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Ocean &
Coastal
Management

Ocean & Coastal Management 48 (2005) 932–947

www.elsevier.com/locate/ocecoaman

Marine protected areas: a tool for integrated coastal management in Belize

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Available online 31 May 2005

Abstract

Management of the Belize Barrier Reef was originally envisioned through the creation of marine protected areas. However, the influence of land-based activities was not accounted for in Marine Protected Area (MPA) programs. Therefore focus was shifted to an integrated approach via Integrated Coastal Management (ICM). The Belize ICM process has evolved into a system of coordination through the fostering of multi-sectoral linkages for integrated management of coastal resources. Marine protected areas were included in the ICM program as tools for achieving biodiversity protection and management of sensitive habitats. The ICM process has resulted in greater coordination and consultation in decision making for coastal resource issues, the MPA program however has not evolved with the trend of greater community involvement in MPA management. The greatest challenges to MPA and ICM programs in the next 10 years are: improved linkages between the two, fostering of community participation in management, broadening of the scope of ICM to watersheds and ocean governance, and sustainable financing for both programs.

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1. Introduction

The coastal area of Belize is an outstanding natural system renowned for the largest barrier reef in the Western hemisphere. The Belize Barrier Reef possesses a rich and diverse array of marine ecosystems and habitats in a network of shallow inshore reefs and numerous sandy and mangrove cayes, with various habitats such as

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doi:10.1016/j.ocecoaman.2005.03.007

patch reefs, faros, coastal lagoons and estuaries. The reef system is representative of the three main reef types with fringing reefs along its mainland coast, the main barrier reef and three offshore atolls (Lighthouse Reef, Glovers Reef and Turneffe Atoll).

The Belize Barrier Reef contributes significantly to the country's Gross Domestic Product, approximately 30%, through provision of commercial fisheries products such as conch and lobster; a high quality eco-tourism product and recent boom in cruise tourism; private sector investments for coastal developments and aquaculture. The management of these resources and their use is a great challenge for a developing nation such as Belize. Aside from the global threats of climate change and natural disasters (primarily hurricanes), the marine resources face threats from within borders such as over fishing, coastal developments resulting in increased sedimentation and eutrophication, agricultural run-off from pesticides and fertilizers; and across borders from Central American neighbors through poor agricultural, fishing and development practices. In addition the coastal and marine resources are also susceptible to regional threats from the Caribbean.

2. Evolution of Marine Protected Areas (MPA) and Integrated Coastal Management (ICM) programs in Belize

The concept of marine protected areas as a means to preserve unique and important marine habitats was first embraced in the early 1980s with the designation of the Half Moon Caye Natural Monument. This MPA was established in recognition of its biological significance as an important fishery area with a pre-existing terrestrial component on account of the red footed Booby (established from 1928). This was done in realization that such areas required protection and management to be preserved. Later that decade, increased awareness of MPAs as tools for managing coastal and marine resources was realized through the lobbying of local communities in San Pedro for the designation of the Hol Chan Marine Reserve in 1987, to preserve and manage depleted reefs in the Ambergris Caye area [1]. This new recognition that MPAs serve not only for conservation and protection but also to improve habitats for fisheries and to enhance tourism, was an important step in achieving sustainable use and management of the Belize Barrier Reef. Gibson [2] noted that initially the Great Barrier Reef Marine Park was envisioned as a model for the management of the Belize Barrier Reef through establishment of marine protected areas. However it was realized that an integrated approach would be more suitable to ensure the incorporation of land-based activities outside marine protected areas, such as sedimentation and pollution, which pose significant threats to reef and coastal areas.

The Integrated Coastal Management process in Belize started in 1989 with a workshop organized by the Fisheries Department for government and NGO partners involved in the management of coastal and marine resources. All stakeholders agreed that an integrated approach was necessary for sustainable use and management of the Belize Barrier Reef and associated ecosystems, in light of the

cross cutting management challenges that were being encountered. These challenges included fisheries management, tourism development and the potential impacts on the marine environment and management of land-based activities primarily agriculture. This led to the formation of a Coastal Zone Management Unit (CZM Unit) in 1990, within the Fisheries Department. The CZM Unit was supported through technical assistance from the UNDP/GEF funded Coastal Zone Management Project (CZMP) from 1993 to 1998. It was realized that the CZM Unit's location in a sectoral Ministry provided limited management capability and was an obstacle in achieving an integrated approach. Through the assistance of the CZM Project, institutional arrangements were formulated for the establishment of a more permanent CZM program. The first major step towards a CZM program was achieved with the establishment of the Coastal Zone Management Authority and Institute (CZMA/I) in 1998 as a statutory body, through the CZM Act of 1998.

Although, initial management efforts for the Belize Barrier Reef focused on marine protected areas this focus was shifted to a broader multi-sectoral approach, adopting the principles of integrated coastal zone management to account for both marine and land based activities. Under a second UNDP/GEF funded project for the "Conservation and Sustainable Use of the Belize Barrier Reef Complex" implemented by the Coastal Zone Management Authority and Institute (CZMA/I), the development of a marine protected areas network was a key component and served as a tool in achieving ICM. Key partners in ICM and MPA initiatives include the CZMA/I, Fisheries, Forestry, Ministry of Natural Resources, Ministry of Tourism, fishing cooperatives, conservation NGOs, Community Based organizations (CBOs), international donor agencies such as World Wildlife Fund, The Nature Conservancy and Wildlife Conservation Society. In the development of the ICM program several conflicts arose during public consultations on the Integrated Coastal Zone Management Strategy (ICZM) for Belize. The groups which had continuous conflict and opposition to the ICZM Strategy were the fishing communities and cooperatives of Belize, primarily since they viewed the MPA program within ICM as inhibitory and exclusive of the fishing interests. This conflict was resolved through greater consultations for the creation of new or proposed MPAs. It was also realized that an educational program targeting the fishing community was necessary to provide a proper understanding of marine protected areas. Fishermen often perceived these as non-extractive thereby resulting in the loss of their fishing livelihoods.

3. Principles, approaches and legislative framework for MPA and ICM programs

The major objectives of marine protected areas in Belize are for the conservation of ecosystem and species diversity, protection of commercially valuable species and the management of tourism and recreational activities. Key principles adopted in the designation and management of MPAs are the habitat approach where activities are managed based on impacts to associated habitats; the land–sea interface which

recognizes the importance of managing adjacent terrestrial areas; participatory process to include the views, inputs and encourage support of stakeholders; and collaborative management between government, NGOs and local communities. Marine Protected Areas are established following a comprehensive system of planning based on scientific data, mapping of critical habitats and uses, assessments of the area, public consultation, etc. Stakeholder participation in the management of MPAs is accomplished through the establishment of advisory committees, which provide advice on critical areas for management. Based on the particular objectives, MPAs are designated ranging from no-take MPAs (which do not allow any type of extraction) to multiple use MPAs (which allow a range of activities including fishing, recreation, tourism, research). Marine Protected Areas in Belize are established based on classification according to the IUCN system for protected areas, under two pieces of legislation. Marine Reserves are established through amendments to the Fisheries Act (Regulations of 1983 and 1988) under the Fisheries Department. National Parks, Wildlife Sanctuaries, Natural Monuments and Nature Reserves are established through the National Parks Systems Act under the Forestry Department.

The overall goal of Integrated Coastal Management in Belize is to support the allocation, sustainable use and planned development of Belize's coastal resources through increased knowledge and building of alliances, for the benefit of all Belizeans and the global community [3]. There are three major objectives of ICM which include: increasing knowledge and sustainable coastal resource use; supporting planned development and building alliances to benefit Belizeans. The formulation of an ICM program for Belize was based on the following principles: a balance between conservation and development; cross-sectoral and interdisciplinary decision making; high quality research and data management; application of environmental best practices in the coastal zone; application of the precautionary principle; decisions should incorporate the knowledge, aspirations and requirements of local communities; and recognition of all national, regional and international activities and initiatives for management of natural resources. The ICM program utilizes the approach of multi-sectoral coordination in ensuring that cross-sectoral decisions reflect an integrated coastal resource management.

Integrated Coastal Management is regulated through a primary piece of legislation, the Coastal Zone Management Act of 1998. Under the CZM Act the CZM Authority was created with a coordinating, advisory and planning role. The CZM Authority is comprised of the major government ministries involved in coastal and marine resource issues. The CZM Authority is responsible for the formulation of a CZM Plan for Belize and is supported through a technical Institute. The CZM Institute is mandated under the Act to provide technical advice to the Authority in the formulation of the CZM Plan and policies relevant to ICM. Its major role is to conduct monitoring and research in the coastal zone of Belize and provide education and training in coastal resource management aspects. Through the CZM Act, the Authority is able to charge a range of environmental management fees for activities and uses of the coastal zone towards a sustainable CZM Program.

4. Types of MPA and ICM programs in Belize

The first MPA established in Belize was the Half Moon Caye Natural Monument in 1982 with its primary purpose for the preservation of natural heritage, education and research. The total area of the MPA is 3925 ha of which 3907 is marine habitat where fishing is restricted; as such there are no provisions for zoning. The primary activities within this MPA are research, environmental education and recreational activities such as diving, snorkeling etc. There is a lack of a buffer area surrounding the MPA. However there is another MPA, the Blue Hole Natural Monument in the adjacent area that is co-managed by the same NGO, the Belize Audubon Society. The Hol Chan Marine Reserve was the next MPA to be declared in 1987. This reserve was established as a multiple use MPA for the main purpose of fisheries management and enhancing sustainable tourism. Hol Chan Marine Reserve has a total area of 1320 ha, comprising of four zones A, B, C D. This MPA is a multiple use marine reserve, with specific regulations governing activities within each zone, a Board of Trustees and a fee system for the MPA. The regulations specify a non-extractive Zone A for recreational activities. Zones B and C, allow sport and commercial fishing under special license. Zone D is designated as a general use zone with fishing allowed except in two Exclusive Recreation Areas for snorkeling.

Since then 12 more Marine Protected Areas have been established and include three Wildlife Sanctuaries, one Natural Monument, one National Park, and seven Marine Reserves (Fig. 1). Seven of these MPAs form the Belize Barrier Reef Reserve System World Heritage Site designated in 1996 under the UNESCO World Heritage Convention. This designation was based on their universal natural heritage value representative of unique biological reef formations. The seven sites illustrate the evolutionary history of reef development and are a significant habitat for threatened species, including marine turtles, manatees and the American marine crocodile. These sites include: Bacalar Chico National Park and Marine Reserve, Laughing Bird Caye National Park, Half Moon Cay Natural Monument, Blue Hole Natural Monument, Glovers Reef Marine Reserve, South Water Cay Marine Reserve, and the Sapodilla Cayes Marine Reserve (Fig. 1). The date of establishment and size of these and the other five MPAs can be found in Table 1. These 14 MPAs form a national network, administered by the Fisheries and Forestry Departments with several co-management partners. The network is coordinated through a Marine Protected Areas Working Group, which is established under the CZMA/I.

The Integrated Coastal Management system established through the CZM Act is an advisory and collaborative process with the aim of coordinating the cross-sectoral activities of the various government agencies involved in coastal resource management. It does not include or allow for regulatory aspects of ICM, all regulatory activities relating to dredging, fishing, mangrove clearance and coastal development are the responsibility of the respective government agencies under the Ministries of Natural Resources, Tourism and Agriculture & Fisheries. The ICM program encompasses resources in the Belize coastal zone as defined within the CZM Act, from the mean high water mark to the territorial sea limit. The key issues addressed in the program include the broadening of critical knowledge for informed decision

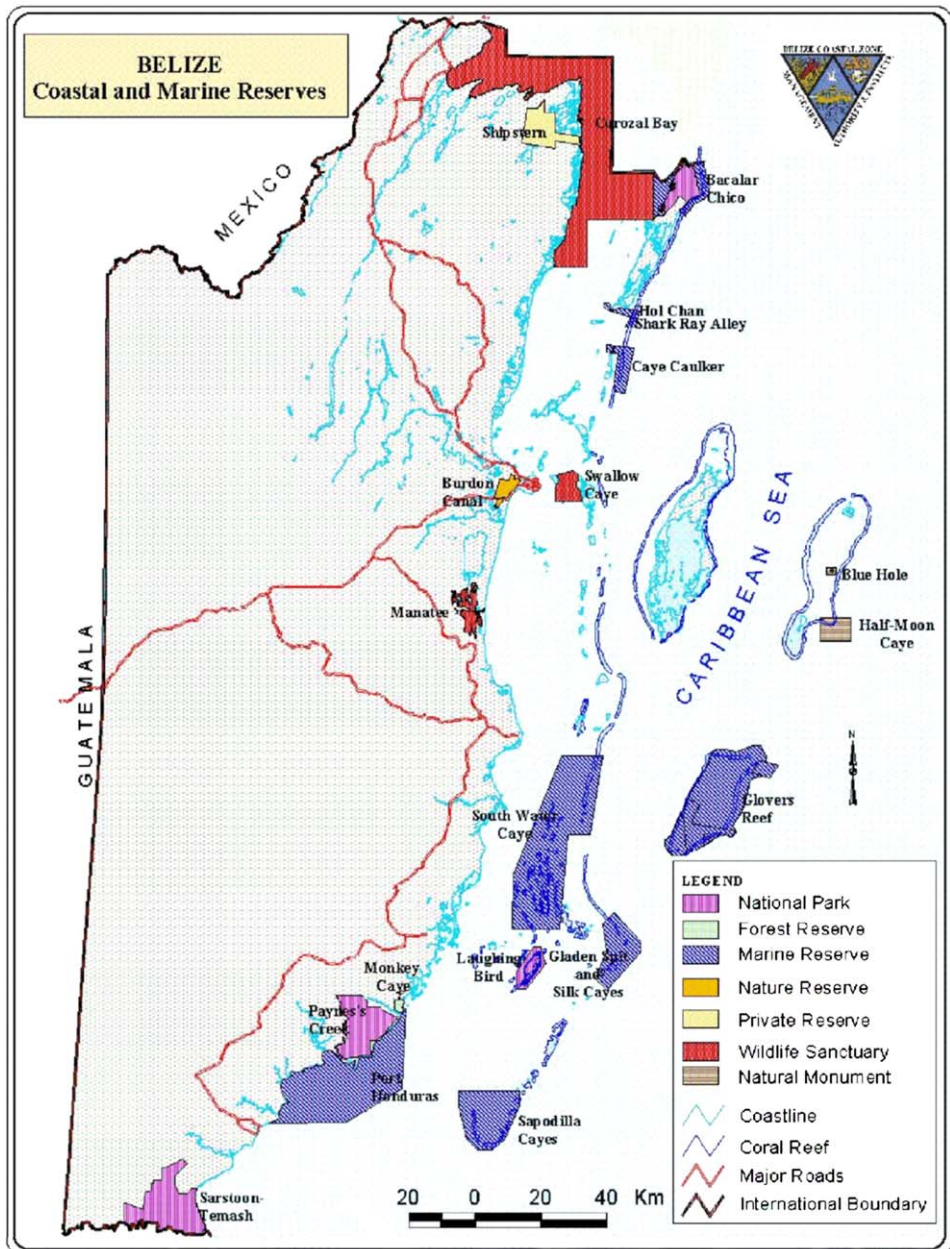


Fig. 1. Map of the Marine Protected Areas of Belize showing the 13 MPAs spanning the Belize Barrier Reef representative of the marine habitats within the system. These MPAs range from National Parks to Wildlife Sanctuaries to Marine Reserves.

Table 1
Marine Protected Areas of Belize

Protected area	Date established	Total area (ha)	Marine area (ha)	No-take area (ha)
Corozal Bay Wildlife Sanctuary	1998	n/a	n/a	n/a
Bacalar Chico Marine Reserve	1996	11,303	6118	894
Hol Chan Marine Reserve	1987	1320	1224	273
Caye Caulker Forest and Marine Reserve	1998	3953	3913	u
Swallow Caye Wildlife Sanctuary	2002	8970	n/a	n/a
Blue Hole Natural Monument	1996	410	410	410
Half Moon Caye Natural Monument	1982	3925	3907	3907
Gales Point Wildlife Sanctuary	1998	9095	9095	9095
South Water Caye Marine Reserve	1996	29,789	29,153	u
Glovers Reef Marine Reserve	1993	35,067	35,018	270
Laughing Bird Caye National Park	1996	10119	10,094	10,094
Gladden Spit Marine Reserve	2000	n/a	n/a	n/a
Sapodilla Cayes Marine Reserve	1996	12,742	12,722	u
Port Honduras Marine Reserve	2002	40,521	39,848	u

u = unknown, n/a = not available.

making with scientific research and monitoring as key components, supporting planned development to address resource use and development control both on land and in sea thereby reducing impacts to coastal resources, and stakeholder participation in forging linkages for coastal resource stewardship in decision making, monitoring, etc. The major aim of the program is to fully integrate all activities within the coastal zone through integrated decision making and participation of both public and private sectors for the conservation and sustainable use of the Belize Barrier Reef and associated coastal resources.

The CZM Act (1998) calls for a Coastal Zone Management Plan for Belize. The first element of the CZM Plan is the ICZM Strategy, recently adopted by the government. The Strategy outlines overarching national objectives and provides guidance on how these objectives can be met. It integrates legislative requirements, regulations, policies and plans which already exist for Belize's coastal zone while identifying the elements which are lacking. The CZM Plan will include inter alia guidelines for development in Belize's coastal zone; guidelines for the general monitoring of the coastal zone; various policies and proposals on land use, planning for marine protected areas and conservation of threatened or potentially threatened or endangered species, recreation and tourism, etc; public education programs and recommendation for public participation in management of coastal resources; recommendations for strengthening governmental policies; and the conduct of research for the purposes of coastal resources conservation and management. Under the ICM Program, the coastal zone of Belize is divided into nine coastal planning regions based on key geographical and cultural features (Fig. 2). For each of these nine coastal planning regions, development guidelines have been prepared which

determine the suitability of development in each region. These plans form the first component of the CZM Plan, and will provide significant improvement in the management of development activities.

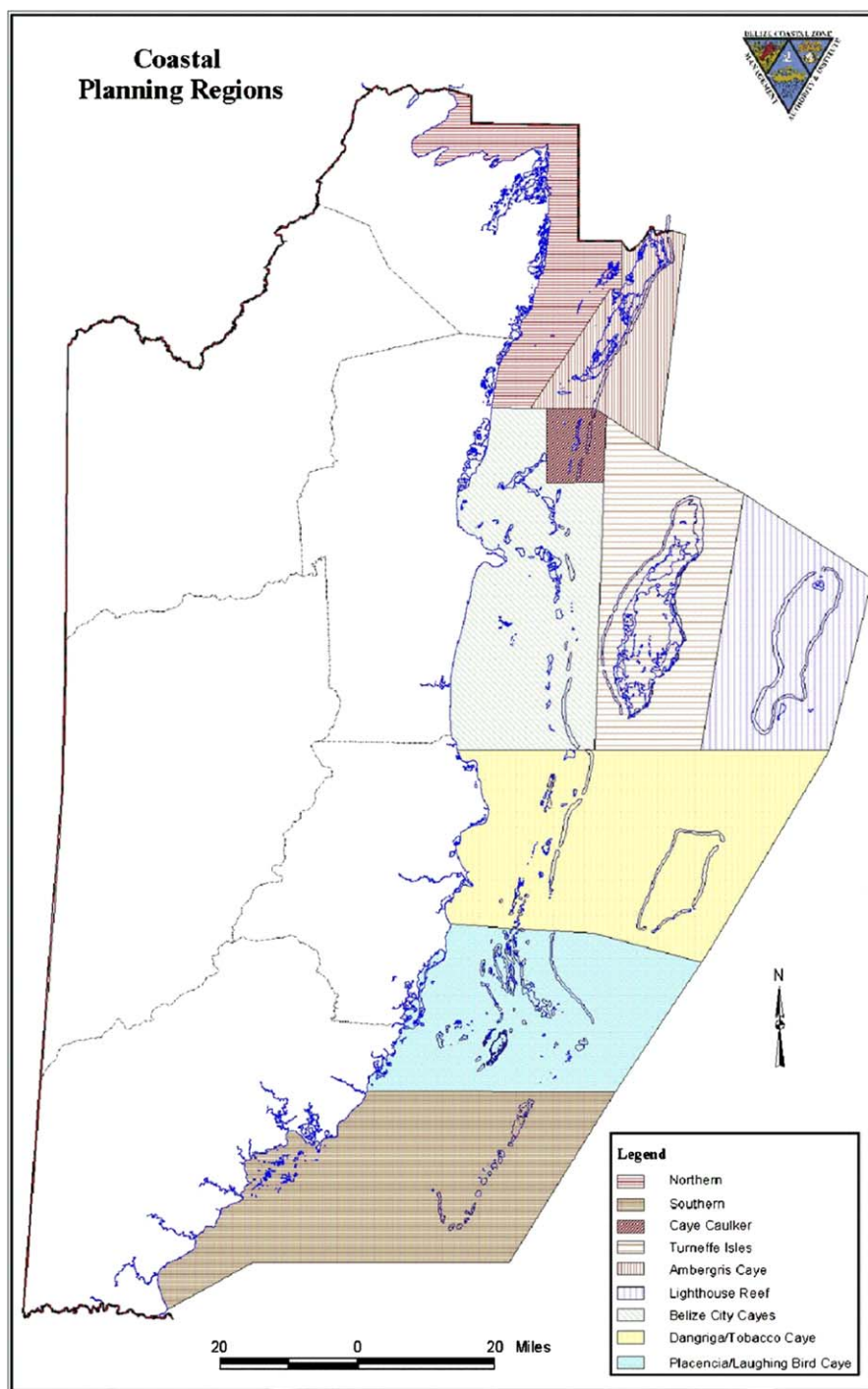
The ICZM Strategy identifies the need for improved coordination and creation of national policies for coastal and marine protected area management to ensure biodiversity protection. The ICM program entails the provision of advice in the adoption of policies guiding various coastal development activities, planning to ensure sustainable use, public awareness and education on coastal issues, and fostering stakeholder participation in decision making. The initiatives of the program will build upon and strengthen existing regulatory systems currently in place which control uses and activities within the coastal zone. Due to the limitations of the legislation, the ICM program does not currently address land-based or watershed issues. In recognition of the importance of the land–sea interface however, planning of marine protected areas and assessment of development applications take both terrestrial and marine issues into consideration.

5. Governance, financial arrangements and enforcement

Marine Protected Areas are administered by the regulating agency either Fisheries or Forestry Department. Stakeholder participation is included through the creation of MPA Advisory Committees comprised of the major stakeholders, usually from public sector regulating agencies, such as Fisheries, Forestry, Department of the Environment, Lands Department, local government, the private sector such as the fishing and tourism industries and local communities. These MPA Advisory Committees serve as a means of community participation in the provision of advice and guidance to the MPA management. There is often good support from national and local levels of the government, however local communities and NGOs often feel marginalized when advice is not incorporated into management efforts.

MPAs in Belize are largely financed through grant and project funding from international donors. The majority of MPAs are currently funded through the UNDP/GEF project executed by the CZMA/I with a few surviving off entrance fees supplemented by research or small grants. The more recent MPAs are lacking in on site management. The Hol Chan Marine Reserve is the only MPA that is self-funding through the collection of fees administered through a Trust Fund. This Fund reported profits for the first time in 2002. All other marine protected areas lack a viable financing mechanism with a few, such as Laughing Bird Caye National Park, striving towards a system of fees. The creation and legal adoption of a system for MPA financing is a critical factor for the continued provision of MPA management.

A few MPAs possess established regulations governing use and activities within the MPA. These regulations are enforced by MPA rangers and wardens who conduct daily patrols and surveillance of the areas. Based on legislation which gives the Fisheries and Forestry Departments the legal authority to administer the MPA, the rangers possess search and arrest powers to aid in enforcement. Due to short term,



uncertain and limited financial resources, there is usually an inadequate capacity to effectively enforce the MPA regulations. The lack of legislated regulations in other MPAs is a great deterrent to successful resource management as the MPA staff is unable to enforce the draft legislation and instead depend on the understanding and awareness of users.

The CZM Act outlines the governance framework for ICM through the establishment of a governing committee, the Board of Directors of the CZM Authority, and a technical advising committee, the CZM Advisory Council. The technical committee is comprised of a range of public and private sector agencies that provide advice on various coastal issues to the CZM Authority. The CZM Authority incorporates this information into policies, plans or legislation for approval by the Board of Directors of the Authority, the decision makers. The Board is comprised of the Chief Executive Officers of four main ministries governing coastal resource issues: natural resources, agriculture & fisheries, tourism and economic development; in addition to NGO, business sector and academic community representatives with the Chief Executive Officer of the CZM Authority as secretary to the Board. The CZM Authority and Institute is the lead agency responsible for the execution of an ICM Program in Belize and coordinates the formulation of policies and legislation for approval by the CZM Authority Board.

The government is well represented on the technical CZM Advisory Council, through the heads of the various government departments, such as Fisheries, Geology and Petroleum, Forestry, Physical Planning, Department of the Environment, Port Authority, Belize Tourism Board, Public Health, and Economic Development. The local government is involved in the ICM process through the coastal planning program and the preparation of planning guidelines. Local government in each of the nine coastal regions is represented on the Coastal Advisory Committee (CAC) which provides advice in the review and adoption of the planning guidelines. When these guidelines have been adopted, these CACs will have the responsibility to monitor their implementation. The local communities in each coastal region are also represented on the Coastal Advisory Committees (CAC). Through the CACs the participation of stakeholders in the provision of advice for decision making is realized, with the representation of fishing communities, local hotels, tour guides, NGOs, village and town councils. In coastal regions which contain marine protected areas, the stakeholders represented on the larger CAC are also involved in MPA management through the MPA Advisory Committee.

Achieving Integrated Coastal Management is a challenging task as it involves integration of all uses and activities within the coastal zone, which often prove conflicting with each other. The approaches to conflict resolution that the Belize ICM initiative adopted has been that of education and awareness to foster greater understanding and support of the ICM process, ensuring public participation



Fig. 2. Map of the nine coastal planning regions of Belize, which form the basis of the coastal area for ICM. For each of these coastal planning regions development guidelines are prepared for the management of activities within the regions.

through consultations on issues which impact a range of uses, and enabling the involvement of stakeholders on the various MPA Advisory Committees and the Coastal Advisory Committees. Recent conflicts have involved fishers and the tourism industry, whereby fishers felt that MPAs were being created solely for tourism and that they would be marginalized by closure of these areas to fishing. These conflicts were resolved through consultations to arrive at a common ground which involved provision of general use areas for fishing, absence of no-take MPAs, and training in alternative livelihoods, often tourism related.

The financing of ICM in Belize has been largely through international funding from donors such as the Global Environmental Facility (GEF) through the United Nations Development Program (UNDP) and the European Union (EU). The government provides a small subvention for the CZM Authority, but the CZM Authority and Institute requires significant committed resources to ensure the successful achievement of ICM. The challenge for the Government of Belize is to secure funding for ICM within 2004, to ensure the continuity of the program. It is envisioned that sustained financing will be achieved through environmental management charges, levied through the CZM Authority for use of resources in the coastal regions of Belize.

6. Major challenges of the MPA and ICM programs

The major challenges to MPA management in Belize are the lack of adequate administration and the failure of the MPA program to evolve with the changing trend towards devolution of authority from government to greater community involvement in MPA management. The Forestry Department has been proactive in this regard and has transferred MPA administrative responsibilities to co-management partners through memorandum of agreements, in realization that the Department lacks the human and financial resources to accomplish the task. Added to this is the recognition that for successful MPA management the involvement in and ownership of the process by stakeholders is critical. The Fisheries Department has been more reluctant in delegating responsibility for MPA administration, despite the fact that the Department lacks the critical financial or human resource capacity to achieve successful management. As a result the marine reserves under the Fisheries Department have not been as effective as the national parks. According to McField [4], although Belize started as a global leader in MPA development in the 1980s and early 1990s, it has not kept pace with the advances in MPA management. Recently however, the Fisheries Department has been developing co-management arrangements with local community based organizations and local NGOs for the management of the marine reserves. Despite this, there is still much improvement necessary as agreements are neither legally binding nor do they delegate management responsibility. These deficiencies will continue to impede the development of MPAs in Belize until a formal or legal arrangement is developed for co-management of MPAs.

Another critical obstacle faced by the MPA program in Belize is the issue of financial sustainability. The only MPA to be self-funded is the Hol Chan Marine Reserve through a Trust Fund. This system in itself however, has experienced great difficulties with transparency of accounting procedures and decision making regarding financing for the reserve. All other MPAs are funded through international donors either under the UNDP/GEF project executed by CZMA/I or from various environmental foundations and international NGOs such as Summit Foundation, The Nature Conservancy, World Wildlife Fund, etc. Long-term success of the MPA program is impossible without secure financing, and this poses perhaps the greatest challenge to Belize's MPAs. There have been several initiatives to implement a system of financing for the MPA network which have been met with various obstacles ranging from institutional arrangements to objections from the tourism industry to additional fees, often perceived as detrimental to the industry. The government has recently approved a standard \$10 US entrance fee for the Marine Protected Area Network, to be implemented by November 2004. This fee system must be properly implemented to address any concerns from the tourism sector. If MPA management is to be a long-term strategy for ICM, this financing system must be fully implemented within the next year since the original funding for the program has been exhausted.

The ICM process in Belize has been relatively successful having evolved with the agreement of all interested parties that integrated coastal management was the necessary approach for the management and sustainable use of Belize's coastal resources. The process has however experienced a few obstacles to its successful establishment. This includes the embracing of the concept of integration by the multi-sectoral range of government agencies involved in different aspects of ICM. Initially, there was significant resistance to the culturing of an integrated approach to coastal area management often accompanied by turf protection. Integration and coordination of activities have been greatly improved through continued consultations with the various government agencies. Presently, monitoring and assessment efforts for various coastal development activities involve multidisciplinary teams. In the decision making process various government departments and the private sector are regularly consulted. The Coastal Zone Management Authority and Institute is routinely involved in assessments for coastal development applications. It is important to note that there is room for improvement in the coordination of ICM efforts, as a few Departments continue to resist the adoption of an integrated approach and interagency consultation. Perhaps the means to achieving this is through the development of formal agreements and/or legal mandates for coordination of management activities and sharing of critical information to support the ICM process.

The securing of sustainable financing for ICM is a next major obstacle in achieving an ICM program. As briefly discussed, Belize is in the process of completing the CZM Plan and ICZM Framework. Key to achieving this objective has been the project funded by the UNDP/GEF "Conservation and Sustainable Use of the Belize Barrier Reef Complex", which has established the framework and capacity for ICM in Belize. This project ends in 2004 along with the current

financing for ICM. This will create a large gap in the long-term funding for the ICM Program. The Government of Belize cannot support such a program given its limited financial resources. The CZM Authority and Institute has the responsibility to identify and implement a framework for the financing of ICM. Recent government efforts to enable financial sustainability for ICM have been the approval the endorsement of a special marine management area administered by the CZMAI, which enables the organization to charge a user fee of \$10 US. This marine area in the central Belize Barrier Reef is a highly frequented area for tourism activities, particularly cruise tourism. The timeline for implementing these measures for long-term financing of ICM is a year, if an ICM program for Belize is to be realized.

7. Program outputs and long-term vision

Any MPA program should be monitored and assessed regularly to detect deficiencies and to produce lessons learned that can be shared or built upon. The MPA Advisory Committees can aid in regular monitoring of management effectiveness through assessment of the work plan implementation. However there is a great deficiency in this system. The only assessment of the MPA program to date was commissioned by the CZMA/I in 2000 for the marine reserves it finances and administers. The conclusions were that although the managed MPAs had the basic elements for successful management, the overall evaluation of four managed MPAs reported moderately satisfactory performance. In addition only 58% of Belize's MPAs had onsite management, with an expected increase to a total of 75%. The remainder lacked the basic finances or management structure. The monitoring and assessment of management effectiveness is a priority area for the long-term success of MPAs in Belize.

The most successful output from the MPA program in Belize has been increased economic benefits to local communities through development of eco-tourism in these areas and the provision of alternative livelihoods for displaced fishers. In addition, increases in stocks of commercially valuable species have been proven for adequately managed no-take MPAs, such as the Hol Chan Marine Reserve and the Glovers Reef Marine Reserve. The MPA program has developed the interest and ownership of local communities for coastal resource management with development of community based organizations, such as Friends of Nature, who currently co-manage the Laughing Bird Caye National Park. There have been negative side effects however, through the perception of fishers that MPAs are for enhancement of tourism only. This can be addressed through targeted education programs on MPAs and their functions and benefits to local communities.

The Marine Protected Area program has been firmly established through incorporation in national ICM efforts and therefore offer great potential as tools for achieving ICM management in targeted areas of the coast. The MPA network faces numerous challenges however, within the next 10 years. Key to a long-term program is the securing of financing mechanisms, a national policy to coordinate

MPA activities, greater integration into the ICM program, and the creation of legislation for co-management arrangements.

The ICM process has been in existence since the early 1990s through various technical and capacity building CZM Projects. During this period, regular monitoring and assessments of the progress of ICM have been conducted as requirements by the funding agencies. As a result, strengths and weaknesses have been continuously detected over time which led to the development and establishment of a single, permanent entity responsible for ICM based on the Belize experience. These monitoring and assessments produced recommendations for the system of ICM best suited to the legal and regulatory climate of Belize, which is that of an advisory and coordinating program. The ICM process seeks to build upon adequate legal and regulatory frameworks by providing linkages between government agencies to ensure that activities within the coastal zone are integrated.

Belize is currently in the process of developing an ICM Program, through the establishment of a CZM Authority and Institute and the implementation of a project for the conservation and sustainable use of the Belize Barrier Reef. The major output of this initiative has been an ICZM Strategy as the first step towards the completion of a CZM Plan. The development process has resulted in increased awareness of coastal and marine resources and their management, greater coordination of activities within the coastal zone and broad based acceptance and support of the integrated approach to managing coastal resources, through the involvement of coastal communities. The creation of a “culture” for ICM has ensured a strong foundation on which to launch a long-term ICM program for Belize. Within the next 10 years it is envisioned that a full fledged ICM program will be in existence, with complete integration of planning and development activities in the coastal zone, comprehensive monitoring of coastal resources, and adequate means of mitigating against threats to coastal resources. The efforts of the early ICM process have contributed to the reality of a long-term ICM program, with the major challenges being sustainable financing and institutional arrangements.

8. Linkages between marine protected areas and integrated coastal management

Initially MPAs were envisioned as the means of managing coastal resources in Belize, however since they do not take land-based influences into consideration, a wider approach of Integrated Coastal Management was chosen for coastal resource management. Under this new strategy, Marine Protected Areas are treated as tools for achieving ICM and planning for a comprehensive network of MPAs under the ICM initiative was included. The CZM Act and the ICZM Strategy includes provisions for the planning, designation and management of MPAs as a means of ensuring biodiversity protection and sustainable management of the coastal resources.

Under the coastal planning program identified in the ICZM Strategy, the coastal regions of Belize are zoned based on the uses within them, inclusive of MPAs. There has been an ongoing pilot study in one of the planning regions, the Caye Caulker

Planning Region, to link development suitability with marine protected area management in that area. As such the proposed zoning for the MPA incorporates the recommendations within the planning guidelines for Caye Caulker. GIS databases highlight the zones of influence of both MPA and ICM planning and considerations for both are included when making decisions on environmental impact assessments. The MPA program is also linked to the ICM program through governance arrangements. The members on the MPA Advisory Committee are often the same players on the Coastal Advisory Committees and even on the CZM Advisory Council, this arrangement ensures that activities will be integrated and not conflicting through the involvement of stakeholders from the bottom up, particularly as the MPA program is included as a component of the wider ICM Program.

9. Conclusions

While Marine Protected Areas were first seen as the model for achieving sustainable management of the Belize Barrier Reef, Integrated Coastal Management was selected as the strategy to accomplish management of the coastal zone taking into consideration the land-based influences of pollution and sedimentation, which marine protected areas do not incorporate. Belize has taken the lead in the region in implementing an ICM program for its globally significant Barrier Reef and its coastal zone. Integral to achieving ICM is the utilization or incorporation of proven tools to ensure ICM. This is being accomplished through the use of Marine Protected Areas in managing particularly sensitive and biologically diverse marine habitats with the establishment of a network of MPAs to ensure biodiversity protection and sustainable allocation and use. This has resulted in greater integration of activities within MPAs through overall coordination under a larger ICM process.

The challenge for Belize is to create a comprehensive ICM program which incorporates land-based activities, watershed issues and ocean governance under a sustainable financing system of environmental management charges. Parallel to this and equally important is the need for a national policy for MPAs to create a functioning network and a system of financing for MPAs either as a part of the greater ICM financing or as a sub-component. There must be continued efforts for improved coordination and regulation for ICM and devolution of management for Marine Protected Areas to include local communities in the management of their resources. These are the major goals which must be achieved within the next 10 years for the long-term success of Integrated Coastal Management in Belize.

Acknowledgements

Special thanks to Biliana Cicin-Sain, University of Delaware and the National Oceanic and Administrative Agency, who provided support for my attendance and

the presentation of this paper at the International MPA and ICM Workshop in Washington, 2003.

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