionalidad 2002. Diputados del la Asamblea nacional consttituyente. Constitucion Politica de la Republica de Honduras (1982) Actualizada hasta el Decreto 36 del 4 de Mayo del 2005. Constitution of Belize (1981) last updated 2011

Nevertheless, the only Constitution that specifically refers to protected areas is that of Guatemala:

> Natural Patrimony. One declares of national interest the conservation, protection and improvement of the natural patrimony of the Nation. The State will foment the natural creation of national parks, reserves and refuges, which are inalienable[172].

This constitutional framework is the legal foundation to promulgate General Acts frameworks or Acts that define the national environmental policy and instruments for their application. In many cases, they regulate the protection of certain natural resources and an ample range of environmental issues. Practically all regulates in some form the biodiversity.

Table 5, Regulatory Acts

Name	Year	General Acts regarding the Environment
Belize	1990	Environmental Protection Act. Last update 2000
Guatemala	1986	Act for the protection and improvement of the environment
Honduras	1996	General Act of Environment
Mexico	1988	General Act of Ecological Equilibrium and Environmental Protection (1988), last update 2007, and the Act of Fishing (1992), last update 2001.

As far as the regulation for the protection and use of flora and fauna and the natural ecosystems, there exists a diversity of texts, a different nature elaborated within different sectors. Initially they were regulated through the Forest Acts, although the emphasis in these was on rules for the exploitation of the forest resources, mainly timber with few provisions on wildlife. The dispositions on the protection of fauna were tied to hunting regulations. However, in spite of these lacunas and obstacles, these gave rise to the legal framework for forest reserves and national parks[173].

[172] Constitucion Politica de la Republica de Guatemala (1985) Aplicada en fallos de la Corte de Constitucionalidad 2002. Diputados del la Asamblea nacional consttituyente. Seccion Segunda, cultura. Article 64 P.56.
[173] *cf supra:* De la Maza Elvira J., Cadena Gonzalez R., Pigueron Ruiz C. (2003) P.97.

From 1972, the legal dispositions on the protection of wildlife and its ecosystems that were dispersed in different Forest Acts and hunting regulations started to came together. Firstly, in Acts specifically related to wildlife and natural protected areas, and then later in conjunction with the Cartagena Protocol various Acts related to biodiversity were elaborated[174].

Table 6, Acts related to the protection of biodiversity

Name	Act	Year
Belize	National Parks System Act CAP 215 Forest Act CAP 213 Fisheries Act CAP 210	2000 2000 2000
Guatemala	Protected Areas Act	1986
Honduras	Act of Forest, Protected Areas and Wildlife	2007
Mexico	General Act of Wildlife Fisheries Act	2000 1992

As can be seen in the table above, only has an Act specifically dedicated to protected areas[175]. On its side, Belize has several Acts for the declaration and establishment of protected areas: the National Parks System Act, the Forest Act, and Fisheries Act[176]. Honduras has an Act in a wider context including the forest, protected areas and wild life[177]. And Mexico, in its General Act of Wildlife[178], emphasizes regulation in a general context, outside and inside protected areas.

The Acts of Wildlife intend to promote simultaneously the conservation and sustainable exploitation of natural resources, but they are not limited to the protected natural areas.

[174] Ibid
[175] Guatemala. Congreso de la Republica (1989) Ley de Areas Protegidas. Decreto numero 4-89.
[176] *cf. supra:* Ministry of Natural Resources and the Environment (2005) The Belize National Protected Areas System Plan.Ibid P.17.
[177] Honduras. Congreso Nacional de la Republica (2007) Ley Forestal, Areas Protegidas y Vida Silvestre. Decreto numero 156-2007.
[178] Mexico. Secretaria de Medio Ambiente y Recursos Naturales (2000) Ley General de Vida Silvestre. Nueva Ley publicada en el Diario Oficial de la Federacion el 3 de Julio de 2000. Ultima reforma publicada en el DOF 7 de Julio del 2011. Mexico: Camara de Diputados, 2011.

With regard to the protection of the marine environment, the regulation is very poor and it is mostly focused on the contamination of waters and fishing.

In all the countries, the exploitation of the natural resources and the execution of productive projects in the protected areas require of authorizations that are regulated with legal instruments of different nature, according to the case, emitted by the competent authorities.

The legal regulations are very varied, of different hierarchy and belonging to different sectors according to the country. The authorizations are established in laws, regulations, decrees of the protected area, master plans or management programs, licenses, resolution of environmental impact, among others. Some are granted by the authorities directly responsible for the protected areas systems, others by different authorities of the same sector or other sectors, or some even require the involvement at Ministerial level[179].

As illustrated in the table above, the four countries have adopted laws rather than regulations. The provisions related to protected areas are mentioned in different types of Acts: forest, fishing, hunting, protected areas, wildlife, etc. In general, these Acts refer to regulations.

With regards to the decree of a protected area, all countries use an Executive order which is published in the Official Journal of the Federation.

According to the manual on planning and design of management plans for MPAs[180], the four countries described in a workshop the process to decree a protected area.

[179] *cf supra:* De la Maza Elvira J., Cadena Gonzalez R., Pigueron Ruiz C. (2003) P.99.
[180] Documento Tecnico del SAM No. 7 (2003) Manual de capacitacion para el diseno y la elaboracion de planes de manejo para areas marinas protegidas. Proyecto para el Sistema Arrecifal Mesoamericano SAM. Ciudad Belice, Belice P.30-31.

Belize. The Government or an NGO prepares and submits a document explaining the reasons for the establishment of a protected area. Then, the necessary scientific research is developed and a proposal is submitted to the Ministry of Environment or Fishing. It continues with a consultation process and a directive committee is created. Finally the House of Representatives approves the proposal.

Guatemala. The process begins with a request submitted to CONAP to initiate the study and analysis process. This technical study determines the level of importance. A law proposal is written including the zoning of the area which is submitted to the National Congress. Parallel to this, an official announcement begins for the co-management. Finally, the decreed law declares who will be in charge of the management and the administration of the area. The first actions of the management can begin before the final approval.

Honduras. The initiative can come from an NGO, community, municipality, Ministry of Environment, and the legislators can propose and even approve the proposal. Furthermore, a request is submitted to the National Institute of Conservation and Forest Development, Protected Areas and Wildlife. Then the necessary studies biological, technical, physical and social are carried out. A pre-proposal of the law is written which is submitted to the Ministry of Environment in order to establish the management category. Finally, the proposal is reviewed by other institutions such as the Ministry of Agriculture and the Attorney General.

Mexico. The process begins with a justified proposal submitted to the National Commission of Protected Areas, who in turn sends the document to the Institute of Ecology. Subsequently the Consultative Council of Protected Areas reviews the proposal and sends it to the Executive Order who finally approves the proposal. The decreed of the area is published in the Official Journal of the Federation. The management plan is then elaborated within two years after the decree.

The denomination and legal validity of the instrument that governs the operation of protected areas vary between the countries. Belize, Guatemala and Honduras have designated it as management plans; as for Mexico, it is designated as a conservation and management programme. Either way, in all these countries this management instrument is published in the Official Journal of the Federation.

It is very important to note that in Guatemala's Protected Areas Act (art. 17) stipulates that the management of transboundary areas should be established with neighboring countries through agreements[181]. This is very important but not implemented as evidenced by the differences in policy and land use in border areas, often regions under threats[182].

Efforts for the protection and conservation to manage the coastal and marine resources have been undertaken at different levels: conventions, declarations, agreements and protocols have been set. These involve Government agencies, national and international non-governmental agencies, organizations, foundations and more; thereby persuading Governments from different countries to establish and manage MPAs.

2. Marine Protected Areas within the MBRS

In the MBRS region, the conservation of the marine environment is crucial, due to the goods and services that the ecosystems provide for tourism and fishing specifically to local communities. This environment has been impacted from natural disasters such as hurricanes, storms, changes of temperatures in the water causing coral bleaching (climate change) and also from human activities such as overfishing, illegal fishing, coastal development and tourism impact.

[181] *Cf. supra:* Guatemala. Congreso de la Republica (1989) Ley de Areas Protegidas. Decreto numero 4-89 P.4.
[182] Barrios M. (2005) Guatemala. Areas protegidas fronterizas. In, NatureServe Red Arriba: Alianza Regional de Redes de Informacion sobre Biodiversidad Amenazada. Centro de Datos para la Consevación/Centro de Estudios Conservacionistas Universidad de San Carlos de Guatemala P.7.

MPAs have demonstrated their value for the protection and increase of the biodiversity and in the process also generating economic benefits by means of tourism and the improvement of fisheries[183]. In Mexico, for instance, MPAs are considered the environmental policy instrument with higher legal definition for the conservation of biodiversity[184]. In the case of Belize, MPAs are one of the most important conservation tools available to ensure the conservation of the marine environment[185].

As outlined in Chapter I above, any IUCN category of protected areas can be applied in the marine environment; and according to the definition of MPAs of the CBD:

> Any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna, and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings" [186]

According to the definitions above, 43 MPAs have been indentified in the MBRS Region, which are in direct relation with the coast of the Caribbean Sea and the marine ecosystem.

The following pages present the MPAs identified in the four countries of the MBRS, with a brief description of the areas and an accompanying case study from each country. This will serve to demonstrate how MPA implementation has been approached in each State, including how issues and threats have been addressed.

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[183] Documento Tecnico del SAM No. 2 (2003) Principios de manejo para las Areas Marinas Protegidas. Proyecto para el Sistema Arrecifal Mesoamericano (SAM). Ciudad Belice, Belice. Pp.43.
[184] Secretaria de Medio Ambiente y Recursos Naturales. Comision Nacional de Areas Protegidas (2011) Areas Protegidas Decretadas. Available at: http://www.conanp.gob.mx/que_hacemos/
[185] Meerman J., Roger Wilson J. (2005) The Belize National Protected System Plan. Task Force on Belize's Protected Areas Policy and Systems Plan. Ministry of Natural Resources and the Environment. Pp.74. P.12.
[186] *cf. supra:* Secretariat of the Convention on Biological Diversity (2004) Technical Advice on the Establishment and Management of a National System of Marine and Coastal Protected Areas, SCBD, 40 pages (*CBD Technical Series no. 13*), P. 7.

Belize's Marine Protected Areas

Belize is bounded to the north by México (the stated of Quintana Roo and Campeche). To the south and west of the territory by Guatemala (Petén and Izabal departments, the latter in the extreme south), and the east by the Caribbean Sea. The country's shape is more or less rectangular, and it spans 280 km from north to south and 109 km from east to west. Its total area, including the cays, is 8,860 square miles (22,960 sq. km). Including its territorial sea waters, it measures a total of 18,000 sq. miles (46,620 sq. km)[187]. The country is divided into six districts, nine municipalities, and more than 240 villages. Is the only English speaking country in Central America[188].

There are twenty one MPAs identified in Belize, national parks and wildlife sanctuaries managed by the Forest Department (Ministry of Natural Resources) and marine reserves and spawing aggregation areas manage by the Fisheries Department (Department of the Ministry of Agriculture and Fisheries) in partnership with a number of co-management agencies (large NGOs: the Southern Environmental Association, Toledo Institute for Development and Environment, and Belize Audubon Society; and smaller community-based organizations: Sarteneja Alliance for Conservation and Development and Friends of Swallow Caye). The table bellow provides an overview of these MPAs.

[187] Official website of the Belize Tourism Board (2011) Available at: http://www.travelbelize.org/
[188] BBC News (2011) Belize country profile, Available at: http://news.bbc.co.uk/2/hi/americas/country_profiles/1211472.stm

Table 7, Marine Protected Areas of Belize[189]

Name	Management/co-management	Status year	Size (ha)	IUCN Category[190]
National Park				
Bacalar Chico	Forest department/ Green Reef	1994	4,510	V
Gra Gra Lagoon	Forest department/ Friends of Gra Gra Lagoon	2002	534	II
Laughing Bird Caye	Forest department/ Southern Environmental Association	1996	4,095	II
Payne's Creek	Forest department/ Toledo Institute for Development and Environment (TIDE)	1994	14,739	II
Sarstoon-Temash	Forest department	1994	16,938	II
Natural Monument				
Blue Hole	Forest department/ Belize Audubon Society	1996	414	III
Half Moon Caye	Forest department/ Belize Audubon Society	1982	3954	II
Wildlife Sanctuary				
Corozal Bay	Forest department/ Sarteneja Alliance for Conservation and Development	1998	73049	IV
Swallow Caye	Forest department	2002	3,631	IV
Marine Reserve				
Bacalar Chico	Fisheries Department	1996	6,391	IV

[189] Protected Areas Conservation Trust (2011) Belize Protected Areas. Available at: http://www.pactbelize.org/.
[190] IUCN World Commission on Protected Areas (2011) Available at: http://www.protectedplanet.net/search?marine=1&q=Belize

Caye Caulker	Fisheries Department/ Forest and Marine Reserve Association of Caye Caulker	1998	3,913	VI
Gladden Spit and Silk Cayes	Fisheries Department/ Southern Environmental Association	2003	10,514	IV
Glover's Reef	Fisheries Department	1993	86,653	IV
Hol Chan	Fisheries Department	1987	1,444	II
Port Honduras	Fisheries Department/ Toledo Institute for Development and Environment	2000	40,470	IV
Sapodilla Cayes	Fisheries Department/ Southern Environmental Association	1996	15,618	IV
South Water Cayes	Fisheries Department	1996	47,702	IV
Spawning aggregation				
Sandbore	Fisheries Department	2003	521	IV
Emily or Glory Caye	Fisheries Department	2003	0	IV
Dog Flea	Fisheries Department	2003	576	IV
South Point Lighthouse	Fisheries Department	2003	533	IV

Figure 4, Map of the marine protected areas of Belize

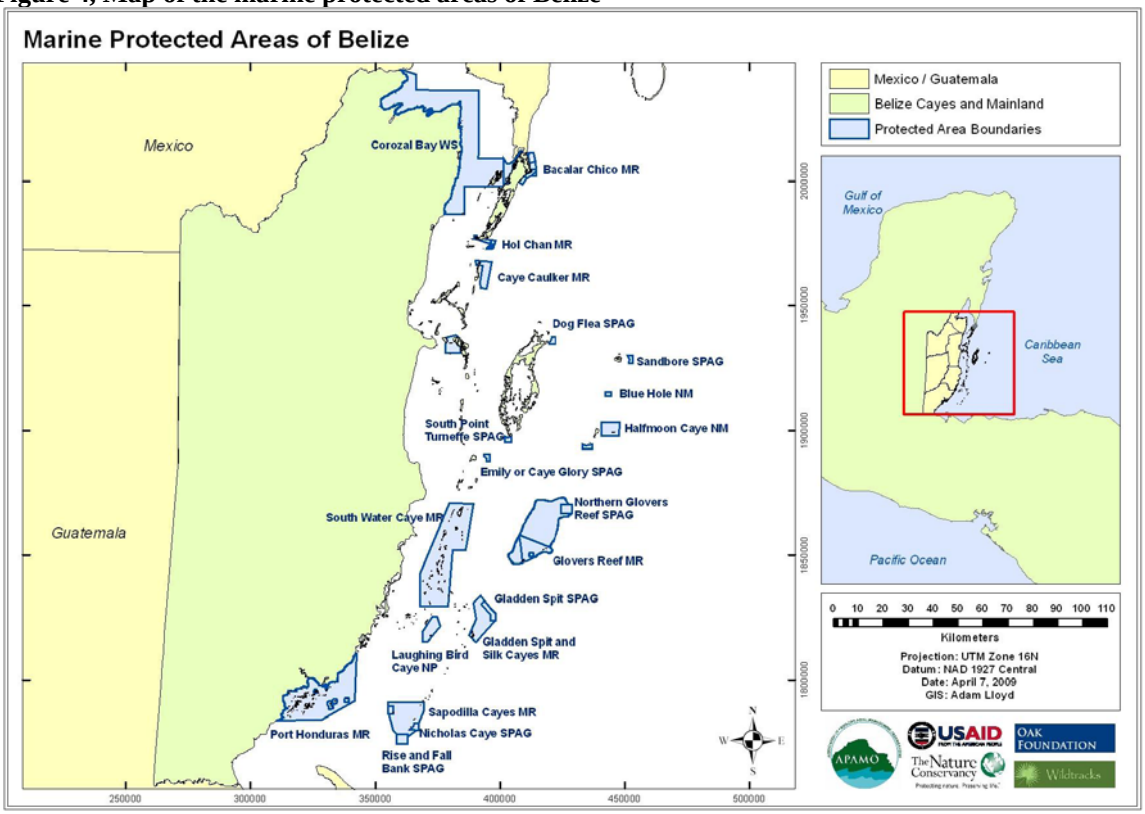


Table 8, Case Study from Belize

Case study - Bacalar Chico Marine Reserve
An area that is important to emphasize, due to the border situation with Mexico is Bacalar Chico Marine Reserve. This area was established in 1996 as a Belize World Heritage Site, to protect Rocky Point for its geological importance: a conch nursery, and the Rocky Point spawning aggregation site. It is situated at the northernmost tip of Ambergris Caye, and includes the most northerly part of the Belize Barrier Reef System, which runs parallel to the east facing shore for almost 1km. It also is the only point where the reef meets the shoreline. To the west, the marine reserve includes part of the shallow, brackish Chetumal Bay, contiguous with the Corozal Bay Wildlife Sanctuary, and to the north, the marine protected area boundary runs along the Belize / Mexico border. A priority goal is to ensure the health of the fish stock, with enforcement against illegal fishing and other illegal activities detrimental to the health of the flora and fauna. It was also established as a site for monitoring and research activities, and a venue for recreational activities, providing job opportunities for tour guides, this at the request of tourism stakeholders in Sarteneja. Management responsibility for Bacalar Chico Marine Reserve is held by the Fisheries Department, which has established a staffed Fisheries Base on Middle Caye for site-

level management of the area.

Blue Ventures, an international conservation volunteer organization based in the UK, provides assistance to the Fisheries Department through collaborative research and monitoring activities.

Some conservation threats for this area include: Coastal development, trans-boundary fishing incursion, unsustainable fishing and tourism[191].

Mexican's Caribbean region Marine Protected Areas

The Republic of Mexico borders on the north with the United States of America, on the south and west by the Pacific Ocean, on southeast by Belize and Guatemala and the Caribbean Sea, and the east by the Gulf of Mexico. It has an area of 1,972,550 sq. km., and it is constituted by thirty-one states and a Federal District, the capital city[192]. With a total population of 112,322,757 inhabitants[193].

Thirteen MPAs where identified in the Mexican Caribbean region, twelve Federal MPAs are managed by the National Commission of Protected Area (CONAP) and one State MPA is manage by the Ministry of Urban Development and Environment (Spanish: Secretaria de Desarrollo Urbano y Medio Ambiente, SEDUMA).

[191] Walker Z. and P. Walker (2011) Directory of Belize's Protected Areas. APAMO/TNC/USAID/OAK Fundation of Belize/PACT/Critical Ecosystem Conservation Fund. Pp.154.
[192] Secretaria de Relaciones Exteriores SRE (2011) General information about Mexico, available at: http://www.sre.gob.mx/.
[193] Intituto Nacional de Estadistica y Geografia, INEGI (2011) Comunicado Num. 389/10, 25 de Noviembre de 2010, Aguascalientes, Ags. Mexico.

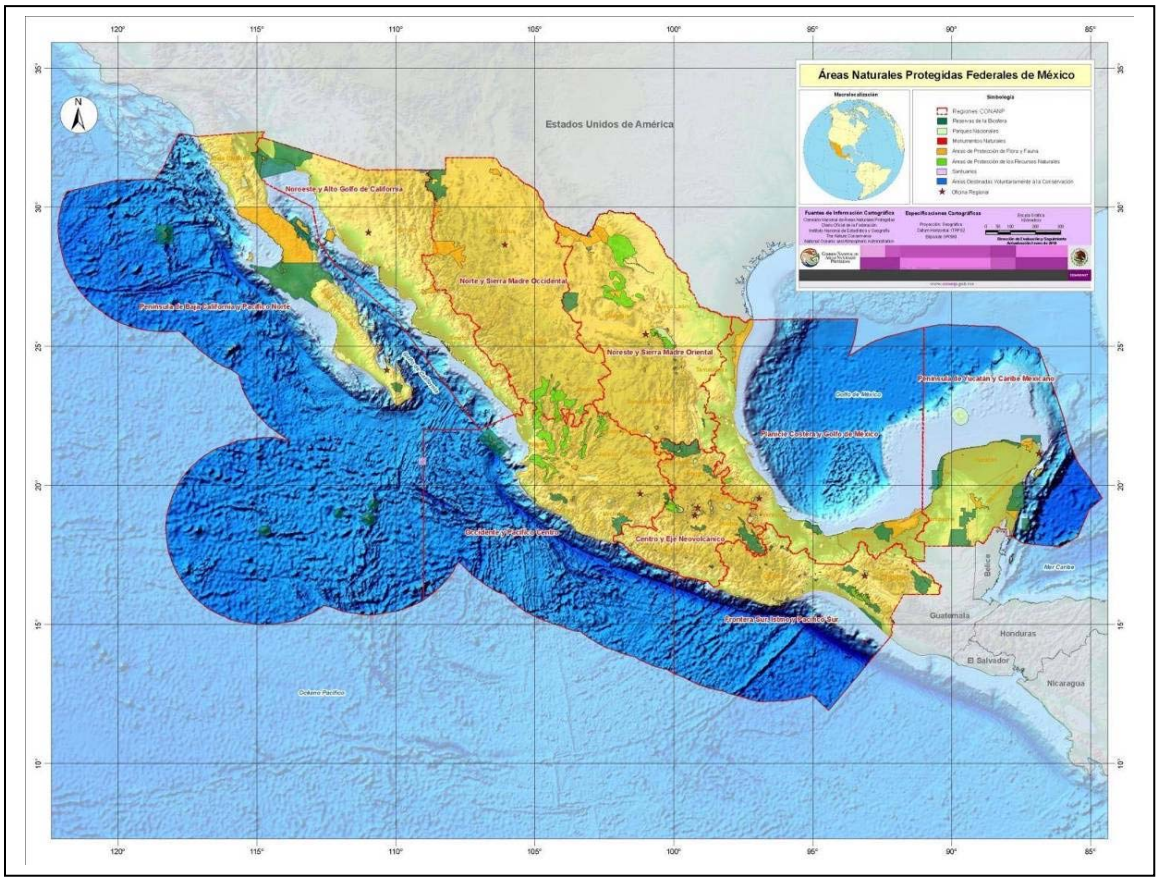
Table 9, Marine Protected Areas of the Mexican Caribbean Region[194].

Name	Management/co-management	Status year	Size (ha)	IUCN Category[195]
Biosphere Reserve				
Tiburon Ballena	CONANP	2009	145,988	unknown
Arrecifes de Sian Ka'an	CONANP	1998	34,927	VI
Banco Chinchorro	CONANP	1996	144,360	VI
Sian Ka'an	CONANP	1986	528,148	VI
National Park				
Arrecifes de Cozumel	CONANP	1996	11,988	II
Arrecifes de Puerto Morelos	CONANP	1998	9,067	II
Costa Occidental de Isla Mujeres, Punta Cancun y Punta Nizuc	CONANP	1996	8,673	II
Isla Contoy	CONANP	1998	5,126	II
Tulum	CONANP	1981	664	II
Arrecifes de Xcalak	CONANP	2000	17,949	II
Flora and Fauna Protection Area				

[194] *cf. supra:* Secretaria de Medio Ambiente y Recursos Naturales. Comision Nacional de Areas Protegidas (2011) Areas Protegidas Decretadas. Available at: http://www.conanp.gob.mx/que_hacemos/
[195] IUCN World Commission on Protected Areas (2011) Available at: http://www.protectedplanet.net/search?q=Mexico

Uaymil	CONANP	1994	89,118	VI
Yum Balam	CONANP	1994	154,052	VI
Area Subject to Ecological Conservation				
Santuario del Manati, Bahia de Chetumal	SEDUMA	1996	281,320	Unknown

Figure 5, Map of the Mexican maritime zones of jurisdiction and protected areas and map of marine protected areas of the Mexican Caribbean region[196]



[196] Comision Nacional de Areas Naturales Protegidas (2011) Mapa de las Areas Naturales Protegidas. Available at: www.conanp.gob.mx.

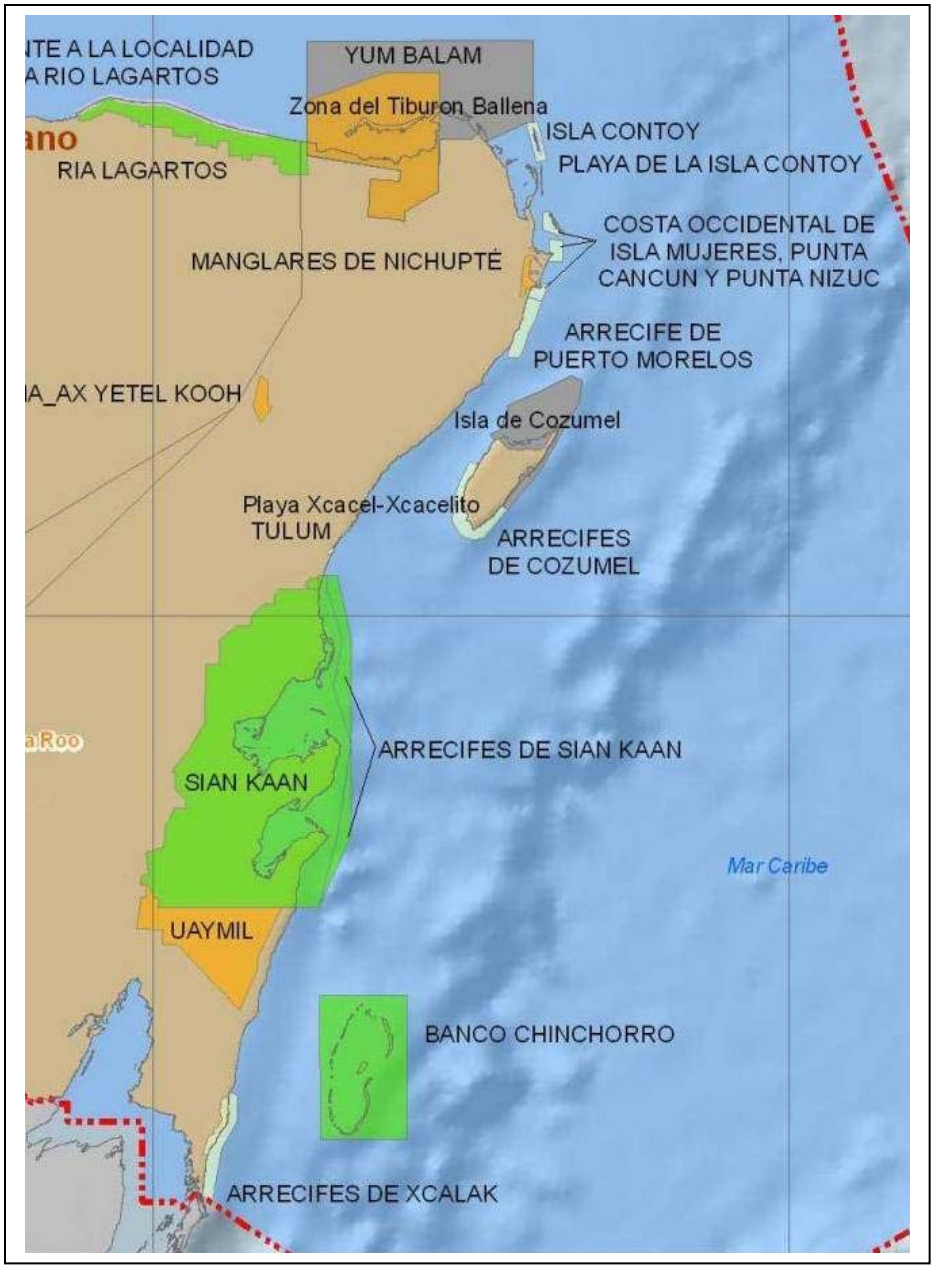


Table 10, Case study from Mexico

Case study- Xcalak, community strategy for conservation
This area was taking as a case study due to the location on the border with the country of Belize. The community of Xcalak is a remote fishing village located on the Caribbean south coast of Quintana Roo State, Mexico. Xcalak is home to approximately 400 residents,

culturally heavily influenced by Belize due to the village's proximity to the Mexico-Belize border. The main sources of income are fishing and tourism[197].

In the mid-1990s, the community's attention was focused on two events—one gradual, one sudden. First, the gradual decline of local fisheries—especially lobster and conch—was affecting many fishermen, who were spending more time fishing for a reduced catch. Independent fishers from inside and outside the community increased competition and pushed stocks even lower. Second, the state government announced plans for the "Costa Maya," a large-scale development on 150 km of the coast, including Xcalak as a major center. The community was not consulted about this plan, and was concerned about the impacts on their tiny town. Many Xcalak residents expressed interest in ecotourism as an economic alternative to fishing; however they wanted to ensure that tourism gains were realized not only by developers, but also by local people.

After the announcement of the Costa Maya development in 1995, the local fishing cooperative wrote to the state governor requesting assistance with fishery restoration and developing a "tourist reserve" where fishermen could pursue alternative work (e.g. sportfishing, ecological tours) that is compatible with conservation. The delegate of Xcalak then wrote to the National Ecology Institute (INE), the national Government agency responsible for protected areas on that time, to seek assistance in gaining protected area status for the marine resources located off the town's shore.

Early on, people in the community identified the protection of coastal resources (principally to guarantee economic benefits) as a priority. They didn't have a particularly strong conservation ethic, per se. However, as the planning process developed, they became interested in a national park as a means of achieving their goals.

In 1995 the University of Rhode Island's Coastal Resources Center (CRC) established a working relationship with Amigos de Sian Ka'an (ASK). The two organizations decided to collaborate on a pilot project to promote community coastal management in Quintana Roo, and to develop a strategy for low-impact tourism for the Maya Coast. The community did not know much about protected areas, but they were curious to find out more about whether a tourist reserve or some other formal category of protected area could achieve their goals. They learned about various possible categories of protection from their advisors. Shortly, the Community Committee for the Protection and Management of the Coastal Resources of Xcalak was formed from local Xcalak residents of different sectors (fisheries, tourism, Xcalak delegation).

The team worked to identify resource management issues of concern to the community. Their vision was documented in "A Community Strategy for Management of the

[197] Wusinich Dana C. (2002) Stakeholder Perspectives: A Tool for Cooperative Coastal Resource Management in Xcalak, Mexico. Masters project submitted in partial fulfillment of the requirements for the Master of Environmental Management degree in the Nicholas School of the Environment and Earth Sciences of Duke University. P.16.

Xcalak Zone" (1997). It contains their formal declaration of the group's objective: to have a forum where the community can design and propose management actions with the purpose of promoting the conservation of natural resources and the development of the region. The main policy recommendation of this document is a proposal for the Xcalak Reefs National Park. The community, working directly with the ASK and CRC project scientists, collected the ecological and other data needed for the national marine park application[198].

After several meeting with the State and Federal agencies in charge of conservation, on November 2000, Xcalak was decreed as a "National Park Arrecifes de Xcalak" with a total of 17,949 ha. In 2004 the management program of the MPA was announced in the Official Journal of the Federation[199].

Since then, the National Park has been managed by the National Commission of Protected Areas. The staff, the director, sub-director, coordinator, and technical staff, covering programs related to protection, restoration, research, management and administration.

Some conservation threats for this area include: Illegal fishing, Coastal development, invasive species, and coral bleaching.

Guatemalan Marine Protected Areas in the Caribbean region

The Republic of Guatemala is located in the center of the American continent, and is bordered to the north and west by Mexico; to the east by Belize, the Caribbean Sea (Atlantic Ocean) and the Republics of Honduras and El Salvador, and to the south by the Pacific Ocean. The country's area is approximately 108,889 sq. km, and is divided into 22 departments and, in turn, which themselves are divided into 331 municipalities[200].

Four MPAs where identified in Guatemala, and as mentioned before, all protected areas are under the direction of the National Council of Protected Areas (CONAP), which coordinates and leads the Guatemalan System of Protected Areas (SIGAP). MPAs are managed in partnership with co-management agencies[201], such as: Fundación para el

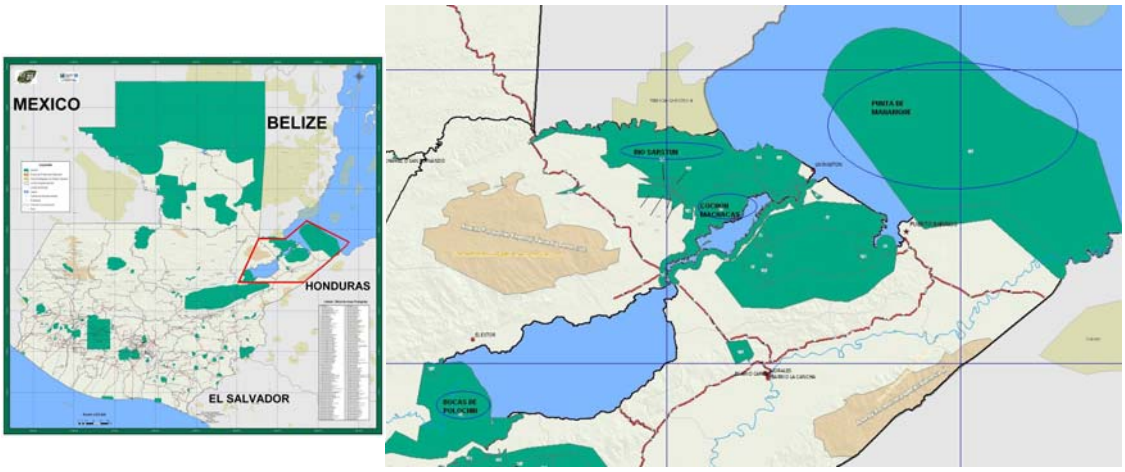
[198] Chung Beth R. (1999) A Community Strategy for Coastal Zone Management of Xcalak, Mexico. In: Community-Based Land Use Planning in Conservation Areas: Lessons from Local Participatory Processes that seek to Balance Economic Uses with Ecosystem Protection. América Verde Training Manual No.3.América Verde Publications, The Nature Conservancy, Ar. P.9.
[199] Comision Nacional de Areas Naturales Protegidas/Secretaria de Medio Ambiente y Recursos Naturales (2004) Programa de manejo del Parque Nacional Arrecifes de Xcalak. Mexico, D. F. Pp.162.
[200] BBC News (2011) Guatemala country profile. Available at: http://news.bbc.co.uk.
[201] *cf. supra:* Barrios M. (2005) Guatemala. Areas protegidas fronterizas. P.6.

Ecodesarrollo y la Conservación (FUNDAECO), Centro de Estudios Conservacionistas (CECON) from the Guatemalan University of San Carlos, Defensores de la Naturaleza foundation, Mario Dary foundation (FUNDARY)[202]. These areas are presented in the table below.

Table 11, Marine protected areas of Guatemala[203]

Name/Category	Management/co-management	Status year	Size (ha)	IUCN Category[204]
Rio Sarstun/ Multiple-Use Area	CONAP/SIGAP/FUNDAECO	2005	35,202	III
Chocón Machacas/ Protected Biotope	CONAP/SIGAP/CECON	1990	6,265	II
Bocas del Polochic/ Wildlife Refuge	CONAP/SIGAP/Defensores de la Naturaleza	1996	20,760	III
Punta de Manabique/ Wildlife Refuge	CONAP/SIGAP/FUNDARY	2005	151,878.45	III

Figure 6, Map of the marine protected areas of Guatemala[205]



[202] Caribe Verde, Izabal, Guatemala (2007) Areas protegidas. Available at: http://www.izabalonline.com.
[203] Consejo Nacional de Areas Protegidas CONAP (2010) Sistema Guatemalteco de Areas Protegidas SIGAP. Available at: http://www.conap.gob.gt/biodiversidad/sigap.
[204] IUCN World Commission on Protected Areas (2011) Available at: http://www.protectedplanet.net/search?marine=1&q=Guatemala.
[205] *cf. supra:* Consejo Nacional de Areas Protegidas CONAP (2010) Mapas

Table 12, Case study from Guatemala

Rio Sarstun, Multiple-Use Area
The Area of Multiple-Use Sarstún River was decreed in 2005. It has 18 communities forming a total population of 4,500 inhabitants. Is a protected area of binational importance since it is located in the border zone between the north of the Department of Izabal, Guatemala, and the south of the District of Toledo in Belize. Sarston has a number of continental, coastal and artificial wetlands and it works as a buffer zone for the National Park Sartstoon-Temash in Belize. It is also an important area for the reproduction of birds, conservation of focal species and it acts as a microclimate regulator and hydrologic process such as the supplying of water-bearing[206]. Sarstun represents a region of important ecological and socio-economic value due to its great biodiversity and the presence of critical habitats (mangroves an subtropical forests). The socio-economic and political value of this region is based on the fact that it forms the political boundary between Belize and Guatemala[207]. Some conservation threats for this area include: contamination and environmental impacts, unplanned human settlements, deforestation, erosion and illegal hunting. In 2009, a project proposal was presented, so as to address environmental justice, community empowerment and social equity in the Sarstun-Motagua Region. The approach proposes for the region of Sarstún Motagua the coordination between Co-administrators of protected areas and the State as a first macro level of decision making, and the involvement of these with the civil society through communitarian groups and leaders at the micro level of this same struture. This is a *sui generis* model where the administrators of the protected areas work in close relation with the Public Ministry (MP), Division of Protection to Nature (DIPRONA), National Council of Protected Areas (CONAP), Program of Environmental Local Management Association (ASOPROGAL), Ministry of Education (MINEDUC), diverse communitarian groups and several other governmental organizations (GO's) and non-governmental (NGO's) with presence in the area. The benefits lie mainly in the results of conservation of the biological and cultural diversity, governance and environmental governability with community participation, reduction of the poverty promoting the eco-rural entrepreneurship, mitigation to the global climatic change and opportunities for the local communities in the sustainable use of the natural resources of the region Sarstún Motagua[208].

[206] *cf. supra:* Consejo Nacional de Areas Protegidas CONAP (2010) Areas protegidas. Humedales

[207] UNEP Caribbean Environmental Programme (1995) Evaluation of the coastal and marine resources of the atlantic coast of Guatemala. CEP Technical Report No. 34. P.31.

[208] ____ (2009) Propuesta de proyecto: Justicia Ambiental, Empoderamiento Comunitario y Equidad Social para la Conservación de la Región Sarstún Motagua (JADE II, 2011-2015) Guatemala.

Honduras Marine Protected Areas in the Caribbean region.

The Republic of Honduras borders the Caribbean Sea to the north, Nicaragua to the east, Nicaragua, the Gulf of Fonseca and El Salvador to the south, and Guatemala to the west; it has a surface area of 112,088 sq. km., and it is divided into 18 departments[209]. Honduras has a great wealth of coastal and marine ecosystems. On the Pacific, the mangrove ecosystem covers about 500 sq. km., spreading over the entire coast, except for small portions of beaches. The coast on the Caribbean is 671 km long, and it includes coastal lagoons, mangroves, and more than 200 small islands and cays. It provides a habitat for diverse forms of life, and at the same time, it is the country's main tourist resource.

Nineteen MPAs where identified in Honduras Caribbean coast. As outlined above, the institution in charge of the management of protected areas is the National Institute of Conservation and Forest Development, Protected Areas and Wildlife (ICF). Nevertheless, NGOs and foundations work in partnership with the ICF as co-managers in MPAs such as The Bay Islands Conservation Association (BICA), Honduras Coral Reef Found (HCRF), PROLANSATE Found, among others. As shown in the following table.

Table 13, Marine protected areas of the Caribbean coast of Honduras

Name/Category	Management/co-management	Status year	Size (ha)	IUCN Category[210]
Natural Marine Monument				
Cayo Cochinos	ICF/HCRF	2003	48,925	V
Raggedy Cay Southwest Kay	ICF /BICA		2,528	
Wildlife Refuge				

[209] Fundacion para el avance de estudios Mesoamericanos, INC. (FAMSI). Available at: www.famsi.org.
[210] IUCN World Commission on Protected Areas (2011) Available at: http://www.protectedplanet.net/search?q=Honduras.

Cuero y Salado	ICF	1987	13,255	IV
Raggedy Cay	ICF/BICA		2,589	IV
Santa Barbareta[211]	ICF/BICA	2009	8650.88	IV
Santa Elena	ICF/BICA	2009	9,580	IV
Marine Zone of Special Protection				
Half Moon Cay – Southwest Cay[212]	ICF/BICA	2009	2577.91	Unknown
Michel Rock[213]	ICF/BICA	2009	2815.65	Unknown
Raggedy Cay-Southwest Cay[214]	ICF/BICA		2749.94	Unknown
Marine Reserve				
Isla del Cisne	ICF		793	
Turtle Harbour-Rock Harbour[215]	ICF/BICA	2009	812.99	Unknown
Sandy Bay-West End[216]	ICF/BICA	2009	941.08	Unknown
Biosphere Reserve				
Rio Platano	ICF/BICA	1980	833,675	

[211] Instituto Nacional de Conservacion y Desarrollo Forestal, Areas Protegidas y Vida Silvestre (ICF) (2009) RESOLUCION-DE-MP-142-2009. Available at: http://www.poderjudicial.gob.hn P.14
[212] Ibid., P.4.
[213] Ibid., P.5.
[214] Ibid., P.19.
[215] Ibid., P.20.
[216] Ibid., P.12.

National Park				
Janeth Kawas (Punta Sal)	ICF/PROLANSATE	1994	78,400	
Utila/Marine National Park	ICF/BICA		28,098	
Port Royal	ICF/BICA		834	
Punta Izopo	ICF/BICA		18,820	IV
Capiro y Calentura (Laguna de Guaymontero)	ICF/BICA	1992	4,856	IV

Figure 7, Map of the marine protected areas of Honduras[217]

[217] Paises, Mapa de Honduras. Available at: www.paises.com.mx/honduras/mapa.html.

Table 14, Case study from Honduras[218]

Case study – Cayo Cochinos, A hope for the Nature and the Environment

The Archipelago of Cayo Cochinos is located 19 miles to the Northeast of the Ceiba, on the Caribbean Sea in Honduras, is a group of two small islands, twelve sand keys and a low octoral, in the middle of 75 km2 of sand banks, adjoining in the North with a coral barrier reef and with the three majors islands of the archipelago of Roatán.

For years the area suffered over exploitation of resources such as overfishing, erosion, destruction of forest and coral reef, hunting of protected and exotic species and over production of waste.

In 1993, nineteen business groups and Honduran businessmen created the Sociedad de Inversiones Ecologicas, S. A. (SIEC). Intensively working together to restore and maintain the balance of the ecosystem. They f ormed the Fundacion Hondurena para la Proteccion Conservacion y de Cayo Cochinos (English: Honduras Coral Reef Found, HCRF). After several agreements of this found with the Government, in 2003 the decreed of the MPA as a Natural Marine Monument of Cayo Cochinos was announced in the Official Journal of the Federation 114-2003.

The management plan of the area was elaborated from 2004 – 2009, and during this period several management activities were undertaken:

- Documentary focused on the fisherman and the Honduras sea;
- Research projects from Operation Wallacea focused on snakes, reef monitoring using the reef check methodology, socio-economic studies and a conservation programme for the sea turtle;
- Certification of a diver instructor and 8 local community divers to provide tours in the area;
- Interchange of fishermen experiences between Mexico and Honduras: “taller regional de pescadores”; and
- Continuing strengthening the programme of control and vigilance with support of the Hondurans Marine force.

[218] Informe conceptual (2010) Cayo Cochinos, A hope for the Nature and the Environment.

a) Assesment of Marine Protected Areas within the MBRS

Different criteria can be taken into account to identify what can lead to success of MPAs. As well, different methodologies of evaluation can be applied according to the needs and situations of the MPAs.

In the MBRS region, several manuals and guidelines have been adopted to evaluate MPA management effectiveness, such as Ecoregional Evaluation by TNC, Management Effectiveness Evaluation by the MBRS project, Actual State of Protected Areas in Latin America and the Caribbean by UNEP, and lately a Management Capacity Assessment of Selected Coral Reef Marine Protected Areas in the Caribbean by CAMPAM and NOA's Coral Reef Conservation Program (CRCP). Some of these using methodologies such as: How is your MPA doing?, The Nature Conservancy 5-S framework, NOAA Coral Reef Conservation Program MPA Management Assessment Checklist.

Features that were described in Chapter 1 of this paper are enlisted in Table 15 bellow, so as to provide an overview of the criteria for the sustainable management of MPAs within the MBRS and as proposed here in. Which ones share a geographical area and, for instance, similar ecosystems; they are part of a Large Marine Ecosystem, and one Caribbean Region, but with different nationalities, culture, policies, and interests.

Some of the information for each country presented in the table bellow and several comments or recommendations were drawn from various evaluations outlined above.

Table 15, Features that lead to success of MPAs within the MBRS region.

Features	Criteria that lead to success	Bel	Gua	Hon	Mex
Community involvement	• Connected to their natural resources and the environment.				X
	• Engage with environment.	X	X	X	X
	• Has an opinion in decision making process.	X	X	X	
	• Comply with regulations.				
	• Has a sense of responsibility for the operation of MPA.	X		X	
	• Collaborative management.	X	X	X	
	• Community-base management.				
	• Public education and awareness.	X	X	X	X
Compliance	• Fisheries knowledge.	X		X	
	• Coastal resource management knowledge.			X	X
	• Understanding regulations.				
	• Environmental awareness.	X	X	X	X
	• Alternative livelihoods.	X	X	X	X
	• Staff hire with expertise needed to undertake various enforcement activities.				
Policy	• Simple understanding rules follow at local level.	X			
	• Legislation and regulation clear and concise.	X		X	
	• Management and zoning plans.	X		X	X
	• Public participation.	X	X	X	
	• Research, monitory and review.	X			
	• Compensation.				
	• Financial arrangements.	X	X	X	X
	• Regulations.	X			X
	• Enforcement, incentives and penalties.	X			
Management tools	• Integrated coastal zone management plan adopted.	X		X	X
	• Ecosystem base management	X		X	X
Evaluation	• MPA management effectiveness evaluation programme.	X		X	X
	• Adaptive management programme.				

Results from the CAMPAM-NOA-CRCP project, for example mention that the majority of the countries perceive a capacity need on enforcement. Belize, for instance, indicated "clearly defined laws and official rules and regulations. Law infractions vary from season to season. All violations to the law are reported but not all result in arrests"[219].

In the case of Honduras, one of the MPA mentioned their enforcement situation as follows:

> Even though violations are reported during patrolling, prosecution rarely reaches a court. MPA managers enforce the laws and regulations but follow-up is under the jurisdiction of a separate institution. Taking into account the environmental laws, there are regulations that can be applied at the MPA level and within the area of economic development. The application of the law lies with the NGOs and the preventive police when they can accompany the rangers[220].

Mexico faces a similar situation due particularly to the different agencies in charge or involved; comments from two MPAs are the follows

> Enforcement of environmental regulations in Mexico requires the participation of more than one Government agency. Both FAO Programa de Seguridad Alimentaria en México (SAGARPA) and Comisión Nacional de Acuacultura y Pesca (CONAPESCA) have to participate for fisheries regulations enforcement. [...] The enforcement of rules and regulations in Mexico are the responsibility of PROFEPA (Procuraduria Federal de Proteccion al Ambiente). PROFEPA is in charge of both green (conservation) and grey (pollution) issues, and they are limited in their ability to effectively enforce both issues. […] The park manager can stop illegal or unauthorized activities but cannot set fines for violations[221].

[219] Gombos, M., A. Arrivillaga, D. Wusinich-Mendez, B. Glazer, S. Frew, G. Bustamante, E. Doyle, A. Vanzella-Khouri, A. Acosta, and B. Causey (2011) A Management Capacity Assessment of Selected Coral Reef Marine Protected Areas in the Caribbean. Commissioned by the National Oceanic and Atmospheric Administration (NOAA) Coral Reef Conservation Program (CRCP), the Gulf and Caribbean Fisheries Institute (GCFI) and by the UNEP-CEP Caribbean Marine Protected Area Management Network and Forum (CaMPAM). 269 pp. P.69.
[220] Ibid., 146.
[221] Ibid., 167.

Therefore, we can say that legal clarification; specific Acts on MPAs and/or better coordination of the different institutions involved in the enforcement process are urgently needed in the region.

On the other hand, complyance with regulations is a tool that can help enforcement in a community MPA. Even though full support by the community is required and in some areas assessed it was observed that:

> From the beginning of the MPA's creation the community has provided full support. Even though the participation has had its ups and downs, the community commitment is with the reef and not with the manager[222].

In this context it has been mentioned that it is very important that, when the community is involved in the planning process, the agency providing planning and technical assistance to the community should continue to provide services to the community during implementation and after the MPA is established[223].

Nevertheless, several of the aforementioned assessments noted that the capacity for management is affected by the institutional framework in which the MPA sites are situated, including available financial resources, political will of decision makers, or levels of staffing.

b) The impact of Tourism in MPAs

Tourism is one of the main economic activities of the Atlantic coastal zone, due to the virtue of its existing natural resources and the scenic beauty. This can be a key to fortify the social and economic bonds of the inhabitants of those zones and to protect its natural and cultural patrimony if it is carried out in a planned way. For instance, in Mexico tourism in protected areas accounted two million visitors in 2009[224].

[222] Ibid., 170.
[223] *cf. supra:* Pollnac R. B., Crawford B. R., Gorospe M. L.G. (2001).
[224] SEMARNAT/CONANP (2010) 10 Anos sembrando semillas cocechando logros. Turismo de conservacion en areas protegidas. P.85.

Commitments of low impact tourism in MPAs have been established in accordance with the terms or criteria of sustainable tourism, such as:

> A. Demonstrate effective sustainable management.
> B. Maximize social and economic benefits to the local community and minimize negative impacts.
> C. Maximize benefits to cultural heritage and minimize negative impacts.
> D. Maximize benefits to the environment and minimize negative impacts[225].

As part of the management plan or program in the MPAs, their public use program plays a significant role as its objective is to inform to the locals, as well as the nationals and foreign visitors, about the importance and respect of the ecosystems of the area, as well as opportunities of recreation in a natural and comfortable environment.

The public use program is considered as a planning instrument

> […] that has tourism, educative, interpretative, and recreational and investigation aims, realized by visitors who participate in activities that do not extract or introduce resources in a protected area. It is a document that diagnoses the tourism of the MPA, determines the necessary instruments for the handling of tourism and the recreation, along with the actions of inter-institutional coordination and the financing required for its implementation. The public use program must be closely tied with the objectives and subprograms of the management plan of the MPA[226].

Different methodologies or tools have been use to control the carrying capacity of tourism in MPAs, one of the most common use is the Limits of Acceptable Change (LAC), which focuses on the establishment of:

> measurable limits to the changes induced by humans in the biophysical and social conditions of the area, and in

[225] Sustainable Tourism Report Suite (2010) More Efficient: More Profit: More Purpose: More Fun knowledge is power - wrong: understanding is power – right. Sustainable Tourism Report 8 February 2010: Totem. P.14.
[226] SEMARNAT/CONANP (2009) Estrategia Nacional para un Desarrollo Sustentable y del Turismo y la Recreacion en las Areas Protegidas de Mexico. P.28.

> defining appropriate strategies to maintain and/or to recover such conditions. The criteria for the limits of the LAC are based on conditions developed for different social and ecological surroundings, and [offer options to the administration of the park such as allowing for managed public use][227].

As presented at the beginning of the present research, MPAs in the Caribbean were established with the purpose of conservation and sustainable use, hence, communities, that live inside or in the periphery of MPAs, have found ecotourism as an alternative livelihood or a change of activity from fishing, hunting or agriculture.

Great benefits related to the conservation, sustainable use of resources and ecology interpretations have been by a large number of communities inside MPAs through sustainable tourism activities. Exemples of this are all the ecoturism business running by locals all over the MBRS region[228].

For instance, recently in Mexico, ecotourism routes have been developed in between MPAs by local business that have been certified with the Mexican Norm of Certification of Sustainable and Ecotourism Business (NMX-AA-133-SCFI-2006).

The two most important documents in Latin America are the Ethical Code for the Development of Ecotourism, written by the National Camera of Ecotourism of Costa Rica, and the Guide of Good Practices for Sustainable Tourism published by the Association Rainforest Alliance. The importance of these is demonstrated by the adoption of their principles by the leading association of tourist services in Latin America.

[227] Stankey, G. H., Cole, D. N., Lucas, R.C, Petersen, M.E, and Frissell, S.S. (1985) The Limits of Acceptable Change (LAC) System for Wilderness Planning. USDA, Forest Service and Intermountain Forest and Range Experiment Station: Ogden.

[228] Galicia Zamora E. (2011) El potencial de Yucatan para el ecoturismo. Instrumentos y estrategias de conservacion *in situ* de la biodiversidad. Parte IV. Gestion de los recursos naturales. Biodiversidad y desarrollo humano en Yucatan.

Honduras, on its side has proposed a concession of tourism in protected areas, which will allow private operators and community groups to provide tourism services in protected areas with the following advantages:

- Less work for manager of MPAs;
- Contribution to the management of MPAs through tourism revenues;
- Monitor and prevention of negative impacts;
- Vigilance;
- Use of areas for tourism to prevent illegal uses;
- Opportunities from locals to obtain benefits from tourism; and
- Environmental education for visitors[229].

As a result of collaborative work between the four countries of the MBRS region, alternative livelihoods have been promoted, including training fishermen in kayaking, catch and release fly fishing, SCUBA and water sports[230].

Section B will describe regional cooperation, challenges and achievements within the MBRS initiative and conservation strategy. As well as the legal framework related to the MPAs in the Mexican Caribbean site.

B. Regional Cooperation and the Mexican legal approach: Toward a sustainable management of the Mesoamerican Barrier system

The central message from the 2003 World Parks Congress was the need to shift the focus in protected area planning away from consideration of individual "islands" of protection towards networks of protected areas linked with each other and with surrounding land use. This is implicit in the Congress theme: "Protected Areas — Benefits beyond Boundaries"[231]. Such approaches must be applied at a larger scale, such as the Meso-American Biological Corridor in Central America, linking protected areas in seven

[229] Alianza Mesoamericana de Ecoturismo (2009) Concesiones para el Turismo en Areas Protegidas. V conferencia AME. Granada, Nicaragua.
[230] *cf. supra:* The World Bank (2001) P.10.
[231] Patry Marc (2003) UNESCO World Heritage at the Vth IUCN Park Congress, Durban South Africa, 8 - 17 September 2003. World Heritage Report 16. Sheppard David Introduction P. 11.

countries, including a number of World Heritage sites from Mexico to Colombia. As well as the Mesoamerican Barrier Reef System Region.

The Mesoamerican Barrier Reef System MBRS is the world's second longest barrier reef system at 1000 km in length and extending from Isla Contoy the northern side of the Yucatan Peninsula (Mexico) to the Islands of the Bay (Honduras); including in between the continuous marine-coast zone of four countries: Belize, Mexico, Guatemala and Honduras[232]. The MBRS stabilizes and protects coastal landscapes; maintains coastal water quality; sustains species of commercial importance; serves as breeding and feeding grounds for marine mammals, reptiles, fish and invertebrates; and offers employment alternatives and incomes to approximately one million people living in coastal zones adjacent to the reefs[233], especially on tourism and fishing activities; for instance in Belize alone, the reef was estimated to contribute approximately $395 - $559 million US dollars in goods and services each year[234].

It is very important to emphasize the high strategic value of the MBRS's natural, socioeconomic and cultural resources. However, due to the continued over-exploitation and unsustainable use of these, it has became critical to the development and implement appropriate management frameworks[235].

Despite the well recognized importance of the MBRS to its four littoral States (México, Belize, Guatemala and Honduras), the wider Caribbean and beyond, many socio-environmental threats persist. These are rooted in, amongst others, a lack of legislative and administrative frameworks, low levels of compliance with existing legislation, difficulties in enforcement, lack of funding for implementation of Government mandates, lacunas in regional and local planning, and boundary conflicts between neighboring

[232] Healthy Reefs for Healthy People (2010) Report card for the Mesoamerican Reef: An Evaluation of Ecosystem Health.
[233] Silva, Mauricio et. al. (2000) Análisis Social del Área de Influencia del Sistema Arrecifal Mesoamericano (SAM). P.22-31.
[234] *cf. supra:* Healthy Reefs for Healthy People (2010), P.2.
[235] Documento Tecnico del SAM No. 1 (2003) Estrategia Regional de Concientizacion Ambiental. Proyecto para el Sistema Arrecifal Mesoamericano (SAM). Ciudad Belice, Belice. Pp.53.

States[236]. Not only do these factors threaten the MBRS ecosystem functions and services, food security at the sub-regional level, and climate change adaptability, but they also represent significant lapses in the coastal States obligations under international law (i.e. UNCLOS and the IMO Regime) and commitments through international and regional instruments (i.e. WSSD targets and the MDGs).

1. Mesoamerican Barrier Reef System, Conservation Strategy

In an attempt to address these threats, in 1997 the leaders of the four nations: México, Belize, Guatemala and Honduras signed the Tulum Declaration "The Mesoamerican Barrier Reef System Initiative" (MBRS initiative). The main purpose of the MBRS initiative is to promote the conservation of the reef system through its sustainable use, contributing in this way to the well-being of the present and future generations. It is also to guide the authorities responsible for the environment and the natural resources of the countries, so that, with the support of the Executive Secretary of the Central American Commission of Environment and Development (SE-CCAD), they can elaborate the Action Plan[237].

Under this commitment, in 1999, Mexico, Belize, Guatemala and Honduras approved a 15-year Action Plan focus on the promotion and sustainable development of the MBRS.

> The main objective of this Action is to safeguard the integrity and productivity of the MBRS by outlining a set of regional and national activities. Regional activities focus on four thematic areas: a) research and monitoring; b) legislation; c) capacity building; and d) regional coordination. Similarly, four thematic areas for the national level include: a) Monitoring and research; b) Sustainable use; c) Capacity building of national institutions; and (4) inter-sectoral coordination. They are designed to be tailored

[236] *cf. supra:* The World Bank (2001) P. 5.
[237] *cf. supra:* Tulum Declaration 5 July 1997

> to member country circumstances while still remaining consistent with the overall framework[238].

In 2000, focused on goals and objectives for the long term implied in the Action Plan, the Central American Commission of Environment and Development (CCAD) presented to the Global Environment Facility (GEF) a project entitled Conservation and Sustainable Use of the MBRS (MBRS project). This project was approved in 2001, and has as its aim the reinterference of the protection of the marine ecosystems that includes the MBRS, as well as helping the participant countries to reinforce and to coordinate their national policies, regulations and institutional agreements for the conservation and the sustainable use of the MBRS[239]. The MBRS project is also oriented to promote actions towards the management of MPAs, wetlands, strategic lagoons, and river basins; sustainable fisheries, and sustainable tourism; involving for this, local communities in the activities of negotiation, management, and planning[240].

To achieve these goals, one of the first MBRS projects was the regional strategy of environmental awareness which one allowed to inform all sectors (tourism, fishing, domestic, community leaders, and investors) in the different communities within MPAs in the MBRS region so these would understand the value and necessity of conservation of their natural resources for them and their future generations.

Several documents, training and workshops have been held under the Conservation and Sustainable Use of the MBRS Project, such as: guidelines for the management of MPAs, training manual for the design and elaboration of management plan in MPAs, Manual of Methods for the MBRS Monitoring Program, Manual for the Rapid Evaluation of Management Effectiveness in Marine Protected Areas of Mesoamerican. Therefore, this

[238] *cf. supra:* GEF (2011) Meso-American Barrier Reef System II.
[239] *cf. supra:* Comision Centroamericana de Ambiente y Desarrollo (CCAD) (2005) Informe Tecnico sobre Tulum + y Plan de Accion SAM.
[240] *cf. supra:* Documento Tecnico del SAM No. 1 (2003) Estrategia Regional de Concientizacion Ambiental. P.12.

project has been highly successful, mostly in catalyzing international cooperation among the four countries through brokering agreements on key policies affecting the MBRS[241].

Some of the regional activities implemented thus far include the establishment of bi-national and tri-national commissions to facilitate policy dialogue, harmonization of legislation and the management of natural resources in trans-border areas and the designation of new marine protected areas (MPAs) to increase ecosystem representation[242].

Even though, as noticed in recent assessments of MPAs; most of the countries agreed that there is a need for the creation of legal instruments to facilitate the co-management of MPAs and the creation of the legal and institutional frameworks to ensure the sustainable management of fisheries and tourism, including enforcement mechanisms for existing laws.

2. Legal framework related to MPAs: the Mexican approach

The following section draws on an analysis of the political instruments applicable to oceans and coast undertaken by the National Institute of Ecology[243].

As mentioned Chapter II (section A) above, the decree of Natural Protected Areas (NPAs) is not considered in the LGEEPA as an instrument of environmental policy. However, because it is a tool that promotes and induces defined objectives for good conservation, in certain zones of the country it can be considered a policy instrument. Furthermore, if we take into account that the decree NPAs is of general observance, and that it regulates all activities as does other orders of Government, it can be seen as

[241] *cf. supra:* GEF (2011), P.3.
[242] Ibid., P.4.
[243] Ibanes de la Calle M., Brachet Barro G., Cortina Segovia S., Quinones Valades L. (2005) Instrumentos de Politica Aplicables a Oceanos y Costas. Instituto Nacional de Ecologia INE. Direccion General de Insvestigacion en Politica y Economia Ambiental. Pp.87.

constituting an instrument of direct regulation. It is for these reasons that this "legislative" interpretation is adopted in the subsequent analysis of the decree of NPAs.

It is possible to indicate that the following analysis, as well as the quoted provision, are based on an analysis of the decree of NPAs as instrument, and does not contemplate the problems associated with the administration or management of its implementation.

a) The NPA tool and its legal framework

Natural Protected Areas, or NPAs, are considered the conservation tool par excellence. This tool is provided in the LGEEPA and tries to protect those original environments that have not been altered in a significant way by the activity of humans whom, by his characteristics or value, require to be preserved and/or to be recovered[244].

This tool of conservation prescribes the protection and control of certain zones or regions which are clearly delimited, as their ecological relevance and state, render it necessary or desirable to preserve.

In particular, the primary targets of conservation of this tool, according to article 45 of LGEEPA:

> I. To preserve representative natural environments of the different biogeographic and ecological regions and of the most fragile ecosystems, to assure the balance and the continuity of the evolutionary and ecological processes;
> II. To safeguard the genetic diversity of wild species on which the evolutionary continuity depends; as well as to assure the preservation and the viable advantage the biodiversity of the national territory, in particular to preserve the species that are in danger of extinction, the threatened ones, the endemic ones, rare and those that are subject to special protection;

[244] Mexico. Camara de Diputados del H Congreso de la Union (1988) Ley General del Equilibrio Ecologico y Proteccion al Ambiente. Últimas Reformas DOF 28-01-2011. Titulo II Biodiversidad. Capitulo I Areas Naturales Protegidas. Seccion I Disposiciones generales. Art. 44. P.31.

> III. To assure the sustainable use of the ecosystems and their elements;
> IV. To provide a propitious field for the scientific research and the study of the ecosystems and their balance;
> V. To generate, to rescue and to disclose knowledge, practices and technologies, traditional or new that allow for the preservation and viable benefits of biodiversity of the national territory;
> VI. To protect towns, industrial communication channels, facilities and agricultural advantages, by means of forest zones in mountains where rivers originate; the hydrologic cycle in river basins, as well as other zones that are directly related to the protection of surrounding ecologically related features; and
> VII. To protect the natural surroundings of zones, archaeological, historical and artistic monuments and vestiges, as well as tourist zones, and other areas of importance for national recreation, culture and identity and of the indigenous towns[245].

In order to accomplish this, it is necessary to establish a "Declaration of the NPA" where the NPA is clear identified as a zone of protection (defining the zone nucleus and of damping), the activities that can be realized in the zone, the modalities of advantage and protection allowed as well as the administrative mechanisms that will operate.

The NPA can be of Federal or local character, and this study focuses on the Federal level as SEMARNAT is a Federal agency. Within this group, different categories – each with their distinct administrative mechanisms – form NPAs according to their characteristics, such as: Biosphere Reserves, National Parks, Sanctuaries and Areas of Protection of Natural Resources and Flora and Fauna.

In particular, for the integrated management of the coastal zone, marine or mixed MPAs are considered (terrestrial and marine) as prescribed by LGEEPA in article 51:

> to protect and to preserve the marine ecosystems and to regulate the sustainable use of the flora and aquatic fauna in the Mexican marine zones; biosphere reserves, national

[245] Ibid. Articulo 45 P.31.

> parks, natural monuments and sanctuaries, that will be able to include the contiguous marine-terrestrial federal zone, in accordance with the particular characteristics of each case[246].

Furthermore, regarding activities allowed in MPAs, the same article provides:

> In these areas there will be allowed, where appropriate, the activities or derived benefits that come, in accordance with this Law, the Law of Fishing, the Federal Law of the Sea, the international conventions of which Mexico is party and the other applicable legal dispositions[247].

In addition to this,

> The authorizations, concessions or permissions for the use of the natural resources in these areas, as well as the transit of boats in the zone or the construction or infrastructure use within the same, will be subject to the provisions of the management programs and on their corresponding declarations[248].

With the intention of reinforcing the administration of the MPA, it is necessary to elaborate a management program[249] that can serve as a planning tool and includes the administrative measures for the short, medium and long term.

In addition to the provisions of the LGEEPA, the Regulation of Natural Protected Areas (Spanish acronym: RANP) defines the following main points:

> In the protected area, the use of natural resources will only be authorized if such use generates benefits to the settlers who live there and who are in agreement with the sustainable development plan, the respective declaration, its management program, the programs of ecological planning,

[246] Ibid. Articulo 51 P.37.
[247] Ibid.
[248] Ibid.
[249] Ibid. Articulo 65 P.42.

> the Mexican official norms and other applicable legal dispositions[250].

This use will be *inter alia* for;

> I. Private consumption, or
> II. Development of activities and management projects and sustainable use of wild life, as well as farming, fishing, ranching, agroforestry, aquaculture, and mining, as long as they fulfill the established criteria.

With regard to tourism and recreational use of the MPAs, such activities will be authorized under the terms established in the management program of each area, also taking into account the conservation criteria that are defined[251] for the particular area.

Concerning the fulfillment of surveillance, monitoring and enforcement, RANP establishes that:

> The Secretariat [SEMARNAT], through the Federal Attorney of Environmental Protection, will undertake within the natural protected areas surveillance, monitoring and enforcement in accordance with the dispositions of the present Regulation, as well as those that which may be derived from the same. While implementing the provisions of the present article, the Secretariat will observe the relevant provisions of [the present law][252].

In addition to this, the surveillance, monitoring and enforcement in the MPAs will be carried out by authorized personnel of the Secretariat in coordination with the Secretariat of Navy (Spanish acronym: SEMAR), according to their respective competencies[253].

[250] Mexico. Camara de Diputados del H Congreso de la Union (2000) Reglamento de la Ley General de Equilibrio Ecologico y la Proteccion al Ambiente en material de Areas Naturales Protegidas. Última Reforma DOF 28-12-2004. Art. 81 P.25.
[251] Ibid. Articulo 82 P.25.
[252] Ibid. Articulo 137 P.41.
[253] Ibid. Articulo 138 P.41.

b) Analysis of the instrument and suggestions

This section examines the instrument's sustainability, given the present conditions and requirements, to serve as a framework to achieve conservation objectives for which it was elaborate.

According to a study undertaken by the National Institute of Ecology[254], it can be seen that even though the instrument is well adapted, achieving its objectives has become difficult due to fundamental problems such as its legal character and institutional capacity.

Despite the Decrees which provide for the control of fishing activities within MPAs, it is observed that these activities persist. This has been reflected in a poor control of the fishing activity and in the lack of institutional capacity to effectively implement the regime.

At the moment, recent reforms to the RANP with respect to this subject established that within the MPA fishing is authorized as long as it does not result in the incidental capture of species under some type of protection prescribed by the applicable legal dispositions, and maintain an identical volume of incidental capture to capture of the target species[255]. In effect, this provision allows for the capture of protected species at the same rate as that of non-protected species thereby severely undermining conservation efforts. Additionally, the modification contemplates the possibility of deciding with the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (Spanish Acronym, SAGARPA) rates, proportions, acceptable limits of change or carrying capacities, as well as the conditions for a superior volume of incidental capture in relation to the target species to allow the fishing. Although this modification opens the possibility of exerting a greater real control on the activity, because a more realistic relation between the target

[254] *cf. supra:* Ibanes de la Calle M., Brachet Barro G., Cortina Segovia S., Quinones Valades L. (2005) Pp.87.
[255] *cf. supra:* Mexico. Camara de Diputados del H Congreso de la Union (2000) Reglamento de la Ley General de Equilibrio Ecologico y la Proteccion al Ambiente en material de Areas Naturales Protegidas. Articulo 81 fraccion f P.26.

species and the incidental capture can be established, it does not diminish the monitoring costs and the required continuous coordination with the SAGARPA.

Furthermore, regarding the institutional issues, they are not deficiencies in the instrument, but factors that affect the application of the instrument's provisions, and these are important to note so as to establish strategies that allow for improvement.

In this context, the lack of capacity to adequately administer and to patrol the MPA is clear. The growth in protected hectares was not accompanied by an increase in the institutional capacities to administer and to patrol them. This is one of the most important problems facing the operation of MPAs: the lack of surveillance and monitoring that allow to guarantee the preservation of the protected ecosystems.

Another problem similar to the previous one is that of the incapacity of the environmental authority to generate the necessary information to justify and to sustain the management programs for the MPA, including, in many cases solid arguments for stricter conservation measures.

Given the above, in order to achieve the conservation targets a real coordination needs to be established between the secretariat in charge of MPAs and other departments such as SAGARPA, SEMAR, PROFEPA, and the Mexican Attorney-General (Spanish acronym, PGR[256]); accompanied by clear Acts.

[256] The Procuradoria General de la Republica (PGR) The Office of the Mexican Attorney-General (hereinafter PGR) is the body of the Federal Executive Branch, which is mainly in charge of investigating and prosecuting the crimes in federal matters and whose Chief Law Enforcement Officer is Mexican Attorney General, who heads the Federal Public Prosecutor and its auxiliary bodies which are the investigative police agents and the experts. http://www.pgr.gob.mx

IV. Conclusions

MPAs are like the water reserves in the desert, that is to say, that they are a source that needs and requires special focus and attention. Even though an infinity of laws and norms exist to regulate them, it is clear that the main problem that they continue to face lie in the implementation of the laws. Also clear is that this is due to the lack of inter-institutional coordination for the application of the instruments.

It has been said that the reality of the Caribbean ocean governance is a diversity of networks of actors serving various purposes that seldom intersect effectively, but with the potential to do so if greater attention is paid to networking[257]. Following by countries also lack of capacity and seldom a clear mandate by any national, sub-regional, or regional level institution for management policies that address integration among sectors at levels up to the ecosystem scale of the CLME[258].

Taking into account that the Mexican Caribbean region is part of the Caribbean Large Marine Ecosystem, shares the world's second longest barrier reef system and is part of the MBRS network, it recognizes the valuable efforts that have been made. As being part of this network

- ✓ It is recognized as a management tool to protect vulnerable marine ecosystems and their biological components;
- ✓ It recognizes humans' responsibility while at the same time providing them with the opportunity to find better management solutions; and
- ✓ It does not preclude specific conservation and management tools, such as marine protected areas, but rather constitutes a framework to integrate such opinions and other methodologies to deal with complex situations.

[257] Fanning, L., R. Mahon, P. McConney, J. Angulo, F. Burrows, B. Chakalall, D. Gil, M. Haughton, S. Heileman, S. Martinez, L. Ostine, A. Oviedo, S. Parsons, T. Phillips, C. Santizo, B. Simmons, and C. Toro (2007) A large marine ecosystem governance framework. *Marine Policy* 31:434–443.
[258] *cf. supra:* Fanning L, Mahon R, McConney P, (2009) P. 224.

On this aspect, legislation and policy should take into account regional, international, and other multi-lateral treaties as well as ecosystem considerations, so as to ensure that the management initiatives of one country are not negated by the actions of others connected through the transport of recruits, food or pollutants, or through the migration of marine species.

In this context, to administer the MPAs implies to achieve integration and to instill the balance between social, cultural, economic, environmental, ecological, ethnic and legal aspects[259].

Therefore, it is important that MPAs are established within the constitutions of States and that specific laws are elaborated which regulate all the activities occurring within them through permissions, authorizations and environmental impact assessments. These laws must also prescribe resource use regimes for the MPAs as well as regulate coastal development which may impact the protected areas. Finally, existing sartorial laws, such as those for fisheries, must be harmonized with the MPA laws.

[259] Chavez F. Walter, Arrastia E. (2005) Plan de manejo de la Cuenca del Rio Sarstun. Fundacion para el Ecodesarrollo y la Conservacion, FUNDAECO. Sarstoon Temash Institute for Indigenous Management, SATIIN. P.86.

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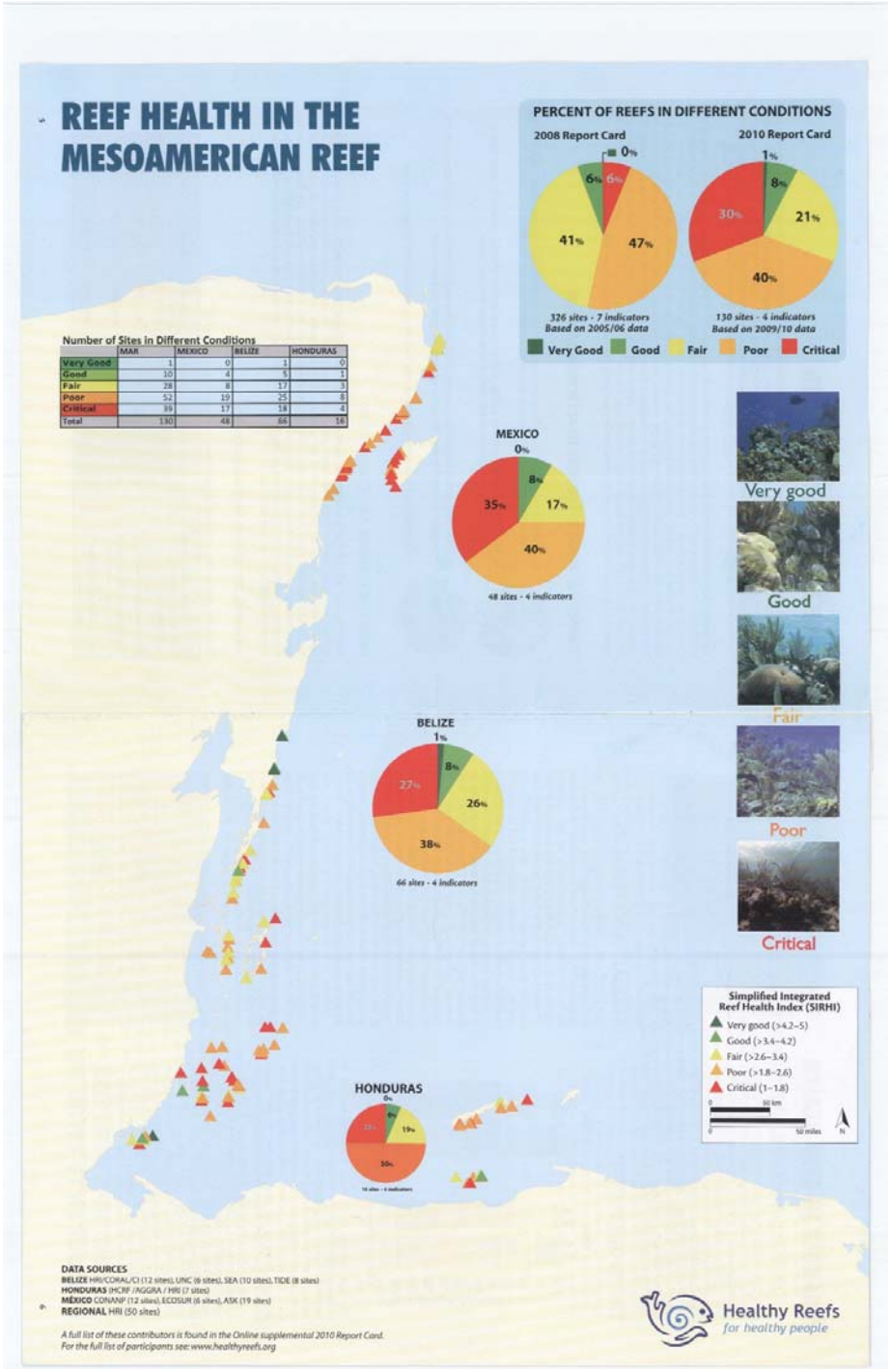
Annexe 1. An illustration of the Reef Health in the Mesoamerican Reef[260]



[260] *cf. supra:* Healthy Reefs for Healthy People (2010), P.5-6.

Annex 2. Tasks of the mediator

Phases of Conflict Resolution	Tasks
Pre-negotiation	Meeting with potential stakeholders to assess their interests and describe the consensus-building process; handling logistics and convening initial meetings; assist groups in determining best alternatives to a negotiated agreement
Establishing representation	Caucusing with stakeholders to help choose spokespeople or team leaders; working with initial stakeholders to identify missing groups or strategies for representing diffuse interests
Drafting protocols and setting agenda	Preparing draft protocols based on past experience and the concerns of the parties; managing the process of agenda setting
Engaging in joint fact finding	Helping to draft fact-finding protocols; identifying technical consultants or advisors to the group; raising and administering the funds in a resource pool; serving as a repository for confidential or proprietary information
Negotiation	
Inventing options	Managing the brainstorming process; suggesting potential options for group to consider; coordinating subcommittees to draft options
Packaging	Caucusing privately with each group to identify and test possible traders; suggesting possible packages for group to consider
Written agreement	Working with subcommittee to produce a draft agreement; managing a single-text procedure; preparing a preliminary draft of a single text
Binding the parties	Serving as the holder of the bond; approaching outsiders on behalf of the group; helping to invent new ways to bind the parties to their commitments
Ratification	Helping the participants "sell" the agreement to their constituents; ensuring that all representatives have been in touch with their constituents
Implementation or post negotiation	
Linking informal agreements and formal decision making	Working with the parties to invent linkages; approaching elected or appointed officials on behalf of the group; identifying the legal constraints on implementation

Monitoring	Serving as the monitor of implementation; convening a monitoring group
Renegotiation	Reassembling the participants if subsequent disagreements emerge; helping to remind the group of its earlier intentions
	Source: Cicin-Sain & Knecht (1998)

Annex 3. General socio-economic and environmental situation

Information	Suggested tools and techniques
The geography of the community (spatial data) Environment, settlement patterns and households (characteristics and size), boundaries, infrastructure, resources, marine resource use and landuse patterns	Sketch maps: Marine resource use sketch maps, landuse maps, social maps, village resource maps, transect walk
History of the community: Significant occurances and changes in the people's live and their environment, migration patterns, etc. How people have coped with changes and circumstances in their lives over time.	Times lines Trendlines Historical transects Historical maps/models
Seasonal trends, e.g., Fishing activities, food availability	Seasonal calendar Seasonal activity calendar (by gender) Livelihood diagram Trend lines
Social composition of the community Significant individual, groups and institutions in the community and their relationships. The relevance of their roles and status to the development theme under discussion. **Community leadership and power structure:** Who has the authority in the community to make or influence what decisions? Who is respected in the community? Who are the formal leaders and the informal leaders of the community?	Venn diagrams Linking diagramming/ scoring Observation Focus group discussion In-depth interviews Wealth ranking
Economy of community	Livelihood mapping Wealth ranking
Group relationship patterns in the community The different roles of various groups in the community How various groups view each other and their roles	Seasonal activity calendar Daily activity calendar Focus group discussion Role playing Observation
Culture of the community Religion, beliefs, customs, value, labels, vocabulary and categories used by potential interaction groups for discussing various issues; meanings people have about their lives; ways in which people express their emotions and needs such as songs, dances, drama, art cultural sites;	Participant observation Audio-visual recording Photographs Village map Transect walk Story telling

mode of dressing; other non-verbal expressions; knowledge that people use to interpret their experience and social behaviour	
Patterns of community access and control of resources Determine the different levels of access and control various groups have to the resources in the community necessary to sustain their livelihood. Access and control profile	Access and conyrolprofle Focus group discussion
Past experiences of community with resource management and conservation projects How did community relate to such initiatives? What the people liked and disliked about such efforts?	Focus group discussion In depth interviews Time lines
Current people- initiated resource management efforts and outside development agencies/ projects in the community	Focus group discussion
Source: Anyaegbunam, C, P. Mefalopus and T. Moetsabi, (2004)	

Annex 4. Example of some international NGO's engaged in marine conservation

International NGO	Mandate/Mission	Web site
Conservation International (CI)	Conservation International's mission is to conserve the Earth's living natural heritage, the global biodiversity, and to demonstrate that human societies are able to live harmoniously with nature.	www.conservation.org
International Ocean Institute (IOI)	The International Ocean Institute's mission is to ensure the sustainability of the Ocean as "the source of life", and to uphold and expand the principle of the common heritage as enshrined in the United Nations Convention on the Law of the Sea; and promote the concept of *Pacem in Maribus* and its management and conservation for the benefit of future generations. The capacity-building programme of the IOI is IOI-OceanLearn.	www.ioinst.org
The Nature Conservancy (TNC)	The Nature Conservancy's mission is to preserve the plants and animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. The Nature Conservancy has over a hundred marine projects around the world.	www.nature.org
Wildlife Conservation Society (WCS)	The Wildlife Conservation Society aims to save wildlife and wild lands through science, international conservation, education, and the management of the world's largest system of urban wildlife parks, led by the flagship Bronx Zoo. Together, these activities change individual attitudes toward nature and help people imagine wildlife and humans living in sustainable interaction on both a local and a global scale.	www.wcs.org
World Wide Fund for Nature	WWF is one of the World's largest conservation organizations, with almost 5 million supporters and a global network active in more than 100	www.wwf.org

(WWF)	countries. WWF forms partnerships with governments, communities and other institutions to assist in the sustainable management of MPAs.	

Annex 5. Methodologies for evaluating MPA management effectiveness

Methodology	Characteristics	Strengths	Issues to consider
World Heritage Management Effectiveness Workbook (www.enhancingheritage.net)	• Broad-scale • Contains worksheets on context, planning, inputs, processes, and outcomes • Qualitative and semi-quantitative	Incorporates a wide range of views from internal and external participants on all elements of management	• Designed for World Heritage sites, so some adaptation may be needed for other protected areas • Funding is necessary for workshops, and possibly for a consultant if MPA managers are not available • Pilot assessments have taken 6-12 months on average to conduct
Workbook for the Western Indian Ocean (www.wiomsa.org)	• Based on World Heritage method • Broad-scale, but with simpler worksheets than World Heritage method • Qualitative and semi-quantitative	Same as above	• Funding is necessary for workshops, and possibly for a consultant if MPA managers are not available • Requires 2-3 months to conduct and the capacity to facilitate workshops and surveys

How Is Your MPA Doing? (http://effectiveMPA.noaa.gov)	• Fine-scale • Focuses on individual indicators, selectable from a generic list • Offers a variety of methods for data collection and analyses of a wide range of indicators • Qualitative and quantitative	• Provides guidance on linking objectives with indicators • Offers good coverage of biophysical and socio-economic outcomes • Gives detailed instructions for collecting and processing data	• Most useful for mature management arrangements (manual advises that it be used for MPAs in existence for 2 years, with a management plan in place) • May be time-consuming, and technically and financially demanding • Requires clear management objectives as a basis for selecting indicators
The Nature Conservancy 5-S framework (nature.org/summit/files/five_s_eng.pdf)	• Fine scale • Provides criteria, questions, and scoring systems to assess status and changes in threats and ecological integrity • Qualitative	• Focuses on threat reduction, with direct relevance to immediate management decisions • Supports strategic planning by gauging ecological integrity • Can be used to compare sites and strategies	• Focuses on outcomes only • Provides indications for overall systems, not specifics for each species or threat • Designed for small-scale and short-term conservation initiatives
World Bank Scorecard to Assess Progress (www.MPAscorecard.net)	• Scorecard initially aimed at MPAs supported	• Is quick, simple, and inexpensive	• Quality and relevance of results are

	by Global Environment Facility projects • Questionnaire addresses context, planning, inputs, processes, outputs, and outcomes • Qualitative and semi-quantitative	• Allows comparisons across sites if used consistently • Incorporates some site-specific objectives and challenges into scoring	based entirely on knowledge and perspectives of respondent(s) at one point in time • Method designed primarily for self-assessment by MPA staff (does not involve other stakeholders)
MPA Report Guide and Rating System (www.coast.ph/text/)	• Contains a survey developed for use as part of a national rating system for Philippine MPAs • Surveys addresses mostly context, processes, and outputs • Qualitative and semi-quantitative	• Is quick and simple •Allows comparisons across sites if used consistently	May need to be adapted for use by MPAs elsewhere

Source: Leverington F., Hockings M., Pavese H., Lemos Costa K., and Courrau J. (2008) Management efectiveness evaluation in protected areas – A global study. Supplementary report No.1: overview of approaches and metodologies. The University of Queensland, Gatton, TNC, WWF, IUCN-WCPA, Autralia. Pp.188.