Learning from Evaluating MPA Management Effectiveness

DONNA ROACH[1], MARIA PENA[1], PATRICK McCONNEY[1], ROBERT POMEROY[2],
MERITHA BAPTISTE[3], JACK NIGHTINGALE[4] and ELSA HEMMINGS[5]
[1]*CERMES, University of the West Indies Cave Hill Campus, Barbados* [2] *Dept. of Agricultural and Resource Economics, University of Connecticut-Avery Point, USA*
[3]*Tobago Cays Marine Park, Union Island, St. Vincent and the Grenadines*
[4]*Sapodilla Cayes Marine Reserve, Punta Gorda Belize*
[5]*Negril Marine Park, Negril, Jamaica*

ABSTRACT

In the Caribbean it is imperative to ensure that scarce coastal marine space is used most efficiently and effectively for the purpose intended, among the several possible and competing uses. The number of 'paper parks' needs to be drastically reduced. Stakeholders need to know that Marine Protected Areas (MPAs) are achieving biodiversity, fisheries or other bio-physical objectives. They need to be convinced that socio-economic benefits and development will result from proper MPA management. For the above to occur there must be good governance from national policy and planning through to the community level. This is why evaluating MPA management effectiveness and instituting adaptive MPA management are critical. The work in progress that this paper reports upon is a project for enhancing management effectiveness at three MPAs in St. Vincent and the Grenadines, Jamaica and Belize. The MPAs are respectively the Tobago Cays Marine Park, Negril Marine Park and Sapodilla Cayes Marine Reserve. Training inception workshops were held to build stakeholder capacity to understand and undertake evaluations of MPA management effectiveness as set out in the guidebook 'How is your MPA doing?', and to decide on goals, objectives, indicators and local evaluation teams. Fieldwork was undertaken to measure the extent to which selected objectives were being achieved. Preliminary results of the evaluation, lessons learned from both the results and the process, and recommendations for adaptive management are reported on. Next steps include the implementation of new management measures and the preparation of teaching and training material to share the lessons learned.

KEY WORDS: effectiveness, evaluating, learning, lessons, management, MPA

Aprendiendo de la Evaluación de la Efectividad de Manejo de AMP

En el Caribe resulta imperativo asegurar que el escaso espacio costero marino sea utilizado de manera eficiente y efectiva para los propósitos previstos, entre los varios posibles y contendientes usos. El número de "parques de papel' necesita ser drásticamente reducido. Las partes interesadas necesitan saber que las APMs están logrando obtener biodiversidad, pesca u otros objetivos bio-físicos. Necesitan estar convencidos que beneficios socio-económicos y desarrollo resultaran del manejo apropiado del APM. Para que lo anterior suceda debe existir una buena gobernabilidad desde las políticas nacionales y planificación hasta el nivel comunitario. Es por ello que la evaluación de la efectividad del manejo de APM y la institucionalización de manejo adaptado de APM es crítica. El trabajo en progreso sobre el cual este escrito reporta es un proyecto para realzar la efectividad del manejo en tres APMs en San Vicente y las Granadinas, Jamaica y Belice. Las APMs son respectivamente el Parque Marino Cayo Tobago, Parque Marino Negril y Reserva marina Cayos Sapodilla. Talleres iniciales de capacitación fueron llevados a cabo para desarrollar la capacidad de las partes interesadas a fin de que puedan entender y realizar evaluaciones de manejo efectivo de APM como se establece en la guía 'How is your MPA doing?', y para decidir sobre las metas, objetivos, indicadores y equipos locales de evaluación. El trabajo de campo se llevó a cabo a fin de medir los logros alcanzados de objetivos seleccionados. Resultados preliminares de la evaluación, lecciones tanto de los resultados como de los procesos, y recomendaciones para manejo adaptado son reportados. Los pasos siguientes incluyen la implementación de nuevas medidas de manejo y la preparación de material de enseñanza y capacitación para compartir las lecciones aprendidas.

PALABRAS CLAVES: efectividad, evaluación, aprendizaje, lecciones, manejo, APM

INTRODUCTION

In the Caribbean it is imperative to ensure that scarce coastal marine space is used most efficiently and effectively for the purpose intended, among the several possible and competing uses (McConney 2004). The number of 'paper parks' needs to be drastically reduced (Geoghegan *et al.* 2001). Stakeholders need to know that marine protected areas (MPAs) are achieving biodiversity, fisheries or other objectives (Geoghegan *et al.* 2002). These stakeholders need to be convinced that socio-economic benefits and development will result from proper MPA management that enhances livelihoods (Ramsubeik *et al*. 2004). For the above to occur there must be good governance from national policy and planning through to the community level (Geoghegan and Renard 2002). These arguments suggest that evaluating management effectiveness and in-

stituting adaptive management are critical to the success of MPAs (Pomeroy *et al.* 2004).

In a project made possible through an International Coral Reef Grant, three MPAs within the region were selected as study sites for the evaluation of MPA management effectiveness. These were the Tobago Cays Marine Park (TCMP), St. Vincent and the Grenadines; Negril Marine Park, Jamaica (NMP), and Sapodilla Cayes Marine Reserve (SCMR), Belize. In collaboration with the Centre for Resource Management and Environmental Studies (CERMES), University of the West Indies, the managers and stakeholders at the three MPAs were able, through participatory approaches, to facilitate stakeholder involvement in evaluation and recommendations for adaptive management. Based on lessons learned, skills gained through training, continuous monitoring of project progress, and evaluation and interpretation of results the aim is that best practices will be institutionalised (McConney 2005).

Comprising four main components, the overarching goal of this project was to promote and institutionalise enhanced and adaptive coastal management practices achieved through applied research and interdisciplinary training (CERMES 2006a). There were two specific objectives:

To conduct participatory management effectiveness research and evaluations by training at least 30 people across three MPA sites in the Grenadines, Jamaica and Belize in management effectiveness evaluation and adaptive management

To improve MPAs in the region by monitoring national and regional-level outcomes from evaluations and adaptive management as documented in widely shared lessons learned from the project, combined with training and communication materials for graduate coursework, further research, management and policy

Not only are the lessons learned from this initiative serve to inform and improve management at the three study sites, but they may be regionally relevant, acting as a guide for countries that wish to do similar assessments and adopt similar management approaches. Such an endeavour also creates the opportunity for information to be gathered on the effectiveness of co-management strategies. Two of the sites, NMP and SCMR, are managed by NGOs that already have co-management agreements with the governments and some TCMP stakeholders have expressed interest in pursuing co-management (Simmons and McConney 2006).

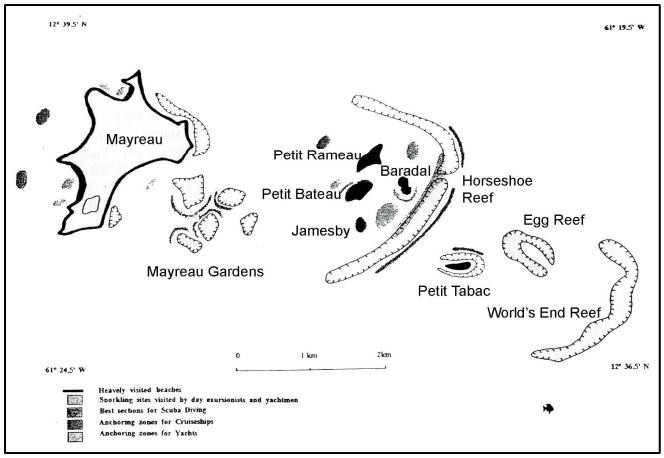

Figure 1. Site map of TCMP. (Source: MEDO 2003)

STUDY SITES

Tobago Cays Marine Park (TCMP)

Located at the southern end of St. Vincent and the Grenadines, the TCMP is contained within the Grenadines island chain. The park covers an area of approximately 15km^2 and encompasses the five uninhabited islands of Petit Rameau, Petit Bateau, Jamesby, Baradal and Petit Tabac which enclose a sand bottom lagoon as well as the island of Mayreau (Pena 2006). The conservation area's islands, reefs and shallows can be found mostly within the 10 fathom depth contour and are of extreme ecological, economical, social and cultural significance to St. Vincent and the Grenadines (Figure 1). The TCMP is governed by the Marine Parks Act, 1997 and the Tobago Cays Marine Park (Marine Parks (Tobago Cays) Regulations, 1998.

Negril Marine Park (NMP)

Located off the coast of the western parishes of Hano-

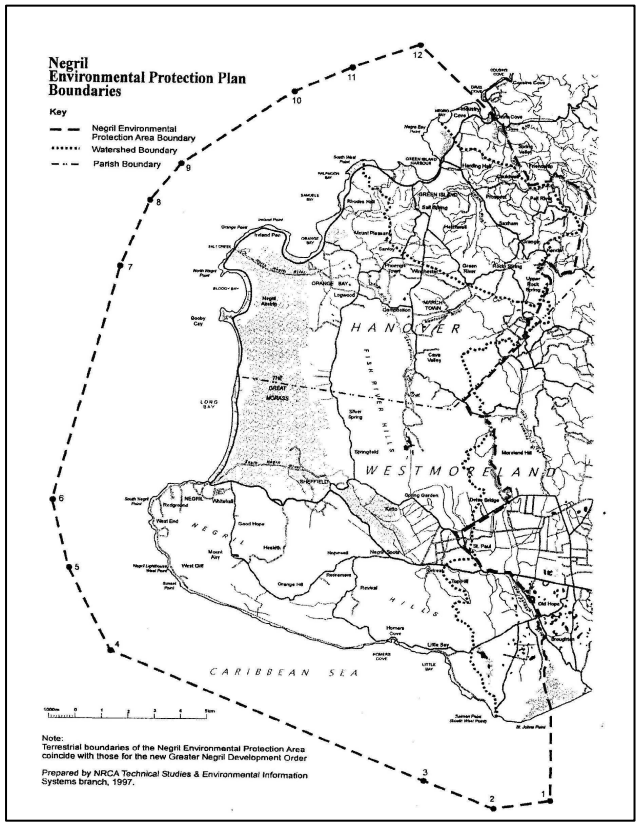

Figure 2. Site map of the NMP, (Courtesy Negril Coral Reef Preservation Society)

ver and Westmoreland, its coastal boundary is approximately 33km and the park covers an estimated area of 160km^2 (Lapointe *and Thacker 2002)*) (Figure 2). Bordered by 13 fishing communities, the NMP is divided into eight zones which have yet to be officially demarcated (McConney *et al*. 2005). The NMP was legally established in 1998 under the Negril Marine Park Order by the government of Jamaica.

Sapodilla Cayes Marine Reserve (SCMR)

The SCMR forms the southern terminus of the Belize Barrier Reef and covers an area of approximately 119km^2. Its boundaries extend from Tom Owen's Cay in the north east to Seal Cay in the North West to Ragged Point in the South East. The reserve encompasses a total of 12 mangrove and sand cays (McConney *et al*. 2005). Officially declared a marine reserve in 1996 through Statutory Instrument 117 under the Fisheries Act of Belize this area has been given the designation of a World Heritage Site (Figure 3).

METHODS

Multi-stakeholder inception training workshops were held at each of the three study sites (CERMES 2005a, CERMES 2006a CERMES 2006b). The MPA stakeholders who participated were identified through a brief stakeholder analysis and included persons drawn from MPA management bodies, government agencies and organisations, various NGOs, civil society groups and funding agencies. Each of these persons was introduced to the marine effectiveness evaluation methodology adapted from the guidebook "How is your MPA doing?" (Pomeroy *et al.* 2004). During the two day training sessions held at each MPA, participants were trained in the use of the methodology. Using both the text and worksheets that were provided, the goals and objectives of the MPAs specific to each study site were then used to identify overlapping goals and objectives in the guidebook as well as their associated indicators that would be used in the evaluation process.

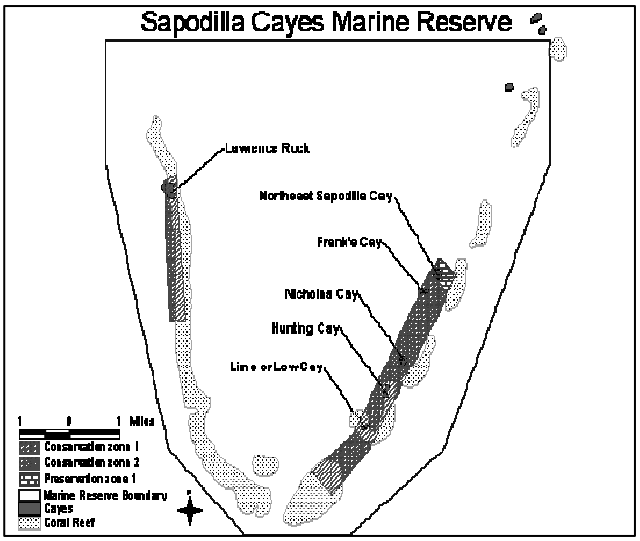

Figure 3. Site map of the SCMR , (Courtesy Toledo Association for Sustainable Tourism and Empowerment).

In the case of TCMP where no goals and objectives for the conservation area have been explicitly agreed to in an approved management plan, some were developed by stakeholders through a process of discussion and open voting on the most relevant and feasible to evaluate in this evaluation project (CERMES 2005a). Similar processes were undertaken at the NMP and SCMR, but using their written management plans as the source documents (CERMES 2006a, CERMES 2006b).

The indicators in the guidebook have been divided into three broad categories: biophysical, socioeconomic and governance, in order to cover all aspects of MPA management (Pomeroy *et al.* 2004). The indicators chosen for each site were examined and prioritized before the final set was selected. Due to the unique nature of each MPA and the management challenges that each had to face, there was variation in the mix and number of indicators finally selected. Ten indicators were selected for the Sapodilla Cayes Marine Reserve, eight for the Negril Marine Park and thirteen for the Tobago Cays Marine Park (CERMES 2005a, CERMES 2006a, CERMES 2006b). The indicators selected for each site are outlined in Table 1.

Fieldwork was conducted from March to October 2006 at the three sites mainly by local evaluation teams. Measurement of the indicators was primarily by bio-physical field sampling (e.g. water quality), document analysis (e.g. existence of decision and management bodies) and interviews (e.g. stakeholder participation). Data gathered through surveys underwent descriptive analysis using the Statistical Package for Social Sciences version 11 and Microsoft Excel. Following this the results were taken through a process of individual and collective interpretation by the researchers and stakeholders to determine the linkages between the MPA objectives and the indicators chosen for the evaluation. Participants were able to share their views and experiences at various stages of the evaluation process to determine lessons learned and how these lessons may influence future evaluation exercises and adaptive management.

After gathering, generating and interpreting the results of the evaluation for each study site, researchers and representatives from each MPA attended a workshop on 4 November 2006 in Punta Gorda, Belize, where the preliminary results of the evaluations were presented (Pena and Roach 2006). Based on these results, as well as the experiences of the participants with both the evaluation process and in the management of each area, key lessons learned and recommendations for adaptive management at the study sites were agreed upon. Using the experiences of the evaluation process and the lessons learned, training materials will be designed and produced as a final output of the

project in early 2007.

RESULTS

Tobago Cays Marine Park (TCMP)

Biophysical

Based on the results from the March 2005 Reef Check training survey, and the May and October 2006 surveys for this project, the coral reef systems at the four sites surveyed vary in condition but appear to be declining across all sites. The Tobago Cays is undergoing a possible phase shift from coral to macroalage dominated communities (Comely *et al*. 2002). The water quality monitoring protocols for the collection and analysis of samples were not adhered to, rendering all results unusable.

Socioeconomic

Mayreau and Union Island are the two closest inhabited islands to the TCMP. Socioeconomic surveys conducted at these sites revealed that household size is generally small with a mean size of 2.2 persons, and residents enjoy a relatively high standard of living. Twenty different occupation types were identified. Out of these, the most common were the operation of water taxis (14%), business (11%) and sales (8%). Deterioration in the condition of the reefs in the Tobago Cays has been documented over the last eighteen years. This decline has been linked to a number of factors including storm damage, diseases, physical damage from fishing gear and boat anchors, and localised pollution from visiting yachts and water taxis (Heyman *et al*. 1988; Smith *et al*. 1996; Comely *et al*. 2002; Deschamps 2000, Lizama 2005). Local ecological knowledge appears to be consistent with the limited scientific information available for the area . Local communities believe that the conditions of the marine resources in the TCMP have worsened in the past five years. The majority of respon-

Table 1. Indicators selected for evaluation at each MPA site

MPA	Indicators for evaluation
Tobago Cays Marine Park	***Biophysical*** B1 Focal species abundance (marine) B8 Water quality ***Socioeconomic*** S2 Local values and beliefs about marine resources S3 Level of understanding of human impacts on resources S7 Material style of life S9 Household income distribution by source ***Governance*** G2 Existence of a decision-making and management body G3 Existence and adoption of a management plan G6 Availability and allocation of MPA administrative resources G9 Degree of interaction between managers and stakeholders G12 Level of stakeholder participation and satisfaction in management process and activities G14 Clearly defined enforcement procedures G15 Enforcement coverage
Negril Marine Park	***Biophysical*** B8 Water quality B9 Area showing signs of recovery (total habitat level) ***Socioeconomic*** S3 Level of understanding of human impacts on resources S14 Distribution of formal knowledge to community ***Governance*** G2 Existence of a decision-making and management body G6 Availability and allocation of MPA administrative resources G12 Level of stakeholder participation and satisfaction in management processes and activities [New] Success of fundraising strategies (revenue and diversity of sources) that form part of the business plan
Sapodilla Cayes Marine Reserve	***Biophysical*** B4 Composition and structure of the community B8 Water quality ***Socioeconomic*** S14 Distribution of formal knowledge to the community S1 Local marine resource patterns ***Governance*** G5 Existence and adequacy of enabling legislation G11 Level of training provided to stakeholders in participation G12 Level of stakeholder participation and satisfaction in management processes and activities G13 Level of stakeholder involvement in surveillance, monitoring and enforcement G14 Clearly defined enforcement procedures G15 Enforcement coverage

dents (74%) thought that human activities are damaging the TCMP, whilst 26% thought they were not contributing to the damage. Many of the respondents had reasonable confidence in the ability of the TCMP office to manage the Marine Park.

Governance

The TCMP Board was established in 1998, is responsible for the day to day management of the TCMP and answers directly to the Administrative Head (Permanent Secretary) for the Ministry responsible for management of the TCMP (the Prime Minister's Office). The management activities undertaken by the TCMP office include administrative functions, enforcement, surveillance of the conservation areas and environmental education. Currently, the office lacks capacity and human resources to adequately and effectively manage the TCMP. Inadequate institutional capacity and lack of available funding has impeded their ability to effectively carry out and implement new programmatic activities and administrative functions. Enforcement coverage for surveillance purposes does not provide adequate coverage. There appears to be no formal document on enforcement guidelines and procedures for the TCMP. Additionally, interactions between TCMP staff and stakeholders seem to be limited, although there has been a concerted effort to involve stakeholders in management decisions. Socioeconomic surveys conducted in Union island and Mayreau show that the majority of respondents (77%) consider themselves to be stakeholders in TCMP management although only 41% of these had participated in any process or activity related to management.

Negril Marine Park (NMP), Jamaica

Biophysical

The South and North Negril Rivers are major pathways of marine pollutants into the NMP. The development of a sewage treatment facility along the South Negril River water ways has lead to an exacerbation of nutrient loading in the area. This is due in part to the limited design features of the plant which does not provide the facilities needed for tertiary treatment which would result in polishing of the effluent and removal of nutrients. Faecal coliform counts are also highest at the mouth of the South Negril River. Water quality readings frequently exceeded prescribed Blue Flag standards suggesting that the water in this area is unsuitable for sea bathing. However, measurements taken in the Norman Manley Sea Park (NMSP) upstream and downstream areas were almost always in keeping with water quality standards. In spite of the wealth of knowledge and expertise held by the staff of Negril Coral Reef Preservation Society (NCRPS) as well as the clearly defined goals and structure of the water quality monitoring programme and access to a certified laboratory, little is being done to encourage change. Community shifts from coral to macroalgae are still being documented.

Socioeconomic

In the socioeconomic survey conducted in the NMP, 94% of tourists interviewed stated that they had no knowledge of the MPA, while 92% had no knowledge of the managing organisation. Both the community members and the tourism workers that took part in this exercise displayed some knowledge of the issues that affected the natural resources within the NMP as well as problems that were directly related to resources in the marine environment. However many of the responses placed great emphasis on solid waste issues such as illegal dumping, as well as the pressures fishermen were placing on fish stocks and coral reef ecosystems. Comments were made by both the community members and the tourism workers on the wording of educational material where some found that this material was difficult to understand. Greater consideration should be given to the level of education of the target audience in relation to literacy and past exposure to environmental material. Many of the respondents also felt that environmental education was an important tool in mitigating activities that may have a negative impact on the NMP.

Governance

Delegation for the management of the NMP was granted to the NCRPS by the National Environmental Planning Agency (NEPA) in 2002 after a successful bid and the submission of a management plan for the area to the Authority (Lapointe and Thacker 2002). The NCRPS is responsible for the day to day management of the MPA. They have been given authority to carry out all management activities with the exception of the drafting of legislation. The management structure for the NMP is illustrated in Figure 4.

The NCRPS proposed to implement nine major management programmes. These include programmes geared towards enforcement, financial stability, lobbying, public relations, research and monitoring, zoning, resource management, sustainable community development and visitor management. The greatest number of staff as well as the largest portion of the required budget has been allocated to administrative functions. These functions require an amount of almost JA$18 million to be carried out effectively, which accounts for approximately 57% of the total budget. This total can be justified by the scope of administrative functions which play a major role in all of the programmes. There are two major variables that limit the capacity of the management team to be able to effectively administer and complete a number of activities within the NMP. These are the glaring lack of funding available to implement programmes, as well as limited institutional capacity.

Many of the income generating ventures that had been proposed have not done well enough to support the operational functions of the NCRPS. In a survey administered to members of the Board of directors of the NCRPS, ell as to donor and regulatory agencies, it was found that the major-

ity of the respondents (89%) were not satisfied with the amount of fundraising activities undertaken by the organisation. Thirty-five percent of the respondents stated that they participated in management activities on a regular or continuous basis. From the results of the evaluation, as well as comments received from the interviewers, it would appear that there is some correlation between the type of relationship that existed between the stakeholders and NCRPS and the level of participation each had in management processes and activities. The more distant the relation between respondents and the organisation, the lower the level of participation appeared to be. This suggests that holding a position within NCRPS fostered a greater sense of ownership and responsibility. Perhaps it is perceived that once this relationship was lost the level of obligation in the management activities was no longer expected or their influence on management decisions would not be as significant.

Sapodilla Cayes Marine Reserve (SCMR)

Biophysical

Hard coral cover and recruitment rates are apparently low at the SCMR. Commercial species have been heavily impacted. This site is heavily used for fishing where temporary camps are set up on many of the cays by fishermen that are based in the neighbouring communities: Monkey River, Punta Negra and Punta Gorda (McConney *et al.* 2005). Additionally, Hunting Cay has been used as the unofficial port of entry for persons arriving from Honduras and Guatemala. The SCMR, though a part of Belize, is equidistant from Honduras, Guatemala and Belize, which makes it ideal for exploitation from persons in the three regions. In addition to local fishing activities, this site also receives a considerable amount of tourists, some of whom have been reported to participate in illegal fishing activities. These factors may have severe implications on the health and viability of local marine ecosystems. Despite this there is little documented information concerning the type and extent of fishing and tourist activities within the reserve. The water quality monitoring programme at SCMR, like that of TCMP, is still in its inception stages. Due to the fact that the water quality programme is in its early stages and the limited amount of that could be obtained with the funding available, monitoring has been restricted to physiochemical parameters only. No microbiological testing or nutrient analysis has been conducted at this stage.

Socioeconomic

There is little documented information on local resource use patterns in the SCMR. The results of this evaluation are still to be analysed, but will provide baseline information on marine space and resource use for the area. The Toledo Association for Sustainable Tourism and Empowerment (TASTE) has conducted some activities as it relates to the dissemination of environmental education material. Socioeconomic surveys carried out in the area have revealed that although the respondents thought the content was generally good the frequency with which they

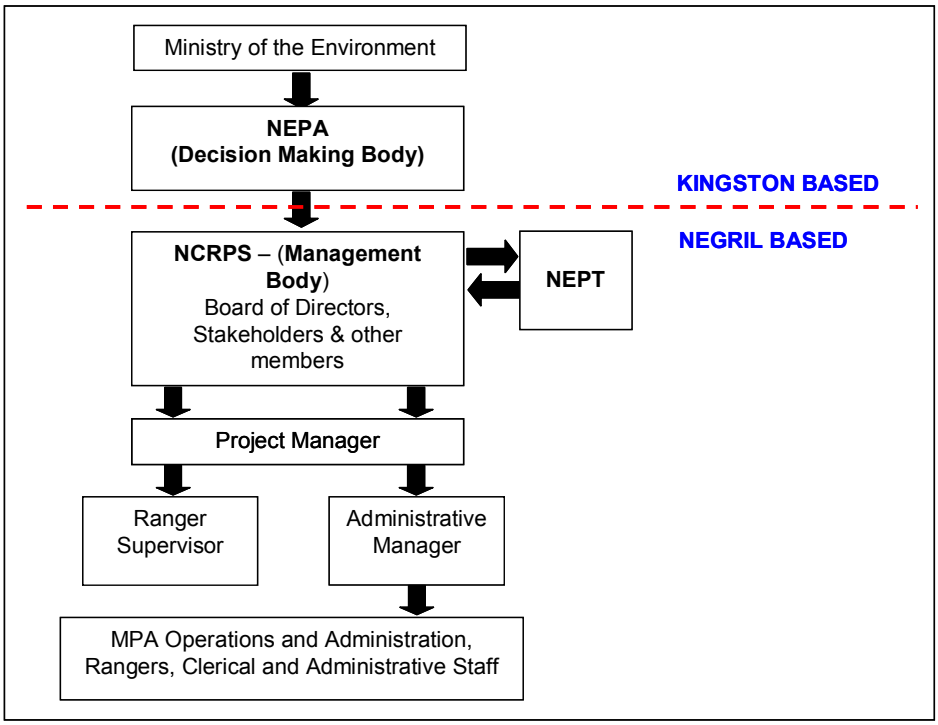

Figure 4. Proposed management structure for the NMP

received this information was too sporadic.

Governance

The Toledo Association for Sustainable Tourism and Empowerment (TASTE) has been delegated some of the management responsibility for the reserve through a co-management agreement signed in 2001 (McConney *et al.* 2005). Though non-profit in nature and small in size this association has been steadily working on increasing its capacity to effectively manage the SCMR. Since 2001, the co-management agreement has been updated, granting this association greater responsibility for the marine reserve (McConney *et al.* 2005). A management plan has been drafted for the area but has yet to be approved by the Belizean government and signed into law (Nightingale personal communication 2006). However, direct responsibility for surveillance and the enforcement of existing regulations for the SCMR lies with the reserve manager, biologist and rangers, all of whom are fisheries officers appointed by the Fisheries Department (McConney *et al.* 2005). There is a greater need for stakeholder involvement in the management process in SCMR with more opportunities for training in different aspects of management made available. As it pertains to enforcement of regulations in the conservation area there are clear guidelines and protocols. These include protocols for approach, arrest as well as evidence collection. Enforcement coverage has been limited in this area however, due to lack of funding for operational costs.

LESSONS LEARNED

At the terminal workshop held in Punta Gorda, Belize project participants assembled to discuss both the products and process of the evaluation. Following presentations on the results for each study site,(noting that some were still incomplete) the lessons learnt from each stage of the process were discussed (Pena and Roach 2006). Some preliminary conclusions on the main lessons learned are described below.

Appreciating management evaluation strategies

The process of evaluating management effectiveness in order to implement adaptive management was new to all of the study sites involved in this project. Although, in theory, the evaluation of outputs in relation to agreed objectives seems to be a logical step in order to improve the management of any conservation area, managers are often so entangled in the day to day operations of running the MPA that processes like these become secondary. However this evaluation exercise enabled MPA managers to fully appreciate its importance in improving the effectiveness of the management area. They have recognised its potential as a tool to promote transparency and accountability within organisations charged with management responsibility. This process may foster greater trust among stakeholders, who ultimately have vested interests in these areas, in management organisations to fulfil their mandates.

Benefits of the evaluation process

Initiating evaluation may often be met with some scepticism. Stakeholders may fail to see how such an evaluation will differ from various studies that have undoubtedly taken place in the past. Additionally, management agencies may be unsure of their ability to see such a process through to its completion and truly apply the information gained in a way that will have a meaningful effect on future park management. The training, financial assistance and outputs generated as a result of this process may serve to alleviate some of the doubts and develop a confidence in the management agencies' ability to effectively conduct their own evaluations. Managers and stakeholders are able to see firsthand the benefit that may be gained from the information gathered in this exercise, and allow practical experience with how it may positively influence management. Continued assessment that is built on this premise creates a reference point from which future evaluations may be conducted and a quantifiable avenue by which progress may be measured. With a viable way in which the effectiveness of various aspects of the MPA can be presented, the need for change can be justified and measures to implement them can be formulated. The ability to see the potential positives of such a process has encouraged many of the participants to learn more about evaluation and give serious consideration to adaptively managing natural resources. Stakeholders have had the opportunity to learn more about the MPAs in their areas and as a result now feel the need to be more actively involved in their management.

Undertake what can be managed

Due the fact that such an undertaking has never been attempted before, management agencies ran the risk of overestimating what could be accomplished within the constraints of their limited resources. There are so many aspects of management that need to be thoroughly assessed that prioritising evaluation needs may be a difficult task. Rather than run the risk of overlooking vital areas that are in need of evaluation managers may attempt to take on more than their resources can adequately handle. The result is improper evaluation of management goals and objectives that produces outputs that are unable to guide future management decisions or create a foundation on which subsequent evaluation exercises can be built.

Stronger science training for evaluation

During the evaluation of some of the indicators it was important to remember that the terminology and the process of data collection and analysis may require the technical services of someone that possesses a scientific background. While training for some indicators may be provided, and the assessment successfully undertaken, technical expertise and experience may be necessary for others. Such was the case for water quality in the TCMP where data collection was compromised by the evaluation team's lack of scientific background. Participants did not under-

stand the necessity of particular protocols or see the need to implement important procedures in the collection of samples. If a suitable background does not exist amongst current staff, measures should be taken to contract competent persons outside of the management organisation for more technical aspects of the assessment. The project erred in not monitoring capacity closely enough to take corrective action.

Presentation and validation of results

It is important that when results are available from the evaluation that they be presented to the communities and the stakeholders. Many of these were vital sources of information and will be more cooperative in future studies if they are informed of the results of the study. In effect, this effort may offer a way in which to reduce respondent fatigue especially in those areas that will need to be accessed for information in the future. This creates a sense of ownership and involvement for community members and stakeholders who will be made to feel included in the evaluation process. It creates an avenue to improve the transparency and accountability of the management agency as the public is kept abreast of management activities, the effectiveness of these actions as well as plans to improve existing methods. Such a forum will allow participants the opportunity to offer suggestions, thereby creating an avenue for information exchange as well as a means by which stakeholder participation in the management process can be enhanced. Additionally, it gives the evaluation teams a means by which to verify their results and identify any errors in the information that was collected that may affect the accuracy of the results.

Explicit requirements for evaluation

In order to ensure that there is a clear understanding of the outputs that should be generated for each indicator there must be an appreciation of what each one seeks to measure and how it is ultimately related to the MPA objectives. The outputs represent quantifiable information that must be represented in such a way that it is reflective of the level to which MPA objectives are being met and can be accurately interpreted by management bodies so as to effectively inform future management decisions. The accuracy of the evaluation depends on the extent to which those given responsibility for this task understand the process of the evaluation and how it leads to the expected product. Only then can the desired outputs have a greater probability of accurately reflecting the level of success achieved by the management process and suggest the changes that may be necessary in order for effective management to be realised. During the evaluation of many of the governance indicators in the NMP, members of the evaluation teams were often unsure of how to conduct data collection, analysis and reporting in their situation, although examples of each stage of the evaluation were presented in the guidebook

Awareness of stakeholder perceptions

The evaluation allows management agencies an occasion to see how their management efforts are being perceived by stakeholders and members of the general public. Whether management has allowed an equitable and fair distribution of resource use, or if disparities are perceived by the public, can be determined. Each stakeholder has the capacity to affect the success of an MPA. They determine if the needs of the stakeholders are being accommodated within the management system, if educational methods are having any effect on behaviour and whether strategies can be formulated to address these issues. It must be noted that management agencies may never have the approval of all of their stakeholders. Although conservation must be sensitive to the needs and cultures of all stakeholders groups, it should seldom be compromised to the extent that conservation efforts become secondary if they are the primary objective.

RECOMMENDATIONS FOR ADAPTIVE MANAGEMENT

Recommendation for ways in which adaptive management can be integrated into the study sites were made by those present at the terminal workshop held in Punta Gorda, Belize (Pena and Roach 2006). Suggestions were based on the results of the evaluations, the experience in management of the respective MPAs and the learning experience which resulted from dialogue with all who were present. Site specific recommendations are outlined below.

Negril Marine Park

There is a need for greater conservation communication. In this way stakeholders gain knowledge on how they impact on the marine environment and are able to make informed choices about their behaviours. In addition to this, greater communication creates transparency within the organisation and allows stakeholders to feel included in the management process, fostering a sense of ownership. NCRPS may facilitate this through holding regularly scheduled meetings between managers and stakeholders, increasing the frequency of public meetings, and the establishment of a comprehensive educational programme. Ways in which financial management can be enhanced should also be carefully considered to maintain the viability of the management organisation and to create means by which to implement programmes that may enhance management.

Tobago Cays Marine Park

A comprehensive educational programme is required in the TCMP. The management agency in the NMP has had more extensive experience with some aspects of public environmental education. TCMP may draw upon this experience. One example of this is the Junior Ranger Programme established by the NMP which may be implemented in the TCMP with the assistance of their Jamaican

counterparts to enhance youth awareness and education. Improvements may also be made to the TCMP brochure to make it more user-friendly and appealing to read while ensuring that the information can be easily understood by a wide audience.

Training is needed in enforcement systems for the rangers responsible for patrolling the area. This includes detailed records of offences committed within the MPA. More extensive training is also required for water quality monitoring where participants understand and have the capability to follow stipulated procedures and protocol. Administrative staff needs to be instructed in ways in which to effectively carry out management functions. Training in data recording and reporting may be prudent.

Sapodilla Cayes Marine Reserve

Environmental education material, although generally thought to be good, has been distributed sporadically. Plans for the dissemination of educational materials should be formulated in order that community stakeholder interaction can be enhanced through regularly scheduled distribution of newsletters and brochures.

The implementation of these strategies at each study site will serve to highlight the transition from the collection and evaluation of data to measure management effectiveness, to the practical use of this information to create change within the management system. In doing this the full cycle of the management effectiveness methodology can be seen and the benefits and challenges that may arise from this step can be used as lessons in how these strategies can be implemented and the approaches that are most appropriate for different conservation areas.

CONCLUSIONS

The evaluations conducted at the three MPAs have highlighted the importance of carrying out regular assessments of management strategies to determine effectiveness and to guide change. The managers who participated in this process have gained greater appreciation of the potential benefits that can be gleaned from frequent self appraisal. It is a means by which information can be provided that creates a reference point of where management is relative to the original objectives stipulated for the conservation area. By locating that point, it is more feasible to chart a course towards the fulfilment of mandates that have been outlined for the MPA. Perhaps this will create a shift in the paradigm of evaluation from that of an opportunity to assign blame to that of an occasion to evaluate current strategies and justify the need for necessary change.

The experiences with the evaluation of water quality in the TCMP and the SCMR highlight the need to integrate such appraisal mechanisms at the inception of new management activities. The deficiencies in the monitoring programme, the need for external support and the importance of having explicitly stated goals and protocols can be applied to all aspects of management. The earlier these insufficiencies are identified the sooner modifications can be made to the process. This will enable management agencies to make wise choices related to the allocation of time and resources.

When choosing evaluation tools one must be mindful of the importance of ensuring that these tools encompass all facets of the management activities: biophysical, governance and socio-economic. In this study there has been a tendency to lean towards the assessment of the governance aspects. There may be several reasons for this trend which are beyond the scope of this report. Perhaps the framework in which these appraisals can be conducted already exists. If so there would be little need for extensive training; there would be accessible sources of secondary data for assessment; and little or no additional equipment would be required. These factors aid in the reduction of evaluation costs. Additionally, it may be thought that enhancing administrative functions will result in a top-down effect where an improvement will be seen in all facets of management. Whatever the true reason, care must be taken in the selection of performance indicators so that any appraisal conducted can provide a holistic view of management activities which adequately address all aspects of the conservation efforts.

Furthermore, effective evaluations are only as good as their ability to influence change in MPA management. Significant time, effort and expense are often essential for in-house assessments. The primary goal of this process is to highlight where management has fallen short or where methods used can be improved to increase the success of the MPA. It is a guide, providing the information required to keep activities focused in order to realise conservation goals. It may serve to highlight the need for adjustments to these goals so that through the evolution of management objectives, conservation efforts can be enhanced and sustainable development can be achieved. However, information without action achieves nothing. If the power to address management issues and develop means by which they can be addressed does not lie in the hands of those charged with management of the area, then those that hold this power need to recognise the important role they play in MPA success. Greater support is needed from those in a position to facilitate change for organisations to be able to manage adaptively.

ACKNOWLEDGEMENTS

This report was prepared with funding under Coral Reef Conservation Grant NA05NOS4631049 from the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce. However, all statements, findings, conclusions and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA or the U.S. Department of Commerce.

LITERATURE CITED

CERMES. 2005a. Report on the inception training workshop for enhancing the management effectiveness of the Tobago Cays Marine Park, St. Vincent and the Grenadines. Union Island 19-20 December 2005. CERMES Regional Project on Enhancing Management Effectiveness at Three Marine Protected Areas in St. Vincent and the Grenadines, Jamaica and Belize. Report No.1. 25pp.

CERMES. 2005b. Socioeconomic monitoring and fisheries management planning for the Negril Marine Park. The Caribbean Coastal Co- management and Coral Regeneration Programme, 4Cs Jamaica Project. 26pp.

CERMES. 2006a. Report on the inception training workshop for enhancing the management effectiveness of the Negril Marine Park, Jamaica. 26-27 January 2006. CERMES Regional Project on Enhancing Management Effectiveness at Three Marine Protected Areas in St. Vincent and the Grenadines, Jamaica and Belize. *Report No*.**2**. 31pp.

CERMES. 2006b. Report on the inception training workshop for enhancing the management effectiveness of the Sapodilla Cayes Marine Reserve, Belize.4 -5 February 2006. CERMES Regional Project on Enhancing Management Effectiveness at Three Marine Protected Areas in St. Vincent and the Grenadines, Jamaica and Belize. *Report No*.**3**. 26pp.

Comely, J., M. Mason, K. Cordice and P. Raines. 2002. Tobago Cays marine biodiversity conservation project: *Summary report*. Coral Cay Conservation Ltd., London. 18pp.

Deschamps, A. 2000. Characterization of modern reefs using the Atlantic and Gulf Rapid Reef Assessment (AGRRA) protocol and digitized aerial photographs, Tobago Cays Marine Park, St. Vincent and the Grenadines. MSc Thesis, Ottawa-Carleton Geoscience Centre and University of Ottawa. 196pp.

Geoghegan, T., A. Smith, and K. Thacker. 2001. Characterization of Caribbean marine protected areas: an analysis of ecological, organizational, and socioeconomic factors. *CANARI Technical Report No.* **287**

Geoghegan, T. and Y. Renard. 2002. Beyond community involvement in protected area planning and management: lessons from the insular Caribbean. *Parks* **12**(2): 16-27.

Geoghegan, T., P. McConney and Y. Renard. 2002. Achieving management effectiveness in marine protected areas: the critical role of participatory approaches. pp128-135. In ICRI. *Report of the Regional Workshop for the Tropical Americas*. 12-14 June, Cancun, Mexico

Heyman, A. M., T.J. Riegert, A. Smith, T. Shallow and J.R. Clark. 1988. Project Proposal: Development of the Tobago Cays National Park. Government of St. Vincent and the Grenadines and Organisation of American States. 97 pp.

Lapointe, B.E and K. Thacker. 2002. Community- based water quality and coral reef monitoring in the Negril Marine Park, Jamaica: Land-based nutrient inputs and their ecological consequences. Negril Coral Reef Preservation Society (NCRPS).

Lizama, D. T. and S. D. Mahon. 2006. Sustainable "green boat" practices for water taxi operators in the Grenadines. Caribbean Coastal Co-management and Coral Regeneration (4Cs) Programme, Sustainable Grenadines Project (SGP) and Centre for Resource Management and Environmental Studies, University of the West Indies, Cave Hill Campus, Barbados. 36 pp.

McConney, P.2005. International Coral Reef Conservation Grant Proposal. Centre Resource Management and Natural Resource Studies, UWI. Cave Hill. Barbados.Mayreau Environmental Development Organisation (MEDO). 2003. A management proposal for the Tobago Cays Marine Park, St. Vincent and the Grenadines. Mayreau Environmental Development Organisation. Mayreau Island, Southern Grenadines. 19th September 2003.

McConney, P. 2004. Integration of fisheries into coastal management. *Proc. Gulf Carib. Fish. Inst*. **57**:77-86.

McConney, P. 2005. International Coral Reef Conservation Grant Proposal. Centre Resource Management and Natural Resource Studies, UWI. Cave Hill. Barbados.

Nightingale, J. 9th November, 2006. Personal Communication. 59th Gulf Caribbean Fisheries Institute Conference, Princess Hotel, Belize.

Pena, M. 2006. Report on Management Effectiveness at the Tobago Cays Marine Park (TCMP), St. Vincent and the Grenadines. Draft. Presented at the Terminal Workshop of the CERMES Regional Project on Enhancing Management Effectiveness at Three Marine Protected Areas in St. Vincent and the Grenadines, Jamaica and Belize. 4 November 2006. 61pp.

Pena, M and D. Roach. 2006. Report of the Workshop on MPA Evaluation Products and Process, Punta Gorda, Belize, 4 November 2006. CERMES Regional Project on Enhancing Management Effectiveness at Three Marine Protected Areas in St. Vincent and the Grenadines, Jamaica and Belize. *Report No*. **4**. 47pp.

Pomeroy, R. S, John, E. Parks and L. M. Watson. 2004. *How is your MPA doing? A Guidebook of Natural and Social Indicators for evaluating Marine Protected Area Management Effectiveness*. The World Conservation Union (IUCN). Gland, Switzerland. 230pp

Ramsubeik, C., H.A. Oxenford and P. McConney. 2004. A livelihoods analysis of two marine protected areas in Belize. *Proc. Gulf Carib. Fish. Inst.* **57**:559-572.

Simmons, B. and P. McConney. 2006. Tobago Cays Marine Park: Are the conditions for successful co-management likely to be met? *CERMES Technical Report No*.**6**. 57pp