

Socio-economic Monitoring by Caribbean Challenge MPA Managers

Report No. 10

Socio-economic trends of adjacent communities of the Sandy Island Oyster Bed Marine Protected Area

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1 INTRODUCTION

1.1 Socio-economic Monitoring by Caribbean Challenge MPA Managers

Socio-economic monitoring for coastal management in the Caribbean (SocMon Caribbean) is a globally networked, regionally adapted, practical methodology of socio-economic monitoring for coastal management (Bunce et al. 2000, Bunce and Pomeroy 2003). Consultation with representatives of the MPA community associated with the Caribbean Challenge Initiative¹ indicated the need for capacity building in socio-economic monitoring for the development of an effective regional system of MPAs. This need for MPA capacity building in socio-economic assessment and monitoring has also been identified in various training needs and capacity assessments (Parsram 2007 and Gombos et al. 2011). The Caribbean Challenge Initiative and regional training in SocMon provide a major opportunity for uptake of SocMon for achieving improved MPA management capacity and therefore conservation of coastal resources. With strengthened capacity for management through socio-economic monitoring, MPA managers, authorities and field staffs will also increase their capacity for adaptive management through learning-by-doing.

The Centre for Resource Management and Environmental Studies (CERMES) at the University of the West Indies, Cave Hill Campus was awarded a grant of just over USD 63,000 by The National Fish and Wildlife Foundation (NFWF) to support Socio-economic monitoring by Caribbean Challenge MPA managers. The project's long-term conservation outcome is increased capacity for effective MPA management among Caribbean Challenge (CC) countries through the use of social and economic monitoring data in MPA decision-making.

The goal of this project is to build capacity for improved and effective MPA management among Caribbean Challenge countries by promoting the use of social and economic data in MPA management by:

- Training approximately 40 MPA managers/staff, from three Caribbean Challenge countries, in the practical use of SocMon Caribbean methods via three country-specific workshops
- Initiation of eight site assessment and monitoring programs for coastal management in each of the countries receiving the training via a small grant of USD 2,500
- Documentation of training and monitoring initiation processes, to make them available to a worldwide audience and CERMES communications for replication, with improvement, in future rounds of SocMon activity
- Submission of compatible data to the Reef Base Socio-Economic global database and CaMPAM database

The project involves eight MPAs across three CC countries - Grenada, St. Vincent and the Grenadines, and St. Lucia. Participating MPAs in Grenada and the Grenada Grenadines are the Molinière/Beauséjour Marine Protected Area (MBMPA) and Woburn/Clarke's Court Bay Marine Protected Area (WCCBMPA) in

¹ (<http://www.nature.org/ourinitiatives/regions/caribbean/caribbean-challenge.xml>)

Grenada, and Sandy Island/Oyster Bed Marine Protected Area (SIOBMMA) in Carriacou. This report presents project activities and results of socio-economic monitoring conducted at the SIOBMMA.

1.2 Situation overview

Grenada is located in the eastern Caribbean, just north of Trinidad and Tobago in the Caribbean chain. The country of Grenada consists of the main island of Grenada and the inhabited Grenadine island of Carriacou and Petite Martinique along with several other uninhabited islands and cays.

The Sandy Island/Oyster Bed Marine Protected Area (SIOBMMA) is a no-take marine protected area on the southwest tip of the island of Carriacou that comprises an area of 7.87 km² that was officially established on July 31st, 2010. The marine protected area was established to protect all the critical habitats including mangroves, seagrass beds, coral reefs for all stages of the growth cycle of marine resources, along with critical nesting and roosting habitats (offshore islands) for sea birds.

In the process of conserving, SIOBMMA aims to lower the human impacts on the marine environment and provide benefits to both fisheries and conservation. By protecting the coral reefs, mangroves and sea grass beds within its boundaries, SIOBMMA will help to maintain a healthy marine and coastal ecosystem in Carriacou.

The MPA boundary stretches from a point along the Lauriston Airport road, across Paradise Beach and L’Esterre Bay, around Point Cistern and ends inside Tyrell Bay. The area encompasses four offshore islands (Sister Rocks, Mabouya Island and Sandy Island) along with the mangroves at Lauriston Point and Tyrell Bay, including all of the Oyster Beds (Figure 1).

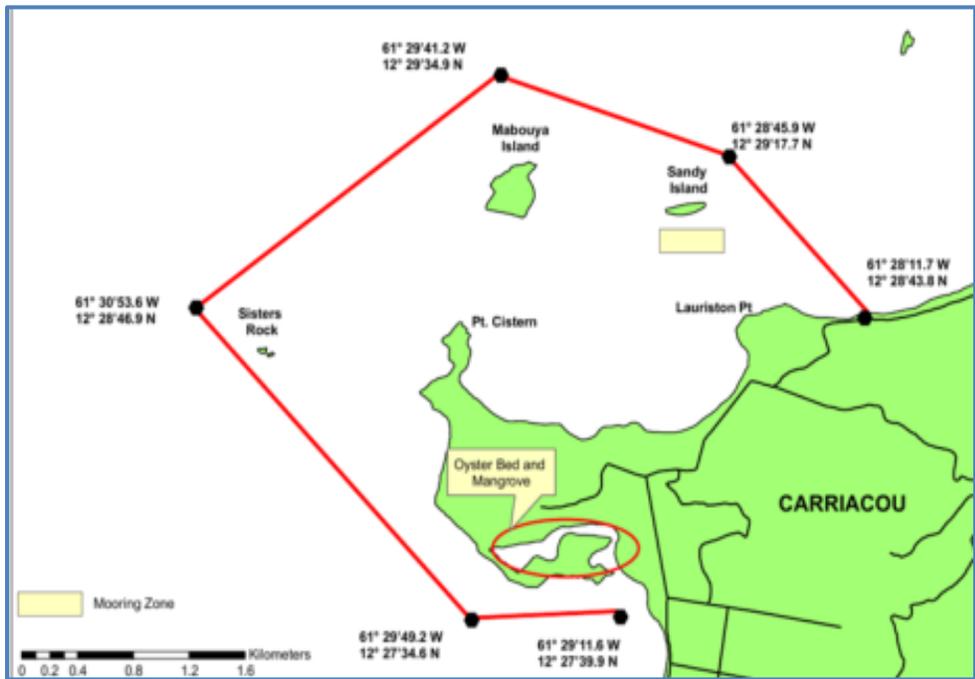


Figure 1 Map of the Sandy Island/Oyster Bed Marine Protected Area

Brunswick, Lariston, L’Esterre and Harveyvale are the communities that are directly adjacent to the SIOBMMA. The population within these communities are largely dependent on the marine environment

for their livelihoods through tourism and fishing activities. The establishment of a no-take MPA has significant implications for the livelihoods of these communities, especially L’Esterre which is one of the largest fishing communities on the island.

1.3 Goals and objectives

The goals and objectives for assessment are outlined below.

Goal	Objectives
To determine impacts, and attitudes and perceptions trends of the Sandy Island/Oyster Bed Marine Protected Area (SIOBMPA), on persons living and working in communities adjacent to the MPA.	1. To obtain MPA stakeholder feedback on the MPA management process, impacts and effectiveness of management activities within the protected area before and after the establishment of the MPA.
	2. To determine the current conditions of the coastal and marine resources.
	3. To identify the specific uses of the MPA and its resources by households within the adjacent communities.

1.4 Organization of report

This report is divided into five sections. Section 1 provides a description of the SocMon Caribbean Challenge project, situation overview of the SIOBMPA and the goals and objectives for monitoring. Section 2 outlines the methods used for gathering the data. The results are provided in Section 3. Discussions and conclusions are in Section 4. The report ends with section 5 which contains recommendations for monitoring and management.

2 METHODS

2.1 SocMon training

Twelve participants from the three participating MPAs, the Fisheries Division, Ministry of Agriculture, Woburn/Woodlands Development Organisation, Royal Grenada Police Force, North West Development Authority Incorporated (NWDAl) and Ministry of Carriacou and Petit Martinique Affairs (MOCAPA), were trained in the SocMon Caribbean methodology via a 5-day training workshop, 6-10 February 2012 at the Grenada Fisheries Division, Melville Street, St. George’s. The Woburn/Clarke’s Court Bay was used as the demonstration site for the duration of the workshop (Pena and Blackman 2012).

2.2 SocMon team

A SocMon team was developed to plan and conduct field work for the project.

Role on team	Specific tasks	Team member name and affiliation
Project manager	Supervision of finances and questionnaire design.	Davon Baker (Board Member)
Team leader	Questionnaire design, data input and analysis	Olando Harvey (MPA Manager)
Community liaison	Raising awareness about the project and assisting with field data collection,	Jody Placid, Bryan Prince & Anique Coy (MPA Wardens)
Monitoring Plan	Development of monitoring plan	Noland Cox (Ministry of Agriculture) Desmond Nicholas (Board Member) Angelo Alexander

2.3 Household surveys

This study was conducted by administering household surveys consisting of both open and closed ended questions within the communities of Brunswick, Lauriston, L’Esterre and Harvey Vale (Appendix 1). These communities were selected because of their adjacency to the SIOBMPA and the fact that the people within these communities were the largest resource users and by extension stakeholders.

The surveys were administered by a trained enumerator at 35 households within the target communities – 10 each in Lauriston, L’Esterre and Harveyvale, and 5 in Brunswick. The households were selected at random to remove researcher bias, by walking along the main road that runs through each of the community and surveying every third house from a randomly selected starting point. In the event that this house was vacant (not occupied or abandoned) the interviewer moved to the next house along the street.

To expedite initiation of site monitoring at the SIOBMPA, the SocMon team requested that CERMES assist with the design of the survey. Once designed, the survey was forwarded to the SocMon team for review and editing after which it was submitted to CERMES for final approval. Seventeen survey variables were used to collect the relevant data, twelve of which were original SocMon Caribbean variables (Bunce and Pomeroy 2003). Of these twelve original variables, three were revised and adapted to collect data relevant to the objectives of the project. The development of five new survey variables was necessary to measure and capture additional data required such as MPA knowledge and awareness, types of and changes in MPA livelihoods, household MPA livelihoods, MPA changes or impacts, and management priority(ies) (Appendix 2).

2.4 Data entry and analysis

The data from the household surveys were entered into an Excel spreadsheet and then analysed using simple descriptive statistics. The Excel datasheet was sent to Maria Pena, Caribbean Challenge SocMon project manager for further review and analysis.

2.5 Validation meeting

A validation meeting was held on 28 February 2013 in L'Esterre where validation results of the SIOBMPA SocMon were presented to the communities. Approximately twenty persons attended the meeting. Mr. Olando Harvey, SIOBMPA Manager, presented the results via a slide presentation and led the discussion to validate the preliminary findings of the survey.



Figure 2 Validation meeting for the SIOBMPA SocMon

3 RESULTS

Results are presented under headings corresponding to the assessment objectives:

1. Current conditions of coastal and marine resources (Section 3.1)
2. Uses of the SIOBMPA and its resources by households within and adjacent to MPA communities (Section 3.2)
3. MPA management effectiveness, management process and management impacts before and after SIOBMPA launch (Section 3.3)

3.1 Current conditions/status of coastal and marine resources

This section highlights the general perception of the population of what they thought the current condition of coral reefs, seagrass beds, mangroves, sandy beaches, offshore islands habitats along with sea turtles and reef fish populations within the SIOBMPA currently are compared with six years ago before the MPA was established. General improvement in the condition of all coastal and marine resources over the period 2006 to 2012 was noted by the majority of respondents. Respondent ratings of condition of a number of coastal and marine resources are provided below.

The 2006 condition of coral reefs in the SIOBMPA was rated by the majority of respondents (45% combined) to be in very good or good health. Smaller proportions of persons rated coral reef condition in 2006 as fair (29%) and poor (3%). Sixty-nine percent of persons believe that in 2012 coral reefs were in very good or good health whereas only nine percent thought they were fair in condition. Just under

one-quarter of persons surveyed (23%) were unable to provide ratings on the condition of this ecosystem in 2006 and 2012 (Figure 3).

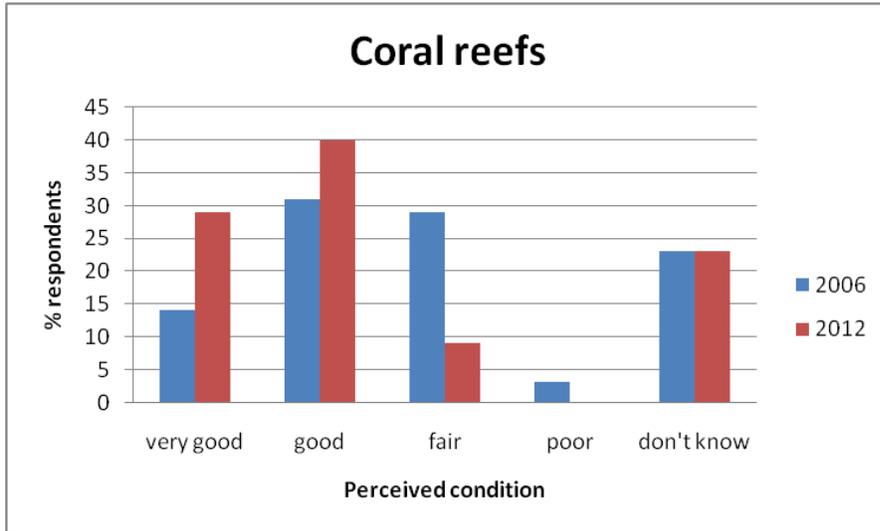


Figure 3 Perceived change in coral reef condition from 2006 to 2012

The majority of respondents (60% combined) believed that in 2006, mangroves were in a very good or good condition whereas 20% rated them as fair and 9% as poor. The 2012 condition of mangroves was rated as very good or good by 66% of respondents whereas 20% rated it as fair and 3% as poor. Eleven percent of the population stated that they did not know about the health of the mangrove habitat within the MPA for the period 2006 to 2012 (Figure 4).

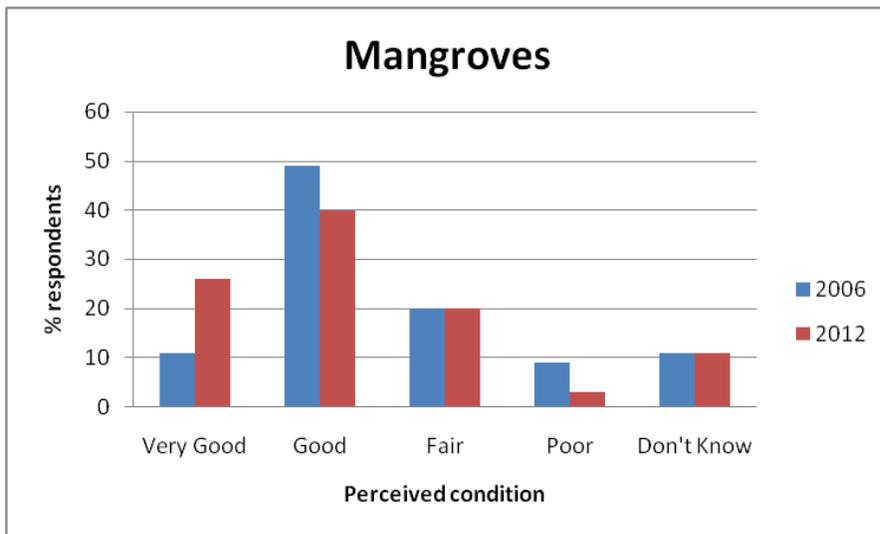


Figure 4 Perceived change in mangrove condition from 2006 to 2012

The 2006 condition of SIOBMPA seagrass beds was rated by most people as being in very good or good health (40% combined). Smaller proportions of persons rated the seagrass beds as fair (29%) and poor (35%). Seagrass bed condition in 2012 was rated as very good or good (60% combined) by the majority

of persons and fair by the minority (11%). Twenty-nine percent of persons did not know about the health of the seagrass beds in the area (Figure 5).

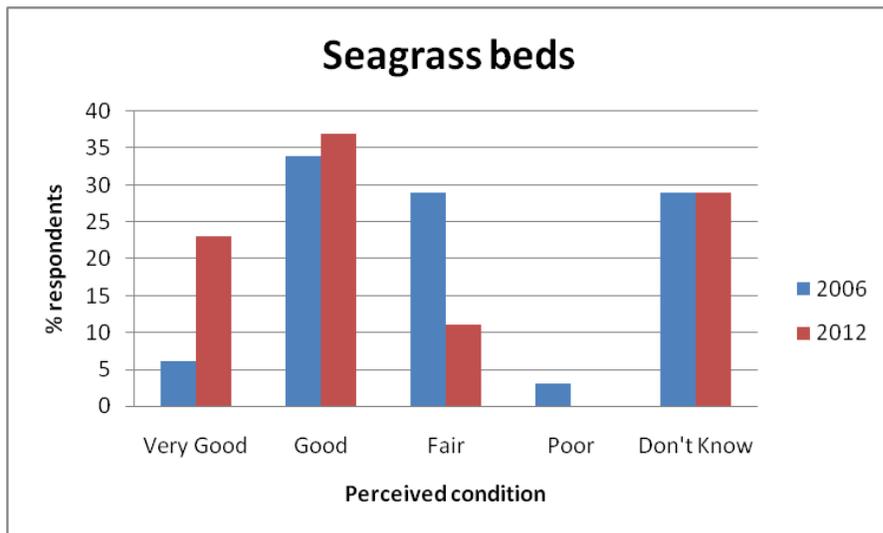


Figure 5 Perceived change in seagrass bed condition from 2006 to 2012

The majority of respondents (74% combined) believed that in 2006 the sandy beaches within the boundaries of the SIOBMPA were in very good or good condition whereas 20% rated them to be in fair condition. Six percent of respondents indicated that they not know about the conditions of sandy beaches within the MPA in 2006. Beach condition in 2012 was perceived to be very good or good by the overwhelming majority of respondents (95%) with only 3% each rating it as fair and poor (Figure 6).

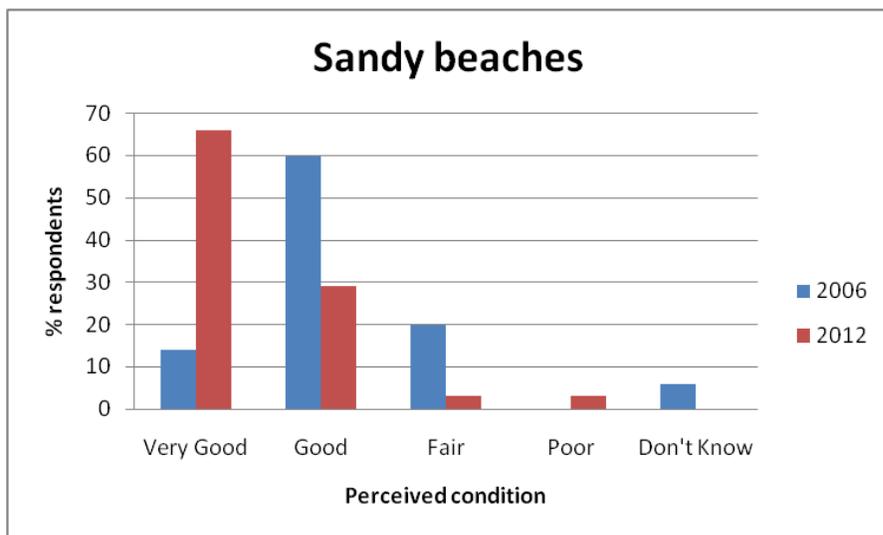


Figure 6 Perceived changes in beach condition in the SIOBMPA from 2006 to 2012

The offshore islands within the SIOBMPA were rated as being in good or very good condition in 2006 by 57% of persons (combined). Smaller proportions of respondents (29% and 3%, respectively) rated them as being in fair and poor condition. The 2012 condition of these islands were rated as very good or good

(77%), and fair (17%). Eleven and six percent of persons were unable to provide information on the condition of these islands in 2006 and 2012, respectively (Figure 7).

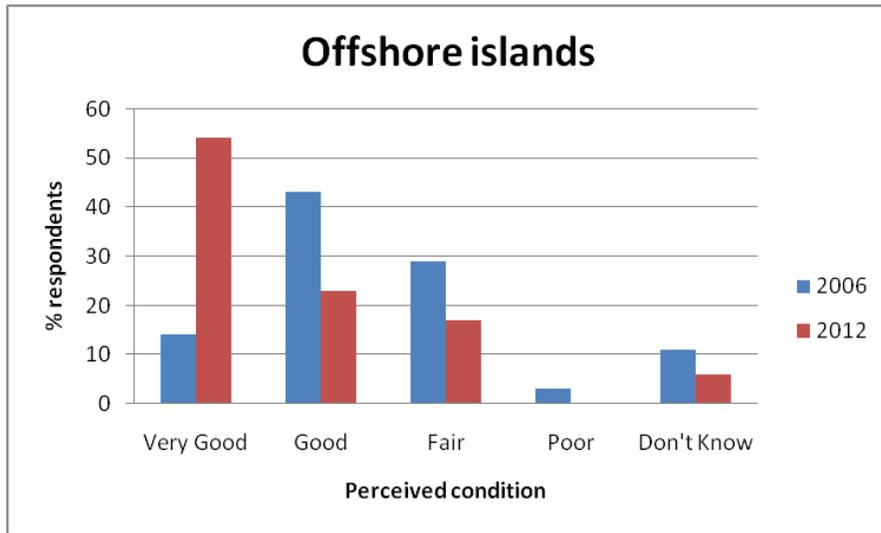


Figure 7 Perceived condition of the offshore islands within the SIOBMPA between 2006 and 2012

The status of turtle populations in the SIOBMPA in 2006 were perceived by just over three-quarters of persons (37% combined) as being good or very good. However, a similar proportion (37%) rated the 2006 population status as fair, while six percent thought it was poor. For 2012 population status was thought to be good or very good (46% combined), fair (34%) and poor (6%). Twenty and fourteen percent of the respondents indicated that they did not know about the status of the sea turtle populations in the SIOBMPA in 2006 and 2012, respectively (Figure 8).

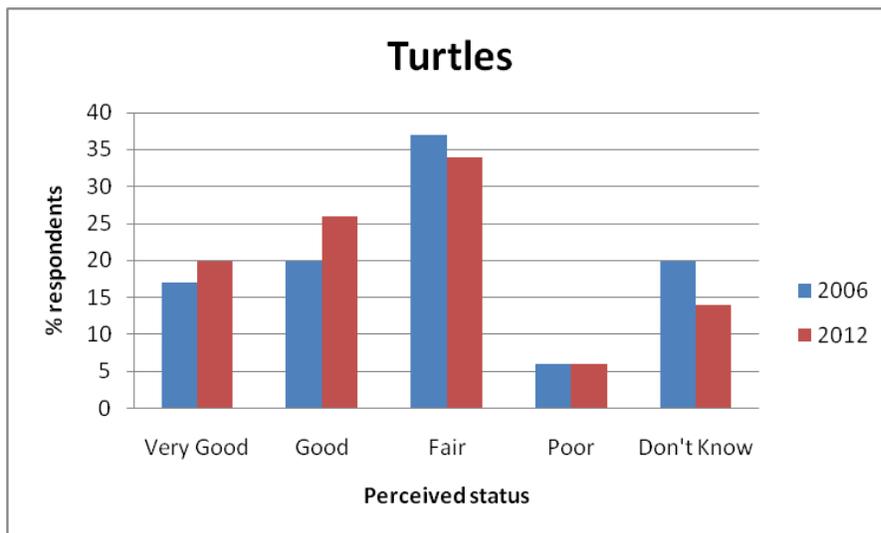


Figure 8 Perceived status of turtles in the SIOBMPA

Almost equal proportions of respondents, 71% and 74%, respectively, thought that the population status of reef fish in 2006 and 2012 was very good or good. In 2006, reef fish populations in the

SIOBMPA were thought to also be fair (17%) and poor (3%). Similarly the 2012 reef fish population status was also thought to be fair (14%) and poor (3%). Nine percent of the respondents stated that they did not know about the status of reef fish within the MPA for the period 2006 to 2012 (Figure 9).

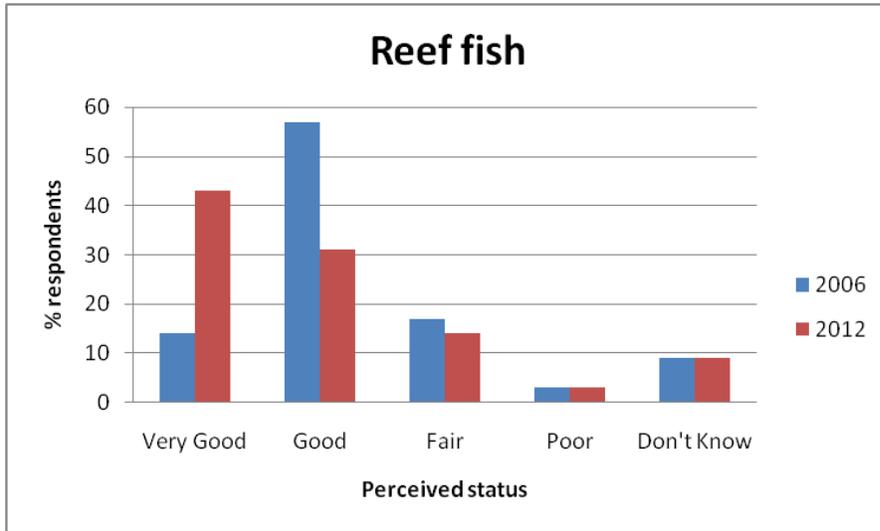


Figure 9 Perceived status of reef fish in the SIOBMPA between 2006 and 2012

Just below three-quarters of persons (74%) believe that the general state of the SIOBMPA has improved since the launch of the MPA in 2010. A fairly significant proportion however, think that it has stayed the same or worsened (25% combined). See Figure 10.

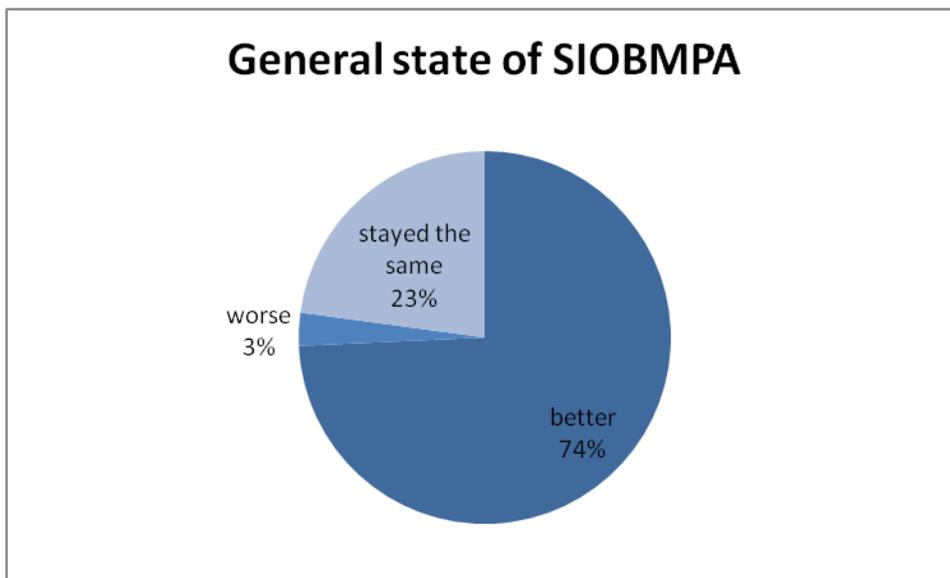


Figure 10 Perceptions of the general state of the SIOBMPA since its launch in 2010

The top three problems people have noticed with the marine resources of the SIOBMPA were overfishing (15%), and pollution and anchor damage (14% each). The other two areas mentioned were illegal fishing (9%) and the MPA being too large (8%). See Figure 11. The top three suggested solutions

for dealing with these identified problems were reduction in fishing pressure, possibly through introduction of fishing seasons (13%), enforcement of laws dealing with illegal dumping (19%) and the use of moorings (15%). The other suggested solutions mentioned were public education (7%) and reducing the size of the MPA (6%). See Figure 12.

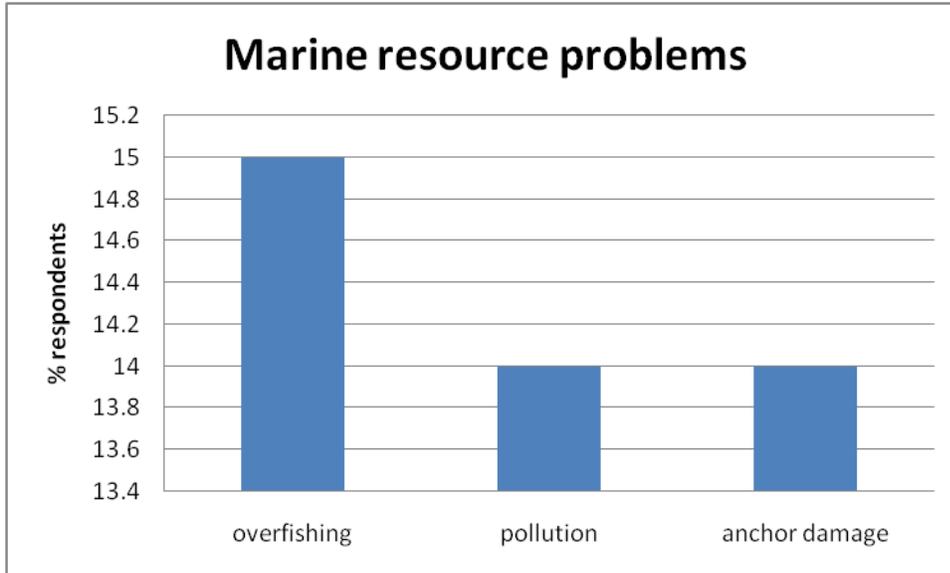


Figure 11 Top three perceived problems with marine resources in the SIOBMPA

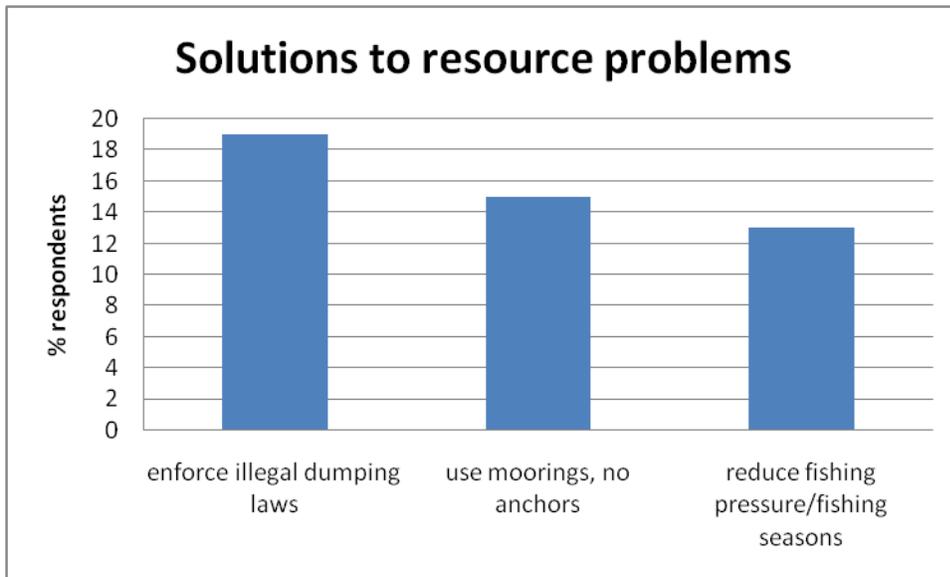


Figure 12 Top three suggested solutions to resource problems

3.2 Uses of the SIOBMPA and its resources by households within and adjacent to MPA communities

Seventy-four percent of respondents indicated that their household utilized the areas with the SIOBMPA for swimming. Forty percent of respondents utilize the area for diving. Thirty-seven percent utilize the beach for picnicking. Both sun bathing and snorkelling were done by seventeen percent of the sample,

followed by recreational fishing with six percent of respondents. None of the persons interviewed indicated that they conduct bird watching activities with the MPA (Figure 13).

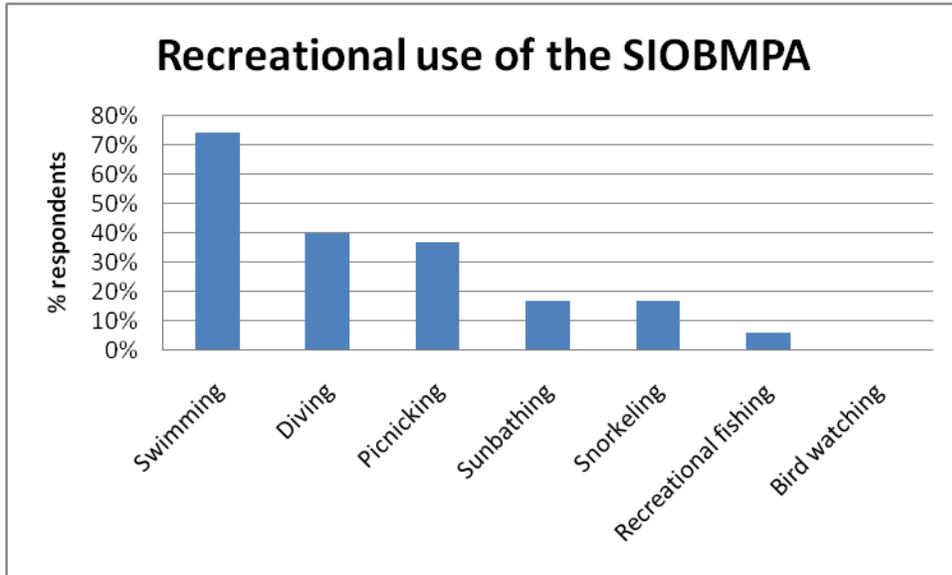


Figure 13 Household recreational use of the SIOBMPA

Pot fishing was the most common livelihood activity within the MPA in which the majority of respondents (29%) and members of their household are involved in. This was followed by spear fishing (26%); seine fishing, dive operation and tour guiding (17% each); water taxi operation (11%) and craft vending (9%). See Figure 14.

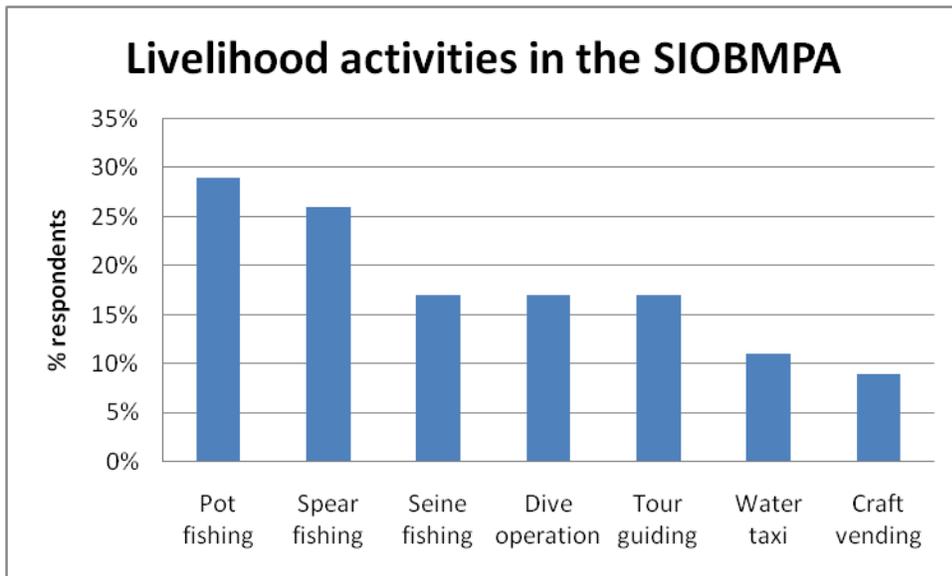


Figure 14 Ways in which households make a living from the resources in and around the SIOBMPA

3.3 MPA management effectiveness, management process and management impacts before and after the SIOBMPA launch

3.3.1 SIOBMPA impact

Seventy-one percent of respondents noted that the launch of the MPA in 2010 and its management over the years has not had any impact on their household. Of the twenty nine percent who indicated an impact on their household by the MPA, 50% cited a reduction in their ability to generate a livelihood in contrast to 10% who believed it lead to an increase in livelihoods, while 40% indicated a loss in potential food sources (Figure 15).

Eighty-six percent of respondents noted that since the launch of the SIOBMPA in 2010 their knowledge about the SIOBMPA and its resources has increased. Of that 86% who cited a change in knowledge, 73% noted that they learnt that the MPA protects nature; 10% noted they learnt that there is no fishing within the MPA; 7% learnt that the environment is improving and ten percent cited other facts - learning that fish would get larger inside the MPA, the importance of the mangroves and MPAs also benefit fishers (Figure 16).

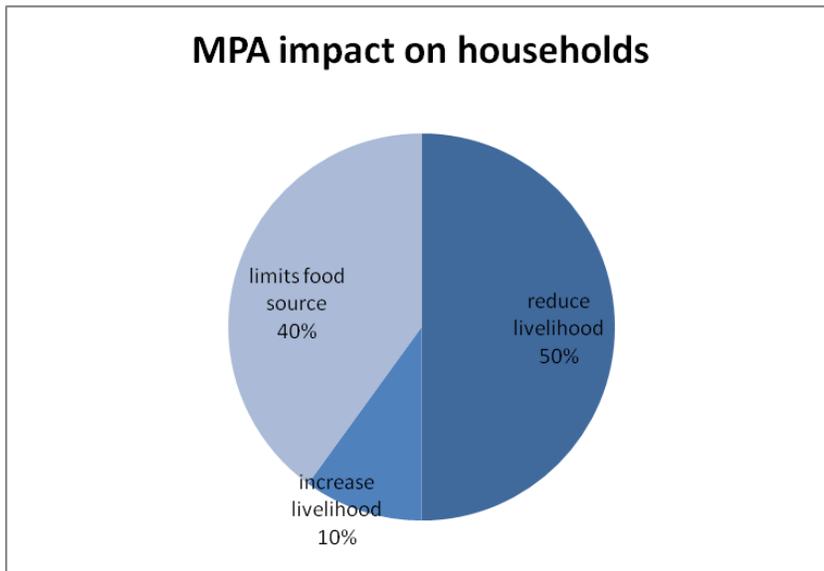


Figure 15 SIOBMPA impacts on households

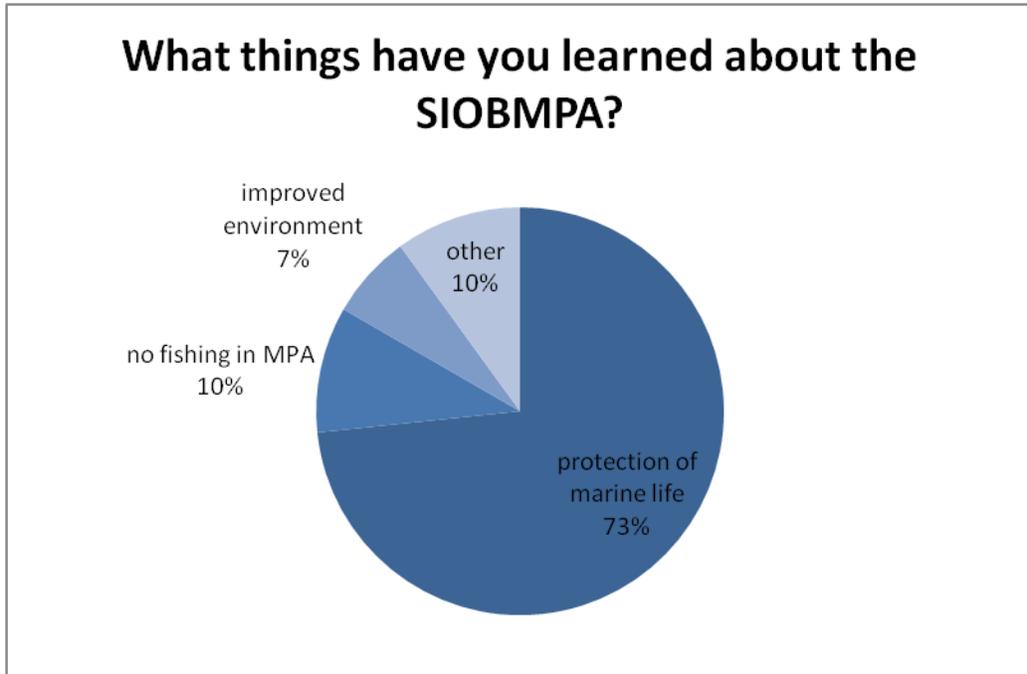


Figure 16 Knowledge of the MPA since its launch

3.3.2 MPA management effectiveness

Respondents believe that the two most successful management activities by the SIOBMPA are the protection of the marine resources (45%) and the management of the yachts visiting the MPA (14%). Other things that persons thought have worked well in the management of the SIOBMPA included protection of the out-islands such as Sister Rocks, Mabouya and Sandy Island (12%) and job creation (Figure 17).

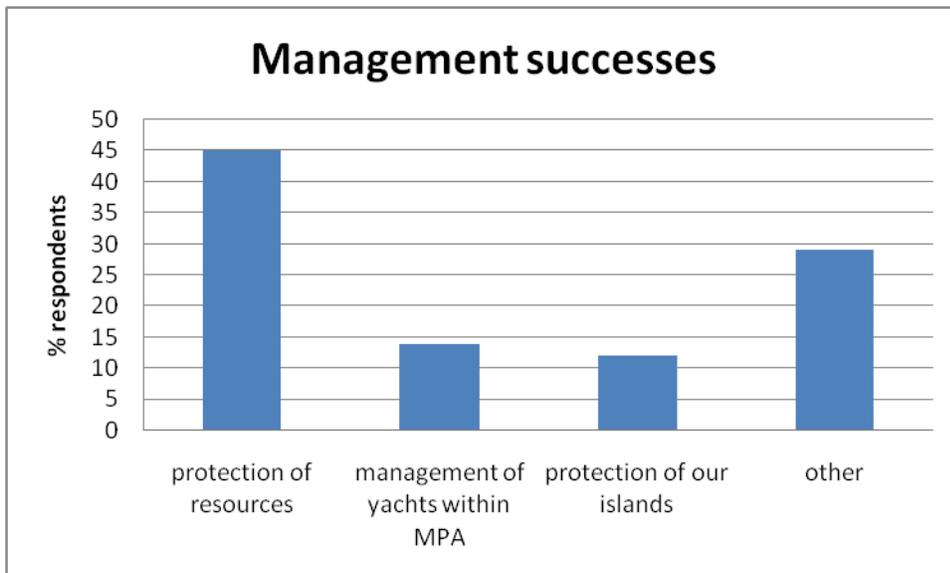


Figure 17 Perceptions of what has worked well in SIOBMPA management

By contrast, the two most unsuccessful management interventions were the MPA’s interaction with fishers/fisheries (51%) and management of illegal anchoring (21%). Other activities that have not worked well in the management of the SIOBMPA relate to solid/liquid waste management (5%) and other activities such as public awareness and enforcement (Figure 18).

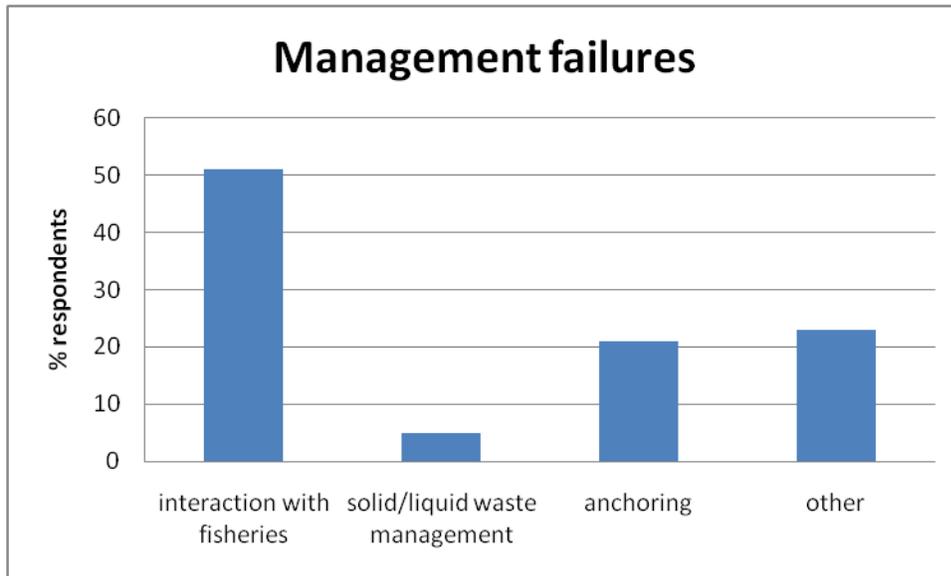


Figure 18 Perceptions of what has not worked well in SIOBMPA management

The majority of respondents (87%) feel that there are issues or problems in the SIOBMPA that management has not addressed. These include displacement of fishers (52%), illegal fishing in the MPA (15%), anchoring within the MPA (4%) and other (30%) such as inclusion of out-island, utilization of out-islands and lack of public education. Persons suggest that management can address these issues by providing assistance to fishers (33%), educating the public (30%), involving stakeholders in management (22%) and other (15%) such as reducing the size of MPA, allowing fishing and relocating/moving the MPA .

3.3.3 New management focus

Thirty one percent of the population indicated that they would like to SIOBMPA to focus on assisting fishers that have been displaced by the establishment of the MPA. Sixteen percent believe that attention should be focused on resource protection. Thirteen percent on public education; nine percent on pollution and twenty-eight percent on other non specific areas supervision of visiting yachts, invasive species and re-vegetation of beaches.

3.4 Demographics

Respondents to the questionnaires ranged in age from over fifteen years to over sixty one years (Figure 19). Eighty-five percent of the respondents were between the age of fifteen and fifty years old. Sixty-six percent of the respondents were male. Secondary school was the last school attended by 49% of the

respondents. Fourteen and seventeen percent indicated that primary and tertiary institutions were the last school they attended, respectively (Figure 20).

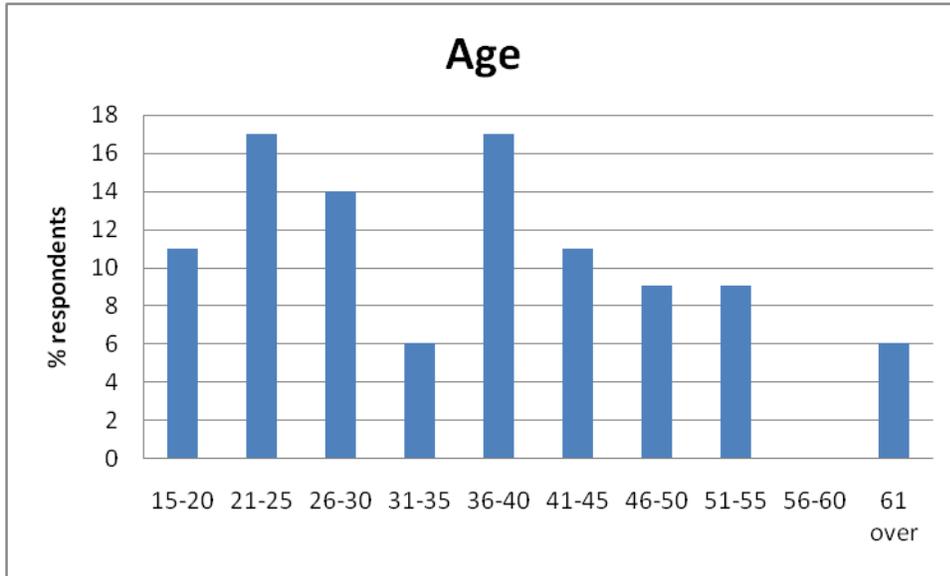


Figure 19 Age distribution of respondents

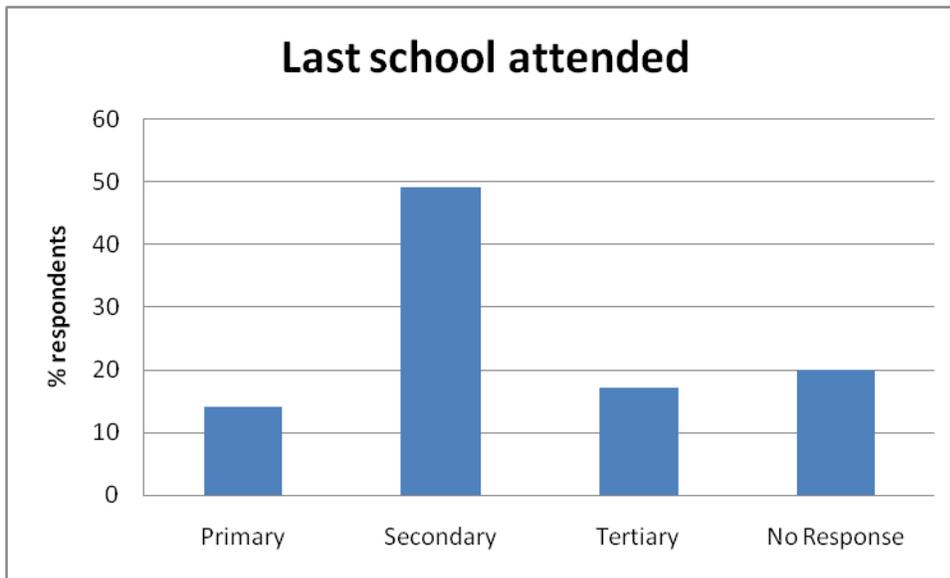


Figure 20 Type of school last attended by respondents

Fishing which represented with twenty nine percent or respondents was the largest employment sector within the community. Construction and retail sales accounted for 14% each, while tourism and government represented nine and six percent, respectively. The other 29% of the respondents were scattered between several different farming, housekeeping and pension (Figure 21). Of the thirty-five individuals that were surveyed, 51% indicated that they had additional sources of income besides their primary occupation with persons tending to move between sectors during different times of the year.

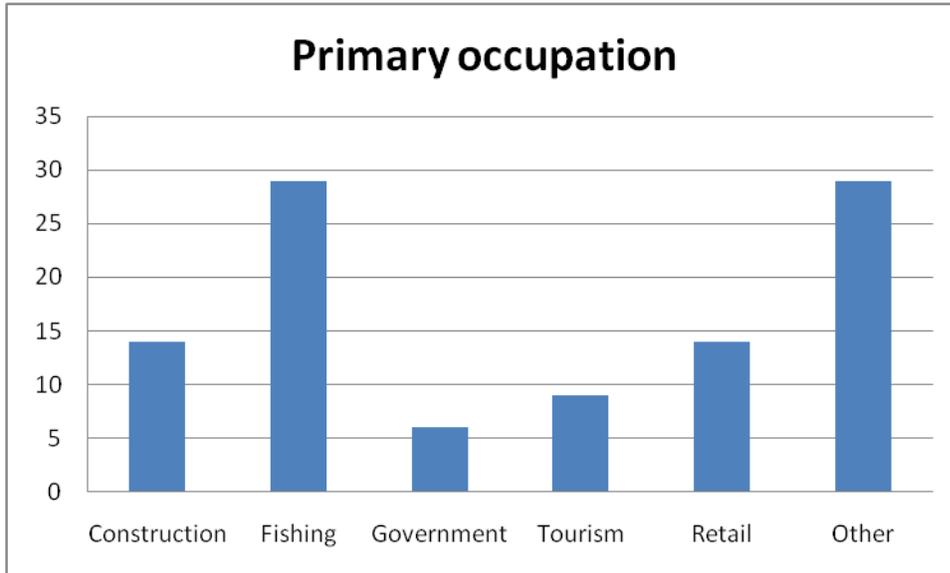


Figure 21 Primary occupation of respondents

4 DISCUSSION AND CONCLUSIONS

4.1 Conditions and uses of coastal and marine resources

Across the board, respondents expressed the opinion that resources and general state of the SIOBMPA are in better condition today than in 2006. This suggests that the public in general are of the opinion that the protection afforded to the priority conservation resources of the MPA is having a positive impact on the status of these resources. Perceived improvement in the condition of seagrass beds in the SIOBMPA may be attributed to the increased awareness of this ecosystem and its importance along with the work done by the MPA to reduce damage caused by the increase in yachts utilizing the MPA. Additionally, the positive change in respondent perception of sandy beaches in the MPA may be attributed to two factors, the increased enforcement of local sand mining laws by environmental wardens and secondly, the increased awareness of the population of the negative impacts on the environment caused by unregulated sand mining. The perceived improvement in sea turtle population status (foraging) is supported by the increase in turtle sightings within the MPA. The population increase may be as a result of improved seagrass habitat health and the enforcement of the area as a no-take marine reserve. Likewise, the general perception that there has been a very small increase in the reef fish population within the MPA over the past six years may also be as a result of the addition of a no-take MPA that is enforced by wardens on a daily basis.

The ratings of perceived condition of resources used in this study were the same as those used for determining resource condition during the development of SIOBMPA management plan in 2005. This has therefore allowed for some temporal comparison. During management planning only mangroves and offshore islands were collectively rated using a combination of local expert opinion and scientific data as being in good condition, requiring some human intervention for maintenance. All other priority conservation resources – coral reefs, seagrass beds, sandy beaches, offshore islands, sea turtles and reef fish were rated as being fair, i.e. requiring human intervention for maintenance and recovery (TNC and Grenada Fisheries Division 2007). See Figure 22. This is in contrast to perceptions of persons surveyed in this SocMon study of past (2006) resource conditions in which all resources with the exception of sea turtles were rated by the majority of respondents as very good or good. This however could be attributed to the fact that the 2005 assessment was based on people’s opinion of resource conditions at the time (as well as the incorporation of scientific data) with people therefore better able to gauge condition and status of resources than asking persons to remember past health and status of the various resources. Comparison of the 2005 ratings with those of current (2012) resource conditions vary with the majority of persons surveyed believing that all resources are in either very good (as close to “natural” as possible) or good (may require some human intervention for maintenance) condition. These results therefore indicate an improvement in resource condition however, these perceptions should be verified by scientific data. Therefore, it is critically important to set baselines for those resources that are not currently being actively monitored such as mangroves, seagrass beds, beaches, offshore islands and sea turtle populations.

<p>The resources were ranked based on the following scale: Very Good: As close to “natural” as possible. Good: May require some human intervention for maintenance. Fair: Requires human intervention for maintenance. Poor: Will be irreversibly damaged without human intervention</p>		
Conservation Resources		Condition
1	Coral Reefs	Fair
2	Mangroves	Good
3	Seagrass Beds	Fair
4	Sea Turtles	Fair
5	Sandy Beaches	Fair
6	Offshore Islands	Good
7	Reef Fish	Fair
Site Biodiversity Health Rank		Fair

Figure 22 Condition of SIOBMPA priority conservation resources in 2005
 Source: TNC and Grenada Fisheries Division (2008)

Similar threats to marine resources identified in the SIOBMPA management plan (2007) were identified in this study. Overfishing, pollution and illegal fishing were common threats to or main problems with marine resources in the MPA identified in both the management plan and SocMon study. However, in the SocMon study two new problems were identified by respondents – anchor damage and MPA size (too large). In general the MPA was relatively relaxed about no anchoring until January 2013 when the no anchoring rule began to be firmly enforced. In regard to the size of the MPA, it is intended for a zoning scheme to be implemented to open some areas to additional fishing with specific gear types. Recurrent and new threats to the priority conservation resources should continue to be addressed by MPA management.

The SIOBMPA is a heavily used area with numerous activities occurring for both livelihoods and recreation. The activities and uses of the area identified in the SIOBMPA management plan and those of this study are similar. It should be noted that 83% of persons interviewed and their households are involved in marine-related livelihoods within the MPA such as fishing, dive operation, and water taxiing. These stakeholders are therefore key to the successful management of the MPA and should be included in management decision-making since management interventions will undoubtedly affect them and likewise, they can have a significant impact on the SIOBMPA. In keeping with another goal of the MPA, all stakeholders and communities should be empowered and fully engaged in the management of the park.

4.2 MPA management effectiveness, management process and management impacts

Given the actual and perceived impacts of the SIOBMPA on the fishing industry within the communities adjacent to the MPA, measures must be put in place to effectively consult and educate these critical stakeholders of the importance and objectives of the SIOBMPA. There is also a significant need for the development of supplemental and alternative livelihood projects to help recuperate the lost revenue that these fishers may have incurred as a result of the MPA's establishment.

Consequently, a rigorous effort needs to be made to ensure that all fishers are registered and documented by the Fisheries Division. This would ensure that they receive all relevant training in occupational health and safety (including safety at sea) as well as ensuring that their fishing activities are executed with the highest sanitary standards. Documentation of the fishers would also provide a mechanism for them to be adequately involved in the effective management of the SIOBMPA. This is especially important given the impact of the MPA on their livelihood and the fact that they as a group have indicated that they are not willing to transition from fishing to any other occupation.

Knowledge and awareness of the SIOBMPA is quite high and has increased since 2006. This may be attributed to the SIOBMPA's public awareness campaign which includes both visits to schools and open air presentation in the different communities on the island. SIOBMPA management seems to be on the right track to achieving one of its management goals of increasing awareness and knowledge about the resources of the SIOBMPA (TNC and Grenada Fisheries Division 2007) but there are areas of awareness that should be reinforced and improved. For example, only a small proportion of individuals are aware that the MPA is a no-take reserve.

Generally people believe that SIOBMPA management has been fairly effective at protecting priority conservation resources hence steadily moving towards another of its goals, to “conserve the coastal and marine ecosystems through effective management for current and future generations.” However, as noted above scientific monitoring of these resources is essential for determination of trends and to guide management. Where possible, the monitoring plan detailed in the SIOBMPA management plan should be utilized and followed. Persons believe that MPA management interaction with fishers regarding displacement as a result of the MPA, the issue of illegal anchoring and waste management have not been handled well by management. The MPA has developed a suit of alternative and supplemental livelihood programs for the displaced fishers; however, due to lack of financing, these have been slow to be implemented. Consequently, fishers are somewhat despondent in likelihood of these programs ever being implemented. SIOBMPA management therefore needs to reassess its management interventions and adapt management to improve its effectiveness at dealing with these issues.

Although people feel that SIOBMPA management has been fairly effective at protecting resources within the MPA, most people would like management to focus on or continue to focus on resource protection. Additionally, public education, control of pollution and assistance to fishers were all seen as areas requiring management’s attention. SIOBMPA management should therefore attempt to focus management resources on these issues according to priority.

5 RECOMMENDATIONS FOR MONITORING AND ADAPTIVE MANAGEMENT

This round of monitoring provides a solid baseline on the socio-economic status of the communities adjacent to the SIOBMPA. It also documents their perceptions on the impact of the MPA on their livelihood and the status of the natural resources of the area. This baseline would function as the starting point for all analysis on the changes in natural resources and socio-economics of the area that would be conducted in the future. The finding of this and future analyses would serve to direct the effective adaptive management of the SIOBMPA.

With the exception of visitation numbers to Sandy Island, monitoring activities outlined in the SIOBMPA management plan (TNC and Grenada Fisheries Division 2007) focus on biological aspects of monitoring and not the socio-economic. SocMon should therefore be incorporated into a regular monitoring plan for the MPA for determination of socio-economic changes and trends in communities adjacent to the area.

6 REFERENCES

Bunce, L. and R. Pomeroy. 2003. Socioeconomic monitoring guidelines for coastal managers in the Caribbean (SocMon Caribbean). GCRMN.

Bunce, L., P. Townsley, R. Pomeroy and R. Pollnac. 2000. Socioeconomic manual for coral reef management. Australian Institute of Marine Science. 251pp.

Gombos, M., A. Arrivillaga, D. Wusinich-Mendez, B. Glazer, S. Frew, G. Bustamante, E. Doyle, A. Vanzella-Khouri, A. Acosta, and B. Causey. 2011. A management capacity assessment of selected coral reef marine protected areas in the Caribbean. Commissioned by the National Oceanic and Atmospheric Administration (NOAA) Coral Reef Conservation Program (CRCP), the Gulf and Caribbean Fisheries Institute (GCFI) and by the UNEP-CEP Caribbean Marine Protected Area Management Network and Forum (CaMPAM). 269 pp.

Parsram, K. 2007. Protected areas planning and management regional training needs assessment. OECS Protected Areas and Associated Livelihoods Project. 73pp.

Pena, M. and K. Blackman. 2012. Report of the Grenada SocMon Caribbean training workshop, 6-10 February 2012. Socio-economic monitoring by Caribbean Challenge MPA managers Project Report No. 3. 71pp.

The Nature Conservancy and Grenada Fisheries Division. 2007. Sandy Island/Oyster Bed Marine Protected Area management plan. USVI. Version 1. June 2007.

7 APPENDICES

Appendix 1: Household survey

ID# ____/Q# ____

Socio-economic monitoring in the Sandy Island/Oyster Bed MPA

This survey is being conducted by the Sandy Island/Oyster Bed Marine Protected Area (SIOBMPA) to determine trends in impacts, attitudes and perceptions about the MPA from people living and working in communities adjacent to the SIOBMPA. We would like you to participate in this survey. The information collected will be used to better manage the SIOBMPA. Any information you give will not be identified with you in reports on the survey and any information that you provide cannot be traced back to you. These reports will be shared with the public.

Date: _____ Area: _____
 dd-mm-yyyy

Current conditions of coastal and marine resources

The Sandy Island/Oyster Bed MPA (MPA) was legally declared a protected area in June 2010. It is approximately 787 hectares in size, located on the southwest coast of Carriacou. Beginning on the northern end, the SIOBMPA includes the mangroves of Lauriston Pt. in Hillsborough Bay, the shoreline through L’Esterre Bay, Pt. Cistern and the north end of Tyrrel Bay, including its mangroves. The MPA extends into the sea to encompass Sandy Island, Mabouya Island and the Sister Rocks. The area within the SIOBMPA has extensive coral reefs, mangroves and seagrass beds. *Show map of the SIOBMPA.*

- The resources that are protected by the SIOBMPA include the beaches, mangroves, seagrass beds, coral reefs, offshore islands, turtles and reef fish. How would you generally describe the condition of each of these resources based on the locations in the SIOBMPA that you are familiar with (a) six years ago (2006) and (b) today (2012)?

Rate the condition of the resources based on the following scale:

- 1 – **Very Good:** As close to “natural” as possible
- 2 – **Good:** May require some human intervention for maintenance
- 3 – **Fair:** Requires human intervention for maintenance and recovery
- 4 – **Poor:** Will be irreversibly damaged without human intervention
- DK – Don’t know

Resource	Condition (2006)					Condition (2012)				
	1	2	3	4	DK	1	2	3	4	DK
Coral reefs	1	2	3	4	DK	1	2	3	4	DK
Mangroves	1	2	3	4	DK	1	2	3	4	DK
Seagrass beds	1	2	3	4	DK	1	2	3	4	DK
Sandy beaches	1	2	3	4	DK	1	2	3	4	DK
Offshore Islands	1	2	3	4	DK	1	2	3	4	DK
Turtles	1	2	3	4	DK	1	2	3	4	DK
Reef fish	1	2	3	4	DK	1	2	3	4	DK

- In your opinion has the general state of the SIOBMPA become [] Better, [] Worse or [] Stayed the same since the launch of the MPA in 2010?

3. Thinking about these marine resources of the SIOBMMPA, what are three main problems that you have noticed with any of these resources and three main solutions that you would suggest to solve them? List problems in order of most severe to least severe.

	<i>Problem</i>	<i>Solution</i>
1.		
2.		
3.		

Uses of the SIOBMMPA and its resources by households within and adjacent to MPA communities
--

4. What do you and members of your household do for recreation/relaxation in or near to the SIOBMMPA? Tick ALL that apply.

- Swimming
 Sun bathing
 Snorkeling
 Picnicking
 Recreational fishing
 Bird watching
 Diving
 Other, please specify _____

5. How, if at all, do you or members of your household make a living from the resources in and around the SIOBMMPA? Tick ALL that apply.

- Pot fishing
 Seine fishing
 Water taxiing/charter craft
 Dive operation
 Tour guiding
 Craft vending
 Other, please specify _____

MPA management effectiveness, management process and management impacts before and after SIOBMMPA launch

6. In what way, if at all, has the SIOBMMPA had an impact on you or your household?

7. Is there anything in particular that you would like SIOBMPA management to focus on?

8.

a) Since the launch of the SIOBMPA in 2010 have you learned more about the SIOBMPA and its resources? Yes No

b) If YES, what things have you learned?

9. What two things do you think have worked well in the management of the SIOBMPA?

10. What two things do you think have not worked well in the management of the SIOBMPA?

11. Are there any issues/problems in the SIOBMPA that management has not addressed?

12. How would you suggest these problems be solved by management?

Demographics

13. Gender (*observe*) Male Female

14. How old are you?

- 15-21 21-26 27-30 31-35 36-40 41-45 46-50 51-55
 56-60 61-65 66 and over

15. What is type of school did you last attend?

- Primary
- Secondary
- Tertiary
- Other, please specify _____

16. What is your primary occupation? _____

17.

a) Do you have another source of income? Yes No

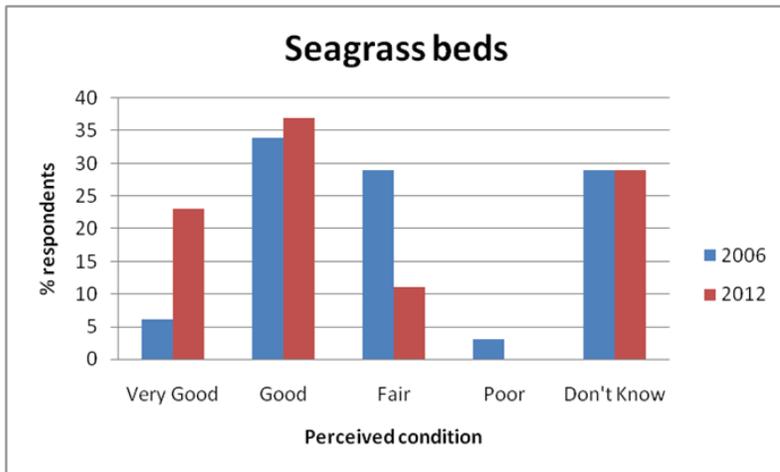
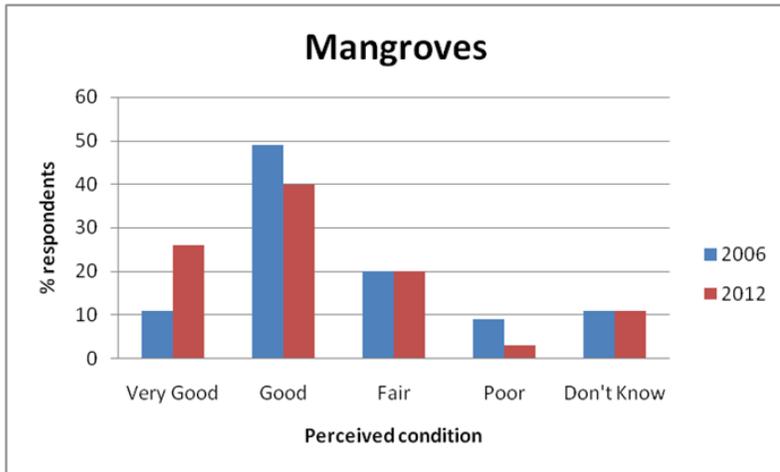
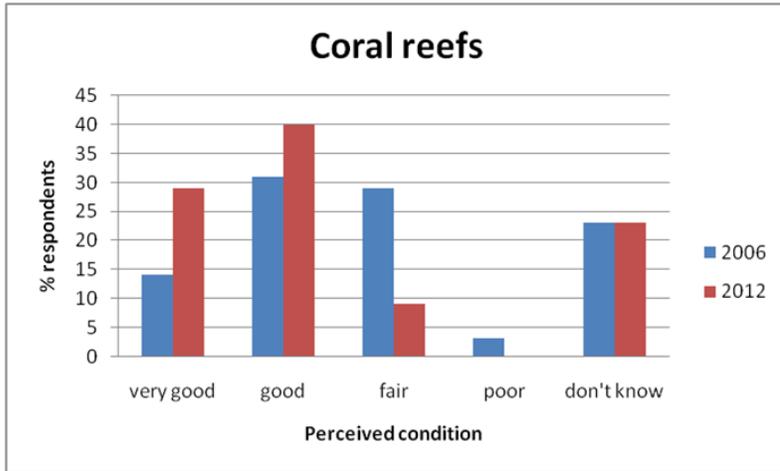
b) If YES, what is this other source of income? _____

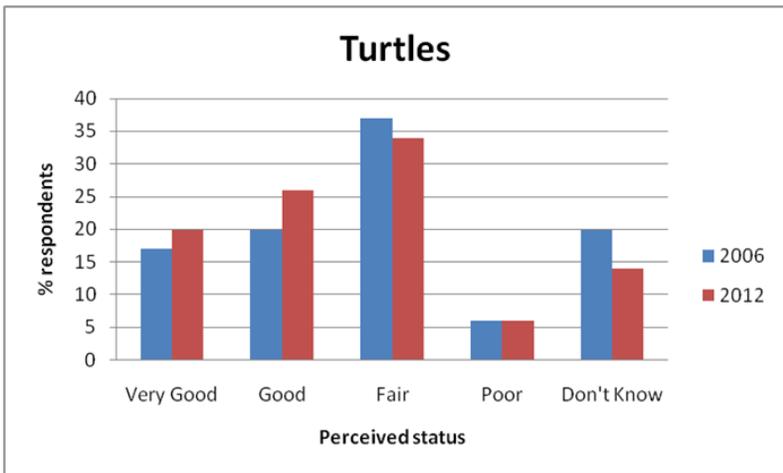
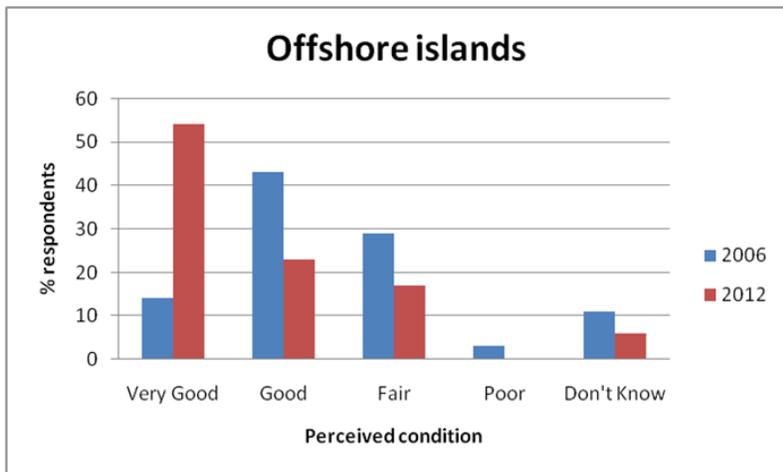
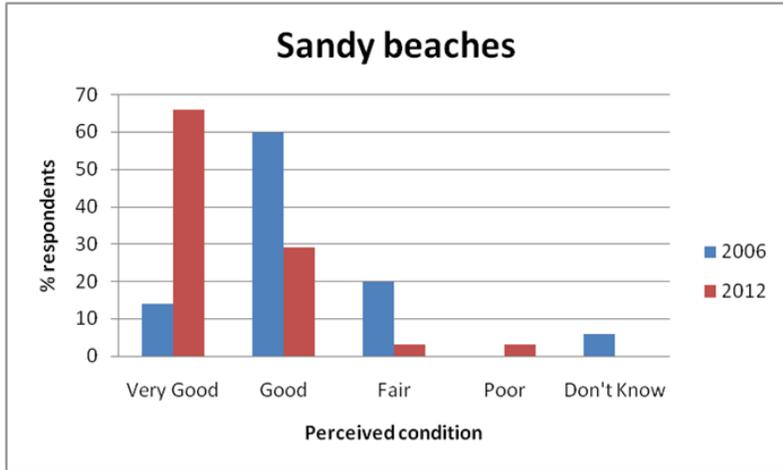
THANK YOU FOR YOUR ASSISTANCE

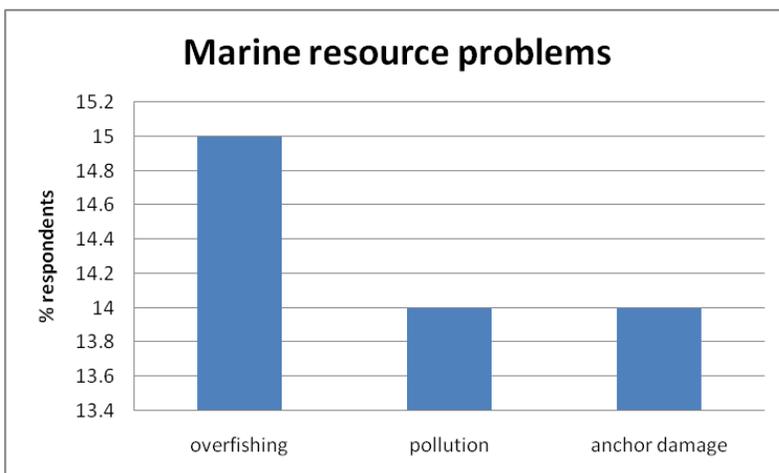
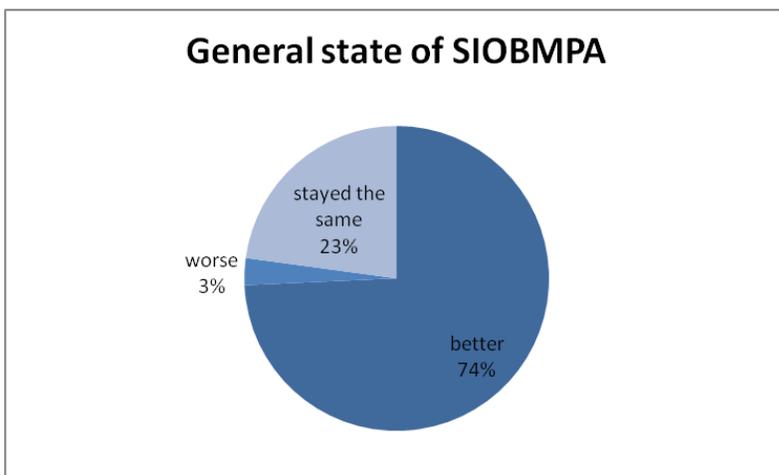
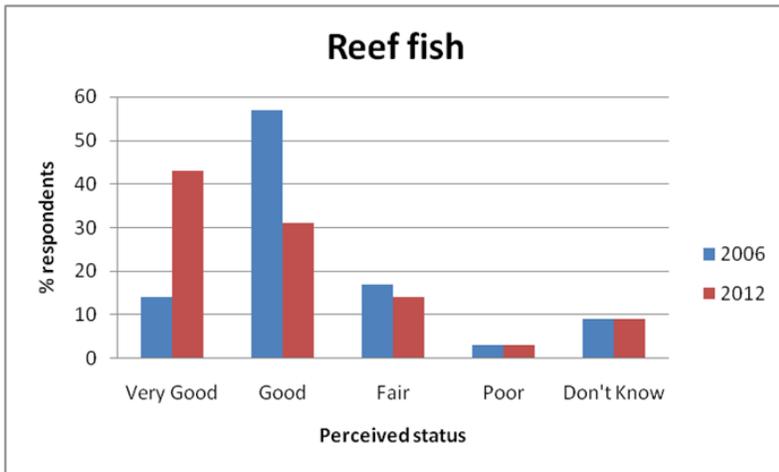
Appendix 2: Household survey SocMon Caribbean variables selected for monitoring

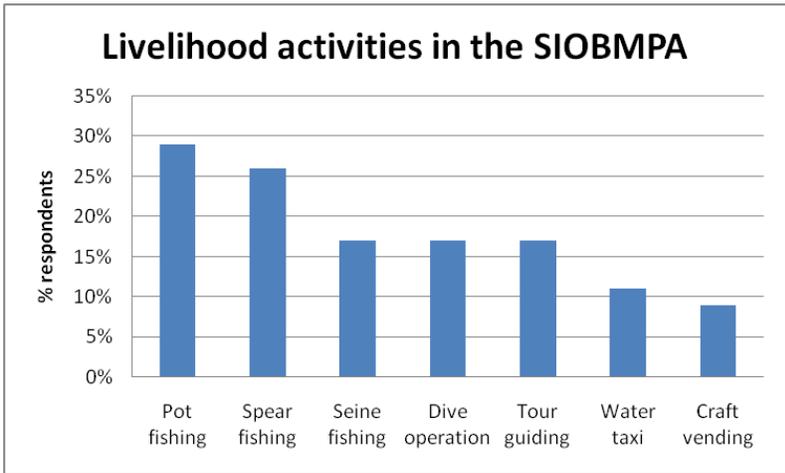
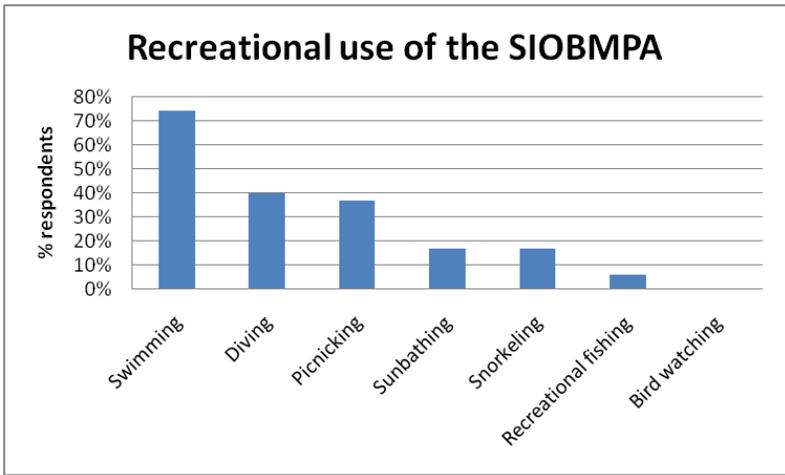
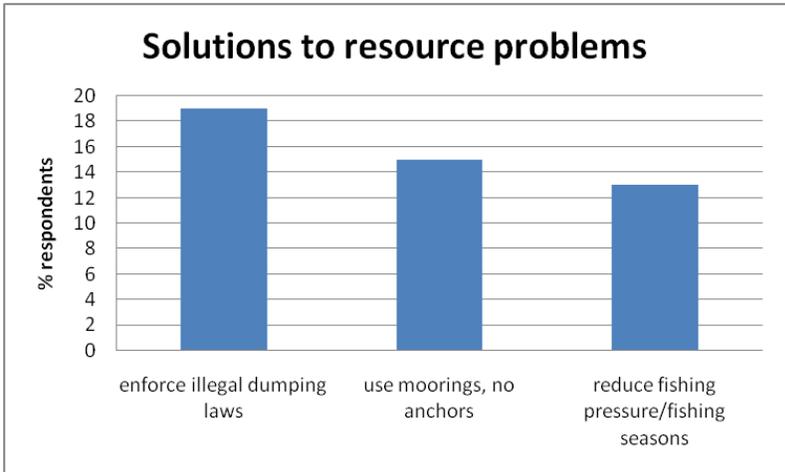
Variable no.	Variable name
S1	Age
S2	Gender
S4	Education
S7	Occupation
S9	HH income
S10 (revised)	HH activities
S16 (revised)	Perceptions of resource conditions
S17 (revised)	Perceived threats
S23	Perceived coastal management problems
S24	Perceived coastal management solutions
S26	Successes in coastal management
S27	Challenges in coastal management
NEW	MPA knowledge and awareness
NEW	Types and changes in MPA livelihoods
NEW	HH MPA livelihoods
NEW	MPA changes or impacts
NEW	Management priority(ies)

Appendix 3: Graphs from household survey analysis

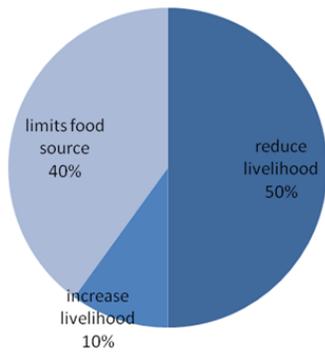




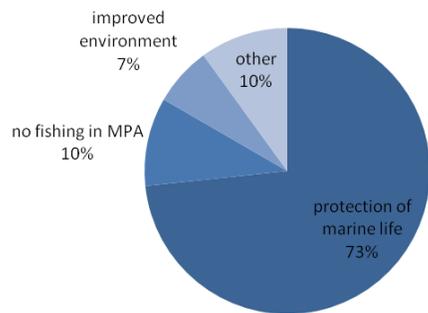




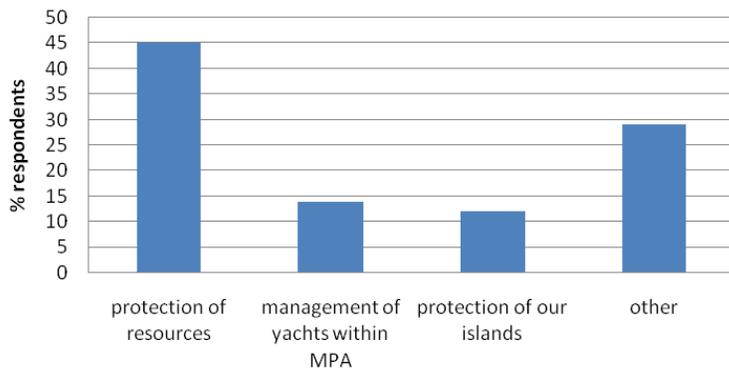
MPA impact on households

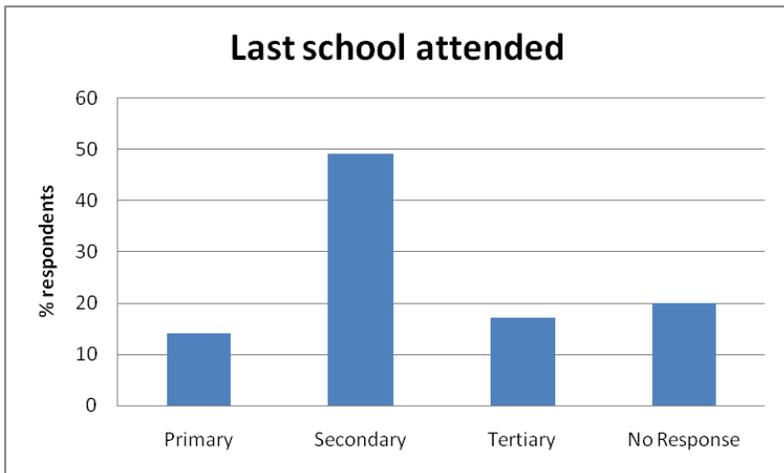
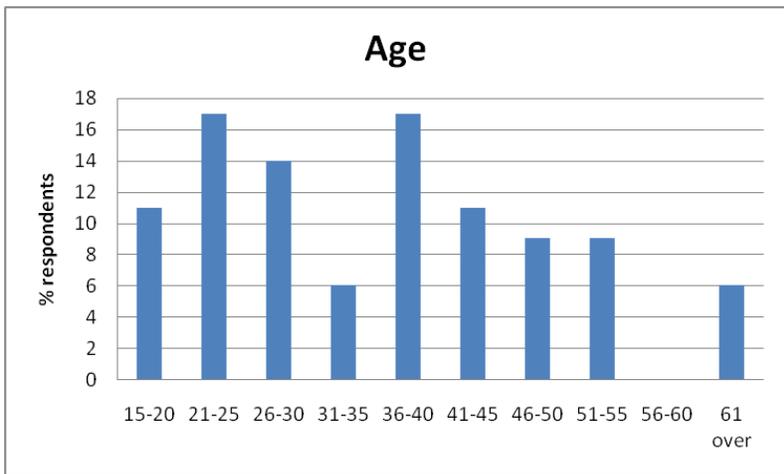
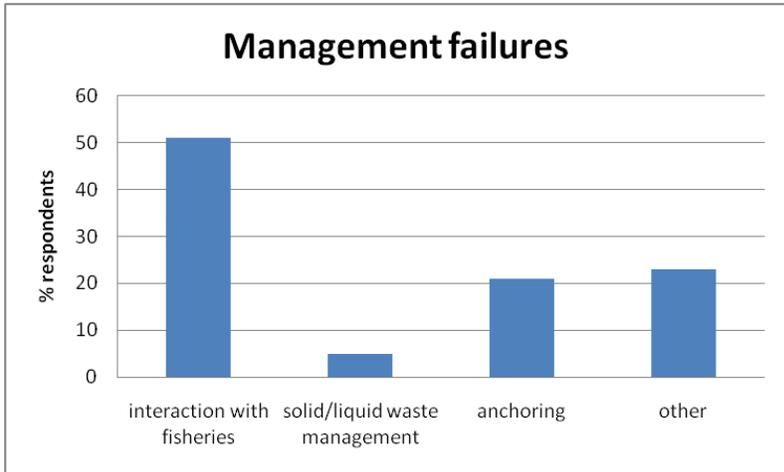


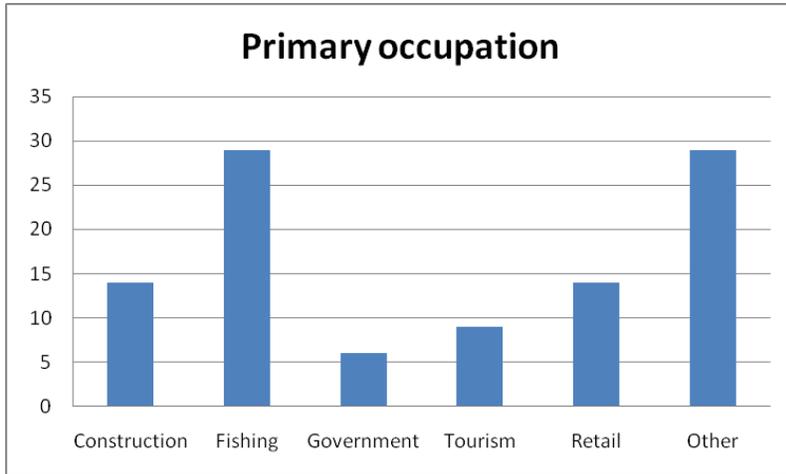
What things have you learned about the SIOBMPA?



Management successes







Appendix 5: SocMon project costs

Description of expense	No. of units	Unit cost (USD)	Total cost (USD)
Preparatory activities			
Community meeting to announce project and activities: Refreshments	40	\$7.00	\$280.00
Community meeting to announce project and activities: Venue rental	1	\$200.00	\$200.00
Transportation costs for site visit scoping	1	\$50.00	\$50.00
Secondary data collection			
Compilation, review and analysis of baseline data: Researcher/data analyst stipend	1	\$250.00	\$250.00
Photocopying costs/acquisition fees for relevant secondary data	1	\$250.00	\$200.00
Interviews and observation			
Interviewer Stipend	35	\$10.00	\$350.00
Data analysis and interpretation			
Data analyst stipend	1	\$300.00	\$300.00
Reporting	1	\$300.00	\$300.00
Validation, communication, adaptation			
Community validation meeting: Venue rental	1	\$200.00	\$200.00
Community validation meeting: Refreshments	40	\$7.00	\$280.00
Communication outputs/media: Flyers, radio announcements, newspaper articles	1	\$90.00	\$90.00
Sum total of SocMon			USD \$2500.00