

# **Promoting Long-term Sustainable Use and Conservation of Marine Resources in the Eastern Caribbean – A Regional Collaborative Project**

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## **ABSTRACT**

The potential for Marine Protected Areas to support fisheries management has been recognised internationally. Within the Caribbean, Marine Protected Areas are increasingly being seen as tools for managing resource use with regard to coral reef fisheries and thus, a number of fairly new Marine Protected Area initiatives are taking place, which are seen as part of the action strategy for the management of the use of a number of fisheries resources. A role for Marine Protected Areas in Biodiversity conservation in the Caribbean region has also been identified. Against the backdrop of limited budgets and staff resources, eastern Caribbean marine resource management agencies and academic research institutions have expressed a strong need for an effort to help them coordinate available information that may be utilized in evaluation of candidate sites for coral reef fisheries reserves and other marine protected areas in the region. These agencies have also requested assistance in improving regional capacity for monitoring and assessing marine habitats, and data management and synthesis to fill priority gaps in the information. Additionally, a need has been expressed for assistance in developing a coordinated geo-spatial references inventory and data management program of available marine fisheries related information. In support of this, a strategic, collaborative, intervention is being initiated in the eastern Caribbean, with the Natural Resources Management Unit of the Organisation of Eastern Caribbean States, US National Oceanographic and Atmospheric Administration, National Marine Fisheries Service, University of the West Indies, School of Graduate Studies and Research, Caribbean Conservation Association, US Agency for International Development, and the US Department of State all having a part to play. This contribution outlines both the context and the content of this initiative.

**KEY WORDS:** Coral reef fisheries, management of resource use, marine protected areas

### MARINE PROTECTED AREAS

The most commonly referred to generic definition of a Marine Protected Area (MPA) is that of the World Conservation Union's (IUCN) Marine Program (Kelleher and Kenchington 1991), which defines a MPA as: "an area of intertidal or subtidal terrain, together with its overlying waters and associated flora, fauna, historical and cultural features which have been reserved by legislation to protect part or all of the enclosed environments". This definition has been expanded (de Fontaubert et al. 1996) to accommodate a wider range of objectives and multiple benefits, viz.:

"Marine Protected Areas ... are coastal or oceanic management areas designed to conserve ecosystems together with their functions and their resources. MPAs range from small, highly protected reserves that sustain species and maintain natural processes to larger multiple-use areas in which conservation is coupled with various socioeconomic activities and concerns".

In the United States, MPAs have been defined as "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural or cultural resources therein" (US Presidential Executive Order 13158, May, 2000). In general MPAs "... can protect marine biodiversity by protecting endangered species, critical habitats, seed banks, and sources of recruits through the establishment of non-extractive zones or harvest refugia" (Eichbaum et al. 1996). Numerous other benefits, emanating from the setting up of MPAs, have been cited (Sobel 1996, Crosby et al. 2000). These can be placed into five broad categories:

- i.) Protect biodiversity and ecosystem structure, function and integrity,
- ii.) Improve fishery yields,
- iii.) Expand knowledge and understanding of marine ecosystems,
- iv.) Provide recreation and tourism opportunities, and
- v.) Provide socio-economic benefits for coastal communities.

Eichbaum et al. (1996) contend that large multiple-use protected areas can be thought of as demonstrating the concept of ecosystem-based management, where limits of protection in a geographical sense are based on the extent of movements of organisms and physically linked processes. The underlying ecology thus defines the outer boundaries for the area of protection. In recognizing these linkages, MPA planners can work toward conserving ecosystem integrity, not just individual

resources or ecosystem structure. MPA management strategies should be designed with ecological linkages in mind so that the protected area reflects the specific objectives for which it was created (Eichbaum et al. 1996, Crosby et al. 2000). Two basic approaches can be used to promote the long-term, self-perpetuating existence of living natural resources within MPAs (Crosby et al. 2000). The first is based on the principle of "sustainable use," the second is based on the principle of "no-take". Sustainable use approaches are predicated on the concept that the living resources of an MPA replenish themselves naturally and can be harvested (i.e., commercial, recreational and/or subsistence), within limits, on a continuing basis without eliminating them. "No-take" marine reserves are a relatively new and often very controversial human-access management tool for replenishing exploited fish stocks, particularly in North America. In the eastern Caribbean, the Fisheries Acts of at least seven nations define "marine reserves" in which "any person who, ... fishes or attempts to fish ... is guilty of an offence ..." (c.f. Government of Saint Lucia, 1984). Unlike traditional extractive use management strategies, "no-take" marine reserves provide a spatial refuge for living marine resources by banning all fishing and other extractive activities within the reserve's boundaries (Crosby et al. 2000).

The potential for MPAs to support fisheries management has been recognised internationally (c.f. Caddy and Oliver 1994). Within the Caribbean, MPAs are increasingly being seen as tools for managing resource use with regard to coral reef fisheries (Miller and Richard 1997, Corless et al. 1997, Goodridge et al. 1997, Hatcher et al. in press). At the Caribbean Workshop on Marine Biodiversity held in Montego Bay, Jamaica from the 27-29 October, 1998, the two working groups met to discuss respectively: the relationship between Tourism and Marine Biodiversity, and the relationship between Integrated Fisheries Management and Marine Biodiversity Conservation. Both working groups identified a role for Marine Protected Areas in Biodiversity conservation. In fact, the workshop agreed that there was need to establish and maintain a regional network of marine and terrestrial protected areas. This could be done along the broad terms supported by the Convention on Biological Diversity, and the Protocol on Specially Protected Areas and Wildlife in the Wider Caribbean Region ("the SPAW Protocol") of the Cartagena Convention (c.f. Aiken 1999, Haughton and Jacobs 1999, Murray 1999, Salabarría Fernández 1999, Vanzella-Khoury 1999). More recently the consensus is "that MPAs were not a panacea for rescuing troubled fish stocks, but they could be considered as one tool in a kit of management techniques" (Anon. 2000).

**The International Group of Experts on Marine and Coastal Protected Areas** (Crosby et al. 1997) have stated that these areas:

- i) Have a critical role in the management for long-term conservation and sustainable use of marine and coastal biological diversity;
- ii) Function as focal points for development of governance for coastal and ocean systems; and
- iii) Provide for local community education and training in the importance of conserving marine and coastal biodiversity.

The National Center for Ecological Analysis and Synthesis (NCEAS) *Scientific Consensus Statement on Marine Reserves and Marine Protected Areas* (issued at the AAAS meetings of February 2001) succinctly summarizes the state of scientific knowledge about the benefits of no-take MPAs (which the NCEAS terms marine reserves [MRVs]), and strongly advocates using MRVs to offset impending marine conservation crises in heavily overused parts of the oceans. The benefits afforded by MRVs include *inter alia*: increases in abundance and diversity of organisms inside reserves, decreased mortality and habitat destruction, reductions in extinction probability, increased abundances and sizes of organisms outside reserves due to spillover effects, replenishment of depleted populations of organisms, and buffering against environmental variability (AAAS 2001, Crosby et al. 2000).

#### THE CURRENT STATUS OF MARINE PROTECTED AREAS IN THE EASTERN CARIBBEAN

Among the island nations of the eastern Caribbean, MPAs have been seen primarily as tools for fisheries management except in very few instances. In seeking to diversify their economies, eastern Caribbean States are paying particular attention to promoting conservation and expanding eco-tourism in the marine environment. Having said that, in most instances the declaration of these marine protected areas has been done under the aegis of the respective fisheries acts. At present, fairly new MPA initiatives are taking place in Anguilla, Antigua and Barbuda, Commonwealth of Dominica, Saint Lucia, and St. Vincent and the Grenadines. The Barbados Fisheries Management Plan, 2001 - 2003 (Government of Barbados 2001) cites the establishment or expansion and enforcement of "agreed upon marine protected areas" as part of the action strategy for the management of the use of shallow-shelf reef, coastal pelagic, turtle, and lobster resources of that country, primarily to deal with issues such as:

- i) Overfishing due to high mortality of juvenile and adult reef and/or coastal pelagic fish
- ii) Habitat degradation and destruction

In all instances the relevant fisheries authorities are the agencies taking the lead or having responsibility for demarcation, management planning, and/or management itself. Responsibility for day-to-day management has in some cases been envisaged as being passed on to a group of stakeholders. In the case of the Cades Bay Marine Reserve in Antigua, "negotiations" are at present taking place with stakeholders to provide a basis for management of the area. In Dominica, a Local Area Management Authority (LAMA) has been designated for the Soufriere/Scott's Head Marine Reserve (SSMR) and "any permission required under the (Marine Reserve Regulations, No. 7 of 2001) shall be obtained from the Local Area Management Authority" (Commonwealth of Dominica, 2001: parentheses mine). In Saint Lucia, the Canaries/Anse La Raye Marine Management Area (CAMMA) is expected to be managed under the Soufriere Marine Management Association (SMMA), while in Saint Vincent and the Grenadines the Tobago Keys Marine Reserve was expected

to be managed by a separate authority set up for that purpose.

The experience, where some attempt at management of the MPAs has begun, has led to a number of observations that can inform future MPA management:

- i) The process of developing a management structure involving participation of all stakeholders is long and often tedious.
- ii) Participatory approaches to management while time consuming may be more sustainable.
- iii) A clear vision of the role the MPAs will play is needed, as well as the management goals and objectives to ensure that the vision is achieved.
- iv) Involvement of all stakeholder groups at some time in the planning cycle is important for success of the marine protected area.
- v) There is need to acknowledge the very real limitations in capacity which exist since they impact seriously on sustainability and efficacy of the structures set up for the management of MPAs.
- vi) MPAs which are perceived as successful may be the target of requests for research activities which may require the creation of well defined frameworks to guide the design and conduct of research and monitoring programmes and activities.
- vii) Of major importance to the management of MPAs is the status and health of the habitats found in those areas.
- viii) Management plans for MPAs need to be kept under review to ensure that their relevance and appropriateness is maintained.

#### MARINE PROTECTED AREAS AND ISLAND SYSTEMS MANAGEMENT

Small islands are influenced by their surrounding marine environment and themselves impact the seas around them in a time frame much shorter than for larger landmasses. In fact, accepted definitions suggest that the entire land mass and the marine area it controls constitute the coastal area of small island States. The island itself is seen as a collection of systems all interacting with each other, such that an intervention on any one system will impact on adjacent, or even distant, systems. Our management framework, therefore, must consider the intricate interactions and linkages between social, cultural, physical and biological systems on small islands and must provide the mechanisms for multi-disciplinary and multi-sectoral management (Anonymous, in press). This framework is what we in the Organisation of Eastern Caribbean States (OECS) region call Island Systems Management (ISM). It has been suggested that ISM should be seen as "an adaptive management strategy which addresses issues of resource use conflicts, and which provides the necessary policy orientation to control the impacts of human intervention on the environment" (Chase, 1994; see also Nichols and Chase, in press). It hinges on the linkages between systems and the recognition that in order for management to be more effective, it needs to be fully integrated, boundary-less and flexible. Within the

fisheries management context, ISM is not inconsistent with good fisheries management (Murray and Nichols, 1998) or the management of MPAs.

The experiences in the OECS have shown that the interface between the use of Marine Protected Areas and Island Systems Management is often within the process of decision-making. This reiterates the suggestion that the process for development of MPAs can be seen as consisting of three general phases and eight steps (BC Parks 1997):

### **Identification Phase**

- Step 1. *Identification of key marine values and marine protected area system goals and objectives* — The first step is to identify the range of key marine values, attributes and features that would best contribute to a system of MPAs, and to ensure that they are adequately reflected in the system goals, objectives, planning frameworks and criteria that will direct area identification, evaluation and selection.
- Step 2. *Identification of areas of interest* — This would take place through (a) systematic application of goals, objectives and criteria through overview studies and (b) identifying and consolidating already known and/or well-supported areas of high value or significance. Opportunities would be provided for stakeholders to nominate areas of interest, and a database of such areas would be undertaken by national agencies working together.

### **Evaluation Phase**

- Step 3. *Technical evaluation of areas of interest* — All areas of interest should be evaluated according to a standard set of criteria including, among others, regional, national and international significance; rarity, scarcity or uniqueness; representativeness; naturalness; ecological vulnerability, sensitivity and fragility; scientific importance; recreational value; and immediacy of need for protection.
- Step 4. *Identification of socio-economic issues and concerns associated with areas of interest* — Prior to selection of MPAs, there would be need to identify the full range of socio-economic issues and concerns associated with any given area of interest. These should give consideration to the social and economic values of a given area; the level of community support; practicality of protecting the area; and the opportunity for forgoing partnerships for future area management.
- Step 5. *Selection of specific areas for special interim management* — If necessary, special interim management arrangements could be developed on a case-by-case basis.

**Decision Phase**

- Step 6. *Making decision to protect areas through planning processes* — This would have to be done through some formal planning process, which would resolve competing issues and values and ensure all interests are considered. During this step, appropriate assessments of environmental, social and economic implications of designating and area would be completed.
- Step 7. *Formal designation of new marine protected areas* — This crucial step involves the selection of the most appropriate/compatible legislation to ensure that the area can be legally managed in accordance with the intended/required management regime(s). This process would clarify the management authority, the geographic boundaries for the MPA and acceptable or permissible uses.
- Step 8. *Management of marine protected areas* — A management plan, developed with stakeholder involvement, is prepared for each protected area. This plan would identify the terms and conditions around the “where” and “when” of permissible uses.

These eight steps can also be used for setting up MPAs within an ISM framework.

In a concluding section to the Proceedings of the 1<sup>st</sup> International Workshop on Marine and Coastal Protected Areas, held in Camberra, Australia, in August 1994, participants (Anonymous 1994) set out suggestions on the necessary conditions for successful management of coastal and marine resources; guiding principles for coastal and marine management; and factors related to the principles that are most likely to lead to effective management implementation. These principles (*ibid.*) include, but are not limited to:

- i) Achieving a balance between the “top down” legislative agency and the “bottom up” community involvement approaches to planning and management;
- ii) Making a strong link to the stakeholders of the area throughout the planning and implementation of management;
- iii) Managing human activities in a structured way;
- iv) Developing management of marine and coastal resources based on long-term resource protection and sustainable utilisation;
- v) Making clear from the earliest stages the management aims and goals; understanding that marine management is a dynamic process;
- vi) Having “key movers” integral to the process; a good and well-managed public information programme supporting the entire process through to implementation and periodic revisions;
- vii) Having knowledge to support the planning and management process;
- viii) Recognizing the scale and linkages in marine and coastal environments in analysis and identification of sites, and the selection process, through to planning, establishment and management;

- ix) Having integration between the various sectors such as industry and conservation managers;
- x) Having appropriate resources available to support the development and implementation of the management process; and,
- xi) Instilling local pride and ownership of the project.

#### A STRATEGIC INTERVENTION

The St. George's Declaration of Principles for Environmental Sustainability in the OECS (SGD) has enunciated a number of principles (principles 6, 7, 11, 12, 13, 15) that pertain to promoting conservation and (possibly) expanding eco-tourism in the marine environment. Against the backdrop of limited budgets and staff resources, assistance from a suite of international donor institutions would benefit these island nations' efforts to utilize their coral reef marine protected areas in this regard. Numerous recent, current and planned regional and international institutions and programs, as well as individual eastern Caribbean fisheries agencies, have/are/will be gathering both general marine-related and coral reef fisheries specific information. Local eastern Caribbean marine resource management agencies and academic research institutions have expressed a strong need for an effort to help them coordinate available information (coral reef fisheries and benthic habitat assessments, sources and sinks related to ocean currents, *in situ*, and remotely obtaining physico-chemical characteristics) that may be utilized to evaluate candidate sites for coral reef fisheries reserves and other marine protected areas in the region. These same local officials also have requested assistance in improving regional capacity for monitoring and assessing marine habitats, and data management and synthesis to fill priority gaps in the information base (i.e., local and regional circulation patterns). Additionally, a need has been expressed for assistance in developing a coordinated geo-spatial references inventory and data management program of available marine fisheries related information.

A strategic intervention in support of this is being initiated in collaboration with NOAA/NMFS, UWI School of Graduate Studies and Research, CCA, USAID and the US Department of State (DOS). The larger programme as envisaged would include:

- i) Development of a regional information database on fisheries harvests and marine protected areas in the Eastern Caribbean,
- ii) Development of a comprehensive meta-database on existing information on the life history, relative abundance and distribution, of fishes, and invertebrates by species for selected Eastern Caribbean islands,
- iii) Assessment of coral reef community structure at selected existing and candidate fishery reserve sites,
- iv) Assessment of ocean current dynamics impacting selected existing and candidate fishery reserve sites,



- v) Development of GIS baseline information and maps that show the distribution of major habitat types, coastal zone use, protected areas, and fish distribution across the region,
- vi) Convening of a workshop in the Eastern Caribbean on the scientifically quantitative basis for establishment and evaluation of no-take marine reserve management regimes (c.f. Appendix V in Crosby et. al. 1997),
- vii) Development of proposals for pilot projects in one or more Eastern Caribbean country to demonstrate the effectiveness of this scientifically quantitative approach for establishing marine fisheries reserves, and
- viii) Initiation of the development and preliminary training for establishment of information clearinghouse resources and a web-based GIS through CEPNET or a similar program.

The implementation of the activities listed above would promote partnerships both regionally and internationally, provide training experiences to a “new cadre of marine scientists and data management technicians” as well as promote long-term sustainable use of marine resources in the Eastern Caribbean. As part of this broader initiative, OECS NRMU, NOAA/NMFS, US AID and DOS State have agreed to a partnership which will hopefully initiate the first steps for the development of the more comprehensive programme. The OECS/NOAA/USAID/DOS partnership project will focus specifically on:

- i) Identification of priority data needed to populate a regional information database on coral reef fisheries harvests and marine protected areas in the Eastern Caribbean;
- ii) Assessment of coral reef community structure at selected existing and candidate fishery reserve sites, and
- iii) Development of proposals for pilot projects in one or more Eastern Caribbean country to demonstrate the effectiveness of this scientifically quantitative approach for establishing coral reef fisheries reserves.

For the Member nations of the Organisation of Eastern Caribbean States, this partnership is consistent with the directive given to the NRMU by the fourth meeting of the Environment Policy Committee (EPC IV), the ministerial committee with oversight on the activities of NRMU, namely: OECS NRMU should develop a joint programme for coastal and marine resources and focus on the environmental aspects of fisheries. Funds are being sought to facilitate other activities of the broader program. The current partners welcome any initiatives in support of this program, as well as any willing new partners.

#### THE LAST WORD?

As areas managed to maintain as much natural integrity as possible, and where natural processes are allowed to continue, the development of MPAs within an ISM-like framework will form one of the foundations of a sustainable marine environment (c.f. BC Parks 1997, Crosby et al. 2000). This framework will enable MPAs within eastern Caribbean States to be of assistance to fishery managers by helping to ensure

viable populations of all marine species, and thus the continuation of sustainable commercial and sport fisheries. At the same time, through the opportunities they also provide for recreation and tourism, MPAs will contribute to the sustainable economies of the Small Island Developing States of the Eastern Caribbean region.

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