

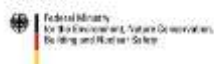
**CLIMATE RESILIENT EASTERN CARIBBEAN  
MARINE MANAGED AREAS NETWORK (ECMMAN) PROJECT**

**Socio-economic monitoring in adjacent  
communities of the  
Grand Anse Marine Protected Area**

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Supported by:



Based on a decision of the German Bundestag



Grenada Marine Protected Areas  
Fisheries Division, St. George's, Grenada  
September 2017

## Acknowledgements

This report is final the socio-economic monitoring report for the Grand Anse Marine Protected Area. We are firstly grateful to our SocMon Team – Orlando Harvey, Ezra Campbell, Danielle Ince, Shanell Cyrus, Arlene Daniel, Christabelle Andrews, Denzel Adams, Kadijah Edwards, Sabrina Compton and Andre Joseph-Witzig, for participating in the training activities and contributing to the completion of this study. The enumerators – Quincy Augustine, Robyn Browne, Jiminy Scott, Amonie Holas, Ashley Lambert, Saditha Benjamin and Timesha Vaughn for assisting with the data collection.

We express appreciation to the Fisheries Division, Ministry of Agriculture, Lands, Forestry and Fisheries and the Environment, Grenada, for granting permission to conduct the trainings. We are also grateful to the Acting Chief Fisheries Officer, Mr. Crafton Isaac, and retired Fisheries Officer, Mr. Roland Baldeo, for their knowledge and support. We extend our gratitude to each of the community members and fishers, key informants for their time and for sharing their knowledge and experiences with us.

And finally, we would like to express gratitude to The Nature Conservancy Team for supporting the implementation of this study.

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**Citation:**

Campbell, E., O. Harvey and D. Ince. 2017. Socio-economic monitoring in adjacent communities of the Grand Anse Marine Protected Area. Climate Resilient Eastern Caribbean Marine Managed Areas Network (ECMMAN): Eastern Caribbean Integrated Coral Reef Monitoring Project Report No. 6. 107pp.

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## EXECUTIVE SUMMARY

The Socio-economic monitoring assessment in adjacent communities of the Grand Anse Marine Protected Area (GAMPA) was part of the 'Climate Resilient Eastern Caribbean Marine Managed Areas Network (ECMMAN)' Project funded by The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) through The Nature Conservancy (TNC) and implemented in collaboration with the University of the West Indies, Centre for Resource Management and Environmental Studies (UWI-CERMES) and the Grenada Marine Protected Areas Unit, Fisheries Division, Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment, Grenada.

In 2001, the Grand Anse Marine Protected Area was identified as a key area for management under the Grenada Protected Areas System Plan. Today, the Grand Anse Marine Protected Area is the newest addition to the Grenada Marine Protected Area Network and also the largest MPA with an area of 19.7 km<sup>2</sup>.

The purpose of this study was to collect socio-economic data and information on Grand Anse and adjacent communities using the Socio-economic Monitoring for Caribbean Coastal Management (SocMon Caribbean) methodology, with primary focus on livelihoods, resource use, threats and attitudes for informing and guiding planning, management actions and policy formulation for the GAMPA. This socio-economic assessment was initiated prior to the official launch of the GAMPA and as such provides good baseline data on the MPA and its adjacent communities against which changes and trends can be measured with future monitoring.

MPA staff and volunteers were trained in the application of the SocMon methodology in 2016. Twenty-five key informant interviews were conducted with governmental, non-governmental and private sector stakeholders. Further data were collected via 112 surveys administered within the communities adjacent to the Grand Anse MPA (i.e. Belmont, Grand Anse, Golf Course, Morne Tout, Morne Rouge, Frequente and Calliste) by eight trained enumerators.

The surveys revealed that only a small percentage of respondents indicated that they or their household make a living from the coastal and marine resources in and around the Grand Anse Bay and most persons interviewed believed that they would not be affected by the establishment of the GAMPA.

A large percentage of respondents identified swimming as the most popular activity currently utilized for relaxation with the proposed GAMPA followed by exercise, snorkelling, diving, recreational fishing, water-sports and boating. Most persons indicated that they generally participated in their respective relaxation activity once per week.

Generally, respondents believed that swimmers and recreational divers/snorkelers had no impact on the marine resources and ecosystem of Grand Anse. Subsistence fishers, recreational fishers, boaters and dive fishers were perceived as having a slight to moderate impact on bay.

A significant percentage (i.e. 96.5%) of the community are aware of the marine protected areas in Grenada; however, only 64% of respondents admitted knowing the intended purpose of the MPAs. There is a general perception that MPAs protect coastal and marine resources and have a positive benefit on tourism, coral reef health and fisheries. This demonstrates that the public awareness activities of the Grenada MPA program are reaching its intended targets within the community; however, there are still gaps in the information disseminated.

Less than one-third of respondents indicated being aware of the proposal to establish an MPA along the coast of Grand Anse; however, over half of the persons interviewed considered themselves to be stakeholders of the proposed GAMPAs.

The results of this study have highlighted that there is a fair level of awareness amongst the population with regard to MPAs in Grenada. However, there is misinformation and bad press in the public domain regarding the management of the existing MPAs. Special attention should be taken to ensure to educate the population on the overarching goals and objectives as well as the locations of the various MPAs. The study has also pointed to the fact that most persons felt that one of the most important strategies for effecting change is via public awareness and education.

The results also suggest that clear majority of respondents believed that the establishment of the GAMPAs would have a positive impact on the health of the coastal and marine ecosystem and resources within the area. Additionally, it is important to establish a scientific baseline for all the resources (i.e. beach, water) and ecosystems (i.e. coral reef, seagrass, mangroves) within the area and develop and implement a long-term monitoring program so that routine monitoring could be conducted to assess the status of the resources.

## **1. INTRODUCTION**

### **1.1. ECMMAN Overview**

The 'Climate Resilient Eastern Caribbean Marine Managed Areas Network (ECMMAN)' Project is funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) through The Nature Conservancy (TNC) and implemented in collaboration with four partner organizations (the OECS Commission; UNEP/SPAWRAC acting through the Caribbean Marine Protected Areas Managers (CaMPAM) network; the Caribbean Network of Fisherfolk Organizations (CNFO) acting through the Caribbean Regional Fisheries Mechanism (CRFM) Secretariat; and PCI Media Impact).

This four-year project started in the last quarter of 2013 and was implemented in six Eastern Caribbean countries i.e. St. Kitts and Nevis, Antigua and Barbuda, Dominica, Saint Lucia, St. Vincent and the Grenadines, and Grenada. At the national level in Grenada, the Fisheries Division, Ministry of Agriculture, Lands, Forestry, Fisheries & the Environment was designated as the National Implementing Entity (NIE) for the ECMMAN project.

The overarching goals of the ECMMAN project are to establish an Eastern Caribbean marine management areas network that will more than double the area of effectively managed marine areas (MMAs) in the region and provide for improved livelihood opportunities. This network will be designed to protect and improve the health of near-shore and coastal habitats, so that these can provide the ecosystem services needed for sustainable/alternative livelihoods and economies.

*The specific project goals are to:*

- Declare new MMAs and strengthen existing MMAs;
- Build strong constituencies for sustainable livelihoods and ocean use in all six countries;
- Improve and update an Eastern Caribbean Decision Support System (ECDSS) that provides accessible decision making tools and incorporates current ecological, socio-economic, and climate change data; and
- Institute sustainability mechanisms to support the MMA network, including regional political commitments and actions, collaboration mechanisms on marine and coastal resources, and sustainable financing.

### **1.2. SocMon Caribbean**

Socio-economic Monitoring for Coastal Management (SocMon) is a global initiative of the IUCN World Commission on Protected Areas (WCPA-Marine), Global Coral Reef Monitoring Network (GCRMN) and the National Oceanic and Atmospheric Administration (NOAA). See [www.socmon.org](http://www.socmon.org). The initiative is being implemented at the global and regional levels with the goal of establishing socio-economic coastal and marine monitoring programmes globally at the site level (Bunce et al. 2000; Bunce and Pomeroy 2003).

SocMon is aimed at helping coastal managers better understand and incorporate the socio-economic context of coastal resource use by various stakeholders into coastal management programs. This is essential for assessing, predicting and managing coastal resource use over time. SocMon is a globally networked, regionally adapted, practical methodology of socio-economic monitoring for coastal management. Globally, seven regions are successfully conducting SocMon – the Caribbean, Central America, Brazil, South Asia, South East Asia, Western Indian Ocean, and the Pacific Islands. SocMon works through regional and local partners to facilitate community-based

socio-economic monitoring. CERMES at the University of the West Indies, Cave Hill Campus is the regional SocMon node for the Caribbean.

Since 2003, CERMES has developed regional capacity of fisheries divisions, MPA management authorities and a wide range of stakeholders through training and several projects in socio-economic monitoring. Site assessments are tailored to site needs with goals and objectives aligned to relevant management plans and/or management questions or decisions. Assessment data are often compared to socio-economic and ecological secondary data in order to better understand socio-economic impacts and explain trends in socio-economic characteristics at coastal community sites. However, until this ECMMAN project, SocMon has never been deliberately incorporated into biophysical monitoring. The Nature Conservancy (TNC) recognises the value and applicability of SocMon and has demonstrated interest in incorporating the methodology as needed to achieve relevant resource conservation and management goals. As such, TNC's ECMMAN Project has adopted SocMon as the socio-economic monitoring methodology of choice for integrated coastal and coral reef monitoring.

### **1.3. Situation overview**

Grenada is the south most island in the Windward islands, just north of Trinidad and Tobago. The tri-island state consists of the main island of Grenada and the inhabited Grenadine islands of Carriacou and Petite Martinique along with several other uninhabited islands and cays. To date, three Marine Protected Areas have been established under the Grenada Protected Areas System Plan i.e. Moliniere-Beausejour Marine Protected Area (MBMPA) and Woburn-Clarkes Court Bay Marine Protected Area (WCCBMPA) in St. George, Grenada, and Sandy Island/Oyster Bed Marine Protected Area (SIOBMPA) on the sister island of Carriacou. The establishment of a fourth Marine Protected Area – Grand Anse Marine Protected Area (GAMPA) was approved by cabinet in April 2017. An official announcement of its declaration was made by the Minister with responsibility for Fisheries, Mr. Alvin Dabreo, during a stakeholder forum held at the Fisheries Division on May 25, 2017. The establishment of the GAMPA is consistent with the strategic plan of the Government of Grenada geared towards enhancing marine biodiversity by providing for the conservation and management of critical habitats and species, as well as to accommodate future demands of the tourism industry. Additionally, the establishment of the Grand Anse Marine Protected Area brings Grenada closer to its goals under the Caribbean Challenge Initiative (CCI), where the country pledged to conserve and manage 25% of its coastal and nearshore marine ecosystems by 2020. Previously only 4% of these ecosystems were managed. The addition of the Grand Anse MPA places the managed areas closer to 15%.

'The proposed Grand Anse MPA is about 1,965 ha (19.7 km<sup>2</sup>) in size and is located along the leeward, southwest coast of Grenada. The landward boundary of the MPA will be the low water mark starting from the entrance to Port Louis Marina at 12°02'45.78"N/61°45' 02.33"W and ending along the shore at a point south of the airport at 11°59'56.08"N/61°47'16.07"W. The seaward boundaries were selected to include critical shallow water habitats as well as deep water habitats; and to ensure that many of the scuba diving sites were included for protection, especially the Bianca C (a 180 m cruise liner which sank in 1961)'(GAMPA Draft Management Plan, 2016). See Figure 1 and Figure 2.



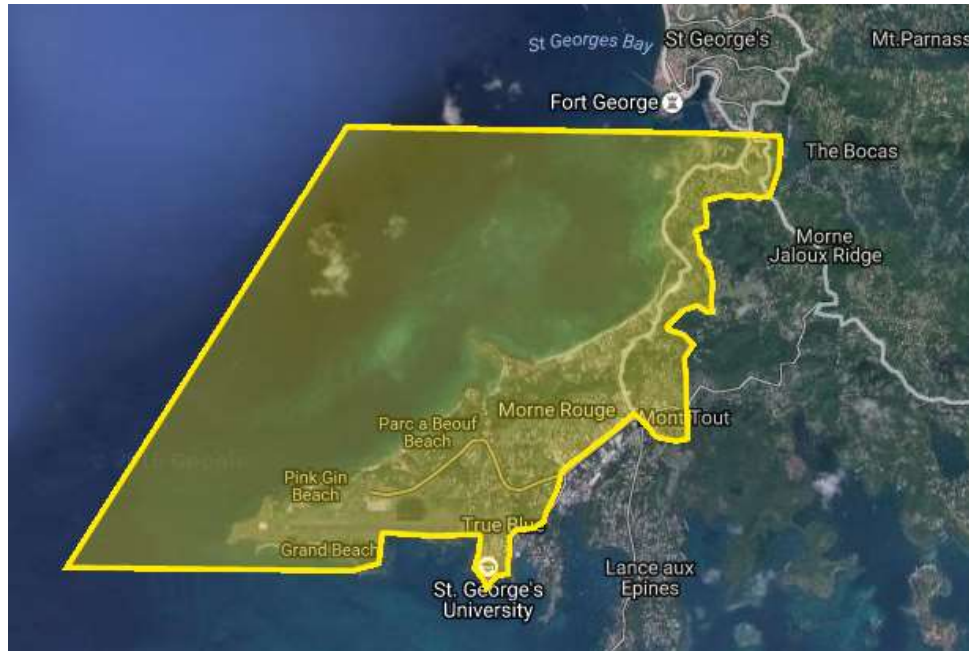


Figure 1 Map of the GAMPA showing extent of boundaries

Source: [Google Web Map Link](#)

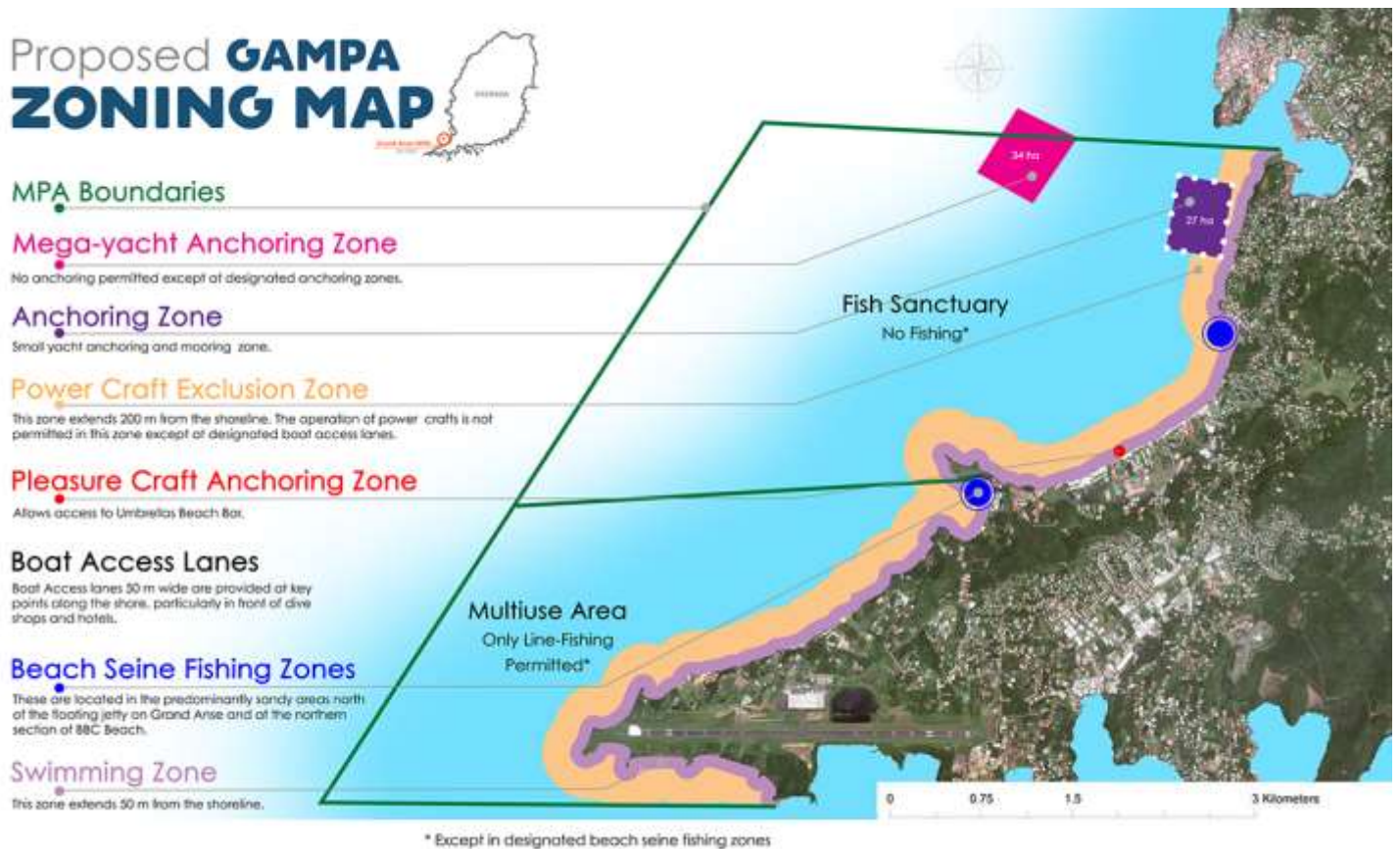


Figure 2 Proposed zoning of the GAMPA

#### 1.4. Goals and objectives

The monitoring goals and objectives for this SocMon assessment were developed initially at a three-day participatory training workshop in November 2016. For details of the training, see Pena 2017.

Monitoring Goals	Monitoring Objectives
To collect socio-economic data and information on Grand Anse and adjacent communities with emphasis on livelihoods, resource use, threats and attitudes, to inform and guide planning, management actions and policy formulation.	1. To determine potential impacts of management decisions /interventions on MPA livelihoods.
	2. Identify resource use and user patterns by user groups for informing the zoning plan.
	3. Identify stakeholder perceptions of threats to coastal resources in Grand Anse.
	4. To understand stakeholder attitudes to, and perceptions of, marine resources, current management and the establishment of the GAMPa.

#### 1.5. Organization of report

This report is divided into four sections. Section 1 provides a description of the 'Climate Resilient Eastern Caribbean Marine Managed Areas Network (ECMMAN)' project, SocMon Caribbean, situation overview of the GAMPa and the goals and objectives for monitoring. Section 2 outlines the methods used for gathering the data. The results are provided in Section 3 and Section 4 comprises the discussions and conclusions. Recommendations for management are provided in Section 5.



## **2. METHODS**

### **2.1. SocMon training**

SocMon Regional Coordinator for the Caribbean, Maria Pena, and Assistant, Jehroum Wood, facilitated the training workshops in all ECMMAN countries. In Grenada, a three-day training was held from October 26 - 28, 2016 and included introduction to the SocMon methodology. Then on November 3 and 4, a two-day training on SocMon Spatial-specific introduction with Mr. Wood was held. Overall 11 persons including, MPA managers, MPA staff, representatives from government agencies such as the environmental unit, community residents and other relevant stakeholders received SocMon training (Appendix 1 for the participants list). Both training workshops included a site visit to the Grand Anse Watershed area for field scoping and practical demonstration. A draft of the SocMon site monitoring plan for Grand Anse was prepared by the end of the SocMon methodology training. This plan formed the basis for the site monitoring programme and was finalised in early 2017.

### **2.2. Preparatory activities**

Based on the goal and objectives of the site monitoring plan, 14 SocMon Caribbean variables, one GCRMN-Caribbean parameter and six newly designed SocMon variables were chosen for measurement and analysis (Table 1; Appendix 2 for Site Monitoring Plan). It should be noted that the variables chosen initially during the development of the site monitoring plan were refined to this final list on completion of the survey and key informant interview guide.

**Table 1 Variables selected for monitoring**

<b>Variable</b>	<b>Variable name</b>
S1/K5	Age
S2/K6	Gender
S4/K7	Education
S7/K12	Occupation
S9	Household income
S10/K14	Household activities/Activities
S12/K12	Types of use/Household types of use
S16	Perceptions of resource conditions
S17	Perceived threats
S21/K31	Participation in decision-making/Stakeholder participation
S24	Perceived coastal management solutions
K19	Use patterns
K20	Level and types of impacts
K23	Stakeholders
GCRMN-Cbbean	Fishing pressure
[NEW]	MMA/MPA knowledge
[NEW]	MMA/MPA support
[NEW]	Management priorities
[NEW]	Management impacts
[NEW]	Livelihood dependency
[NEW]	Alternative livelihoods

### 2.3. SocMon team

A SocMon team was developed to lead specific tasks, plan and conduct field work for the project.

<b>Team member name</b>	<b>Role on team</b>	<b>Specific tasks</b>
Ezra Campbell	ECMMAN IPC	Overall support for logistics for training and development of monitoring plan, survey design, data input and analysis, and reporting
Olando Harvey	MPA Coordinator	Data analysis and reporting
Danielle Ince	MPA Manager	Survey design and development of monitoring plan
Arlene Daniel	Community Liaison	Development of monitoring plan and training of enumerators
Shanell Cyrus	Team Leader for Volunteers/Enumerators	Development of monitoring plan, raising awareness about the project and assisting with field data collection and data input

## 2.4. Secondary data

The following table shows the secondary data analysed by monitoring objective for the GAMPA SocMon. All sources of secondary data were analysed to determine gaps in knowledge for informing primary data collection.

SocMon objective	Sources of secondary data
1. Potential impacts of [management] decisions of livelihoods	<ul style="list-style-type: none"><li>• Coral Nursery Business/Marketing Plan</li><li>• Sustainable finance report (Wayne Sandyford)</li><li>• Grenada poverty assessment 2008</li><li>• National Census</li><li>• Blue Growth report</li><li>• GAMPA Management Plan (2015)</li></ul>
2. Resource use and user patterns	<ul style="list-style-type: none"><li>• TNC ECMMAN habitat maps</li><li>• CARIBSAVE reports</li><li>• Blue Growth report</li><li>• GAMPA Management Plan (2015)</li></ul>
3. Stakeholder perceptions of [coastal resources and] threats to coastal resources	<ul style="list-style-type: none"><li>• CARIBSAVE Risk Atlas</li><li>• Grand Anse Baseline Assessments</li></ul>
4. Stakeholder attitudes and perceptions [of marine resources and] the establishment of the GAMPA	-

## 2.5. Key informants

Twenty-five key informants were identified by the SocMon team as being critical to the SocMon assessment. Due to the number of key informants identified, group interviews were held with stakeholders from the same organisation by the SocMon team (Appendix 3: Report from Key Informant Interviews).

## 2.6. Surveys

One hundred and twelve surveys were administered within seven communities adjacent to the proposed Grand Anse MPA - Belmont, Grand Anse, Golf Course, Morne Tout, Morne Rouge, Frequente and Calliste - by eight trained enumerators. Respondents were selected at random to remove researcher bias, by walking along the main road that runs through each of the community or assigned area. The survey was designed by the participants of the SocMon training with CERMES. Once designed, the survey was reviewed and edited after which it was submitted to CERMES for final approval. Twenty-one survey variables were used to guide the data collection process. (Appendix 4: Copy of survey)

## 2.7. Data entry and analysis

The data from the surveys were entered into an Excel spreadsheet and then analysed using simple descriptive statistics. Due to work commitments and time constraints, the SocMon team was unable

to conduct the data analysis. CERMES provided technical assistance with data analysis and compilation of results.

### **3. RESULTS**

Results are presented under headings corresponding to the assessment objectives:

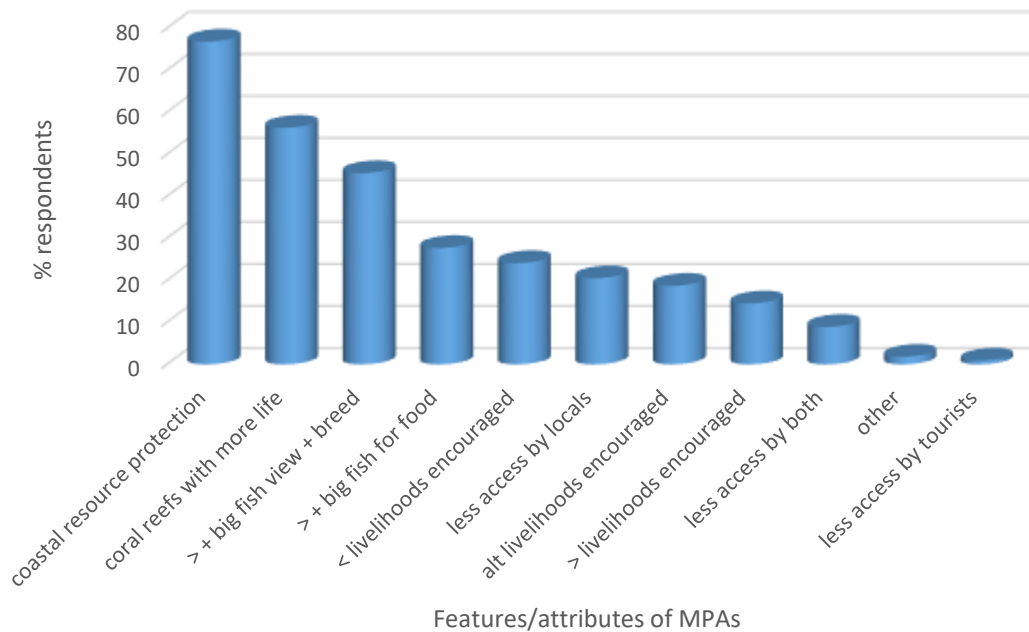
- i. To understand stakeholder attitudes to, and perceptions of, marine resources, current management and the establishment of the GAMP.
- ii. To identify resource use and user patterns by user groups for informing the zoning plan.
- iii. To determine potential impacts of management decisions/interventions on MPA livelihoods.
- iv. Identify stakeholder perceptions of threats to coastal resources in Grand Anse.

#### **3.1. Understand stakeholder attitudes to, and perceptions of, marine resources, current management and the establishment of the GAMP**

##### *3.1.1. MPA knowledge*

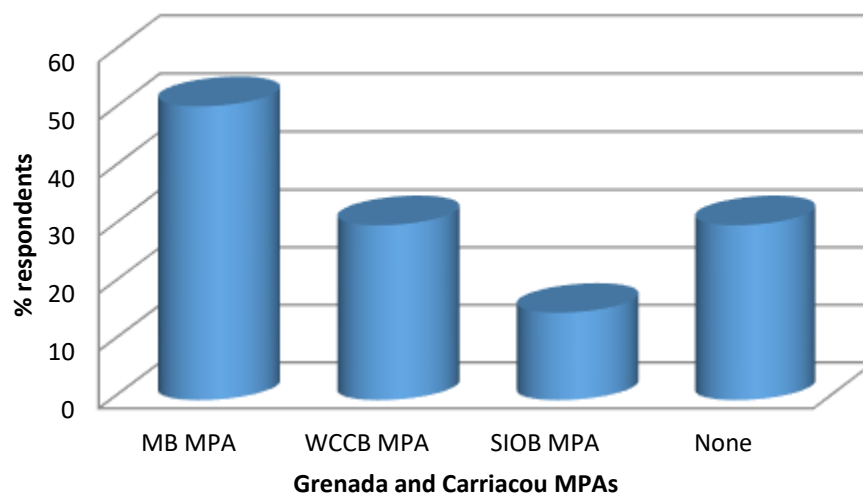
Of the 112 respondents interviewed, 64% said they knew what a Marine Protected Area (MPA) was. To verify their understanding, persons were asked follow-up questions on the features or attributes that came to mind when thinking of a MPA. Ecological and biophysical attributes were among the top four features respondents associated with MPAs. Significant proportions of persons associate protection of coastal and marine resources (76.8%); coral reefs with more life on them than at present (56.3%); more and bigger fish to be viewed and breed but not caught (45.5%); more and bigger fish to be caught by fishermen for food (27.7%). Interestingly, changes in livelihoods – increases, decreases and alternatives – and restrictions in terms of access, were attributes respondents associated less with MPAs. It should be noted however that some persons attribute the encouragement of less work and activities (24.1%) and reduced access to the area by locals (20.5%). See Figure 3.





**Figure 3 Attributes people associate with MPAs, n = 112**

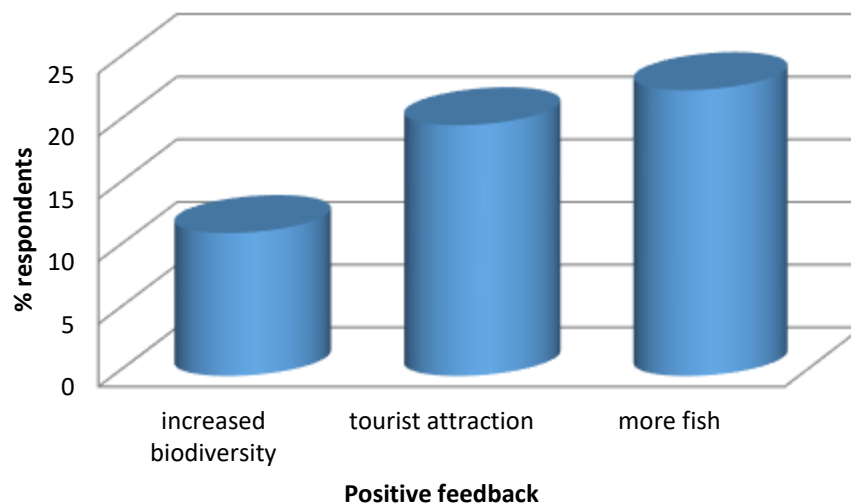
The overwhelming majority of persons interviewed (96.5%) are familiar with established MPAs in Grenada and Carriacou. As might be expected, more persons (50.9%) are familiar with the Molinière/Beauséjour MPA (MB MPA) than with Woburn/Clarke's Court Bay MPA (WCCB MPA; 30.4%) and Sandy Island/Oyster Bed (SIOB MPA; 15.2%). A fairly large proportion of persons (30.4%) are familiar with none of the Grenada and Carriacou MPAs (Figure 4).



**Figure 4 Respondent familiarity with MPAs in Grenada and Carriacou, n = 112**

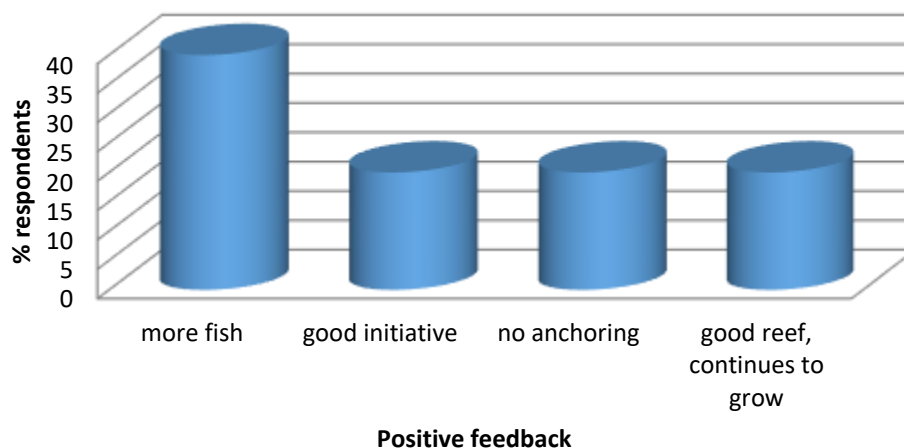
Awareness of positive things heard about these three MPAs was highest for the MB MPA with nearly one-third (31.3%) of all respondents providing some positive feedback. Knowledge of good things heard about the WCCB MPA and SIOB MPA was generally low with only 8.9% and 4.5% of

respondents respectively, providing information on each. Top three good things people have heard about the MB MPA could be categorized as more fish (including variety, abundance and size; 22.8%), tourist attraction (20%) and increased biodiversity (“diversity of reef species”, “sea full of life”; 11.4%). See Figure 5.



**Figure 5 Good things people have heard about the Molinière/Beauséjour MPA, n = 35**

Good things heard about the WCCB MPA were more equally spread among nine categories across 10 respondents – good initiative (20%); fish variety and protection, protected mangroves, more mangroves, mangroves are a good nursery, good location and view, generates employment, protects marine life, good initiative, and functioning well (10% each). Only five persons were able to provide feedback of good things they have heard about the SIOB MPA – more fish (40%), good initiative, no anchoring and good reef continues to grow (20% each). See Figure 6.

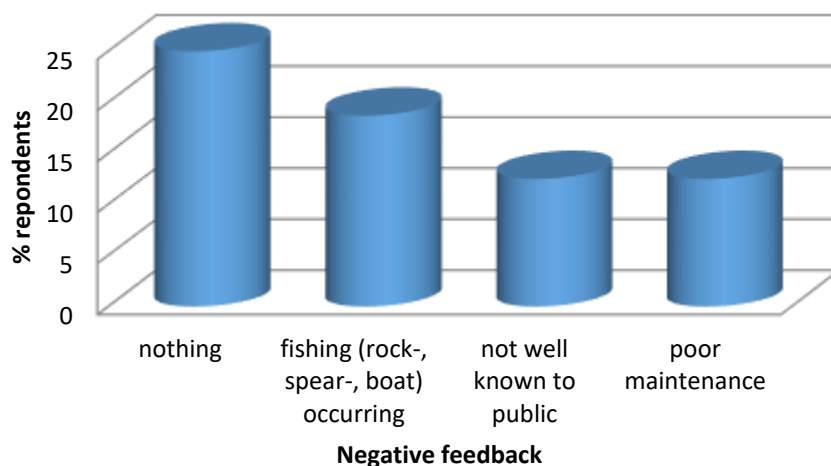


**Figure 6 Good things people have heard about the Sandy Island/Oyster Bed MPA, n = 5.**

Generally, negative things heard about these three national MPAs were low amongst all respondents, 14.3% for the MB MPA, 8% for the WCCB MPA and 0.9% for the SIOB MPA. The general majority of persons noted hearing nothing negative about either the MB MPA (25%) or

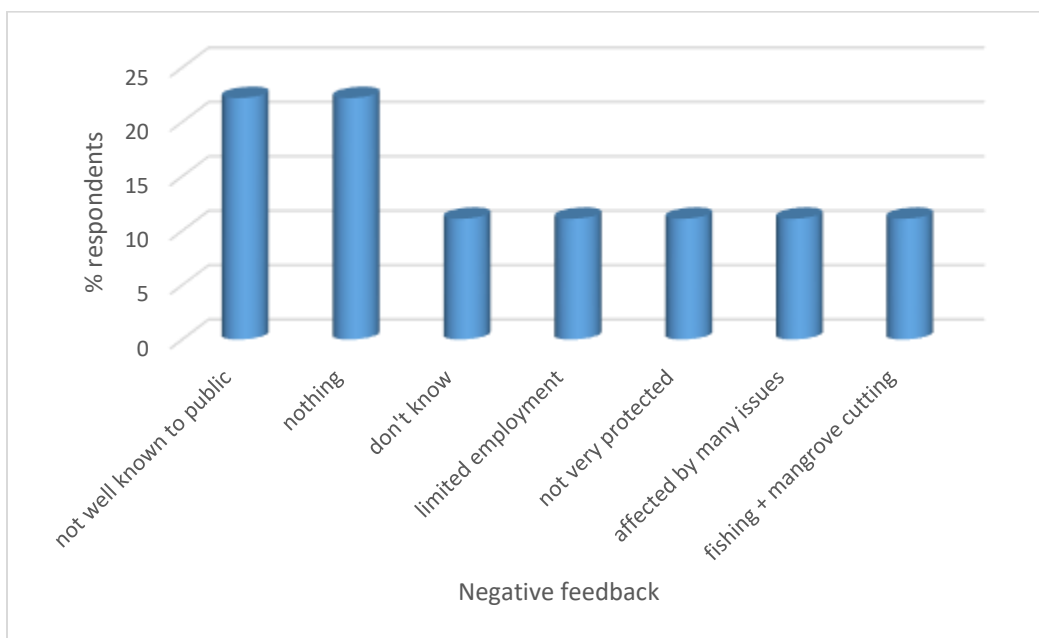


WCCB (22.2%). For the MB MPA, most persons (25%) noted they had heard nothing negative about the MPA, while smaller proportions mentioned hearing about fishing (rock, spear and from boats) occurring in the MPA (18.7%); and poor maintenance, including broken mooring lines that remain unfixed, dirty buoys, and poor management with respect to the checking of user bands; 12.5%). Some persons (12.5%) noted that the MPA is not well-known to the public (Figure 7).



**Figure 7 Negative things heard about the MB MPA, n = 16**

Limited employment, not being very protected, affected by many issues (such as land run-off, waste pollution and coastal development) as well as fishing and mangrove cutting activities were mentioned by each of 11.1% of respondents as things they had heard about the WCCB MPA that were not so good. A fairly large majority of persons (22.2% in each case) noted the MPA was not well-known to the public and that they had heard nothing negative about WCCB (Figure 8)

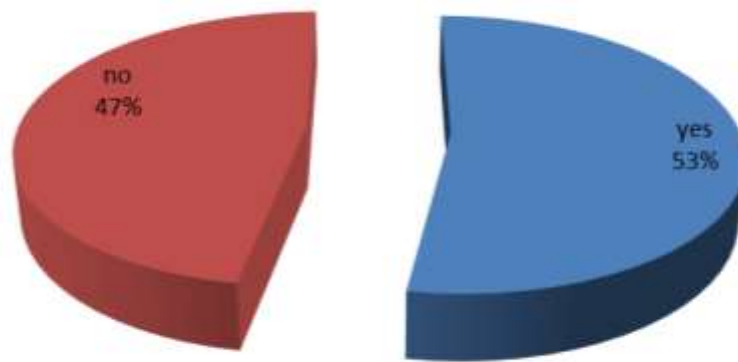


**Figure 8 Negative things heard about the WCCB MPA, n = 9**

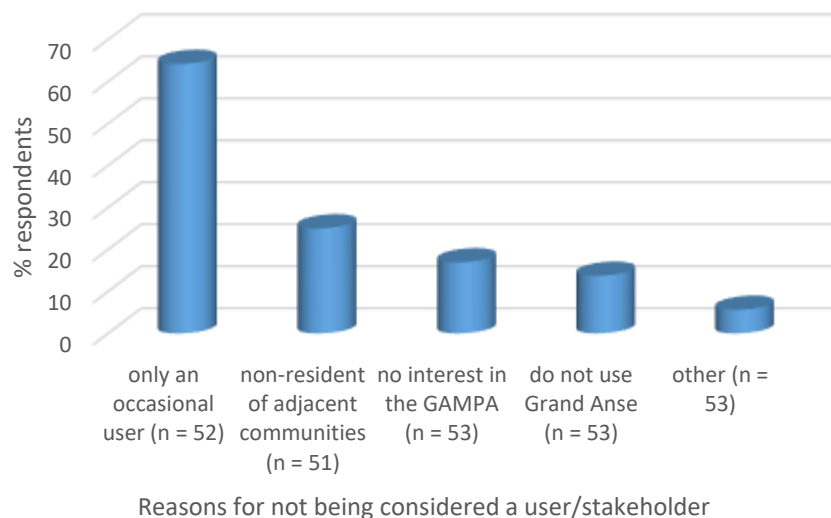
Based on the lack of knowledge about the SIOB MPA, only one person noted a negative thing about this MPA was that it was not well-known to the public (0.9%).

Just under one-third (31%) of all respondents are aware of the proposal to make most of the Grand Anse coast a MPA.

Most persons surveyed (53%) consider themselves to be a user or other stakeholder of the proposed GAMPA (Figure 9). Those persons who do not consider themselves either users or some other type of stakeholder gave the following reasons for their response: only an occasional user (64.2%), not a permanent resident of adjacent MPA communities (25%), no interest in the proposed GAMPA (16.9%), do not use the area (13.7%) and other (“just passing through” and “not a fisherman”, 5.6%). See Figure 10.



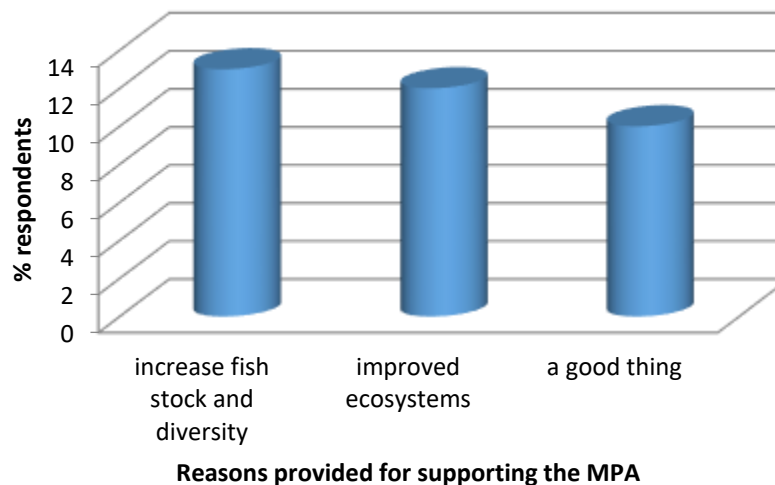
**Figure 9 Individual perception of being a user or other stakeholder of the proposed GAMPA**



**Figure 10 Reasons why people do not think they can consider themselves a user or other type of GAMPA stakeholder**

### 3.1.2. MPA support and management focus

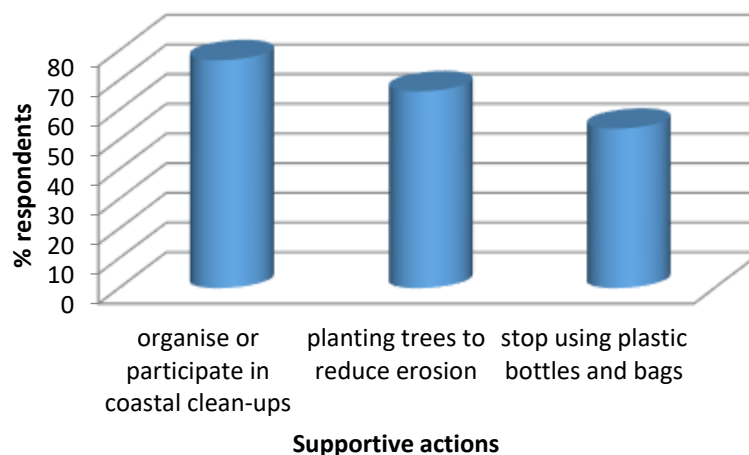
Out of 108 persons, the majority (86%) are supportive of the establishment of a MPA in Grand Anse. A small proportion (12%) of people, do not support an MPA in the area, while 2% are uncertain of their support. Persons provided a number of reasons for their support or non-support of the MPA but the top three were because there would be an increase in fish stock and diversity (13%), improved ecosystems (12%) and simply because it is a good thing (10%). See Figure 11.



**Figure 11 Reasons for support for the establishment of a MPA in Grand Anse, n = 100**

Diverse and numerous suggestions were provided when people were asked what they would like management to focus on once the GAMPA was established. Enforcement (9.6%), pollution (8.2%) and making the area a yacht or boat free area (6.8%) were the “common” suggestions offered from among 73 responses.

The majority of persons surveyed indicated their willingness to support the GAMPA in three main actions (Figure 12). Most (76.8%) would be willing to assist in the organisation of or participation in coastal clean-ups. Substantial proportions of individuals would also be willing to plant trees to reduce erosion (66.3%) and stop using plastic bottles and bags (53.7%)

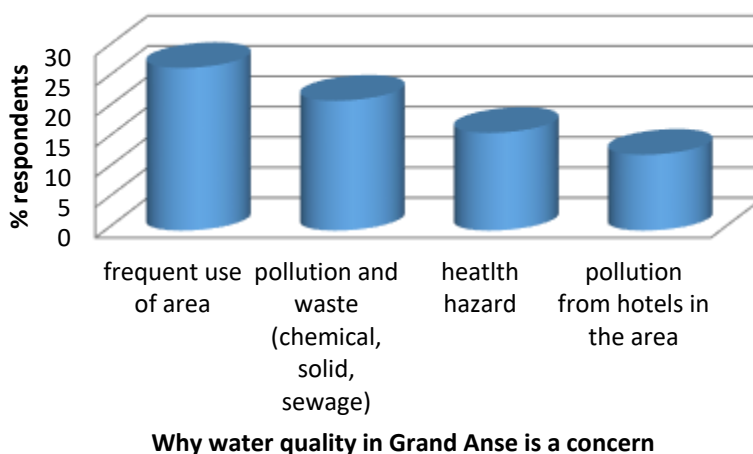


**Figure 12 Willingness to support MPA actions, n = 95**

Very few persons provided other ways in which they would be willing to assist the GAMP. Of the six persons who provided a response, 66.6% said they would like to help with outreach activities, 16.6% each indicated willingness in helping to zone the MPA (possibly meaning to provide advice) and assisting with the placement of more bins.

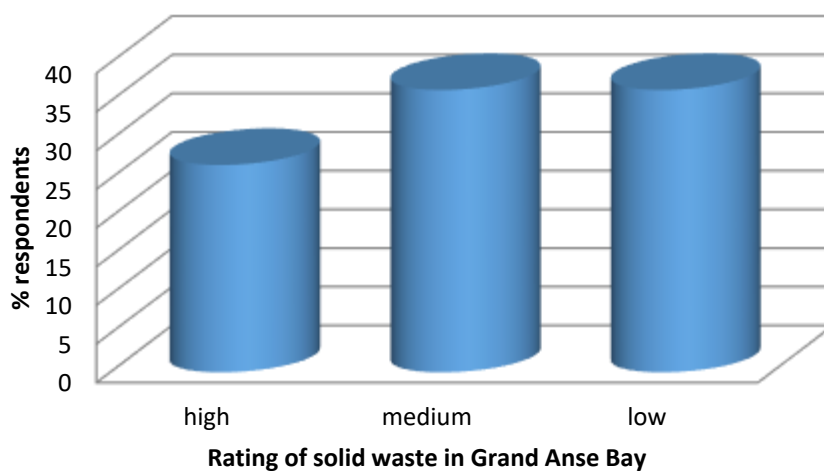
### 3.1.3. Perceptions of resource quality and conditions

Water quality is of concern to just over half (56%, n = 110) of the people surveyed. The main reasons cited for this concern included frequent use of the area (26.8%), pollution and waste (solid, sewage; 21.4%), potential health hazard (16.1%); and specific pollution from hotels in the area (12.5%). Pollution and waste included sunscreen and other 'foreign' chemicals, garbage and waste, and inland run-off (Figure 13).



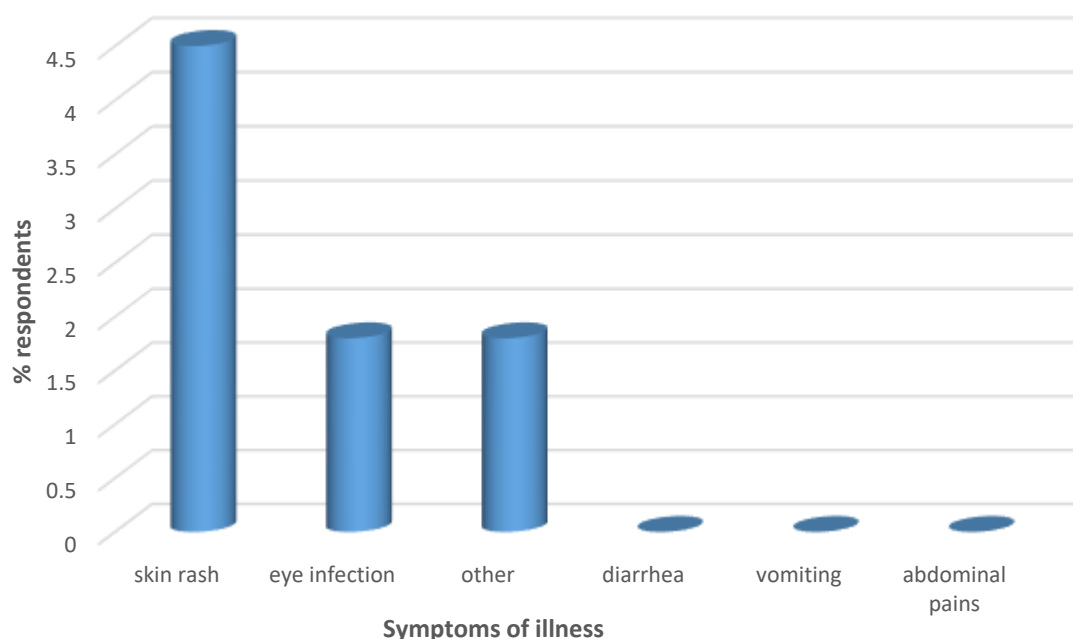
**Figure 13 Water quality concerns, n = 56**

The presence of solid waste (plastics and garbage) in Grand Anse Bay was rated equally as medium or low by 36.5% of persons. Just over a quarter of all persons (26.8%) believed solid waste was high in the area (Figure 14).



**Figure 14 Solid waste in Grand Anse, n = 93**

Only a minority of persons (7%, n = 111), indicated that they or members of their households had become ill due to swimming in Grand Anse Bay. The symptoms of such illness included skin rash (4.5%), eye infection (1.8%) and other (itching and ear infection, 1.8%). It should be noted that presentation of a skin rash may not be a direct result of water quality but instead is typical of beach/sand quality. Diarrhea, vomiting and abdominal pains were not reported by any respondents (Figure 15).



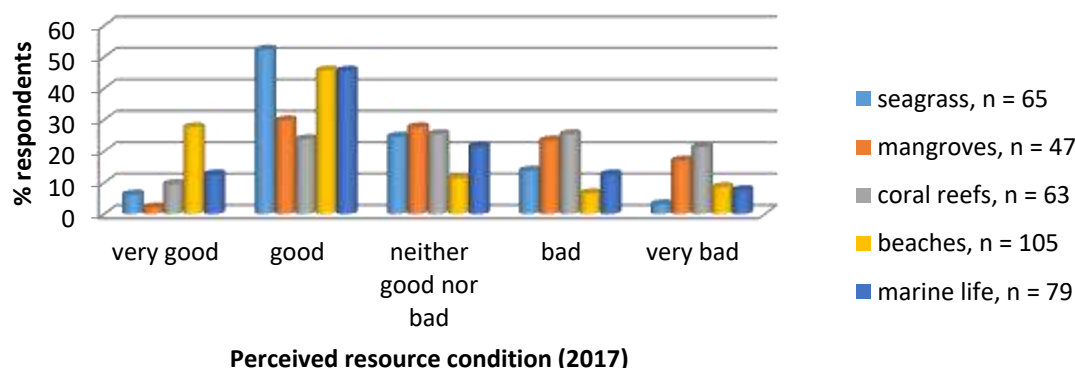
**Figure 15 Symptoms of illnesses thought to be associated with swimming in Grand Anse Bay, n = 111**

Perceptions of current (2017) conditions of ecosystems and resources varied by resource. Beach condition was thought to be very good or good by the majority of persons interviewed (73.3%). This perception was the highest across all other resources investigated. Almost equal proportions of persons believed that seagrasses (58.5%) and marine life such as fish, lobster and lambi (58.2%) were also in very good or good condition. Persons seemed somewhat divided regarding the perceived condition of mangroves and coral reefs. While higher proportions of persons thought these resources to be in bad or very bad condition, 46.7% for coral reefs and 40.4% for mangroves, fairly high proportions of persons thought they were in very good or good condition (33.3% for coral reefs and 31.9% for mangroves). Additionally, there were persons who thought there were in neither good/nor bad condition, 25.4% for coral reefs and 27.6% for mangroves (Figure 16).

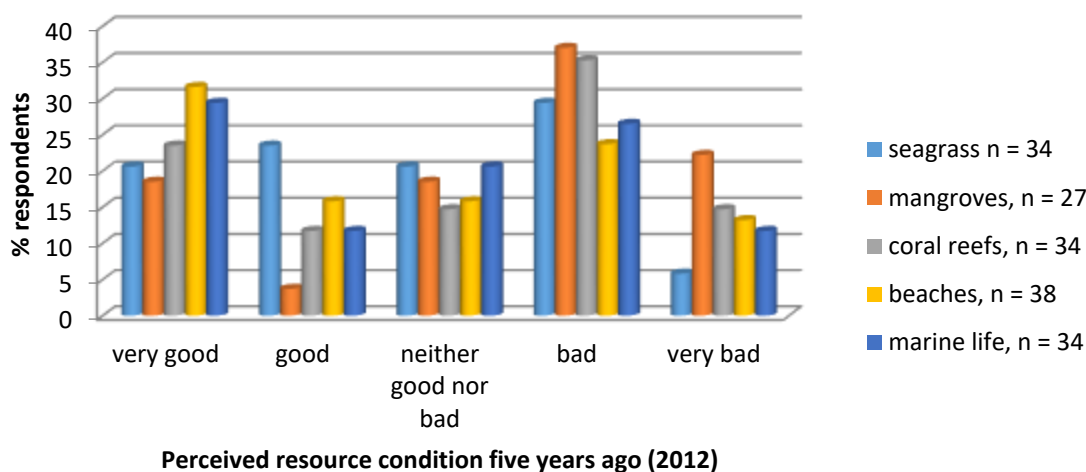
Forty-one percent of respondents (n = 102) perceived changes in the conditions of these ecosystems and resources since 2012 (in the last five years). Although the majority of persons believed that seagrasses (44.1%) and beaches (47.4%) were in very good or good condition, fairly high proportions of persons also felt that they were in bad or very bad condition (35.2% for seagrasses, 36.9% for beaches) in 2012. Across all ecosystems, the majority of persons (59.2%) rated mangroves as being in either bad or very bad condition in the past. Similar perceptions were accorded to coral reefs where 50% of persons thought they were also in bad or very bad condition. Persons seemed more divided in their perceptions of marine life (fish, lobster, lambi) condition. While most (41.1%) thought these resources were in very good or good condition five years ago, a

fairly similar proportion thought they were in bad or very bad condition, while 20.6% were undecided (neither good or bad condition). See Figure 17.

Overall, perceptions of ecosystem and resource conditions within the Grand Anse Bay increased positively (rated as very good and good) over the five year period of interest for all ecosystems and resources except coral reefs. The perceived very good or good condition of beaches in the area increased most significantly from 2012 to 2017 from 36.9% in 2012 to 73.3%, the highest increase across all other resources. Positive perceptions of the conditions of marine life and seagrasses increased over the five-year timeline but less significantly than beaches. A slight decline in the very good or good rating of coral reef condition was perceived by respondents from 2012 to 2017. It should be noted that overall less respondents were able to rate the conditions of these ecosystems and resources in 2012; between 66-76% of all respondents did not know about the conditions at this time or did not answer the question.



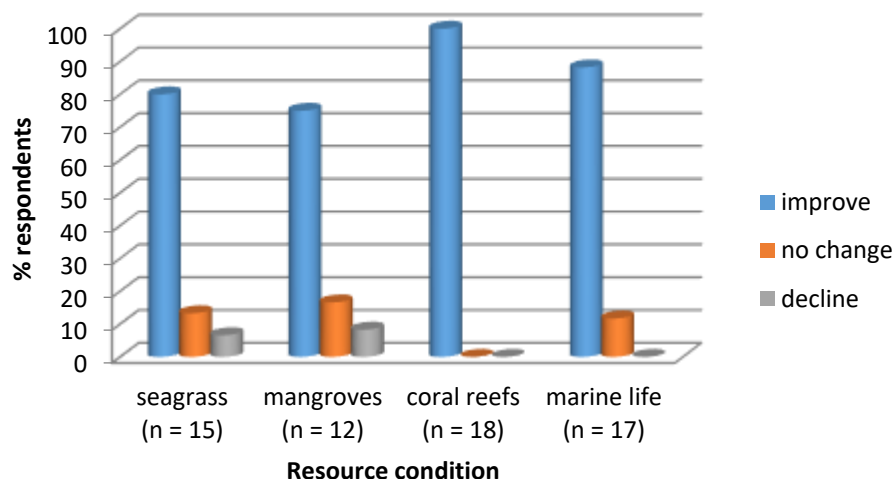
**Figure 16 Perception of current condition of ecosystems and resources in the Grand Anse Bay**



**Figure 17 Perceptions of past ecosystem and resource condition in the Grand Anse Bay**

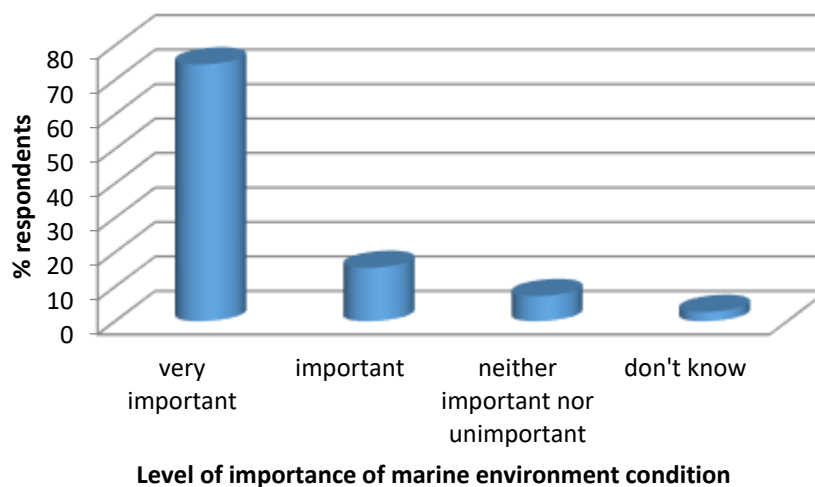
Over half of the respondents (59.8%) were able to provide a number of suggestions for improving the state of ecosystem and resource condition within Grand Anse. The top six suggestions included education and raising public awareness (17.9%), cleaning the area regularly (11.9%), implementing rules and regulations (10.4%), controlling or reducing development (4.5%), and the implementation of seasonal fishing (4.5%).

The majority of respondents anticipate improved changes in the condition of seagrass beds (80%), mangroves (75%), coral reefs (100%) and marine life (fish, lobster, lambie etc.; 88.2%) in Grand Anse Bay after the establishment of the proposed GAMP. A minority of persons across all ecosystems and resources remain sceptical of changes and expect there will be no change in coastal and marine resource conditions. Less than 10% of persons expect declining conditions in seagrasses and mangroves. No one believed the conditions of coral reefs and marine life would decline with the establishment of the GA MPA (Figure 18).



**Figure 18 Expected changes in ecosystem and resource conditions with GAMP establishment**

Ninety percent of persons combined believe the condition of the marine environment - coral reefs, mangroves, water quality, beaches etc. - is very important and important in general for work, relaxation and just for its existence value (Figure 19).

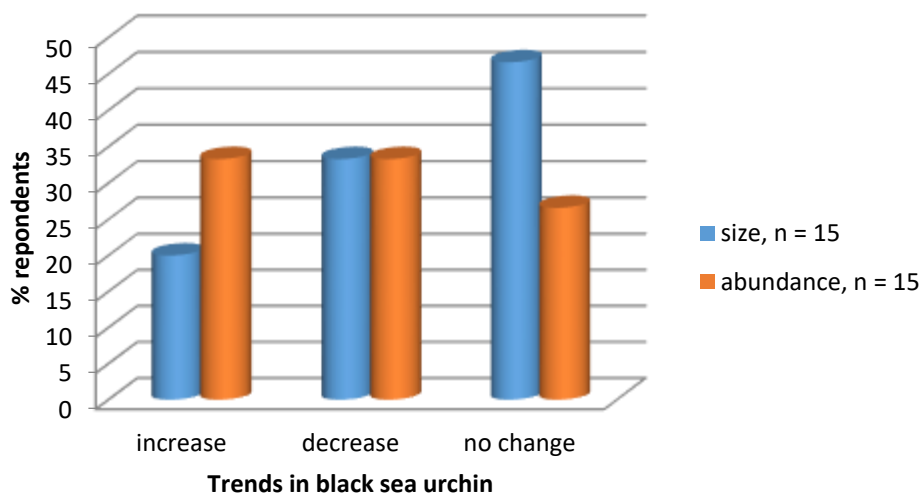


**Figure 19 Level of importance of the condition of the marine environment to individuals, n = 110**

### 3.1.4. Trends in size and abundance of key species

Respondent perception of trends in size and abundance of three key indicator coral reef species – long-spined black sea urchin, lobster and parrotfish – was investigated. Most persons (46.6%)

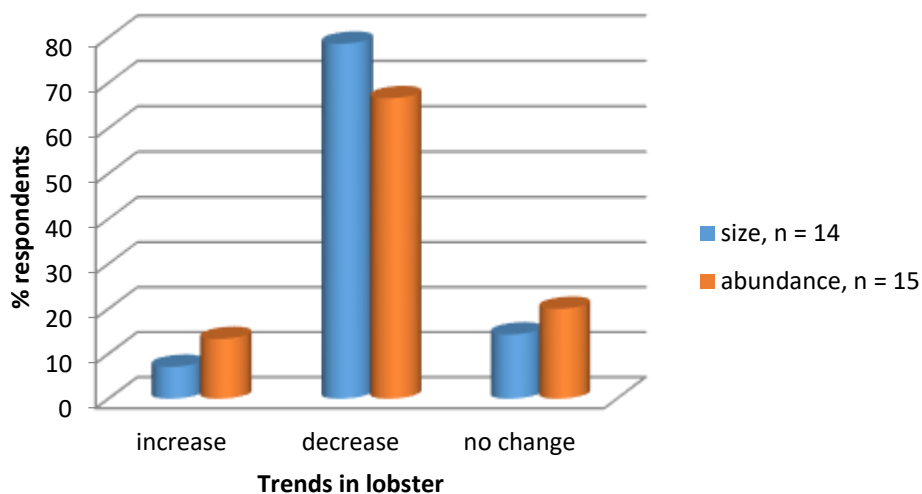
believed there had been no change in size of the black sea urchin in the past five years. Trends in abundance varied with equal proportions of persons (33.3% each) believing that there had either been an increase or decrease in urchin quantity (Figure 20).



**Figure 20 Perceived trends in size and abundance of the long-spined black sea urchin in the past five years, n = 15**

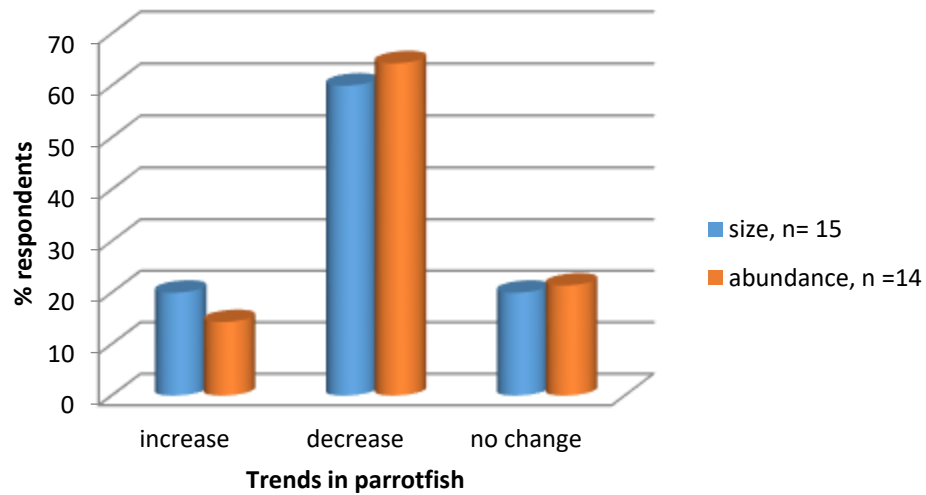
The overwhelming majority of respondents perceive a decrease in both size (78.6%) and abundance (66.6%) of lobster over the last five years (Figure 21). A similar trend for parrotfish was observed with 60% of persons believing there had been a decrease in size, and 64.3% perceiving a decrease in abundance of parrotfish in the Grand Anse Bay in the last five years (Figure 22).

Persons providing this information represented a small subset (12-13%) of the total number of respondents but were individuals who were familiar with the marine environment of the area. The information gathered may not be statistically representative of the survey sample, but does provide an indication of the perceptions of persons such as fishers, fish vendors, dive and water-sports operators, who are well acquainted with these key species.



**Figure 21 Perceived trends in size and abundance of lobster in the past five years**

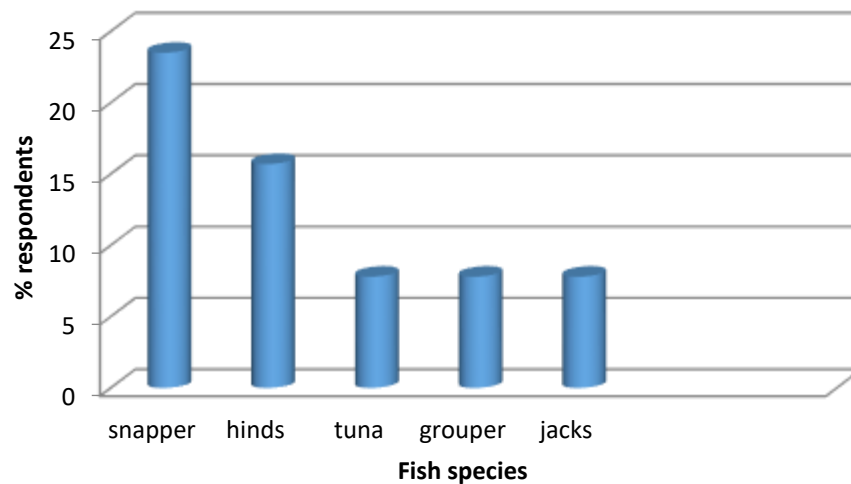




**Figure 22 Perceived trends in size and abundance of parrotfish in the past five years**

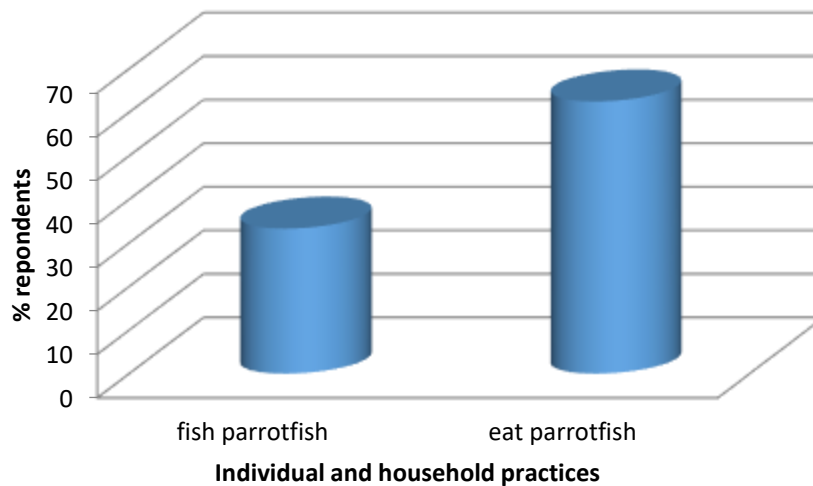
### 3.1.5. Targeted species

Fish species targeted the most in the Grand Anse Bay include snappers (23.5%), hinds (15.7%), tunas (7.8%), grouper (7.8%) and jacks (7.8%). The type of snapper targeted was identified by one person as glass-eyed snapper. Other persons did not indicate the species of snapper caught. Hinds targeted were either rock or red hinds. Of the eight persons who target hinds, 25% target rock hinds, 37.5% prefer red hinds, and an equal proportion (37.5%) did not differentiate between the species (Figure 23).

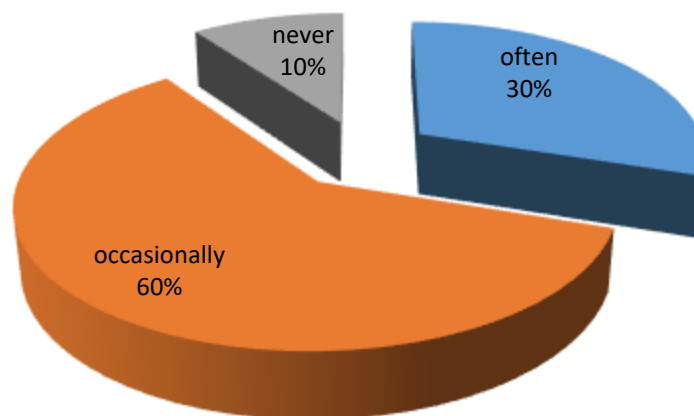


**Figure 23 Top five fish species targeted most by respondents or members of their households, n = 51**

The fishing and eating of parrotfish is fairly common only among a small proportion of respondents (16.2%). While one-third (33.3%) of persons surveyed fish for parrotfish, 62.5% eat this fish (Figure 24). The majority of respondents consume parrotfish occasionally (once a month; 60%), while a fairly high proportion (30%) eat it often (more than one day per week). One person noted that they never eat this species, even though they catch it (Figure 25).



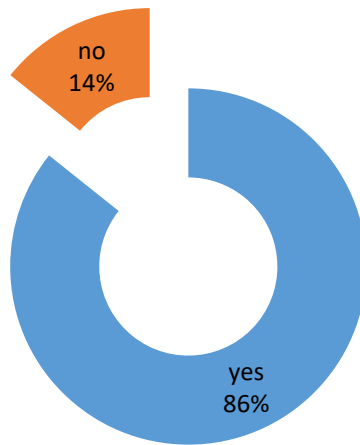
**Figure 24 Individual and household practices regarding parrotfish, n = 18**



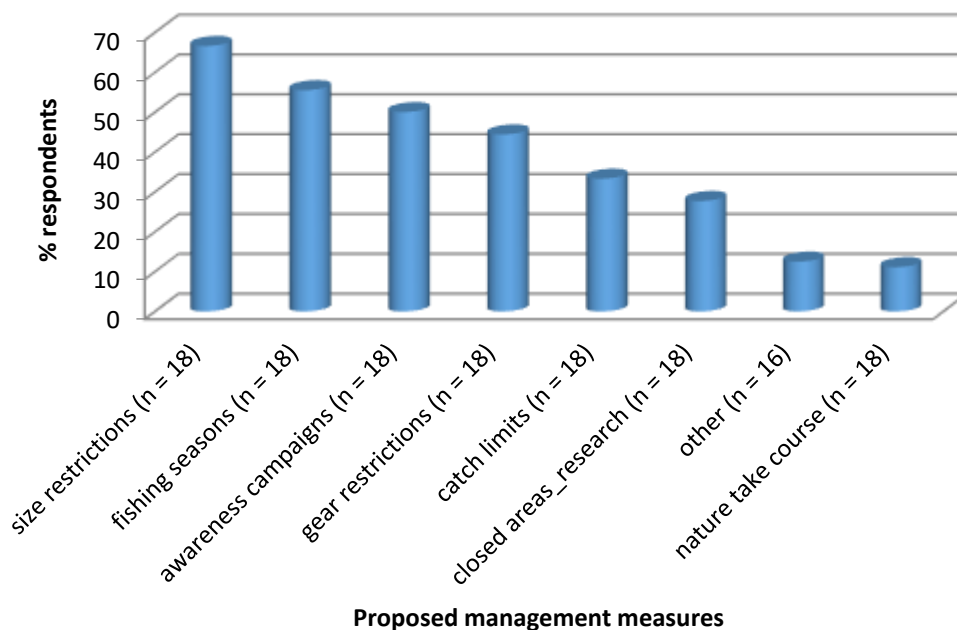
**Figure 25 Frequency of consumption of parrotfish, n = 10**

### 3.1.6. Support for marine resource management measurements: parrotfish, black sea urchin, reef fish, sea turtles, coral reefs

Eighty-five percent of persons surveyed would support temporary measures to help keep parrotfish populations growing and recovering (Figure 26). Implementation of size restrictions (66.6%), fishing seasons (55.5%) and campaigns for increasing awareness, education and outreach about this species (50%) received high support among the majority of respondents. Fairly significant support for gear restrictions (44.4%), catch limits (33.3%) and closed areas for research (27.7%) exists. Other measures for aiding population recovery of parrotfish were provided by two persons (12.5%) and included a total ban on fishing and a ban on seine fishing (due to damage caused to ecosystems and marine life). A minority of persons thought that letting nature take its course would be suitable for maintaining and increasing parrotfish populations. Of the 14% of respondents that indicated they would not support any temporary parrotfish management measures, 9.5% justified this was due to the perception that the species damages sea life through the removal of macroalgae (Figure 27).



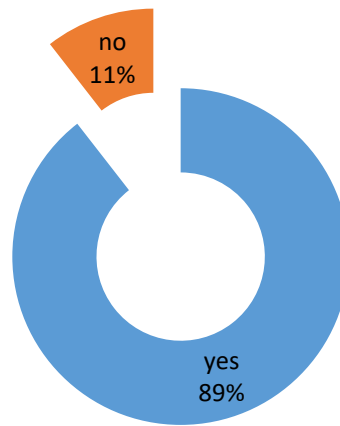
**Figure 26 Support for proposed temporary parrotfish management measures, n = 21**



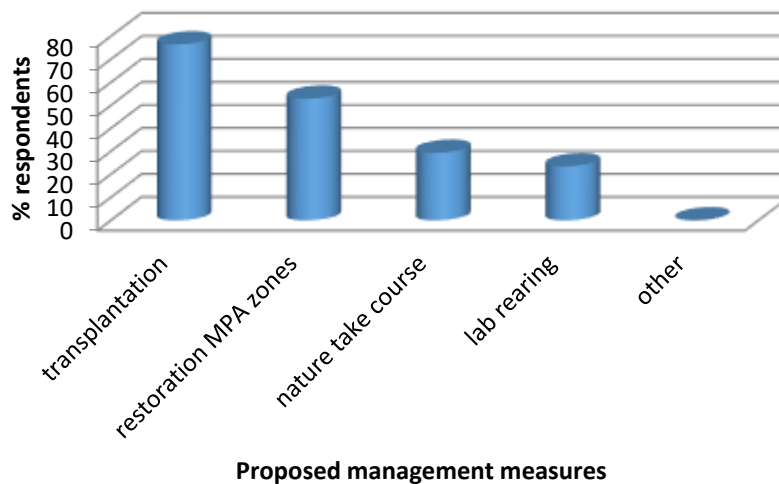
**Figure 27 Range of support for proposed parrotfish population growth and recovery measures**

Support for management efforts to aid black sea urchin recovery in the Grand Anse Bay was also very high with 89% of persons indicating their favour for such (Figure 28). The suggested management measure receiving the greatest support (76.5%) was transplantation from reefs with good abundance to those with poor abundance. Over half of those surveyed (52.9%) favoured the setting aside of MPA zones for restoration, while similar proportions support a nature take its course solution (29.4%) or laboratory rearing for replenishment of reefs (23.5%). No additional management measures were suggested by any of the respondents (Figure 29). Of the two individuals who were not supportive of measures to aid black sea urchin recovery, one person

indicated they were still plentiful (and therefore in no need of help) and the other individual justified their no support stance because they were scared of the organism.

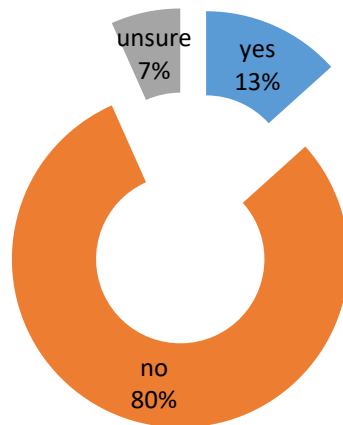


**Figure 28 Support for black sea urchin population recovery measures, n = 19**

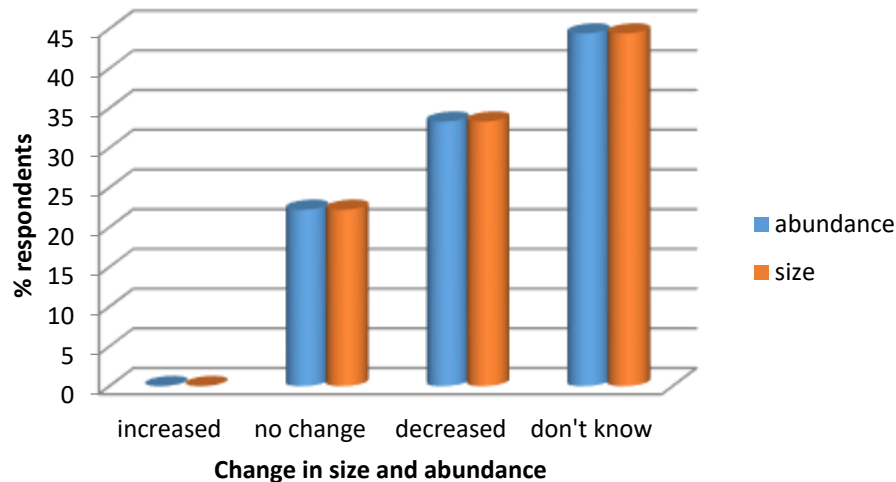


**Figure 29 Range of support for proposed black sea urchin population recovery measures, n = 17**

The overwhelming majority of persons surveyed (80%) do not, or have never fished, a spawning aggregation, while only 13% have fished them (Figure 30). Most persons were unsure as to whether the number and size of the fish in these aggregations had changed (44.4% in both cases) over the last five years. One-third of respondents thought there had been a decrease in both characteristics of the aggregations, while 22.2% noted no change in either feature. No one noted an increase in either characteristic over the time period of interest (Figure 31).

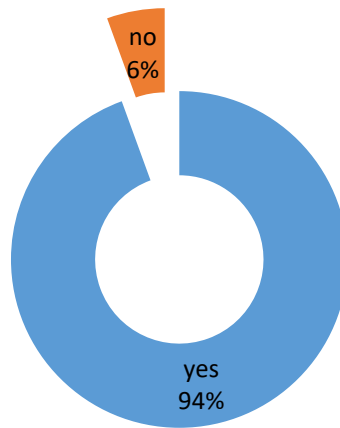


**Figure 30 Do you or have you ever fished a spawning aggregation?, n = 15**

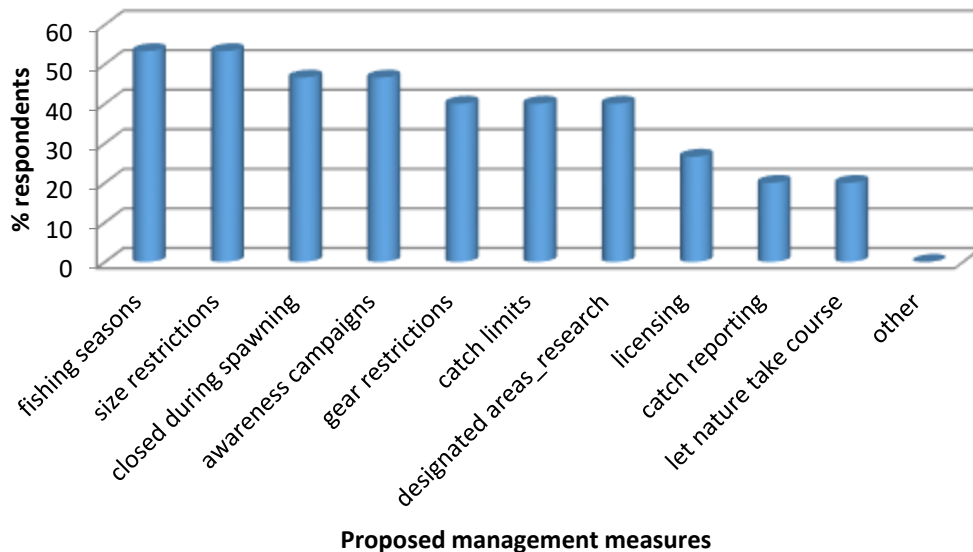


**Figure 31 Trends in size and abundance of spawning aggregations in the last five years, n = 9**

Similar to the support for parrotfish and black sea urchin management measures, the overwhelming majority of persons would support management efforts to help aggregating species recover (94%). See Figure 32. Generally, there was reasonably high support for a range of management measures – implementation of fishing seasons and size restrictions (53.3% each); closures during spawning, and campaigns to help increase awareness, education or outreach (46.6% each); imposition of gear restrictions, catch limits, and designated areas for research (40% each). Licensing (26.6%), catch reporting and letting nature take its course (20% each) were the least supported recovery measures (Figure 33). The individual who was non-supportive of management measures, provided no justification for this position.

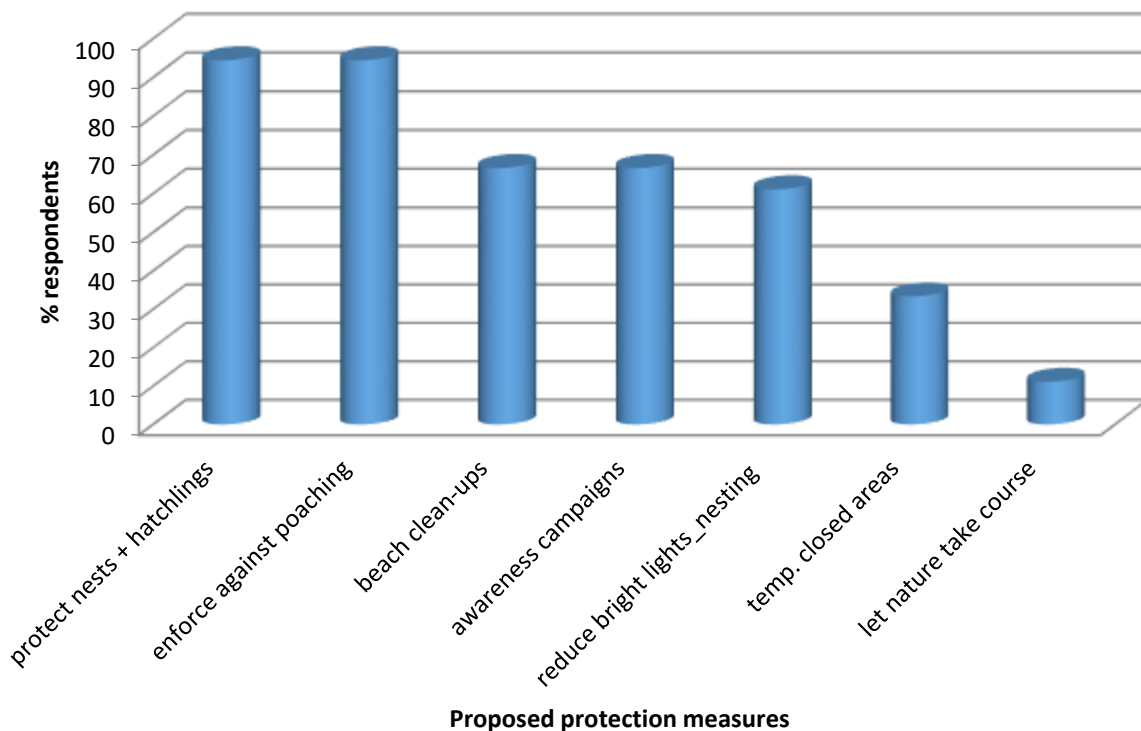


**Figure 32 Support for spawning aggregation recovery measures, n = 18**



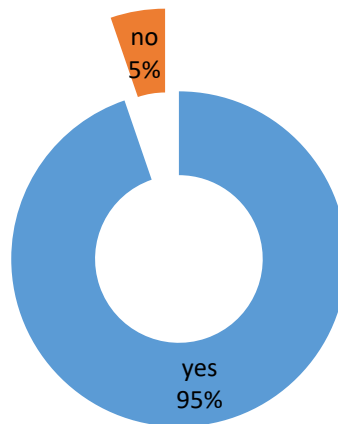
**Figure 33 Range of support for spawning aggregation management measures, n = 15**

Respondents completely support (100%) measures to protect sea turtles in the GAMPA. Top measures supported by the majority of persons include more protection of nests and hatchlings during the nesting season, and enforcement to prevent illegal take (94.4% each). Beach clean-ups during nesting time to prevent turtle entanglement and campaigns to help increase awareness, education or outreach received fairly high support from two-thirds of respondents (66.6%). Reducing bright lights during the nesting season was favoured by 61.1% of persons surveyed. A smaller, yet still fairly significant proportion of respondents agree with the implementation of temporary closed beach areas or activities (33.3%). Only 11.1% favour a more natural solution to protection (leave nature to take its course). No additional management measures were suggested (Figure 34).



**Figure 34 Range of support for sea turtle protection measures, n = 18**

Coral reef protection is important to most persons surveyed with the majority (95%) indicating support for measures to protect this ecosystem.



**Figure 35 Support for coral reef protection measures, n = 19**

Coral gardening (restoration) was the most highly favoured protection measure (73.7%) among a set of proposed interventions. Significant proportions of individuals also supported fishing seasons (52.6%), gear restrictions and closed areas (42.1% each), and size restrictions (36.8%). Similar to the other marine resources investigated, only a minority of persons (15.8%) indicated nature

taking its course to be a favourable measure of protection for coral reefs. No one proposed any other management measures (Figure 36).

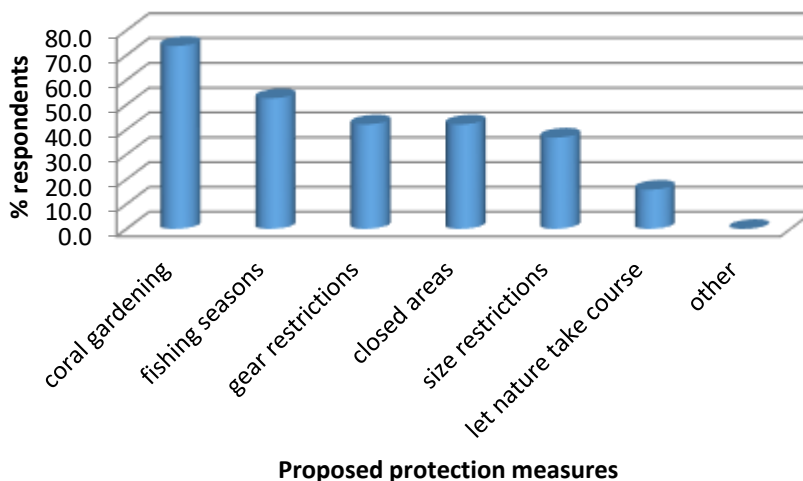


Figure 36 Range of support for coral reef protection measures, n = 18

### 3.2. Identify resource use and user patterns by user groups for informing the zoning plan; and determine potential impacts of management decisions/interventions on MPA livelihoods

#### 3.2.1. Activities in Grand Anse Bay: relaxation and livelihoods

Swimming is the most popular means of relaxing in the area of the proposed GAMPAs for survey respondents and members of their households; 97.9% of persons indicated this activity. Significantly smaller proportions of persons surveyed participate in exercise (22.9%), snorkeling (20.8%), diving (17.7%), recreational fishing (14.6%), watersports (13.5%) and boating (8.3%) for relaxation (Figure 37).

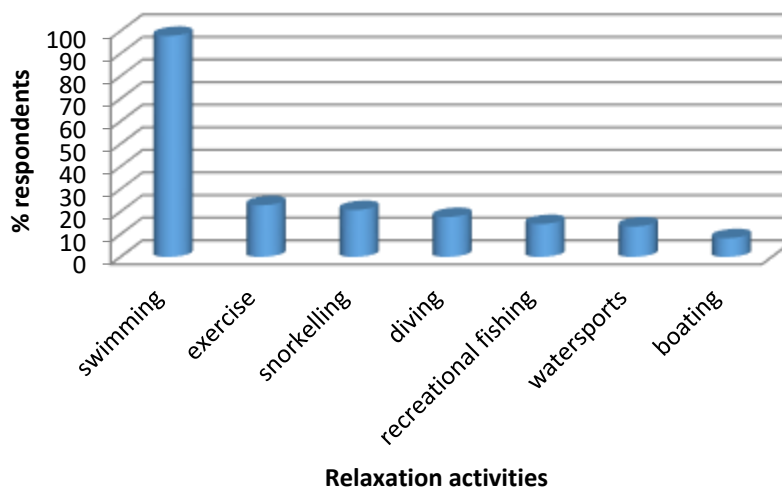
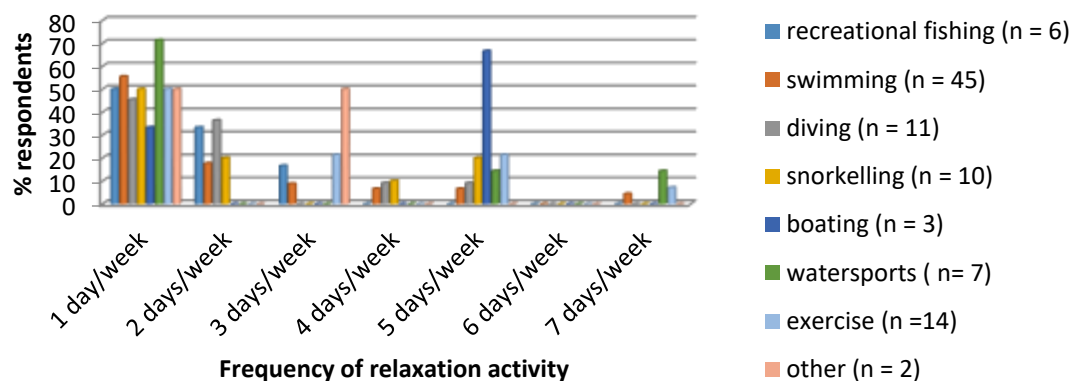


Figure 37 Types of activities people participate in for relaxation in Grand Anse Bay, n = 96



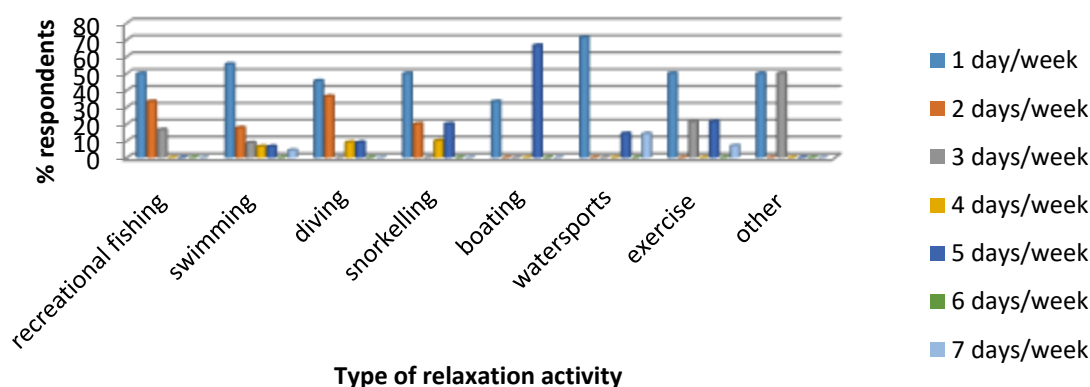
Picnicking and just general relaxation (not linked to a specific activity) were mentioned as additional activities by 5.2% of persons (n = 97).

The most common frequency with which persons and their family members participate in the full range of relaxation activities in and around the proposed GAMPa is once per week; fairly high proportions of people (33.3 to 71.4%) engage in relaxation in the area. Participation in water-sports (71.4%), swimming (55.5%), recreational fishing, snorkeling and exercise (50% each), are the most popular forms of relaxation in which respondents participate the most in once a week. Generally, relaxation in and around the GAMPa multiple times per week is not common across most activities investigated. No activities occur six days per week (Figure 38).



**Figure 38 Weekly participation in common forms of relaxation in and around the proposed GAMPa by days/week**

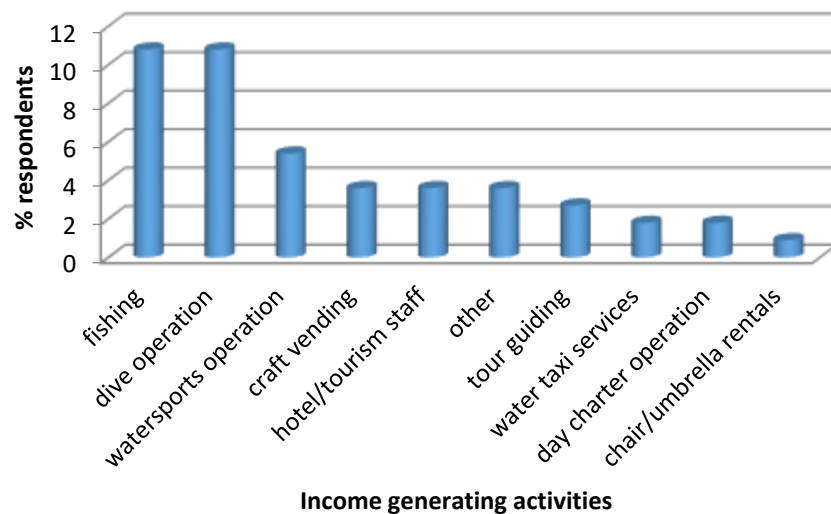
Swimming is the only form of relaxation that persons engage in consistently throughout the week (1 to 5 and 7 days per week); although the majority of persons (55.5%) only swim once per week, only small proportions (between 4 and 17%) swim 2-5 and 7 days per week. Diving and snorkelling both occur somewhat consistently one, two, four and five times per week with higher proportions of persons (between 9 and 36.4%) than those for swimming participating in these activities 2 and 4-5 days per week (Figure 39).



**Figure 39 Weekly participation in common forms of relaxation in and around the proposed GAMPa by activity**

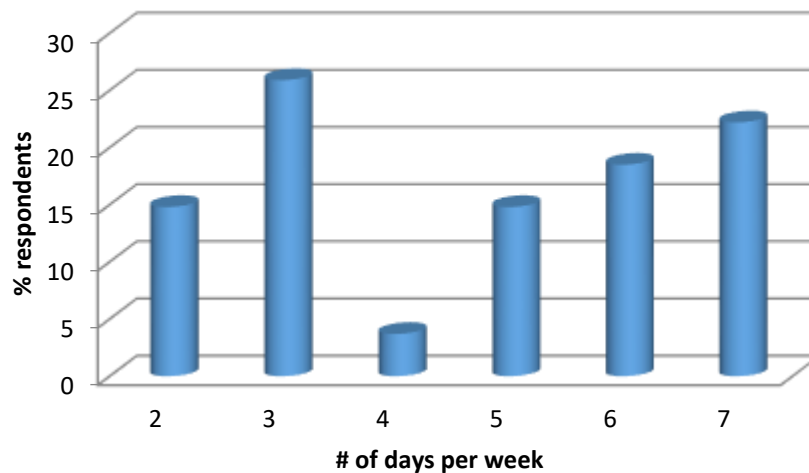
Perhaps surprisingly, a minority of persons interviewed (or their household members) make a living from the coastal and marine resources in and around the Grand Anse Bay. Fishing (10.8%), dive operation (10.8%) and water-sports operation (5.4%) are the main ways in which persons

make a living from the area; only 1 and 4% of persons earn income from craft vending, hotel/tourism, tour guiding, water taxi services, day charter operation and beach chair rentals.



**Figure 40 Means of making a living from Grand Anse Bay, n = 111**

The majority of persons making a living from the resources in Grand Anse Bay do so three days per week (25.9%). A fairly significant proportion of people (22.2%) making a living within the area throughout the week (Figure 41).



**Figure 41 Number of days in an average week people spend making a living from Grand Anse Bay, n = 27**

People believe that there are a number of activities that should be allowed within the proposed GAMPA and its boundaries. Approximately one-third to 93% of respondents feel that recreational or subsistence, as well as research activities, should be permitted. Commercial activities and those prone to causing damage or pollution to the surrounding environment such as yacht anchorage, farming, hotel development and land clearing (between 5-12% of respondents) are less favoured. Five persons thought that other activities that should be allowed also include fish farming, floating

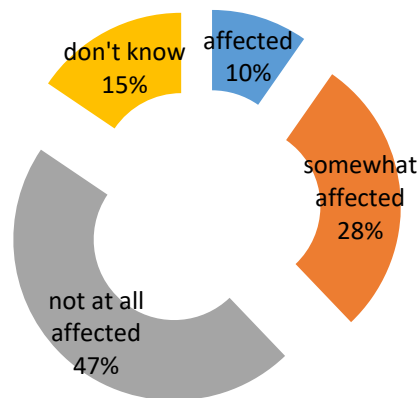
water park and most surprisingly, mining (20% each), while 40% believe no activities should be allowed. See Table 2.

**Table 2 Activities people believe should be allowed within the proposed GAMPa and its boundaries**

Allowed activities (n = 109)	% respondents
Swimming	92.6
Recreational snorkeling	74.3
Recreational SCUBA diving	69.7
Research and education	69.7
Recreational fishing	52.3
Non-motorised boating	42.2
Subsistence fishing	41.3
Motorised boating	32.1
Commercial fishing (seine)	16.5
Yacht anchorage	11.9
Farming	11
Hotel development	11
Land clearing	5.5
Other	4.5

### 3.2.2. Potential management impacts

Most persons (47%) believe they will not be affected by the establishment of the MPA and implementation of management actions or measures. Only 10% feel they will be affected while just over a quarter of persons think they will be somewhat affected. Some persons (15%) were uncertain of the extent to which they might be impacted.



**Figure 42 Perceptions of the extent to which MPA establishment and management will impact persons**

Explanations for these perceptions were numerous and were categorized into 25 groupings. Main reasons (5% of respondents and more) given for perceptions fall into the affected, somewhat affected and not at all affected levels of expected impact. The top seven are noted. With MPA

establishment and management implementation, 17.9% of persons felt that negative implications (“affected”) would include a combination of limited access, activities and displacement of persons from the area. Approximately 42.4% of respondents combined say they would “not at all be affected” by the MPA or any management actions because they are only occasional users (16.6%), are not dependent on the beach (7.8%), the MPA is a good thing (7.8%), they are only recreational users (5.1%) or don’t use the area (5.1%). 6.4% of those who felt there would be a “somewhat affected” level of impact, noted it would depend on the users such as fishermen and beach users, and what could be interpreted as people not altering practices or complying with management – “people hear but don’t take action” (Table 3).

**Table 3 Reasons provided for perceived extent of MPA establishment and management impact**

<b>Reasons (n = 78)</b>	<b>%</b>
Limited access, activities, displacement	17.9
Occasional user	16.6
It's a good thing	7.8
Not dependent on beach	7.8
Depends on users	6.4
Only a recreational user	5.1
Don't use the area	5.1
Livelihood dependent on area	3.8
No limitation in activities	3.8
Depends on management	2.6
Need to know the intent	2.6
Use the area	2.6
Less development = less jobs	1.3
Don't live in Grand Anse	1.3
Unsure of regulations and associated limitations	1.3
Contribution to development	1.3
Don't fish	1.3
It will be advantageous and disadvantageous	1.3
Fishermen will have to adjust	1.3
Solution to threats	1.3
More effects if use is unsustainable	1.3
Don't know much about fishing	1.3
Increased biodiversity = increased local + tourist attractions	1.3
Larger fish for sale	1.3
Personal benefit from MPA	1.3
Better reefs, more business	1.3

More detailed investigation of the perceived impacts associated with the establishment of the MPA and implementation of management revealed that majority of persons believe there will be positive impacts for ecosystem health, biodiversity, species populations, livelihoods and the economy. Significantly high and similar proportions of people strongly agree and agree that there will be improved ecosystem health (88.2%), biodiversity protection (87.5%) and increased species populations (86.3%) with implementation of management actions (Table 4; Figure 42). Smaller

proportions, but still considered as a fair majority of respondents, also strongly agree and agree that the MPA and any associated management will result in an improved economy (52.9%) and improved livelihoods (50%). A fair proportion of persons (43.7%) believe reduced access will be a result of the MPA. Perceptions regarding potential impacts of livelihood loss and reduced income are not as easy to interpret. While 40.7% of persons disagree and strongly disagree that there will be livelihood loss, fairly substantial proportions of persons either believe livelihoods will be loss (31%, strongly agree and agree combined) or are uncertain (28.2%, neither agree nor disagree). Perceived impact on income is variable with similar proportions of respondents divided across response categories; a slight majority (38.6%) seem uncertain as to whether reduced income will be an impact of the MPA. Almost equal proportions, believe income will be negatively impacted (29.6%, strongly agree and agree combined) whereas 31.7% feel there will no negative impact on income. See Table 4 and Figure 43.

**Table 4 Level of agreement with perceived impacts of GAMPA establishment and associated implementation of management**

<b>Perceived MPA impacts</b>	<b>Strongly agree and agree* (%)</b>	<b>Neither agree nor disagree (%)</b>	<b>Strongly disagree and disagree* (%)</b>
Livelihood loss (n = 103)	31	28.2	40.7
Improved ecosystem health (n = 102)	88.2	10.8	0.9
Improved livelihoods (n = 100)	50	44	6
Reduced income (n = 101)	29.6	38.6	31.7
Increased species populations (n = 102)	86.3	13.7	0
Reduced access (n = 103)	43.7	28.2	28.1
Biodiversity protection (n = 104)	87.5	10.6	1.8
Improved economy (n = 102)	52.9	37.3	9.7

\* combined categories

When persons were asked to suggest any other anticipated management impacts (either positive or negative), out of 55 persons, most indicated they did not know or said there were no other impacts (34.5%). A minority indicated impacts related to livelihood loss and improved livelihoods – i.e. loss of jobs (9.1%) and more (increased) jobs (7.3%).

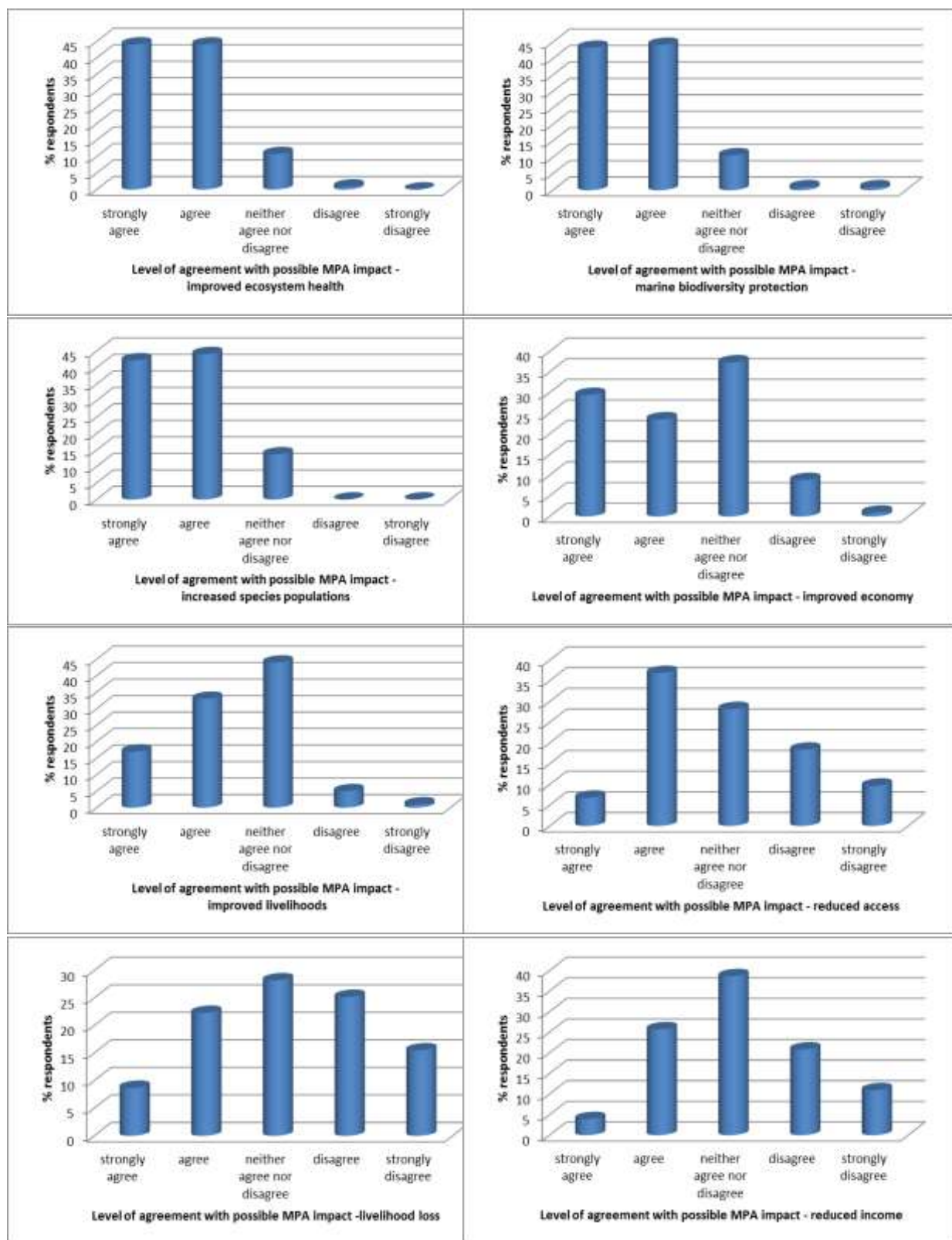
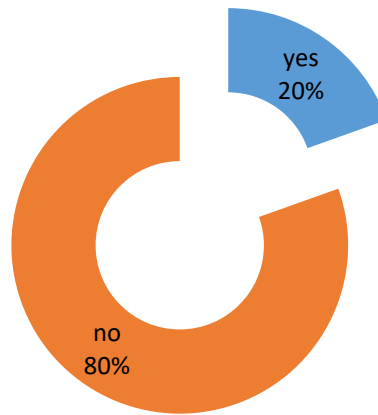


Figure 43 Perceived impacts of GAMPA establishment and management

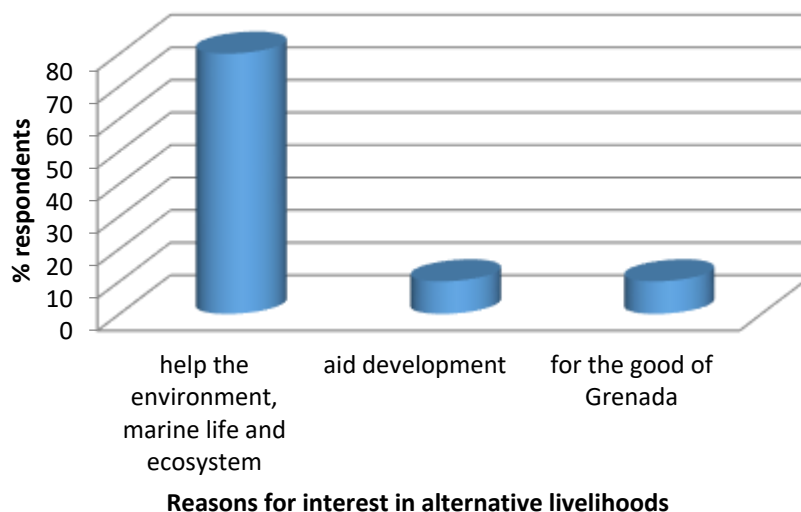
### 3.2.3. Alternative livelihoods

A substantial majority of persons surveyed or members of their households (80%) are not interested in the pursuit of alternative livelihoods.



**Figure 44 Are you or members of your household interested in alternative livelihoods?, n = 87**

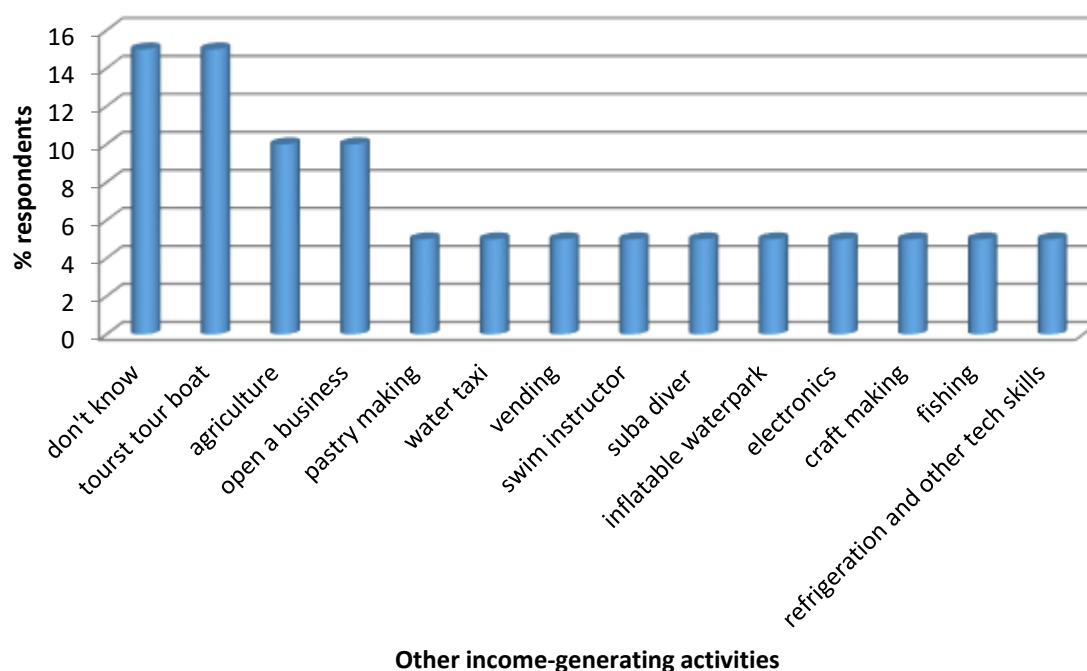
Of those who are interested in giving up what they do now in the Grand Anse Bay to change to another livelihood entirely, main reasons for this were grouped according to three categories – to help the environment in general (including marine life and ecosystems; 80%), to aid development (10%) and for the good of Grenada (10%). It is assumed the meaning of ‘development’ given for the second reason is in the context of personal development. A clear understanding of the meaning of brief response, “for the good of Grenada” is difficult (Figure 45).



**Figure 45 Main reasons for wishing to pursue alternative livelihoods, n = 10**

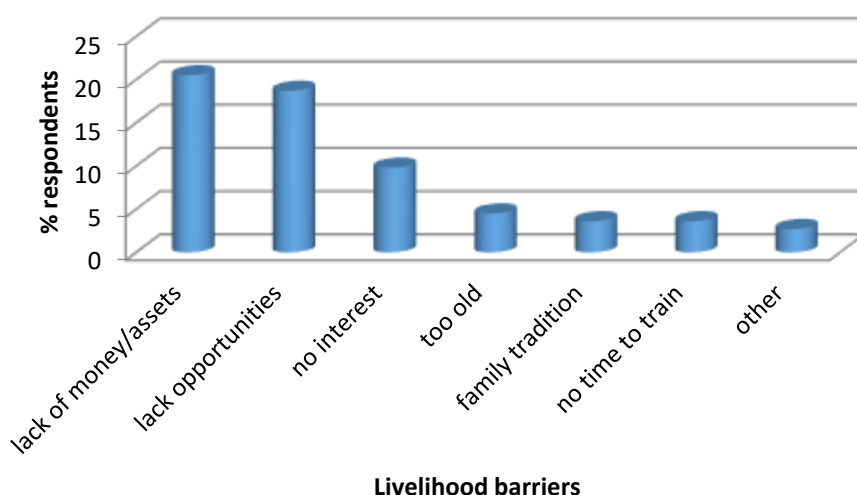
Other income-generating activities that persons or their household members would like to become involved in but have not done so yet were quite varied (Figure 46). The top three income-generating activities of interest included tourist tour boat operation (15%), agriculture and

business (10% each). Fifteen percent of people did not know what other income-generating activities they could become involved in.



**Figure 46 Other income-generating activities that persons would like to get involved in, n = 20**

The main barriers to pursuing alternative livelihoods among respondents are a lack of money or assets such as land, property, vehicle etc. (20.5%) and a lack of available opportunities (18.7%). No interest in trying something new, too old to try something different, family tradition and no time to train for anything else also have or will prevent persons from trying a livelihood they believe is better; however less than 10% of persons highlighted these as major barriers (Figure 47).



**Figure 47 Barriers that have or will prevent persons from pursuing alternative livelihoods, n = 112**



### 3.3. Identify stakeholder perceptions of threats to coastal resources in Grand Anse

Just under 60% of persons are aware of pollution sources in Grand Anse. Of the 15 different sources identified, hotels (40.3%), Grand Anse beach and bay (16.6%), and boats in the bay (13.8%) were thought to be the main sources of pollution (Figure 48 and Figure 49).

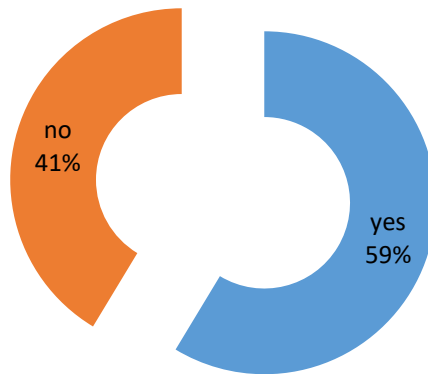


Figure 48 Respondent awareness of pollution sources in Grand Anse, n = 104

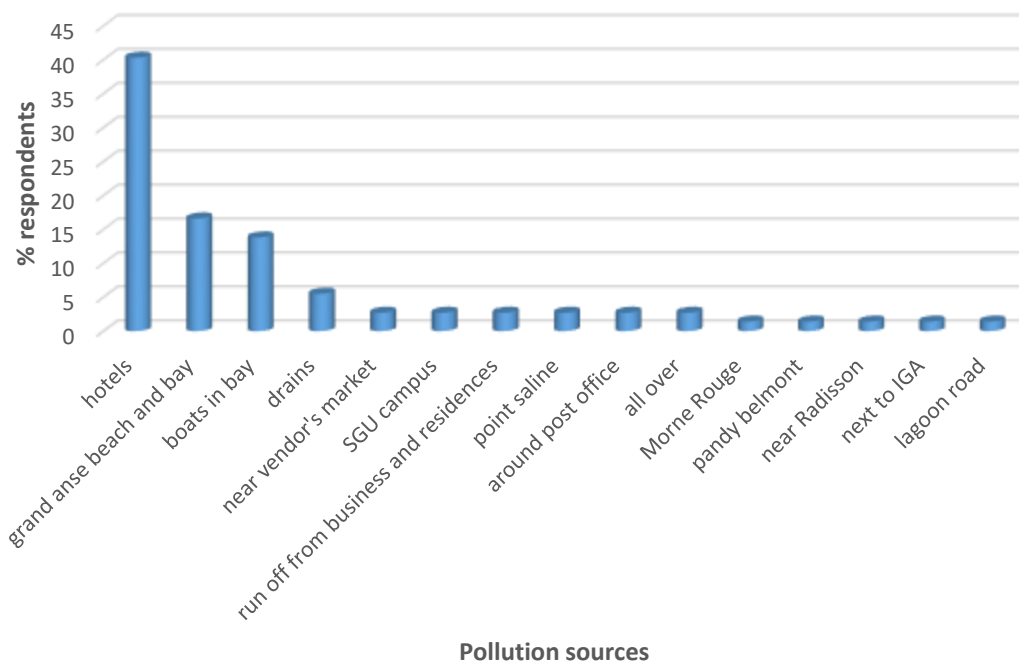
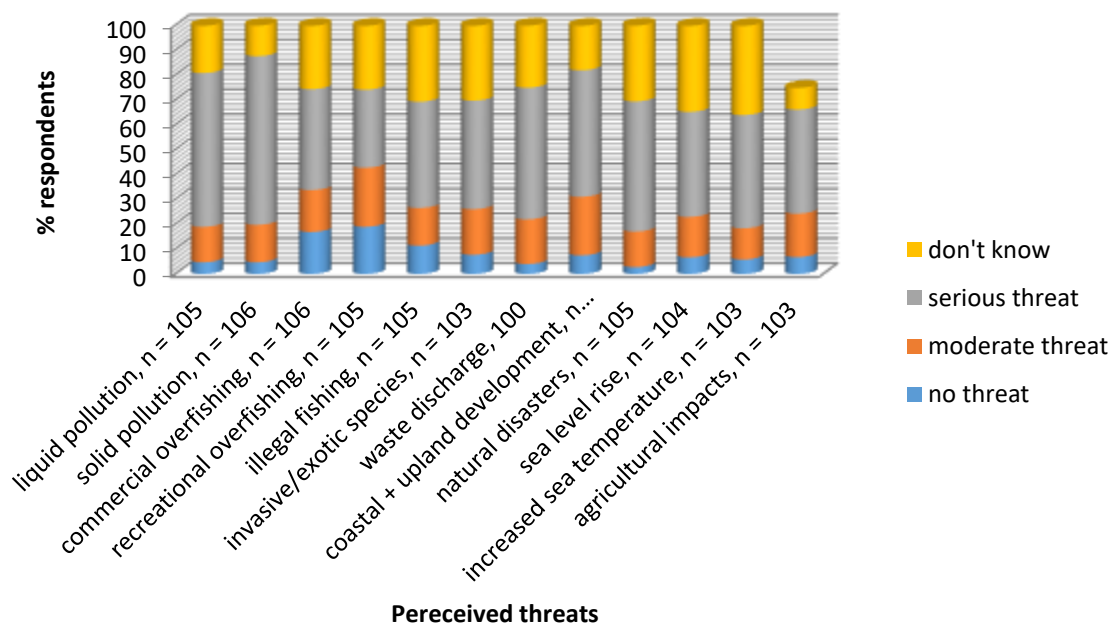


Figure 49 Perceived sources of pollution, n = 72

All pre-determined threats in the survey were ranked as 'serious threat' by the majority of respondents. Individuals perceive solid pollution (67.9%)<sup>1</sup>, liquid pollution (61.9%)<sup>2</sup>, waste discharge<sup>3</sup> (53%), natural disasters (52.4%), and coastal and upland development<sup>4</sup> (50.9%) to be among the top five most serious threats to the marine ecosystems and resources in Grand Anse Bay (Figure 50). Fairly significant proportions of individuals, between 45-31%, also ranked increased sea temperatures, invasive or exotic species, illegal fishing, sea level rise, agricultural impacts (sedimentation/erosion or increased pollutants such as fertilisers and pesticides), commercial overfishing (40.6%) and recreational overfishing (31.4%) as serious threats.



**Figure 50 Ranked threats to the marine ecosystems and resources in Grand Anse Bay**

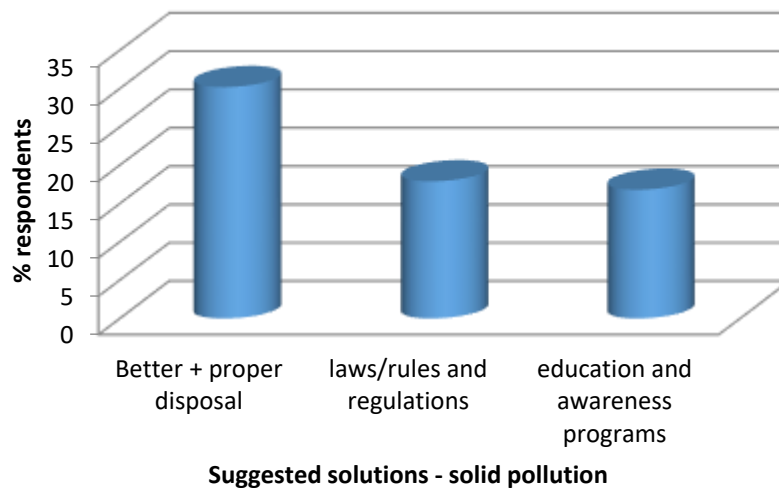
Respondents provided suggestions on ways to address or solve the threats identified. Solutions to each of the five main threats follow. Better and proper disposal (30.2%), the implementation of laws/rules and regulations (17.9%) and education and awareness programs (16.8%) were thought to be suitable solutions to the solid pollution issue (Figure 51). Better and proper disposal includes more bins and better placement. Nine percent and less of persons provided other suggestions such as clean-ups, rangers/wardens, imposition of fines, grills on storm drains, signage, alternative discharge end points, better management, and avoid it. Some people (4.5%) did not know how this issue should be tackled.

<sup>1</sup> Marine trash, debris, plastics etc.

<sup>2</sup> Oil, raw sewage etc.

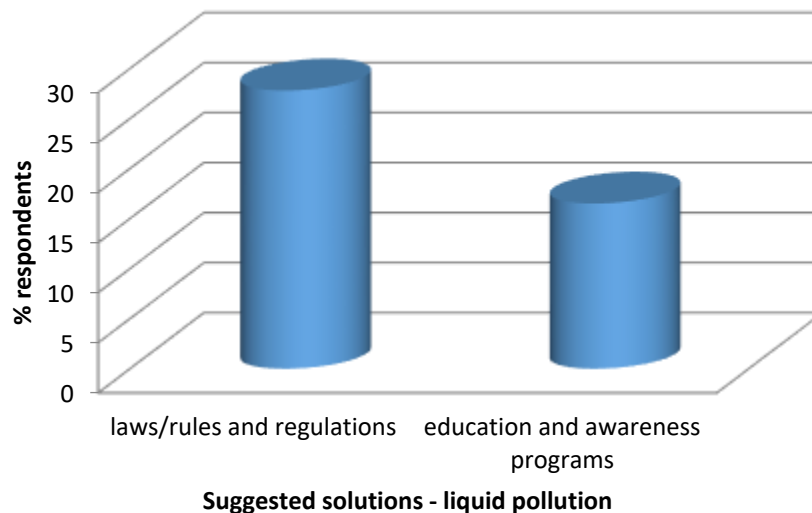
<sup>3</sup> From for example, yachts

<sup>4</sup> Marinas, hotels, resorts, housing, golf courses



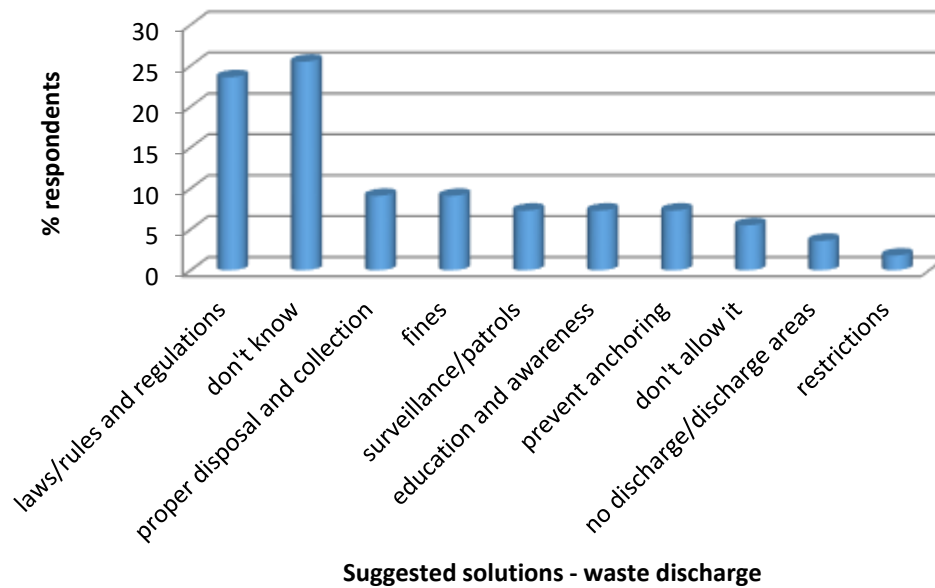
**Figure 51 Top three suggested solutions for addressing solid pollution threat, n = 89**

To help address the liquid pollution threat, laws/rules and regulations (27.8%) and education and awareness programs (16.5%) were considered by the majority of persons to be appropriate solutions to this issue (Figure 52). Other suggestions were provided by 10% and less of persons surveyed and included the monitoring of sources, clean-ups, alternative discharge end points, controlling coastal development, better management, fewer boats within the area and zonation, informing the National Water and Sewage Authority (NAWASA) of issues, and repair of broken pipes. Some people (10.1%) did not know of ways to deal with this issue.



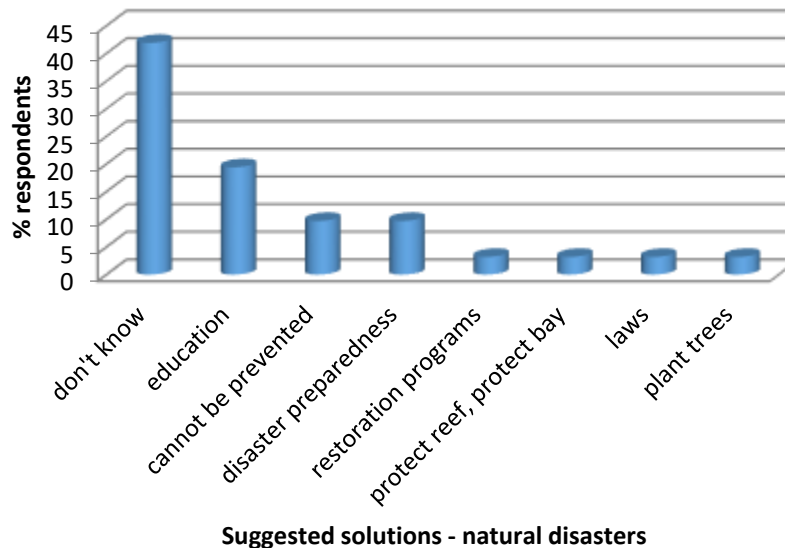
**Figure 52 Top two suggested solutions for addressing the liquid pollution threat, n = 79**

Similar proportions of individuals did not know (25.5%) how the issue of waste discharge could be addressed or felt that laws/rules and regulations (23.6%) were a possible solution. Although other solutions were suggested by a minority of respondents (9% and less), they are noteworthy and included proper disposal and collection of waste, imposition of fines, surveillance or patrols, education and awareness, prevention of anchoring, prevention of waste pollution, implementation of no discharge and discharge areas, and other restrictions (Figure 53).



**Figure 53 Suggested solutions for addressing the waste discharge threat, n = 55**

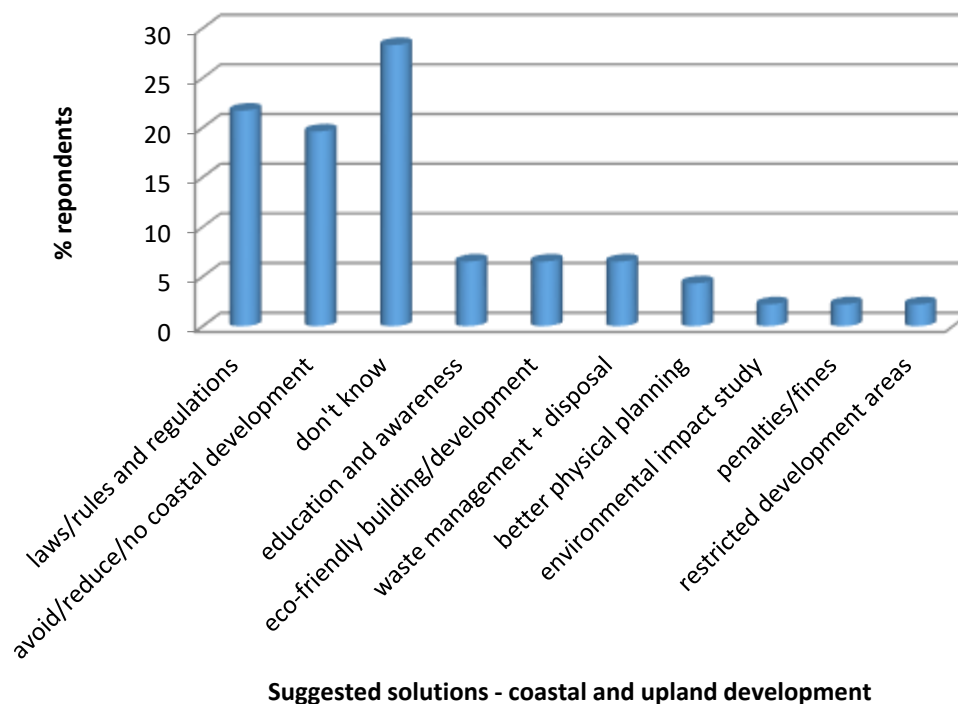
Most people (41.9%) did not know how natural disasters could be addressed to mitigate impacts on ecosystems and resources in Grand Anse Bay. A fairly significant proportion of individuals indicated that education and awareness, and disaster preparedness (29.1%, combined) could be beneficial to mitigating threats by natural disasters. A minority of respondents suggested threats by natural disasters cannot be prevented (9.7%) while others thought that restoration programmes, protection of the reef and bay, laws, and the planting of trees (3.2%, each) could be possible means to addressing this threat (Figure 54).



**Figure 54 Suggested solutions for addressing the threat of natural disasters, n = 31**

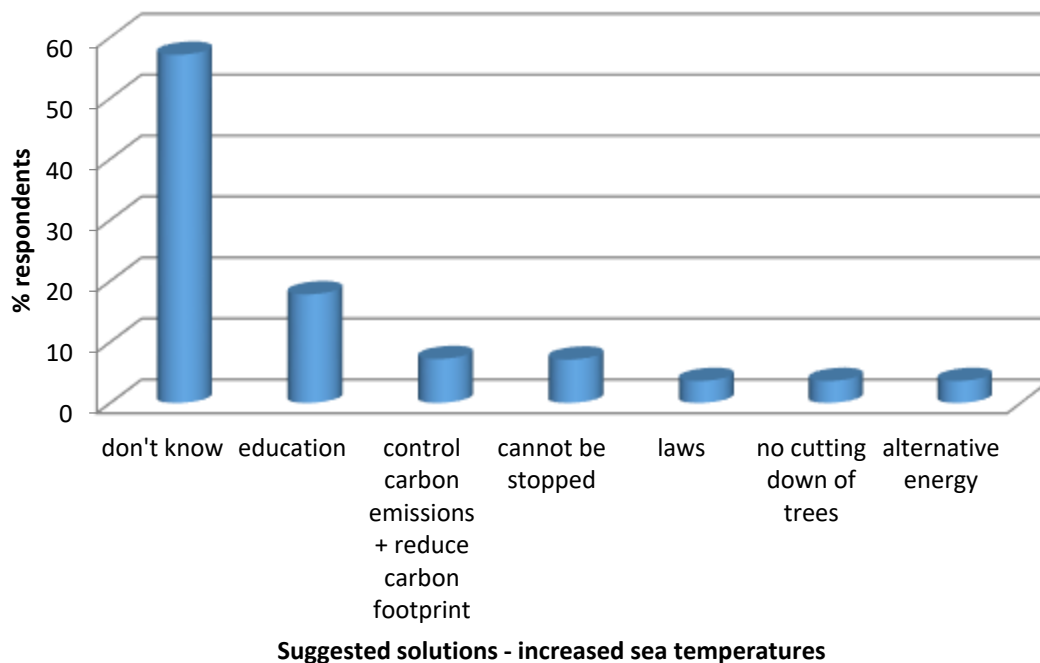
Laws/rules and regulations (21.7%), and avoid, reduce or allow no coastal development (19.6%) were two primary solutions suggested by respondents to address the threat posed by coastal and upland development. A fairly large proportion of people (28.3%) said they did not know how to

deal with the issue. Education and awareness (6.5%), eco-friendly building and development (6.5%), waste management and disposal (6.5%), better physical planning (4.3%), environmental impact studies (2.2%), penalties/fines (2.2%) and restricted development areas (2.2%) were noted by a small minority of persons as means by which the perceived threat of coastal and upland development could be addressed. See Figure 55.



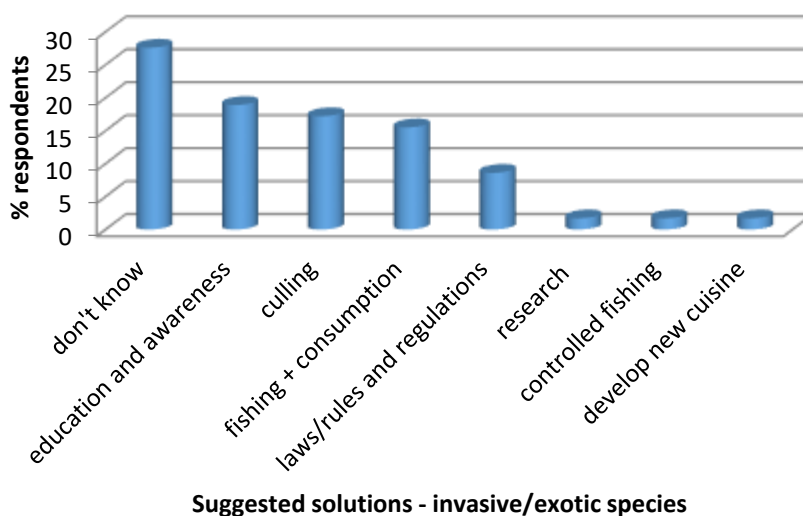
**Figure 55 Suggested solutions for addressing the threat of coastal and upland development, n = 46**

Most people (57.1%) were uncertain of ways in which the threat of increased sea temperatures to the marine ecosystems and resources of Grand Anse Bay could be solved. However, education (17.8%), controlling carbon emissions and reducing the carbon footprint (7.2%), laws (3.6%), no cutting down of trees (3.2%) and alternative energy (3.6%) were also proposed by a few persons as means by which the issue could be mitigated. A few persons (7.1%) felt the threat could not be stopped (Figure 56).



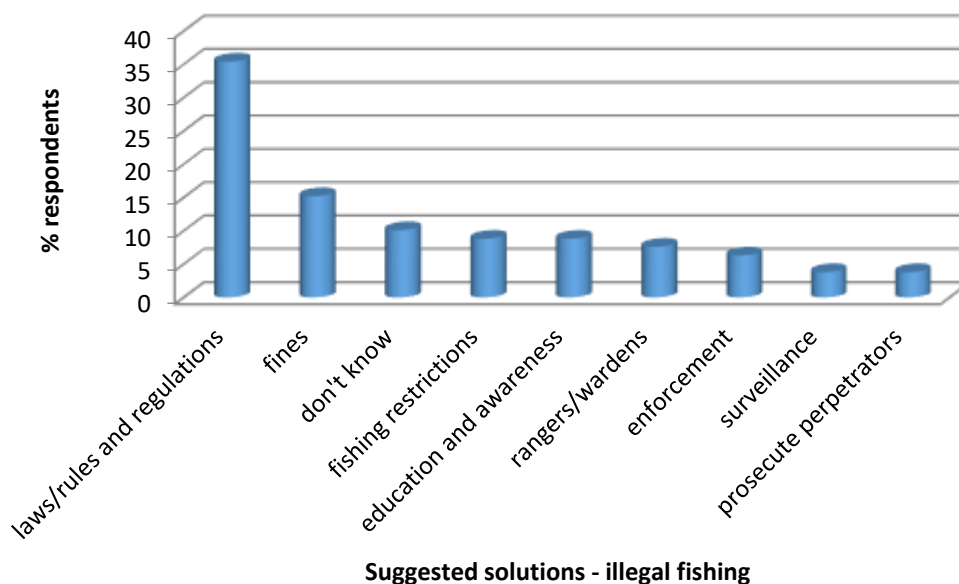
**Figure 56 Suggested solutions for addressing the threat of increased sea temperatures, n = 28**

Education and awareness (18.9%), culling (17.2%), and fishing and consumption (15.5%) were the top three solutions suggested for dealing with the threat of invasive or exotic species. Laws/rules and regulations (8.6%), research, controlled fishing, and development of new cuisines (1.7% in each case) were also mentioned as ways of addressing this threat. Just below thirty percent of persons interviewed (27.6%), indicated they did not know how the threat could be solved (Figure 57).



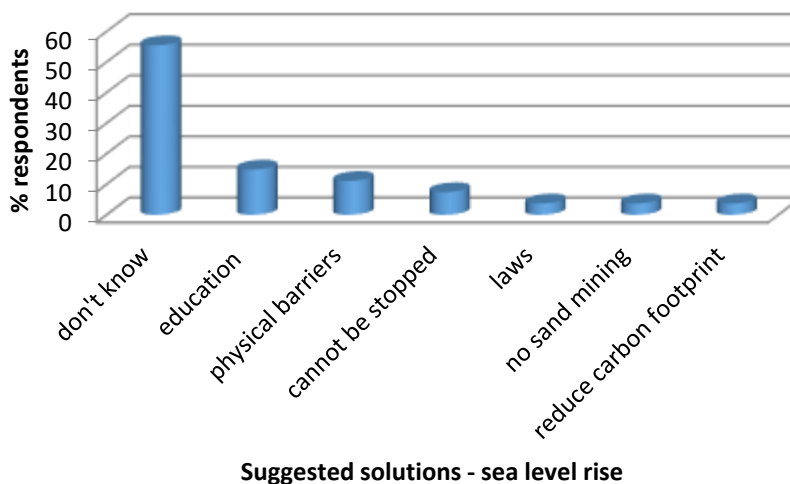
**Figure 57 Suggested solutions for addressing the threat of invasive/exotic species, n = 58**

It was suggested that the threat of illegal fishing within Grand Anse Bay could be addressed via two main ways laws/rules and regulations (35.4%) and imposition of fines (15.2%). Fishing restrictions (8.8%), education and awareness (8.8%), rangers/wardens (7.6%), enforcement (6.3%), surveillance and the prosecution of perpetrators (3.8% in each case) were also provided as potential solutions to this threat. A few persons (10.1%) indicated not knowing how to deal with the illegal fishing issue (Figure 58).



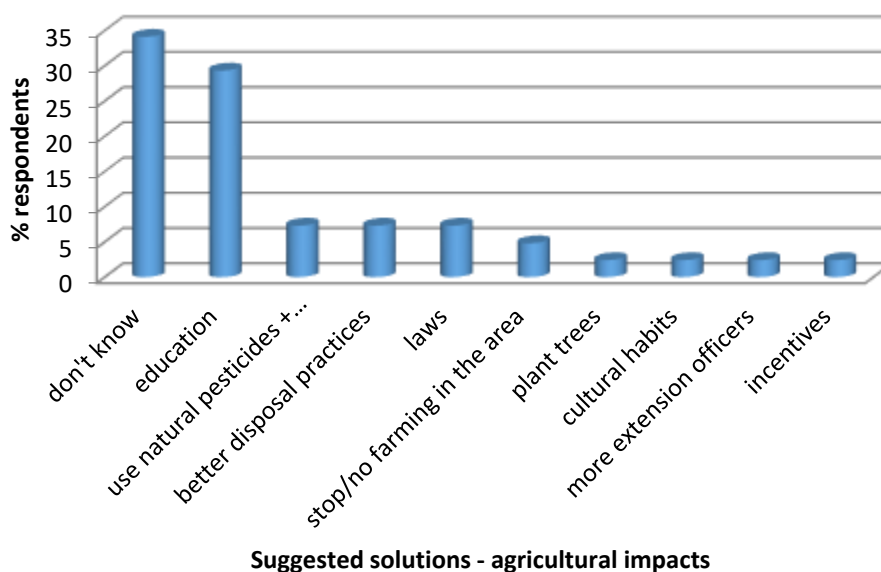
**Figure 58 Suggested solutions for addressing the threat of illegal fishing, n = 79**

Persons believe that problems associated with sea level rise could be solved by education (14.8%), the erection/placement of physical barriers (11.1%), laws (3.7%), prevention of sand mining (3.7%) and a reduction in the carbon footprint (3.7%). A minority of persons (7.4%) noted this issue could not be stopped, while over half of those interviewed (55.5%) could not provide suggestions for solving the threat of sea level rise (Figure 59).



**Figure 59 Suggested solutions for addressing the issue of sea level rise, n = 27**

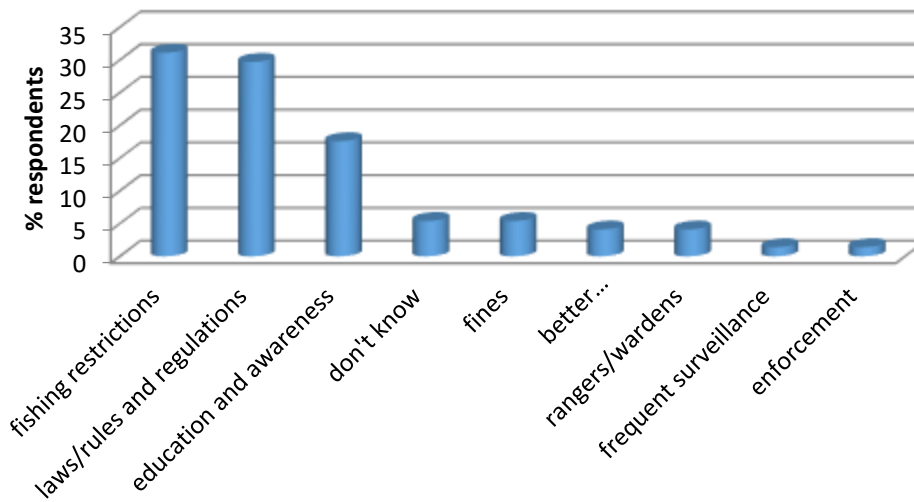
Education was thought by the majority of persons surveyed, to be the main solution (29.3%) to the impacts of agriculture on the marine ecosystems and resources in Grand Anse Bay. The utilisation of natural or eco-friendly fertilisers and pesticides (7.3%), better disposal practices (7.3%), laws (7.3%), stopping/disallowing farming in the area (4.8%), planting trees (2.4%), addressing cultural habits (2.4%), increasing the number of extension officers (2.4%) and provision of incentives (2.4%) were all put forward as possible solutions to the impacts of sedimentation, erosion or increased pollutants due to agricultural impacts. Just over one-third of persons (34.1%) did not know how the issue could be solved. See Figure 60.



**Figure 60 Suggested solutions to the threat of agricultural impacts, n = 41**

Fishing restrictions (31.1%), laws/rules and regulations (29.7%), and education and awareness (17.6%) were the primary solutions offered for dealing with the threat of commercial overfishing. Fines (5.4%), better management or regulatory systems (4.1%), rangers/wardens (4.1%), frequent surveillance and enforcement (1.4% in both cases) were also suggested as possible solutions. A small proportion of persons (5.4%) could not provide any solutions to this threat (Figure 61).

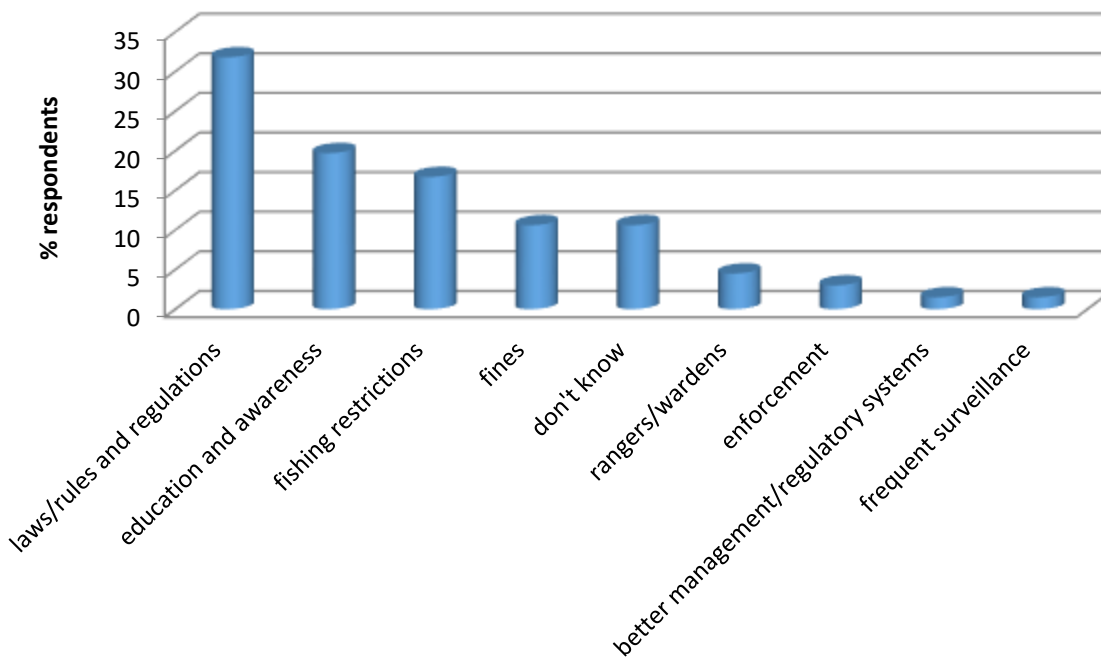




**Suggested solutions- commercial overfishing**

**Figure 61 Suggested solutions to addressing the threat of commercial overfishing, n = 74**

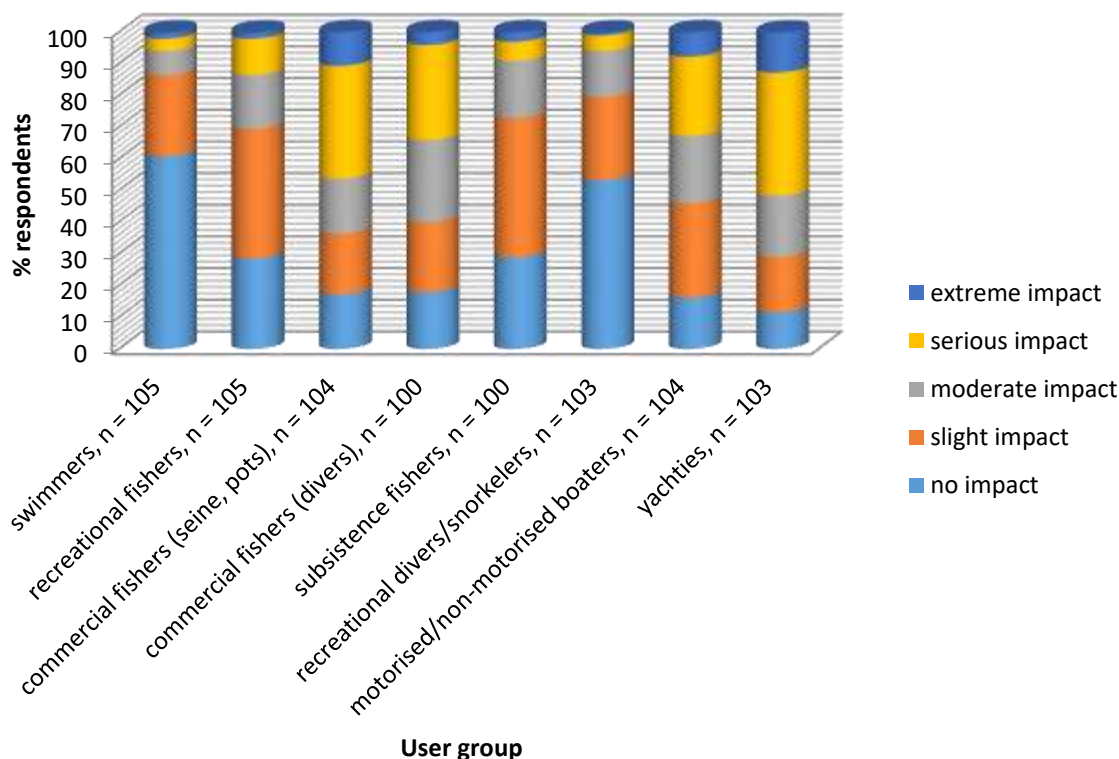
Similarly, the implementation of laws/rules and regulations suggested by nearly one-third of persons surveyed (31.8%), education and awareness (19.7%) and fishing restrictions (16.7%) were thought to be three of the most appropriate solutions to the threat of recreational overfishing. Fines (10.6%), rangers/wardens (4.5%), enforcement (3%), better management/regulatory systems (1.5%) and frequent surveillance (1.5%) were also offered as potential solutions to this threat (Figure 62).



**Suggested solutions - recreational overfishing**

**Figure 62 Suggested solutions to address the threat of recreational overfishing, n = 66**

Of all the user groups examined, persons surveyed believe that yachties (51.4%) and commercial fishers (seine nets or pots, 46.2%) have a serious to extreme impact (combined results) on the resources and ecosystems in Grand Anse Bay. Users groups perceived to have a slight to moderate impact on Grand Anse Bay include subsistence fishers (62%), recreational fishers (58%), motorised and non-motorised boaters (51%), and commercial fishers in dive fisheries (48%). Generally swimmers (60.9%) and recreational SCUBA divers/snorkelers (53.4%) are believed to have no impact on the marine resources and ecosystems of Grand Anse (Figure 63).

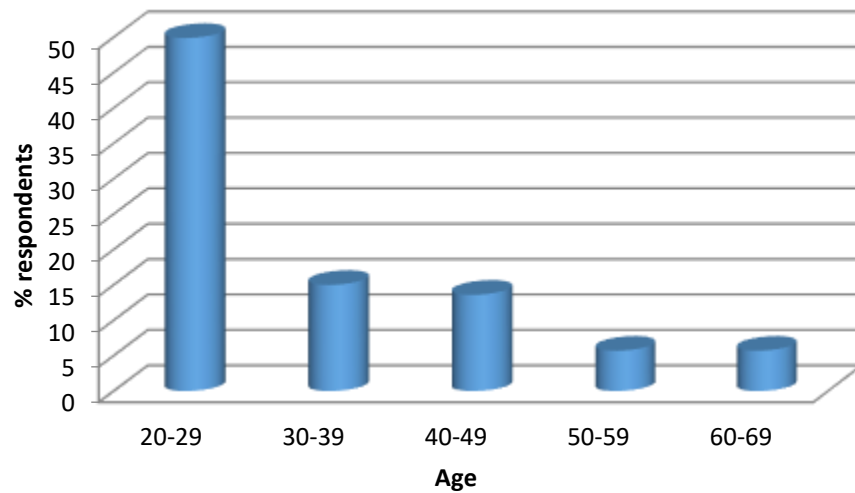


**Figure 63 Perceived impact on Grand Anse Bay of a range of users groups**

### 3.4. Demographics

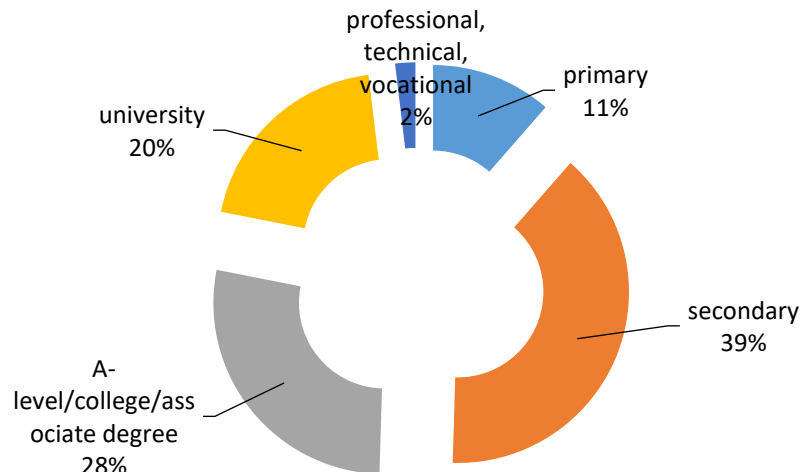
Almost equal proportions of males and females were surveyed for this study; slightly more males (54%) than females (46%) participated in the survey.

The majority of respondents (49.9%) who participated in the survey were within the 20-29 age group. Similar proportions of persons in the 30-39 (15%) and the 40-49 (13.6%) age groups were interviewed. Significantly smaller and equal proportions of individuals in the 50-59 and 60-69 age groups (5.7% each) participated in the study. Age ranges are those used in the Grenada census. See Figure 64.

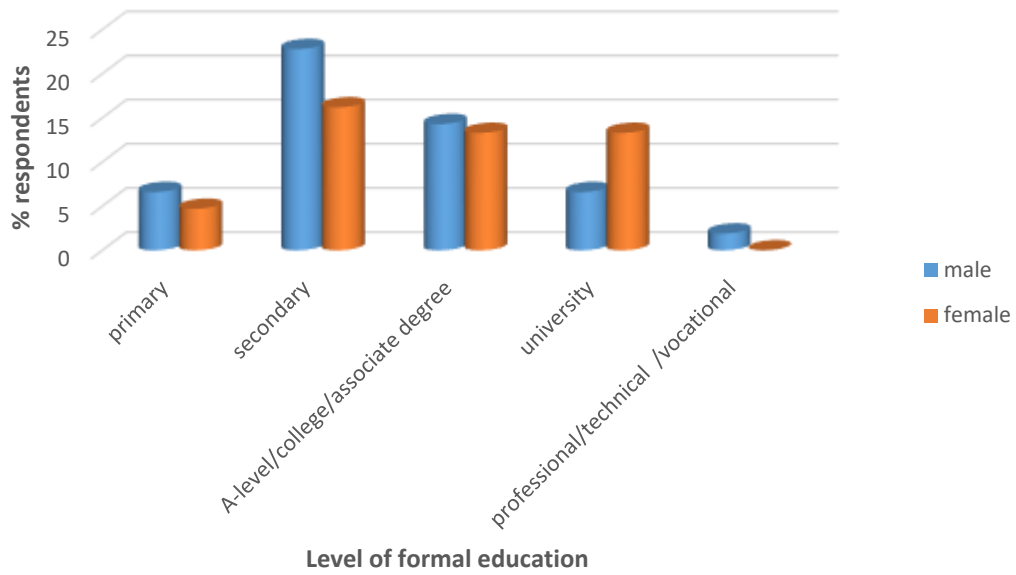


**Figure 64 Age range of persons who participated in the SocMon assessment, n = 88**

Respondents exhibit high levels of formal education with 86.6% having a secondary level of education and higher (up to university level). Professional, technical and vocational levels of training/education are significantly low amongst respondents (2%). See Figure 65. Similar proportions of males and females have attained primary to A-level/college/associate degree levels of education, however females outstrip males in terms of university level education (Figure 66).



**Figure 65 Level of formal education amongst respondents, n = 105**



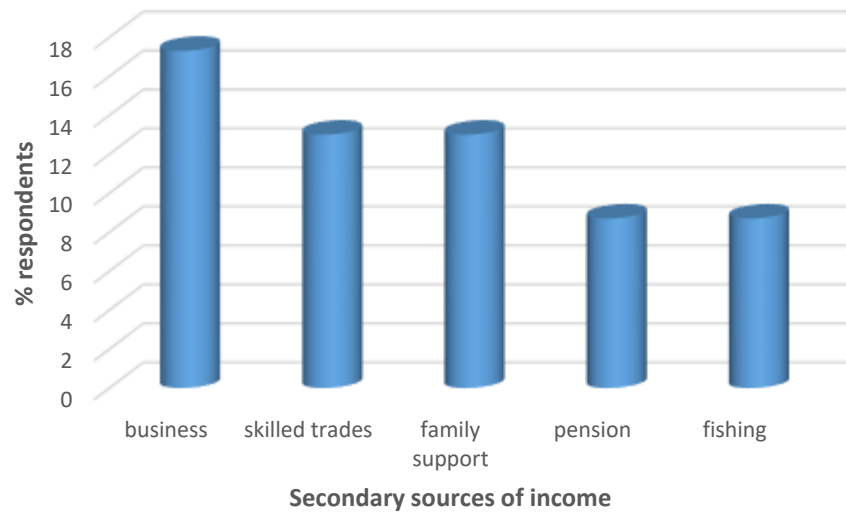
**Figure 66 Level of education by sex, n = 105**

Primary sources of income of respondents were grouped into 22 categories. The top six types of primary income include business (13%), skilled trades (11.6%), sales worker (8.7%), vending (7.2%) and watersports and diving (7.2%).



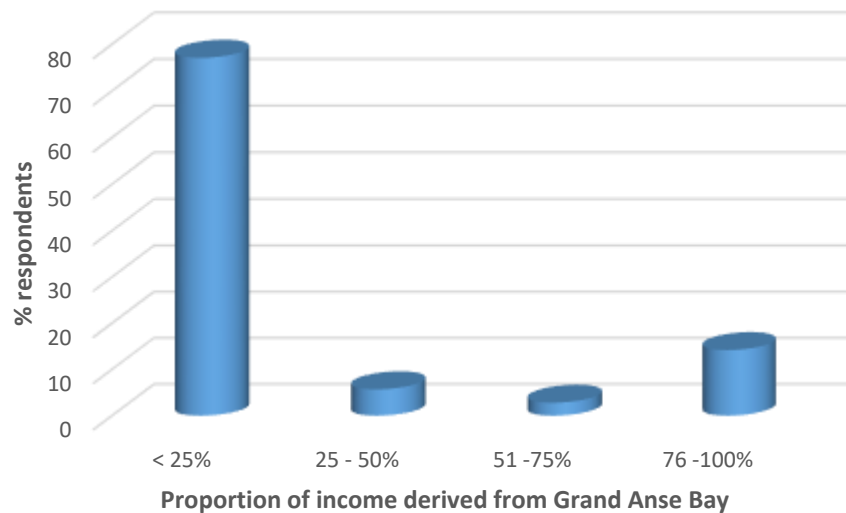
**Figure 67 Primary sources of income of respondents, n = 69**

The top five sources of secondary income include business (17.3%), skilled trades (13%), family support by partners and parents (13%), pensions (8.7%) and fishing (8.7%). See Figure 68.



**Figure 68 Secondary sources of income of respondents, n = 23**

Over three quarters of persons (77.1%) interviewed derive less than 25% of their income from activities in the Grand Anse Bay. Only 10% of individuals derive 76-100% of their income from income generating activities in the area (Figure 69). Upon further examination of this latter group, equal proportions of men and women (50% each) derive the majority of their income from Grand Anse Bay.



**Figure 69 Proportion of income derived from income-generating activities in Grand Anse, n = 70**

## **4. DISCUSSION AND CONCLUSIONS**

### **4.1. Demographics**

Gender refers to the social boundaries that separate men from women and has a direct influence on community structure; decision making; type of institutional governance; and family organisation (Gonzalez and Martin 2007). For instance, men generally play a larger role in the exploitation of natural resources than women; therefore, if management seeks to effectively manage the natural resources, the gender perspective is critically in understanding and integrating such differences into management protocols, goals, and policies (Gonzalez and Martin 2007). The survey was administered to almost equal proportions of male (54%) and females (46%) which should ensure that the responses received are gender balanced. This was critical as it follows the Seventh Meeting of the Conference of the Parties (CoP7) of the Convention of Biological Diversity (CBD) in 2004 “carrying out participatory national reviews of the status, needs and context specific mechanism for involving stakeholders, ensuring gender...in protected areas policy and management”[at all levels] (Gonzalez and Martin 2007).

The age ranges utilized in the study are the same as are typically used for Grenada’s National Census. Almost fifty percent of the respondents were between the ages of 20-29, indicating that perhaps interviewers targeted a younger age group or that persons from this age group were more accessible for surveying. This skewed distribution in age range could impact the results of the study in that perceptions from younger people will be better represented and will dominate the findings. Additionally, this could have implications when it comes to respondents’ perception on the status of resources from five years ago as the younger age group is less likely to have a good baseline of condition. Over eighty percent of respondents had formal education to at least the secondary level. The sex rates were equal up to community college level then females outnumbered males in terms of university level education. High formal education is beneficial to future management of the GAMPA as persons will be more likely to understand and appreciate management measures and interventions. Having well educated individuals in communities adjacent to the GAMPA should make it easier for management authorities to manage activities within the area and perhaps even gain support for and participation in GAMPA management.

### **4.2. Potential Impacts of Management Interventions on MPA Livelihoods**

Grenada, being a Small Island Developing State (SIDS), has a precarious economy that is highly dependent on the international trade agreements for food imports and exports of goods and services (*Country Documnet on Disaster Risk Reduction for Grenada, 2014*). Additionally, Grenada has been affected severely by two major hurricanes (2004 and 2005, respectively) and the global fiscal crisis that resulted in the economy retracting by 9.7% between 2008 – 2012 (*Country Documnet on Disaster Risk Reduction for Grenada, 2014*). The most recent Poverty Assessment Survey for Grenada estimated that 37.7% of the population lives below the poverty line and a further 14.7% was considered vulnerable (*Country Documnet on Disaster Risk Reduction for Grenada, 2014*). Having such a small open and susceptible economy; the consequences of improper analysis of the potential impact of management interventions on livelihoods, can consequently be a key factor in stakeholder contention with management or support of the MPA. Only a small percentage of respondents indicated that they or their household made a living from the coastal and marine resources in and around the Grand Anse Bay via marine-related activities such as fishing, dive and water-sports operation. Only four percent of respondents indicated making a living from associated tourism services (e.g. crafts, hotel, guiding, water taxi, day charters or beach chair rentals). Additionally, from an examination of income proportions derived from Grand Anse Bay, it may be deduced that the Bay may not be significantly important to respondent livelihoods

given that over three quarters of persons interviewed derive less than 25% of their income from activities in the Grand Anse Bay. Therefore, there may be low potential for GAMPAs management to impact income-earning ability in the area. Any future management actions (such as zoning, restricted access etc.) may therefore result in limited displacement of MPA-dependent persons.

Only a small percentage of respondents indicated that they or their household make a living from the coastal and marine resources in and around the Grand Anse Bay. Of those which indicated making a living, the main sources of income were fishing, dive industry and water-sports. It was a bit surprising that only a small percentage of persons indicated that their household made a living from the coastal and marine resources within the bay as Grand Anse is considered anecdotally, an important fishing community in Grenada. This is an important revelation in that it suggests that a significant percentage of the stakeholders of the proposed GAMPAs do not live within the communities immediately adjacent to the area and were not captured by this survey. This would have significant implications for public awareness, stakeholder engagement and alternative/supplemental livelihood activities of the MPA. Further, this is potentially problematic in establishing boundaries for future surveys, as identifying communities would be difficult and the data collected maybe skewed or diluted as persons affected maybe scattered across multiple communities. Therefore, it may not necessarily demonstrate the true impact of the MPA on livelihoods. In future surveys, primary stakeholders may have to be surveyed separately and a snowball or chain sampling methodology applied to capture this information.

Generally, it seems as though the establishment of the GAMPAs is being viewed positively among persons. Most individuals interviewed believed that they would not be affected by the establishment of the GAMPAs. However, some people (just over one-third) believe that they would be impacted primarily by limited access to the area or by displacement (traditional users such as fishers and vendors). It is anticipated that there will be limited displacement of persons based on the activities currently undertaken within the bay, which tend to be primarily of a recreational nature as opposed to income-generating. Deleterious activities (e.g. poor fishing methods or anchoring) are to be prohibited. However, all efforts will be made to ensure that the negative impact of these activities on livelihoods and cultural/traditional values related to the area is minimized or mitigated.

Over fifty percent of respondents strongly agree and agree that the establishment of the GAMPAs and any associated management will result in improved economy and livelihoods; however, there was mixed perception and uncertainty on what the overall impact of the MPA would be on income. It appears that respondents are confident that the MPA would have a positive impact on the health of the coastal and marine resources and that it would have a positive knock-on effect on the economy and livelihoods in general; however, they are less confident on what exactly that would mean tangibly for the average person on the ground. In general, therefore these positive perceptions indicate support for the establishment of the MPA.

Should displacement of individuals making a living from the Grand Anse area be unavoidable due to management objectives and the implementation of management measures, the management authority must be mindful that the majority of people interviewed are not interested in pursuing alternative livelihoods, while a minority would be interested in pursuing alternative livelihoods to help the environment, for the good of Grenada and to aid personal development. As such detailed livelihoods analyses of those persons for whom alternative livelihoods must be found should be undertaken to ensure that persons' livelihood objectives are achieved and outcomes met. Failure to align alternative livelihoods with people's livelihood objectives and outcomes could result in resentment and lack of support for the MPA, and the proliferation of illegal activities within the MPA.

### **4.3. Resource use and User Patterns**

Swimming is by a significant margin the most popular activity currently utilized for relaxation with the proposed GAMPAs followed by exercise, snorkelling, diving, recreational fishing, water-sports and boating. Most persons indicated that they generally participated in their respective relaxation activity once per week. There appears to be a direct correlation between the proportion of persons engaging in a relaxation activity and the amount of gear/equipment required for that activity. Also, it is a traditional practice in Grenada for the entire family to “go to the beach” at least one of the days during the weekend; this appears to hold true for the Grand Anse area.

Most respondents believe the proposed GAMPAs should be a multi-use area that allows for research, recreational and subsistence (e.g. rock fishing) activities while prohibiting commercial activities (e.g. development, deforestation and anchoring) that may cause damage or pollution to the environment. Forty percent of respondents felt that the GAMPAs should be a full marine reserve where no activities would be allowed. The perceptions of the respondents for the area being a multi-use area where activities can occur with specific zones under strict control are in line with the status quo of the MPAs that are under active management and the vision of the Grenada MPA Unit for the GAMPAs. Respondent perceptions indicate a good understanding and awareness of the purpose of MPAs. This may be attributed to a number of national Public Service Announcements (PSAs) about MPAs; and educational/public awareness campaigns and activities that have been executed in and around the various communities within Grand Anse.

### **4.4. Stakeholder Perceptions on Threats to Coastal Resources in Grand Anse**

Generally, respondents believed that swimmers and recreational divers/snorkelers had no impact on the marine resources and ecosystem of Grand Anse. Subsistence fishers, recreational fishers, boaters and dive fishers were perceived as having a slight to moderate impact on the bay. Yachters and commercial fishers (i.e. seine or pot) were believed to have a serious to extreme impact on the resources and ecosystem within the bay. Similarly, in a 2015 stakeholder analysis of the Woburn Clarkes Court Bay Marine Protected Area (WCCBMPA) within close proximity to the GAMPAs, residents pointed to the yachting community, vessel waste, and overfishing among the major threats to the MPA (Ince 2015), this was again repeated in an older SocMon report on the WCCBMPA suggesting similar beliefs (Pascal et al. 2012). It is very interesting that respondents felt that yachters were having a more negative impact on the environment than subsistence and dive fishers given the fact the fishers are extracting resources from the environment. This perception may be since a significant percentage of the population perceive yachters as indiscriminate in their anchoring practices and that they dispose of their sewage within the bay while on anchor. It is also noteworthy that respondents do not believe that swimmer and divers/snorkeler have no impact on the marine environment. However, in the case of the WCCBMPA, the water quality study that accompanied the 2015 stakeholder analysis did not find any significant point sources of pollution in the bay, contradicting the residents perception that the yachting community was a major source of pollution in the MPA (Waechter 2015). Further, studies have indicated that diver impact has significantly impacted the health of the reef where frequent diving occurs (Tralalos and Austin, 2001). This has led to MPAs establishing carrying capacity and/or acceptable level of change standards to help manage the level of diver impact on the marine environment. It is widely believed that there is a direct correlation between the level of damage inflicted on the marine environment and the experience level of the diver.

Respondents identified fifteen different sources of pollution within the Grand Anse Bay, the top three of which were hotels; Grand Anse Beach and Bay and boats within the bay. Respondents noted that all pollution was a serious threat to the area; however, they list the top five threats as



solid waste, liquid waste (i.e. hydrocarbons and sewage), vessel waste (i.e. bilge and sewage) natural disasters and coastal/upland development (e.g. hotel, marinas, golf course, housing).

Respondents went on to highlight that the pollution issues may be best resolved by better/proper disposal of waste; enforcement of legislation and education and awareness programs. More specifically, respondents note that the laws governing liquid waste (i.e. chemical, hydrocarbon and sewage) need to be strengthened and effectively enforced (i.e. more patrols and imposition of fines) along with conducting a comprehensive education and awareness program.

Most respondents were at a loss as to measures that could be implemented to address the impacts of natural disasters on the ecosystem with the Grand Anse Bay. Just over a quarter of respondents felt that public awareness and education combined with proper disaster preparedness could be beneficial in mitigating the threats posed by natural disasters.

Regarding the threat posed by coastal development, respondents indicated that stricter legislation governing development or a moratorium on coastal development were the two most effective means of reducing their threat on the environment. The Grenada Industrial Development Corporation reported that 63% of all the planned development projects are carded for the parish of St. George's, and the vast majority (90%) were in the tourism sector (Paul et al. 2000). A 2000 biodiversity strategy and action plan noted that further accommodation development in Grand Anse (the tourism concentration area) will be restricted to planned extensions of existing properties (Paul et al. 2000). However, the extensive reconstruction of the Mount Cinnamon hotel and development of the Silversands Grenada resort may potentially add to the area's overall accommodation development. A recent news article that included excerpts from the Grand Anse Development Master Plan noted the single goal of ensuring a carrying capacity of 2,000 hotel rooms (across the individual independent developments) ("The Mast Palm for Grand Anse can still be tapped into to save the area," 2016). There is need to balance the countries goals for economic development in the tourism sector with a sustainable approach to the ecosystem's health; which is a critical component for the area's attractive marketable features for the tourism sector.

Although most of the respondents were uncertain of ways in which the threat of increased sea temperatures on the marine ecosystem and resources within the bay, a smaller percentage of respondents indicated that public education, reducing emission/carbon footprint and laws governing emissions would help to solve the raising sea temperatures. Similarly, over fifty percent of those interviewed could not provide any suggestion for dealing with the threat associated with sea level rise. Again, the minority suggested education and the erection of physical barriers as the most viable option for mitigating the impact of sea level rise. It appears that most respondents were at a loss as to what could be done at a national level to positively impact increasing sea surface temperatures and sea level rise given the fact that it is a global issue. In a 2006 report prepared for the Caribbean Disaster Emergency Response Agency (CDERA) and The Caribbean Development Bank, Grand Anse was among the areas identified as a priority hazard for coastal erosion (*Grenada: National Hazard Mitigation*, 2006). It is estimated that between 20- 31% of the beach will disappear for every 20cm sea level rise and a further 55-75% would disappear for every 50cm rise in sea level (Peters and Smith 2001). With the combination of the rate of sea level rise and the rate of beach erosion, one of the mostly likely scenarios for Grand Anse beach suggests that 1.0m of the coastal line will be inundated by 2100 (Peters and Smith 2001). It is critical the management include a management action plan for this hazard as this may emerge as one of the major threats to the GAMPA existence.

Invasive or exotic species were considered a serious threat to the coastal and marine resources and environment in the bay. The three top solutions proposed for dealing with these species were education and awareness, culling and consumption. Based on the solutions received, one can

conclude that most respondents to this question were basing their answers on the invasive lionfish which is an issue that Grenada is currently addressing through an extensive National Lionfish Campaign that includes derbies; school presentations; creation of a market for the lionfish fishery; and targeted educational activities in fishing communities across Grenada. In the case of the lionfish, the fish is safe to eat and relatively easy to capture using the proper precautions. However, if one is to use the invasive seagrass (i.e. *Halophila* sp.), given our cultural norms, culling and consuming that seagrass would not be a viable option for managing the species.

Education, better disposal practices, utilizing eco-friendly agro-chemicals and stricter laws were cited by respondents as solutions for combating the threats associated with sedimentation, erosion or increased pollution due to agriculture on the marine ecosystem and resources. Again, over one-third of respondents did not offer a solution for dealing with the threats of agriculture. Although there is no farming done within the hinterland of the proposed GAMPAs, there is a major river upstream that runs from a large agricultural district. There is a golf course and several hotels with lawns and gardens within the areas adjacent to the MPA which could pose the same issues if proper agricultural practices are not employed.

Fishing restriction, enforcement of fishing regulations and education were the top three solutions proposed for solving the threats of commercial overfishing on the ecosystem and resources within the proposed MPA. It is important to note that commercial fishing within the context of Grenada would be fishing conducted by a crew of 1 to 3 operating from an open vessel typically less than 8m long and powered by an outboard engine. These fishers would typically target predatory demersal (e.g. snapper, grouper and jacks) or coastal pelagics (e.g. barracuda and small tunas). In the MBMPA fishing is restricted to fishing priority areas where seine and hook and line fishing from shoreline is allowed. The natural coastal topography; a narrow coastal shelf on the west coast of the island encourages large pelagic fisheries. Therefore, the small to large scale longliners and open pirogues (trolling) are not issues for our largely shore-hugging MPAs. Similar restrictions are being considered for the Grand Anse MPA, with the inclusion of a large multiuse area for pirogues to line fish within the GAMPAs.

#### **4.5. Stakeholder attitudes to and perceptions of marine resources and the proposed GAMPAs**

A significant percentage of the communities are aware of the marine protected areas in Grenada; however, only 64% of respondents admitted knowing the intended purpose of the MPAs. There is a general perception that MPAs protect coastal and marine resources and have a positive benefit on tourism, coral reef health and fisheries. This demonstrates that the public awareness activities of the Grenada MPA program are reaching their intended targets within the community; however, there are clearly still gaps in the information disseminated.

MBMPA was the most well-known MPA amongst respondents followed by WCCBMPA and the SIOBMPA. Generally, the respondents noted that there were not aware of negative publicity of the three MPAs; however, the ones who indicated hearing incidences that reflected negatively on the MPAs, cited deficits with enforcement (i.e. illegal fishing & collection of user fees), maintenance of infrastructure (i.e. buoys & moorings) and public awareness. The deficits highlighted can be attributed to inadequate human capacity at the MPAs. More specifically, MBMPA and SIOBMPA which are the two MPAs under active management are currently being staffed with a ranger team that is below optimal levels. This has resulted in abbreviated patrols and delays in routine maintenance of infrastructure.

Despite acknowledging the positive benefits of MPAs on coastal and marine resources there is also a perception amongst a smaller proportion of the population that MPAs negatively impact livelihoods and limit local access to the areas. The perception that MPAs negatively impact livelihoods can be attributed to the fact that most MPAs in Grenada are no-take to most

conventional methods of fishing; therefore, there has been displacement of fishers from their historic fishing grounds. The notion that MPAs limit access to protected areas to locals can also be attributed to the fact that MPAs have various user fees which may be viewed as a barrier to accessing resources that were once utilized for free.

Less than one-third of respondents indicated being aware of the proposal to establish an MPA along the coast of Grand Anse; despite over half of the persons interviewed considering themselves to be stakeholders of the proposed GAMP. The most common justification given by the respondents for not considering themselves as stakeholders of the proposed GAMP (by proportion of respondents) was the fact that they only utilized the area occasionally; they were not permanent residents of the area; they had no interest in the MPA and they did not use the area. While the Fisheries Division's MPA Unit has held a number of stakeholder consultations in relation to the establishment of the GAMP, as the evidence suggests there is still more educational/awareness activities that need to be conducted for that co-management model to be effective. These results point to two facts; firstly, there is still a significant percentage of the communities in the Grand Anse Area that are not aware of the activities related to the proposed GAMP. Secondly, in order to facilitate the effective stakeholder-based co-management model of MPA management being proposed for the GAMP to be successful, the population needs to be made aware of their stake in the area and their required role in the management of the MPA.

The majority of respondents indicated their support for the establishment of the proposed GAMP owing primarily to the perceived positive impacts of the MPA on fish stocks and ecosystem health as well as a general feeling of it being a "good thing" to do. The respondents also indicated their willingness to actively participate in management of the proposed GAMP through coastal clean-ups, tree planting and stop using plastics. These results indicate the community is willing and ready to actively participate in the management of the GAMP. This is very positive for GAMP management.

Respondents provided seventy-three different options as their proposal for the management focus of the proposed GAMP. Top amongst the options were enforcement (of MPA legislation), pollution reduction and creation of yacht/boat free area. The diversity in the options suggested is a testimony of the complexity of users and uses of the Grand Anse area. The Grand Anse area is the heart of all tourism activities on the island of Grenada, with Grand Anse Beach being its major artery. There are several incompatible uses and users vying for the limited space within the bay which frequently results in conflicts. Consequently, the management of the MPA must take the interest of all parties involved into consideration. The issues of enforcement (of MPA legislation); pollution reduction; and creation of yacht/boat free area are addressed in the management plan for Grand Anse as management issues. Additionally, they are also included (inferred) under the GAMP objectives: 1. To protect and enhance the area as a habitat for key species of fish and other aquatic flora and fauna; 2. To enhance and maintain the quality of the marine resources for sustainable livelihoods; and 3. To improve and maintain user experiences in the marine protected area (Homer 2016).

Over half of the respondents indicated that water quality issues are a concern in the Grand Anse area due to frequency at which the area is used; pollution (i.e. solid, chemical & sewage) in the area; potential health hazards and hotel related discharge. Despite the concerns regarding water quality, only a small proportion of respondents indicated illnesses due to swimming within the Grand Anse Bay. Just over a quarter of respondents felt that solid waste pollution in the area was high, while just over one-third felt it was medium to low. Based on water quality data from the National Water and Sewage Authority for the Grand Anse Bay, *Enterococci*, bacteria normally associated with sewage has been occasionally elevated to potentially harmful levels (Homer 2016). Based on this fact, the concerns of the population regarding water quality, especially as it relates to sewage pollution, are well founded.

Generally, most persons felt that beaches, seagrass and marine life are currently in very good or good condition within the Grand Anse Bay. Conversely, there is the general perception that coral reefs and mangroves are in bad to very bad condition within the bay. There is an overall perception amongst the persons who indicated that they perceived a change in condition of the resources within the Grand Anse Bay, that all ecosystems except coral reefs exhibited a positive increase in condition over the five-year period (i.e. 2012 – 2017) of interest. Respondents generally felt that coral reefs decreased in condition during the period under review. A study of the coral reefs within the Grand Anse Reef Complex indicated the coral reefs are above the Caribbean average while fish biomass was below Caribbean average especially for economically (i.e. snapper & grouper) and ecologically (i.e. parrotfish & surgeonfish) important species (Nimrod 2015). Additionally, the overall perceived decline in coral reefs and very good or good rating of marine life (fish, lobster and lambi) noted by respondents does not align with the actual Reef Health Index (RHI) as outlined in the Grenada, Carriacou, Petite Martinique 2016 Coral Reef Report Card for the west of the island which encompasses Grand Anse and is referred to as Subregion 2 (Kramer et al. 2016; [www.CaribNode.org](http://www.CaribNode.org)). The overall reef health index reference value for Grenada West which encompasses the inshore area of Grand Anse is between 2.7 to 3.4, represented as “fair” on a five point scale. The RHI provides the following information on a number of indicator species surveyed and indicates: “very good” reef condition due to low (0-0.9%) fleshy macroalgal cover; “critical” condition of commercial fish species due to low biomass values of <420 g/100m<sup>2</sup> versus ≥ 1,680 g/m<sup>2</sup> for reefs in “very good” condition; biomass of herbivorous fish on reefs within the inshore area of Grand Anse is “critical” (960g/100 m<sup>2</sup>); and “very good” coral cover of ≥40%.

The results of these studies contradict the perceptions that generally coral reefs are in bad to very bad condition while marine life is in very good or good condition within the bay. The perception of the respondents may be attributed to the concept of the shifting baselines. In other words, the frame of reference is based on one’s first encounter with the resources; therefore, in terms of coral reefs, if someone had seen the reefs before the mass coral mortality of the mid 1980s, their perception of a health reef would be vastly different from someone whose only encounter with a reef came in the 2000s. Additionally, only a small percentage of persons surveyed were acquainted with the present marine conditions (based on their livelihoods). The results may just reflect that most respondents are not familiar with these ecosystems and their associated marine life.

Most persons felt that there was no change in the size of long-spined sea urchin (*Diadema*) and they were equally split between whether there was an increase or decrease in *Diadema* abundance within the area. Conversely, there is general agreement that there has been a decrease in size and abundance of both lobsters and parrotfish within the bay over the past five years. Although the number of respondents to these questions rendered them statistically unrepresentative of the population, it is interesting to note that there is a general feeling that amongst the persons familiar with the resources (i.e. fishers, diver and water-sports) that these resources have been on the decline within the proposed MPA. While there exist recent reports on the present ecological status of these species, there aren’t any that can be considered baseline data (as they largely are the baseline surveys for Grand Anse). Specific surveys that target fishers for this information can be developed to gain a more thorough understanding of these species.

The vast majority of respondents anticipate an improvement in the conditions of all ecosystems and resources within the area after the establishment of the proposed GAMPa and they suggested six actions that should be implemented to aid in the improvement of the resources including public education/awareness; regular clean-ups; enforcement of MPA rules/regulations; management of development; and managing fishing pressure. The fact that most respondents felt that the GAMPa will improve ecosystem health may be attributed to the fact that they understand the goals and

anticipated outcomes of a MPA and foresee these successes for GAMPAs. Similarly, the suggested management actions for ensuring the improvement of the ecosystem within the protected area aim to address some of the outstanding concerns and shortcomings of the existing MPAs (i.e. MBMPA & SIOBMPA).

Three of the five categories of fish (i.e. snapper, hind and grouper) that are targeted by fishers within the Grand Anse area are reef associated species which represent almost half of the species targeted. This is very significant as these species are all apex predators in their own right and play critically important roles on the reef; consequently, overharvesting of these species' could have catastrophic effects on the health of the reef.

One-third of the fishers surveyed indicated that they fished for parrotfish, while almost two-thirds indicated that they eat parrotfish. The respondents who consume parrotfish indicated that almost two-thirds consume it once per month, while the others consume it more than once per week. Parrotfish is most frequently caught by net, trap and spearfishing within the Grand Anse area. It is important to note that parrotfish are seldom sold at the primary landing facilities, instead it is retained by the fishers for their own consumption or for special clients as they are considered a "fisher's choice".

Most respondents indicated that they would support management efforts to restore populations of keystone species (i.e. parrotfish and *Diadema*). Respondents felt that management measures such as size limits, fishing seasons and public awareness of the importance of the species would be the most effective in restoring parrotfish populations. Similarly, transplantation from well-populated reefs, and MPA restoration zones were noted as the best options for restoring *Diadema* populations. It is significant to note that over a quarter of respondents felt that management should let nature take its course with *Diadema* populations. The high level of support for the restorative measures for the keystone species is an indication that most of the respondents are aware of the status of these species and the ecologically important role they play in the health of the coral reef ecosystem.

Thirteen percent of respondents noted that they have fished a spawning aggregation. One-third of respondents thought there had been a decrease in both size and number of spawning aggregations, while almost half of respondents were unsure of changes in aggregations. It is important to note that no one felt that spawning aggregations had increased in either size or numbers. Although only a small percentage of fishers indicated that they have fished spawning aggregations, given the significance of these areas to the overall population of those species, this is an area for grave concern. Fishing a spawning aggregation targets primarily mature adults that are within those areas to reproduce. In some cases, spawning would only happen if a critical mass is reached so fishing in those areas could prevent spawning for an entire season. An overwhelming majority of persons would support management efforts to help spawning aggregations species recover (e.g. snapper and grouper). Fishing seasons, size restrictions, temporal closures and public awareness and education were amongst the most supported management measures to improve spawning species populations.

There was complete support for the protection of sea turtles within the proposed GAMPAs including ensuring measures such as strict enforcement to prevent take, beach clean-up during nesting season to prevent entanglement, increased education/outreach, and reducing bright lights on the beach during the nesting season. Charismatic mega fauna such as sea turtles have grown in popularity globally including here in Grenada; consequently, the consumption of marine turtles has significantly reduced within the population and there has been a local movement working towards the complete protection of all species of turtles in Grenadian waters (only the leatherback turtle is completely protected currently).

Coral reef protection is of great important to most of the persons surveyed , with coral restoration, fishing seasons, gear restriction and closed areas being the most supported management measures to protect this ecosystem. It is not surprising that the protection of the coral reefs is of importance to the entire population given that fact that the two largest subsectors (i.e. tourism and fisheries) in Grenada are completely dependent on healthy and productive coral reef ecosystems.

## **5. RECOMMENDATIONS FOR MONITORING AND MANAGEMENT**

The results of this study have highlighted that there is a fair level of awareness amongst the population with regard to MPAs in Grenada. However, there is misinformation and bad press in the public domain regarding the management of the existing MPAs. Special attention should be taken to educate the population on the overarching goals and objectives as well as the locations of the various MPAs. The study has also pointed to the fact that most persons felt that the one of the most important strategies for effecting change is via public awareness and education. To capitalize on this fact, the GAMPAs should develop a holistic communication and public engagement strategy for the MPA to be implemented nationally very early in its establishment. Having a national outreach and awareness program is critically important given the large geographic scope of the persons who generate a living for the coastal and marine resources of the proposed GAMPAs.

The general perception that the establishment of the MPA would limit access to the area for the average person is of particular concern and should be adequately dealt with in the management of the MPA. A concerted effort should be made to ensure that the socio-cultural values of the area remain intact and that any user fee system devised for the area takes that into account.

To ensure that all stakeholders are engaged and included in the management of the GAMPAs, it would be important to conduct a comprehensive stakeholder identification study, especially given the fact that this study indicated that a significant percentage of persons who work and conduct business within the Grand Anse area live outside the immediate area. This would be critically important when to the discussion and identification of potential supplemental/alternative livelihood options for the stakeholders (e.g. fishers) affected by the establishment of the MPA.

The clear majority of respondents believe that the establishment of the GAMPAs would have a positive impact on the health of the coastal and marine ecosystem and resources within the area. To this end, it is important to establish a scientific baseline for all the resources (i.e. beach, water) and ecosystems (i.e. coral reef, seagrass, mangroves) within the area and develop and implement a long-term monitoring program so that routine monitoring could be conducted to assess the status of the resources. The findings of this monitoring compared against the baseline would help to direct the adaptive management of the MPA to ensure the improved health of the environment.

The MPA authority should make it a priority to conduct investigate, identify and monitor the various spawning aggregations within Grenadian waters. This should be done to reduce, and where possible, eliminate fishing on spawning aggregations as it could have significant negative impact on fish populations both within and outside of MPAs.

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## APPENDIX 1: SOCMON TRAINING PARTICIPANTS LIST

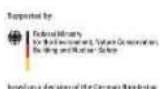
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## APPENDIX 2: GRAND ANSE SITE MONITORING PLAN

### Socio-economic Monitoring for Coastal Management (SocMon) Workshop

*A workshop hosted by the Climate Resilient Eastern Caribbean Marine  
Managed Areas Network (ECMMAN) in collaboration with the Centre for  
Resource Management & Environmental Studies (CERMES), UWI Cave Hill*

Grenada Fisheries Division, St. George's Grenada  
26-28 October 2016



## SocMon preparatory activities worksheets used to plan monitoring

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These worksheets are *guides* to organising the preparatory activities for a socio-economic assessment or monitoring programme. They can be modified in any way you find useful. Other worksheets are in the GCRMN manual. Spreadsheets are often more convenient than word processing applications for working with tables of all types.

## 1 Introduction

You may use this worksheet to help structure your formulation of an ecosystem-based socio-economic monitoring plan for the Grand Anse Marine Protected Area (GAMPA). The worksheet forms the basis of your SocMon site monitoring plan. Feel free to provide explanations, where applicable, for your choices in each of the section notes.

Read the SocMon literature — GCRMN manual, Caribbean guidelines and climate addendum. Also read relevant literature on the GAMPA and adjacent areas from which you can gather useful information on what should be monitored, how, when and where.

The socio-economic data and information from monitoring need to be useful for management planning, decision-making and adaptive management. A monitoring plan must take into account the local reality - available funds, human resource capacity and the demands of decisions. It has to prioritise particular variables to monitor, with good reasoning behind choices. When completing the worksheet, be sure to refer to the SocMon Caribbean guidelines and GCRMN manual for guidance.

## 2 Goals and objectives guiding socio-economic monitoring

Monitoring must have a goal and specific objectives for being undertaken. These are often based on management plans (e.g. fisheries, MPA, tourism) or other expressions of policy.

Monitoring goal	Monitoring objectives (up to three SMART ones)
To collect socio-economic data and information on Grand Anse and adjacent communities with emphasis on livelihoods, resource use, threats and attitudes, to inform and guide planning, management actions and policy formulation.	1. To determine potential impacts of management decisions /interventions on MPA livelihoods
	2. Identify resource use and user patterns by user groups for informing the zoning plan.
	3. Identify stakeholder perceptions of threats to coastal resources in Grand Anse
	4. To understand stakeholder attitudes to, and perceptions of, marine resources, current management and the establishment of the GAMPA.

*Notes: User patterns include identifying characteristics related to location, timing, frequency and level of use.*

**GCRMN Manual: Pages 19-20, 36-40**

### 3 Defining the study area

Using the information on issues and stakeholders, define the geographic area appropriate for the study site (contains all or most critical activities/issues and stakeholders). Document the specific selection criteria that you used. Clearly identifying the study area is important in identifying use patterns and potential threats to resources. The study area should include where the stakeholders live and work.

Study area selection criteria	Study area description (or attach area map)
GAMPA boundaries	See map of MPA
Inclusion of watersheds for capturing threats to the MPA	
Study area extent should be larger than the MPA area since the establishment of the MPA is still in the planning phase and baseline data for a larger area will be critical to determining the focal area(s) for future monitoring.	



[Google Web Map Link](#)

*Notes:* Study area boundaries encompass the MPA boundaries but are extended to include at least three important watershed areas. The landward extent of the study area will depend on these catchments.

**GCRMN Manual: Pages 26-28**

#### 4 Stakeholder identification

Stakeholder identification and selecting the boundaries for the study site are iterative processes. Start by identifying the activities in the area and then determine who the likely stakeholders are. Name their organisation, if any.

Study area activity or issue	Primary stakeholder [and organisation]	Secondary stakeholder [and organisation]
Fishing	Fishers – seine, spear, hook and line Vendors	Fisheries Division Southern Fishermen's Coop Grand Anse FisherFolks
Diving	Dive shops Divers (tourists)	Grenada Scuba Divers Association Grenada Hotel and Tourism Association (GHTA)
Watersports	Watersports operators Tourists Locals SGU students	Grenada Tourism Association (GTA)
Beach chair/umbrella rentals	Tourists Locals	Community-based Organisations
Tourism – hotels, restaurants, craft	Hoteliers Restaurant owners Craft vendors	GHTA GTA Ministry of Tourism Craft vendors association
Recreation – swimmers, joggers	Users (locals and tourists)	GTA (lifeguards) GTA - Grand Anse Beach Patrol (security)
Yachting	Yachters Marinas	Marine and Yachting Association of Grenada (MAYAG) Grenada Ports Authority
Water taxi and charter operations	Water taxi operators Day charter operators	Water Taxi Association Day Charters Association GTA Grenada Ports Authority
Private sector	Shopping malls, supermarkets and other businesses	Spiceisland Mall (IGA) KFC, Courts, Creative Do it Best Chambers of Commerce
Religious activities/events	Churches	Grenada Conference of Churches
Entertainment/festivals/billfish competition	Organisers and promoters Locals Tourists	MAYAG St. George's University Carnival Committee Ministry of Sports Grenada Yacht Club

Notes:

## 5 Stakeholder locations and key informants

The communities where SocMon will take place will depend primarily on the stakeholders involved in coastal management. Suggest key persons who can talk about the larger population.

Stakeholders (1° and 2°)	Location of stakeholder	Key informants for stakeholders
Fishers	Grand Anse (and other locations)	Ingram Harford + Dwayne Lewis
Vendors	Grand Anse	Ingram Harford
Fisheries Division	St. George's	Crafton Isaac Moran Mitchell
Southern Fishermen's Co-op	Grand Mal	James Nicholas
Dive shops and Grenada Scuba Divers Association	Grand Anse True Blue Lance aux Epines	Christine Finney Phil Saye
GHTA	Morne Rouge	Pancy Cross
Watersports operators	Grand Anse	TBD
GTA and Hoteliers (Tourists)	St. George's	Kirl Hoschtialek
Locals SGU students	True Blue	SGA – Student Government Association
Beach chair/umbrella community association	TBD	TBD
Hoteliers Spice Isle Beach Resort Radisson Coyaba Etc....	Grand Anse	Royston Hopkin
Restaurant owners	Grand Anse	TBD
Craft vendors		
Recreation – swimming groups (Dolphin and Grenfin), senior group		Natalie Sihera (Grenfin) TBD (Dolphin)
Marinas and MAYAG	Port Louis	Robin Swaisland Nicholas George

Stakeholders (1° and 2°)	Location of stakeholder	Key informants for stakeholders
Grenada Ports Authority	St. George's	Carlyle Felix
Water Taxi Association	Grand Anse	President
Day Charters Association		President
GTA		As above
Grenada Ports Authority		As above
Grenada Conference of Churches	Grand Etang Road	Dr. Osbert James
MAYAG	St. George's	As above
St. George's University	St. George's	Faculty
Carnival Committee		Kirt Seetahal
Ministry of Sports		Jacinta Joseph
Grenada Yacht Club		Richard McIntyre

Notes:

**GCRMN Manual: Pages 21-25**

## 6 SocMon Spatial reconnaissance checklist

Good reconnaissance is critical in the initial phases of the SocMon Spatial process. In this phase, researchers gain an understanding of on-the-ground spatial interactions which guide future monitoring activities. A checklist should be created to guide reconnaissance observations. Information of importance is "What are we looking for?", "Where is it?" and "Who can tell us?" These questions are related to the monitoring objectives, and later to the specific variables selected for monitoring.

Feature (What are we looking for?)	Location (Where is it?, What is it close to?)	Key informants (Who can tell us about it?, Who uses this space?)
Activities		
Fishing	Grand Anse Beach - Jetty	<b>See Section 5</b>
Diving	Grand Anse Beach	
Watersports	Grand Anse Beach	
Beach chair/umbrella rentals	Grand Anse Beach – Vendors Market	
Tourism – hotels, restaurants, craft	Grand Anse Beach	
Recreation – swimmers, joggers	Grand Anse Beach	
Yachting	Grand Anse – Pandy Bay	



Water taxi and charter operations	Grand Anse Beach	
Private sector	Grand Anse	
Religious activities/events	Grand Anse	
Entertainment/festivals/billfish competition	Grand Anse and Yacht Club	
Resources		
Rivers/waterways	To be determined – See Maps	
Salt ponds		
Key infrastructure		
Commercial infrastructure	Morne Rouge	Planning, Physical Development
Religious infrastructure	Grand Anse	Planning, Physical Development,

## 7 SocMon leader and team

Although an initial study or monitoring program can be done by a single person (e.g. MSc student), the process is intended to be undertaken by an interdisciplinary team, the size and the required talents of which partly depend on the goal and objectives of the study or monitoring program. What types of expertise do you need and where from?

Skill requirement or role on team	Names and affiliations of team leader and members
Coordinator/manager	Ezra Campbell Olando Harvey Andre Joseph-Witzig
Community liaison(s)	Arlene Daniel SocMon team
Data collection coordinator(s)	ECO SocMon team
Data entry	Danielle Ince Leon Radix
Data analysis	Ezra Campbell Olando Harvey GMPAs
Communication	Christabelle Andrews Lucienne Cross Dwayne Lewis
Research	Kadijah Edwards SocMon team
Reporting	Sabrina Compton Kadijah Edwards Shanell Cyrus

Notes:

GCRMN Manual: Pages 43-47

## 8 Secondary data sources

One of the first steps in SocMon is to consult secondary data sources that can be used for guiding the investigation and interpreting the results. Use this table to identify the sources of secondary data based on the objectives set for your SocMon. When completing the table also think about secondary spatial data. In future monitoring you can check if additional sources of information on the objectives become available. One row is added for general types of information. Where possible make notes about the suitability, quality, method(s) of collecting the data, when it was collected, who collected, analysed and interpreted it. When reporting, documents should also be listed in your 'References'.

Tips for scoping secondary spatial data:

- Look for information that is specifically related to the area of interest.
- Information should not be restricted to GIS data and/maps; descriptive information is important as well. For example, newspaper articles about user conflicts within a specific area.
- For GIS data:
  1. Look for information on data collection methodologies that can be easily replicated in your study, and
  2. Ensure quality by looking out for the 5 Ws: What, Where, When, how and by Whom.

SocMon objective	Sources of secondary data	Notes
1. Potential impacts of [management] decisions of livelihoods	<ul style="list-style-type: none"> <li>• Coral Nursery Business/Marketing Plan</li> <li>• Sustainable finance report (Wayne Sandiford)</li> <li>• 2008 Grenada poverty assessment (?)</li> <li>• National Census</li> <li>• Blue Growth report</li> <li>• GAMP Management Plan (2015)</li> </ul>	Contact WINDREF for recently published documents
2. Resource use and user patterns	<ul style="list-style-type: none"> <li>• TNC ECMMAN habitat maps</li> <li>• CARIBSAVE reports</li> <li>• Blue Growth report</li> <li>• GAMP Management Plan (2015)</li> </ul>	
3. Stakeholder perceptions of [coastal resources and] threats to coastal resources	<ul style="list-style-type: none"> <li>• CARIBSAVE Risk Atlas</li> <li>• Grand Anse baseline assessments</li> </ul>	

SocMon objective	Sources of secondary data	Notes
4. Stakeholder attitudes and perceptions [of marine resources and] the establishment of the GAMPA		
General types of information		

Notes:

**GCRMN Manual: Pages 53-57**

## 9 Key indicators to be monitored

Based on the goal and objectives of the monitoring, you need to determine which (if not all) of the SocMon Caribbean variables<sup>1</sup> need to be measured, sources of secondary information to consult before interviewing (key informant, household, visualisation techniques), and practical considerations for each variable. The practical considerations include levels of difficulty in acquiring information, issues, error or uncertainty, challenges in implementing fieldwork, links to data sources that are desirable, etc. Refer to the Caribbean guidelines when selecting the variables to determine the information measured by the variable and its suitability for monitoring based on its relevance to monitoring goals and objectives. Recently broad socio-economic parameters with links to drivers of ecological change have been developed by GCRMN-Caribbean. See below.

*\*Since most socio-economic information can be gathered from secondary data rather than interviews (key informant) and surveys (household) rigid distinction between variables (as shown in the SocMon Caribbean guidelines) is unnecessary. Select your variables and choose the most appropriate data collection method.*

*Also remember that if a variable/indicator specific to your purposes of monitoring is not available among the suite of SocMon Caribbean and GCRMN-Caribbean parameters, you can design new variables.*

The variable selection process for SocMon Spatial must consider the spatial relationships between features. Certain spatial representation goals may require the packaging of related variables E.g. We may have to group Use Patterns and Types of Impacts if we are monitoring. In selecting variables for monitoring, identify whether they represent a feature, an attribute or both. This will help in determining which variables must be linked as features and attributes for monitoring of spatial characteristics in this assessment.

GIS abbreviations:

- a. F = Feature (These are physical points and/or areas highlighted on the map)

<sup>1</sup> For the purpose of these worksheets, variable and indicator are being used synonymously

- b. A = Attributes (These are sets of information which describe the features that they are related to)

a) SocMon Caribbean variables

Variable to monitor (see the Caribbean Guidelines)	Obj. # 1, 2, 3	Secondary and key sources of information and comments on factors to be taken into account	Priority (high, med, or low)	Spatial info F/A
<b>Demographics</b>				
K1. Study area	1-4	Coastal zone. Obtain information from secondary data	H	F
K2. Population	2	Maps (TNC), census data, other secondary data	M	A
K3. Number of households	2	Census data, other secondary data	L	A
K4. Migration rate (adapt to Daily Movement)	2	With K19		A
K5/S1. Age	1	Census data	M	A
K6/S2. Gender	1	Census data	M	A
K7/S4. Education	1	Census data	M	A
K8. Literacy	1	Census data	H	A
K9/S3. Ethnicity	1	Information on nationality, more so than, ethnicity is required; census data	M	A
K10/S5. Religion	1	Census data	L	A
K11/S6. Language	1	Census data (MSMPA data: Yachters), other secondary data (Willingness-to-Pay Reports) Information may be important for future management actions	L	A
K12/S7. Occupation	1	Census data and other relevant secondary data but primary data required.	H	A

Variable to monitor (see the Caribbean Guidelines)	Obj. # 1, 2, 3	Secondary and key sources of information and comments on factors to be taken into account	Priority (high, med, or low)	Spatial info F/A
S8. Household size	1	Census data and other secondary data	H	A
S9. Household income	1	Census data but primary data required. Collect by income ranges.		
<b>Community infrastructure and business development</b>				
K13. Community infrastructure and business development	1, 2	Census data and secondary data	H	F
<b>Coastal and marine activities</b>				
K14/S10. Activities Household Activities	1, 2	Possibly could be obtained from census data, other secondary data. Focus group for collection of primary data.	H	F
K 15/S11. Goods and services (from activities)/ Household goods and services	1, 2	Secondary data. Collect primary information through focus group with institutional groups	H	F/A
K16/S12 Types of use (of good/service) /Types of household uses	1, 2	Secondary data and focus group with institutional groups	H	A
K17. Value of goods and services	1	Secondary data, GHTA, GTA, regional relevant information. Primary data collect through focus group and stakeholder surveys	H	A
K18/S13. Goods and services market orientation/Household market orientation	1	Fisheries-related secondary data, GTA, GHTA data, primary data required (focus groups)	M	A
K19. Use patterns	1, 2	Census data, other secondary data. Primary data collected by focus group	H	F

Variable to monitor (see the Caribbean Guidelines)	Obj. # 1, 2, 3	Secondary and key sources of information and comments on factors to be taken into account	Priority (high, med, or low)	Spatial info F/A
K20. Levels and types of impact	3	Primary data (focus groups)	H	F/A
K21. Level of use by outsiders	2	Census data.	H	A
K22/S14 Household use(s)				
K23. Stakeholders	2	GAMPA management plan	H	F/A
K24. Tourist profile	2	Secondary data – GTA, GHTA	H	A
<b>Governance</b>				
K25. Management body				
K26. Management plan				
K27. Enabling legislation				
K28. Management resources				
K29. Formal tenure and rules				
K30. Informal tenure, rules, customs and traditions	2	Focus group	M	A
K31. Stakeholder participation	4	GAMPA management plan	H	A
K32. Community and stakeholder organisations	4	GAMPA management plan	L	A

Variable to monitor (see the Caribbean Guidelines)	Obj. # 1, 2, 3	Secondary and key sources of information and comments on factors to be taken into account	Priority (high, med, or low)	Spatial info F/A
<b>Attitudes and perceptions</b>				
S15. Non-market and non-use values	4	Focus groups. Primary data collected through stakeholder surveys	H	A
S16. Perceptions of resource conditions	3	Primary data (including focus groups)	H	F
S17. Perceived threats	3	Primary data (including focus groups)	H	F
S18. Awareness of rules and regulations	4	Primary data (including focus groups)	H	A
S19. Compliance	4	Primary data (including focus groups)	H	A
S20. Enforcement	4		H	F/A
S21. Participation in decision-making	4	Merge with K31 and K32	H	A
S22. Membership in stakeholder organizations	4	Merge with K32	L	A
S23. Perceived coastal management problems	3		H	A
S24. Perceived coastal management solutions	3		H	A
S25. Perceived community problems	3		H	A
S26. Successes in coastal management				
S27. Challenges in coastal management				

Variable to monitor (see the Caribbean Guidelines)	Obj. # 1, 2, 3	Secondary and key sources of information and comments on factors to be taken into account	Priority (high, med, or low)	Spatial info F/A
<b>Material style of life</b>				
S28. Material style of life	1	Census data, poverty assessment	M	A

See SocMon Caribbean Guidelines: Bunce and Pomeroy (2003); Pages 18-23, 30 – 68

Notes:

**b) GCRMN-Caribbean parameters**

Parameter to monitor (see the GCRMN-Caribbean Guidelines)	Obj. # 1, 2, 3	Secondary and key sources of information and comments on factors to be taken into account	Priority (high, med, or low)	Spatial info F/A
Tourism arrivals	2	Secondary data, Ministry of Tourism, GTA, GHTA. Link to K22.	M	A
Tourism recreation	2	As above	M	F
Tourism infrastructure	2	As above	M	F
Fishing infrastructure	2	Fisheries and MPA data		F
Fishing pressure	2	Primary data required through surveys and focus groups		F
Agriculture (large-scale)				
Other point sources pollution	3	Secondary information from NAWASA, Physical Planning, focus groups. Linked to S17.	H	F

See GCRMN-Caribbean Socio-economic Guidelines



## 10 Variables associated with climate change

Abbreviations are used for data collecting methods:

- a. BM = Biological monitoring
- b. FG = Focus group interview/survey
- c. HH = Household survey
- d. KI = Key informant interview/survey
- e. M = Mapping
- f. O = Observation
- g. S = Secondary data (referenced from the SEM-Pasifika Guidelines)

Area and Indicator number	Indicator and data collecting methods	Obj. # 1, 2, 3	How information might be used	Priority (high, med, or low)	Spatial info F/A
<b>Exposure</b>					
CC1	Demographically vulnerable groups <b>KI, S, HH</b>				
<b>Sensitivity</b>					
CC2	Dependence on resources and services vulnerable to climate change impacts <b>S, M, BM, KI, HH</b>				
Existing SocMon and SEM-Pasifika	Perception of resource conditions <b>HH</b>				
<b>Adaptive Capacity</b>					
CC3	Current livelihood and income diversity of household <b>HH, KI, seasonal calendar</b>	1, 4		H	A
CC4	Perceived alternative and supplemental livelihoods <b>HH, KI</b>	1, 4		H	A
CC5	Awareness of household vulnerability to climate hazards <b>HH (S, KI)</b>	1, 4		H	A
CC6	Access to, and use of, climate related knowledge <b>KI, HH</b>				

Area and Indicator number	Indicator and data collecting methods	Obj. # 1, 2, 3	How information might be used	Priority (high, med, or low)	Spatial info F/A
CC7	Formal and informal networks supporting climate hazard reduction and adaptation <b>KI</b>				
CC8	Ability of community to reorganise <b>KI, HH</b>				
CC9	Leadership and governance <b>KI, HH</b>				
CC10	Equitable access to resources <b>HH</b>				

Notes:

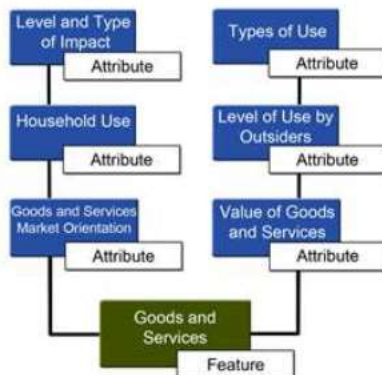
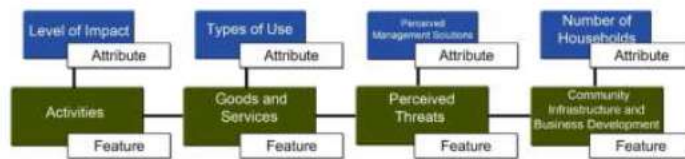
See Climate Change addendum Guidelines, Wongbusarakum and Loper (2011)

## 11 Organising SocMon Spatial variable packages

What features must be visualised?

Depending on your management objectives, feature variables can sometimes be closely linked. For example, if you are monitoring fishing pressure on coral reef resources, you may want to show both where coral reef habitat is located and where fishing pressure is greatest. As a result you may be required to represent both Goods and Services and Use Patterns as features.

How do you want features and attributes to interact within your database? In the space provided on the following page, show which attributes are used to describe which features. Remember that attribute variables will be used to provide descriptive information about the features you are highlighting. Draw diagrams (flow charts, matrices etc.) as outlined below, which show how your feature and attribute variables are linked.



**E.g Output** – If we are analysing pollution effects, we must look at it in relation to the affected feature.



Draw your variable packages here

**Feature**

Study Area

**Attributes**

Population

Age

Gender, Sex

Education

Ethnicity

Occupation

Household Size

H. Income

Religion

Literacy

Language

**Feature**

Community Infrastructure and Business Development

**Attributes**

Tourism Profile

Stakeholders

**Feature**

Activities/Household Activities

**Attributes**

Level of Impacts and Patterns of Use

## 12 Interview sample design

Depending on many factors ranging from the objectives of monitoring to area demographics, you need to determine 'how' and 'how many' for selection of key informants and households.

a. Key informants	b. Households
<b>Critical information areas</b> Determined from activities detailed in Section 4.	<b>Estimated number of households in study area and means of obtaining estimate</b>  These surveys will be primarily stakeholder surveys.
<b>No. of informants:</b> At least 25 key informants were identified in Section 5. SocMon team to determine adequacy and coverage of critical information areas by these key informants. Due to the number of key informants identified, group interviews will be held by the SocMon team.	<b>Approx. sample size:</b>  To be determined based on estimated number of stakeholders per activity of relevance to the assessment.
<b>Selection process:</b> Based on knowledge of issues of interest and persons identified by the SocMon team who can ably inform the socio-economic assessment.	<b>Sample selection method:</b>  Random

GCRMN Manual: Pages 72-73, 229-234

## 13 Draft interview (key informant and household) questions

There are many ways of asking the same question (content) and many types of question layout (structure). Rules apply. Select variables in your study and draft questions per variable to get information from respondents. Demonstrate that you can craft questions well using a variety of layouts, and ensure that each question is designed to provide data related to one or more of the objectives.

Questions (for key informant or household survey). Try a mix of both open and closed-ended questions		
Var. No.	Var. name	Question
K30	Informal tenure, customs, rules and traditions	(a) Are there any unwritten rules while conducting various types of fishing in the GAMPA: - seine - spearfishing - pot fishing (b) Should there be formal rules/zones to regulate fishing activities? If yes, what would you recommend?

19

Questions (for key informant or household survey). Try a mix of both open and closed-ended questions		
Var. No.	Var. name	Question
S17	Perceived threats	What do you see as the key environmental problems in the area? How do these issues affect, if at all, your livelihood?
K20	Levels and types of impact	
K19	Use patterns	Indicate the area (on the map provided) in the MPA that the following activities take place: - Fishing - Tourism - Recreation
K17	Value of goods and services	Assess the monetary value of each of the activities above to the service providers. (Tabulate)
K31	Stakeholder participation	What is the structure for making decisions that govern the MPA? Are you involved in the decision-making process? What changes would you propose? Why?
S21	Participation in decision-making	

**GCRMN Manual: Pages 96-100, 109-112**

## 14 Visualisation techniques

The GCRMN manual describes several visualisation techniques that are useful for collecting, displaying and communicating socio-economic data informatively to document or assist decision-making. Many methods may be used simultaneously or sequentially. The means of presenting socio-economic monitoring results is critical in showing relationships among the data. Which methods will you use?

Technique and page in manual	Variable and objective nos.	Notes on application of the technique to the variable and objectives (e.g. for all or some stakeholders? Issues?)
Maps – 113	2	Visualise user patterns within (and surrounding) the GAMPA
Transects - 119		
Timelines - 121	4	Add relevant photos to the timeline
Seasonal calendars - 125		
Historical transects - 129	4	
Decision trees - 131		
Venn diagrams - 133		

Technique and page in manual	Variable and objective nos.	Notes on application of the technique to the variable and objectives (e.g. for all or some stakeholders? Issues?)
Flow charts – 136		
Ranking - 138		

**GCRMN Manual: Pages 113-145**

## 15 Communication plan

Communication of results and key learning is often done in terminal workshops, but other means are used to supplement this and ensure that various audiences receive the outputs.

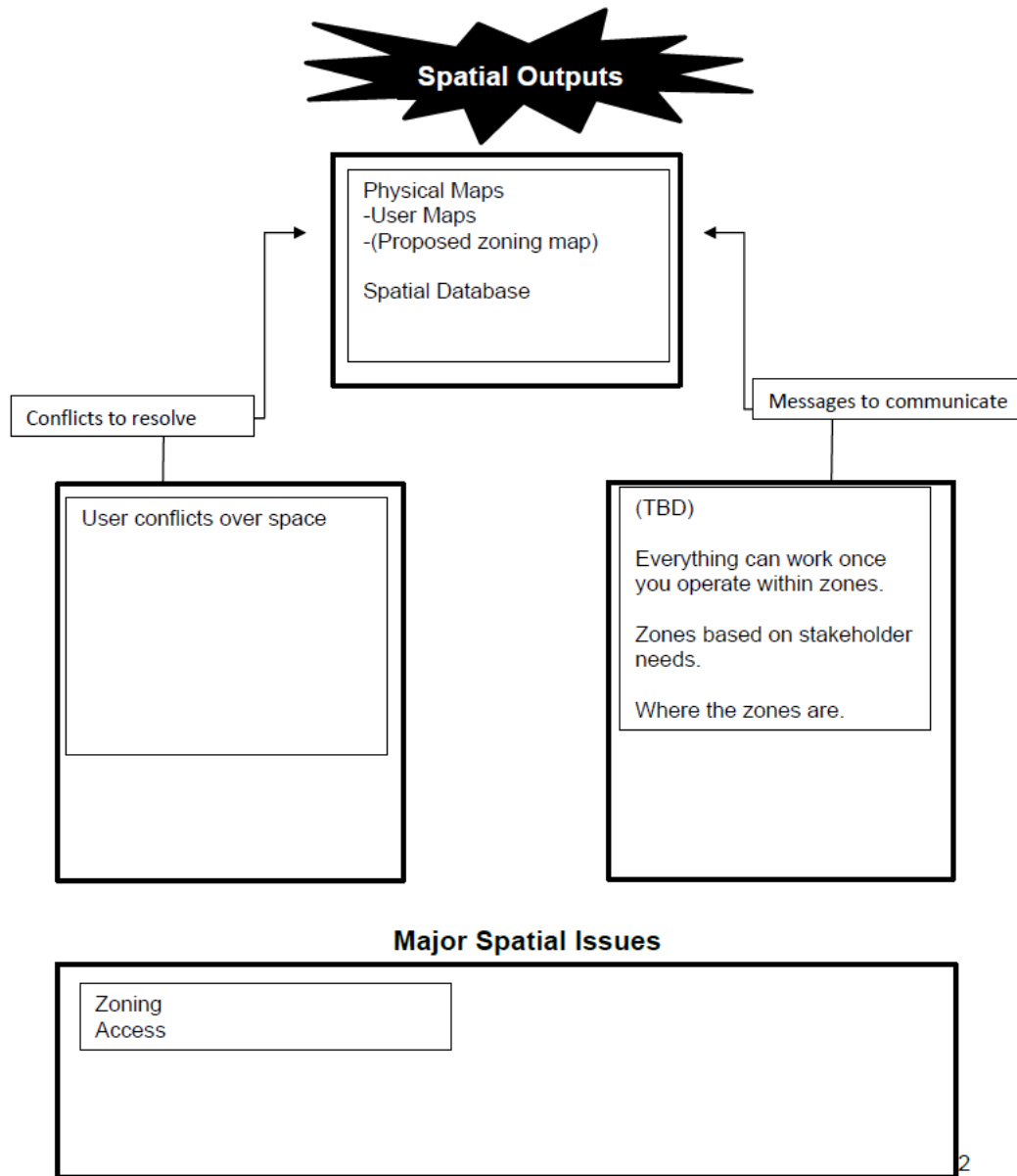
Target audience	Main message	Communication product + pathway
Community members and relevant stakeholders	To be determined	Flyers/brochures using piggy back on events such as Pure Grenada and Sailing Festivals
Primary stakeholder groups	To be determined	Presentations at MPA stakeholder consultations
General public	Announce SocMon assessment	TNC Radio Programme – to announce upcoming SocMon

*Notes: Communication messages will be developed based on SocMon key learning, hence the determination of messages prior to implementation is difficult.*



## 16 Determining spatial outputs

Using a “bottom-up” approach complete the diagram below. Start by identifying the major spatial issues and work your way up.



## 17 Work plan schedule

A SocMon study should take no more than one month (at most 6 weeks), so you need to schedule your work accordingly, remembering the SocMon stages including validation. For the purposes of this training workshop, set out tasks under each heading for the implementation of the SocMon assessment at the NEMMA. Provide an estimate of the number of days/weeks required for each task.

Activity / task	Week →	1 14 Nov	2 21 Nov	3 28 Nov	4 5 Dec	5 12 Dec	6 2 Jan	7 9 Jan	8 16 Jan
<b>Preparatory activities</b>									
Finalise site monitoring plan									
Announce SocMon assessment to general public and stakeholders									
Selecting and confirming team of data collectors									
<b>Secondary data collection</b>									
Compile and review secondary data									
<b>Primary data collection and observation</b>									
Develop and design key informant interview guide									
Develop and design surveys									
Train data collectors in survey techniques									
Pre-test survey									
Collect data (including spatial data)									
<b>Data analysis and interpretation</b>									
Enter data (including spatial data)									
Analyse data (including spatial data)									
Draft site monitoring report									
Finalise site monitoring report									
<b>Validation, communication, adaptation</b>									
Validation meeting									
Develop communication products									

Notes: opportunities to communicate SocMon results will be explored. First possibility will be at the SusGren Grenadines Bank meeting (June 2017).

## 18 Critical research resources required (budget and non-budget)

Many resources will be used in the research, but there are usually just a few that are so critical the assessment may not be able to proceed without them. You must know early what these are.

Resource description	Use of resource	Comments on availability
Volunteers (student)	Data collection and analysis	To be determined
GIS software	SocMon Spatial analysis	Available
Travel stipend	Transportation for students for surveying	To be budgeted
Data collection stipend	Data collection	To be budgeted

## 19 Budget

The SocMon methodology is intended to be affordable so that monitoring can be sustained. Pay close attention to what are realistic costs, including in-kind contributions that may be available.

Description of expense	No. of units	Unit cost*	Total cost*
Data collectors training workshop (includes lunches and training fee)	7 persons		500.00
Venue for data collectors training (in-kind through Fisheries Division)		In-kind	In-kind
Data collection stipend: XCD 10/survey x approx. 150 surveys. Approx. 5 persons will be involved in data collection	150	\$10.00 per survey	1,500.00
Data entry			350.00
Focus groups meetings: 4 meetings @ XCD 200/meeting	4	200.00	800.00
Venue transportation & chairs etc. (in-kind)			150.00
Printing			1,000.00
Validation with focus groups: 1 combined meeting	1	200.00	200.00
Data analysis and report preparation and production (in-kind)		In-kind	In-kind
<b>Sum total of SocMon costs</b>			<b>4,500.00</b>

\* = currency used [XCD]

**Budget explanatory notes (use if needed to explain calculations/estimations)**

Estimated costs are slightly over-budget but may be so due to slightly inflated estimates. Additional expenses may be topped up from ongoing projects.

## APPENDIX 3: REPORT FROM KEY INFORMANT INTERVIEWS

### ECMMAN SOCMON KEY INFORMANT INTERVIEWS

#### 1. What have you heard / learned about the (MMA, MPA)?

- Fourteen of the respondents have heard of the establishment of MPA. Eight of them were involved in the stakeholder consultations and many could describe the proposed boundaries from Port Louis to Point Salines. They described the limitations on proposed activities to include the establishment of no fishing zones, areas designated for sporting / diving areas. They also described the purpose of the MPA to preserve sea life to include coral reefs, sea beds and avoid overfishing.

#### 2. When you hear the term Marine Managed Area/ Marine Protected area, what features come to mind?

- All respondents have heard and understood the concept of MPA's, which they described as an area along the coast designated to be protected and conserved. It promotes the sustainable use of the environment and its resources. One respondent pointed out that the proposed establishment of the GMPA is a policy that is part of a national plan. More specifically, respondents highlighted the protection of fish stock and their habitat, the coral reefs. Respondents said that they believed that a challenge was the control of water quality; namely, the need to reduce effluent. The other concern was the enforcement of regulations to enforce the ban on sand mining in the area.

#### 3. What impacts (socio-economic) has the (MMA/ MPA) had on you or your operation?

- All stakeholders supported the establishment of the marine protected area. They were concerned about the sustainable use of the area; hence, there was need for policy guidelines and effective policing of the area. The priority area of focus was different according by sector. The fisher folk were directly affected and while they agreed that the fish stock was depleted, alternative livelihoods were not identified nor any short-term measure for employment.
- Pollution was highlighted by half of the respondents, this included garbage disposal, water quality, watershed management as the last wetland was destroyed by hotel development, mooring field areas and its effect on the coral reef, the pumping of raw sewage into the water and its effects on the environment.

#### 4. What coastal and marine activities currently occurring in the MMA/MPA are of concern to you?

- *Diving / snorkeling*: Some respondents believed that divers damage the reef by standing on portions of them.
- *Anchoring of yachts*: The chains and anchor damage the reef in an area where the coral has been regenerating.
- *Sand mining*: The Ministry of Works removes the sand after clearing the beach head at the furthest end of the beach and uses it for road repairs.

- *Flooding*: The Morne Rouge area floods during heavy rains. The last area of wetlands has been back-filled during construction of the new hotel. It is believed that system put in place by the hotel is inadequate and will cause damage to the reef and grass bed.
- *Sewage*: Nawasa's system has failed at times resulting in raw sewage in the Morne Rouge area. Also, raw sewage is pumped into the sea. The water outside the boundary of the MPA is murky and it is believed that the polluted water washes back into the MPA. Lack of regulation and government lacks the ability to police the dumping of sewage from yachts anchored in the MPA.
- *Construction*: The Silver Sands project was highlighted by many respondents, as the removal of the last area of wetlands in the beach. There is also a proposed jetty that would be constructed in the large seagrass bed, which is a sanctuary for small fish.
- *Over Fishing*: The seine fishermen and the spear fishermen are a separate group and blame the other for not observing best practices. The size and quantity of catch has been depleted over the last few decades. The fisher folk are willing to have their activities regulated.
- *Poor Garbage Disposal*: This was highlighted particularly for the smaller beaches going southward from Morne Rouge Bay. It was also a concern, generally, as during heavy rains and heavy swells, there is a considerable amount of debris in the water and sea bed.
- *Management of The Marine Space To Regulate Competing Activities*: The speeding of boats in areas designated for swimmers, and yachts moored outside the designated areas, which sometimes obstructs the entry of vessels to the port.

**5. In what ways have the condition of the coastal and marine resources changed in the MMA/MPA over the last 5 years?**

- Not known (4)
- Not significant (2)
- Degradation (4) – Particularly of the coral reef, they suggested that near-shore ecosystems will be affected.
- New reefs emerging – Particularly in the Mt. Pandy area
- Less fish stock
- Additional recreational use, creating potential for user conflict as well as safety and navigation. Para sailing has been introduced and there is an increase in snorkeling and motorized craft in the area.
- Hotel development has reduced the access and increased the risk of pollution
- Decrease in water quality
- Drainage

**6. What are the main threats/ pressures to conditions of the coastal and marine resources in the GMMA/ GMPA?**

- In addition to those mentioned in #5, natural disasters like storm surge and hurricanes, the use of laundry detergents and fertilizers, and improper disposal of oil by street vendors and fishermen were identified. The improper disposal of nets and lines on the smaller beaches can trap turtles. The increased number of buildings for residential and business purposes increases the speed of the runoff during rainfall which speeds to the coast.

### **Recommendations**

- *Public education and awareness:* Individuals need to take responsibility for their role in protecting the environment.
- Planting of trees on the shoreline regular maintenance of drains to reduce flooding and the development of mechanism to slow down the outfall of water during heavy rains
- Greater stakeholder involvement in MPA management – Only key personnel are included at present, while the desired outcome needs the buy in of residents and users of the area. Users have conflicting interests in the management of resources, the need for management of their expectations and interests are critical. Development vs environmental protection within government entities needs strengthening. Its ability to do environmental impact assessment needs to be enhanced
- *Need for strong national policy/ legislation:* The zoning and regulation of activities in the MPA will determine the success of the policy.
- Joint exercise by stakeholders to clean up the sea bed
- Strengthening the monitoring and regulatory arm of MPA

### **7. Have there been any significant changes in the way the MMA/MPA has been used over the last 5 years? In what way and who are the users?**

- All respondents believed that there was more physical development with the construction of one new hotel and the refurbishment/ expansion of another. New housing development has been noted as well. There are more business activities not as many large recreational activities. More yachts and use of by tourists.

### **8. Is enough being done by MMA/ MPA management authorities to include stakeholders in decisions regarding management of the area?**

- Four respondents were satisfied with the level of engagement; however, they were concerned with the process and speed of implementation.
- Three respondents stated that they did not have a say as the more powerful players influence the outcomes consultation. They believe that consultations need to be wider and more inclusive.

### **9. Would you support the establishment of an MPA in Grand Anse?**

- All respondents supported the establishment of an MPA. A few had conditions – the fishermen were not dispossessed, adequate stakeholder buy-in and ability to enforce the policy.

## **FINDINGS**

- There were two distinct groups of the key informants. One group consisted of persons who were engaged in the consultations that were conducted by the Division Of fisheries or were representing a Government agency. The second group was that of persons who were persons of influence in the community who had information about the project and were aware of the socio-economic issues of the area.
- Group one was convinced of the benefits of the proposed MPA for their sector and believed that it would enhance and preserve livelihoods. The business interests were tourism-based; and as such, they were concerned about the marketability of the environment as part of the Pure Grenada initiative. These include: water quality, reef degradation, decrease in the quantity, size and the number of species of fish and the cleanliness of the land and sea bed. The conflicting interests emerged in several of the interviews.
- Generally, ownership of threats to the environment are not owned by a particular sector, instead persons were able to point out the contributions of other groups.
- The second group has had little or no information about the policy/ project but were able to project based on the work done with the Beausejour project. They, however, represent “John Public” who support the MPA in principle, but may be guilty of contributing to environmental degradation. However, they were critical of government’s role in establishing the MPA, since the new development projects were approved, which negative impact on the environment.

## **RECOMMENDATIONS**

- One respondent summed up the policy that MPA management is people management. There is need to develop a realist plan of implementation, which includes action plan by sector. The implementation should be phased, concentrating on the aspects that are achievable in the short run and where there is buy-in. Government t should provide a safe-space for meaningful, continuous dialogue between stakeholders. It also is responsible to provide adequate resources to develop and enforce regulations.
- The balance between development and the preservation of the environment is the key challenge of the proposed GMPA.

## APPENDIX 4: SOCMON SURVEY

Date        /        /2017        Questionnaire ID #       

Community        Enumerator ID #       

The Fisheries Division (Ministry of Agriculture, Lands, Forestry & Fisheries) and the Climate Resilient Eastern Caribbean Marine Managed Areas Network (ECMMAN), in collaboration with the Centre for Resource Management and Environmental Studies (CERMES), are conducting a study to determine the Socio-Economic characteristics of the proposed Grand Anse Marine Protected Area and adjacent communities.

ALL the information you give CANNOT be traced back to you. You will not be personally identified in any reports. Once this phase is completed, you will be invited to a meeting where the information from all the surveys will be presented. After a few years you may be asked similar questions to see if you think things have changed.

We would now like to ask you a number of questions, remember there are no right or wrong answers – we are seeking your opinion.

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Record questionnaire ID number, enumerator ID number, settlement, respondent identity and address on this sheet. Write DK = Do Not Know and NR – No Response as appropriate by the question where appropriate.

Please note:

MPA – Marine Protected Area

GAMPA – Grand Anse Marine Protected Area



**A. Understand stakeholder attitudes to, and perceptions of, marine resources, current management and the establishment of the GAMPA**

1.

- a) Do you know what a Marine Protected Area (MPA) is? [NEW: MMA Knowledge]

☐ Yes ☐ No

*If YES, follow-up with part (b) to verify the respondent's understanding of the concept of a MPA. If NO, the interviewer should provide the respondent with a brief description of a MPA. **A MPA is protected space in the ocean that is put under protective management to help to keep it in its natural state. MPAs can be conserved for a number of reasons including economic resources, biodiversity conservation, and species protection. They are created by delineating zones with permitted and non-permitted uses within that zone.***

- b) Which of the following comes to mind when you think of a MPA? Tick **ALL** that apply. [NEW: MMA Knowledge]

- ☐ Protection of coastal and marine resources  
☐ Less access to area — by ☐ locals ☐ tourists ☐ both  
☐ More and bigger fish to be caught by fishermen for food  
☐ More and bigger fish to be viewed and breed, but not caught  
☐ Coral reefs with more life on them than at present  
☐ Less work and activities (livelihoods) in the area encouraged  
☐ More work and activities (livelihoods) in the area encouraged  
☐ Alternative livelihoods to working in the area encouraged  
☐ Other, please specify \_\_\_\_\_

2.

- a) Which of the following existing MPAs in Grenada and Carriacou are you familiar with?
- ☐ Molinière/Beauséjour MPA  
☐ Woburn/Clarke's Court Bay MPA  
☐ Sandy Island/Oyster Bed MPA  
☐ None of the above

*If the respondent is familiar with any of the MPAs above, follow-up with part (b)*

- b) What is one good thing and/or one not-so-good thing you have heard about this (these) MPA(s)?

MPA	Good	Not-so-good
Molinière/Beauséjour MPA		
WoburnClarke's Court Bay MPA		
Sandy Island/Oyster Bed MPA		

3. *Show the respondent a map of the proposed GAMPA and provide a brief description of the areal extent.*

- a) Have you heard of the proposal to make most of the Grand Anse coast a MPA?  
[NEW: MMA Knowledge]

☐ Yes ☐ No

4.

- a) Would you consider yourself a user or other stakeholder of the GAMPA? [K23]

☐ Yes ☐ No

- b) If **NO**, why not? Please tick **ALL** that apply.

☐ I am not a permanent resident of any of the adjacent communities

☐ I do not use the Grand Anse area

☐ I am only an occasional user

☐ I have no interest in the proposed GAMPA

☐ Other, please specify\_\_\_\_\_

5.

a. Is water quality within the Grand Anse Bay a concern to you?

☐ Yes☐ Nob. If **YES**, why?

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6. How would you rate the presence of solid waste, particularly plastics and garbage, in Grand Anse bay? Where is it seen most?

a) Presence of solid waste	b) Areas where solid waste is seen more
<input type="checkbox"/> High	
<input type="checkbox"/> Medium	
<input type="checkbox"/> Low	

7.

a) Have you or anyone in your household ever become ill because of swimming in the Grand Anse bay?

☐ Yes☐ Nob) If **YES**, what were some of the symptoms? Tick **ALL** that apply.☐ Eye infection☐ Skin rash☐ Diarrhea☐ Vomiting☐ Abdominal pains☐ Other, please specify \_\_\_\_\_

8.

- a) How would you describe the **current** conditions of each of the following ecosystems and resources within the Grand Anse bay? [S16]

Ecosystem	Very Good 1	Good 2	Neither good nor bad 3	Bad 4	Very Bad 5	Don't know
Seagrass beds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mangroves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coral reefs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beaches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marine life e.g. fish, lobster, lambi, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- b) Have you noticed any changes in the condition of these resources in the last five years? [S16]

[ ] Yes [ ] No

*If YES, go to part c. If NO, move to the next question.*

- c) How would you describe the conditions of each of the following ecosystems and resources within the Grand Anse bay in the **last 5 years**? [S16]

Ecosystem	Very Good 1	Good 2	Neither good nor bad 3	Bad 4	Very Bad 5	Don't know
Seagrass beds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mangroves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coral reefs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beaches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marine life e.g. fish, lobster, lambi, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- d) What do you think can be done to improve the state of these conditions? [S24]

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Q#\_\_\_/ID #\_\_\_

*Questions 9- 15 should be directed to persons who are familiar with the marine environment of the area – for example, fishers, dive operators, regular divers, snorkelers etc. Skip for all other respondents and go to question 16.*

9.

- a) Describe the change in size and abundance of the following species in the Grand Anse bay over the last 5 years. [S16]

	Increase	Decrease	No change	Don't know
Long-spined black sea urchin <b>size</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Long-spined black sea urchin <b>abundance</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lobster <b>size</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lobster <b>abundance</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parrot Fish <b>size</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parrot Fish <b>abundance</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- b) What are the top three fish species you or members of your household target the most?

*Fish species 1:*

*Fish species 2:*

*Fish species 3:*

- c) Do you or members of your household actively fish and eat parrotfish? Tick **ALL** that apply.

[ ] Fish

[ ] Eat

*If persons eat parrotfish ask part (d)*

- d) How often do you or members of your household eat parrotfish? Tick **ONE**.

[ ] Often (more than one day/week)

[ ] Occasionally (once a month)

[ ] Never

10. What changes in the conditions of coastal and marine resources in the Grand Anse bay would you hope to see once the MPA is established?

Ecosystem	Improve 1	No change 2	Decline 3	Don't know 4
Seagrass beds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mangroves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coral reefs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marine life e.g. fish, lobster, lambi, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11.

- a) Parrotfish, especially large-sized fish, are important to keep reefs healthy. They eat and remove macroalgae (seaweed) that would otherwise cover coral reefs causing them to become unhealthy and hindering their growth. Would you support temporary measures to help keep their populations growing and recovering? [S24]

[ ] Yes [ ] No

- b) If **YES**, which of the following would you suggest? Tick **ALL** that apply. [S24]

- [ ] Fishing seasons  
 [ ] Gear restrictions  
 [ ] Size restrictions  
 [ ] Catch limits  
 [ ] Closed areas for research  
 [ ] Campaigns to help increase awareness, education or outreach  
 [ ] Let nature take its course  
 [ ] Other, please specify \_\_\_\_\_

- c) If **NO**, why not?

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12.

- a) Long-spined black sea urchins are important coral reef residents as they help keep macroalgae (seaweed) from overgrowing corals and keep the reef bottom clear for young corals to settle on. Would you support management efforts to help black sea urchins recover? [S24]

☐ Yes ☐ No

- b) If **YES**, which of the following would you suggest? Tick **ALL** that apply. [S24]

- ☐ Transplantation from reefs with good abundance to those with poor abundance  
☐ Laboratory rearing for replenishment of reefs  
☐ Let nature take its course  
☐ MPA zones set aside for restoration  
☐ Other, please specify \_\_\_\_\_

- c) If **NO**, why not?

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13. Reef fish species, like groupers and snappers, often rely on forming "spawning aggregations" in order to reproduce and increase their population. These reef fish that form spawning aggregations, are more vulnerable to overfishing during their spawning times than some other species like tuna.

- a) Do you or have you ever fished a spawning aggregation?

☐ Yes ☐ No

- b) If **YES**, where have you fished them? **Record fishing locations on the map.**

- c) Has the number and/or size of fish in these aggregations increased or decreased in past 5 years?

	Increased	No change	Decreased	Don't know
# of fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Size of fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Q#\_\_\_\_/ID #\_\_\_\_

d) Given their importance on reefs and their vulnerability to fishing, would you support management efforts to help these aggregating species recover?

☐ Yes

☐ No

e) If **YES**, which of the following would you suggest? Tick **ALL** that apply.

☐ Fishing seasons

☐ Closures during spawning times

☐ Gear restrictions

☐ Size restrictions

☐ Catch limits

☐ Licensing

☐ Reporting of catch

☐ Designated areas for research

☐ Campaigns to help increase awareness, education or outreach

☐ Let nature take its course

☐ Other, please specify\_\_\_\_\_

f) If **NO**, why not?

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14.

a) GAMPAs contain important sea turtle nesting habitat and coastal turtle feeding grounds. Sea turtles are threatened species and vulnerable to overfishing and other human impacts. Given their ecological importance, would you support measures to help protect this species in GAMPAs?

☐ Yes

☐ No

b) If **YES**, which of the following would you suggest? Tick **ALL** that apply.

☐ Reduce bright lights during nesting season

☐ More protection to protect nests and hatchlings during nesting season



- ☐ Enforcement to prevent illegal take
- ☐ Temporary closed beach areas or activities
- ☐ Beach clean-ups during nesting time to prevent turtle entanglement
- ☐ Campaigns to help increase awareness, education or outreach
- ☐ Let nature take its course

c) If **NO**, why not?

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15.

a) Some reefs provide more and better habitat for reef creatures, do you support measures to help protect them (e.g. restoration, protection, mooring buoys to prevent anchor damage etc.)? [S24]

- ☐ Yes   ☐ No

b) If **YES**, which of the following would you suggest? [S24]

- ☐ Fishing seasons
- ☐ Gear restrictions
- ☐ Size restrictions
- ☐ Closed areas
- ☐ Coral gardening (restoration)
- ☐ Let nature take its course
- ☐ Other, please specify\_\_\_\_\_

**ask all respondents:**

16. How important is the condition of the marine environment (*coral reefs, mangroves, fish, water quality, beaches etc.*) to you (*in general for work, relaxation and just for its existence value*)? [S16]

- ☐ Very important
- ☐ Important
- ☐ Neither important or unimportant
- ☐ Not important at all
- ☐ Don't know

17. What activities do you think should be allowed within the proposed GAMPA and its boundaries? Tick **ALL** that apply. [K14/S10]

- ☐ Swimming
- ☐ Recreational fishing
- ☐ Commercial fishing – seine nets
- ☐ Subsistence fishing (for personal use only)
- ☐ Recreational SCUBA diving
- ☐ Recreational snorkelling
- ☐ Motorized boating/Watersports
- ☐ Non-motorized boating
- ☐ Yacht anchorage
- ☐ Research and education
- ☐ Farming
- ☐ Hotel development
- ☐ Clearing of land for agriculture, tourism or housing developments
- ☐ Other, please specify \_\_\_\_\_

**B. Identify resource use and user patterns by user groups for informing the zoning plan;  
Determine potential impacts of management decisions/interventions on MPA livelihoods**

18. What sort of activities do you and members of your household do for relaxation within the proposed GAMPA and surrounding areas? Where exactly and how often? [K14/S10; K19]

*\*Show map here and mark activities on it. Use different symbols to represent activities. If fishing is chosen identify on the map, the species caught (lambi, lobster, reef fish, offshore fish species, urchins etc.) and the areas they fish for these species.*

Activity	Frequency (# days per week)	Location
<input type="checkbox"/> Recreational fishing	<input type="checkbox"/>	
<input type="checkbox"/> Swimming	<input type="checkbox"/>	
<input type="checkbox"/> Diving	<input type="checkbox"/>	
<input type="checkbox"/> Snorkelling	<input type="checkbox"/>	
<input type="checkbox"/> Boating (motorized or non-motorized)	<input type="checkbox"/>	
<input type="checkbox"/> Watersports	<input type="checkbox"/>	
<input type="checkbox"/> Exercise	<input type="checkbox"/>	
<input type="checkbox"/> Other, please specify _____	<input type="checkbox"/>	

19.

- a) What, if anything, do you or members of your household do to make a living from the resources (coastal and marine) in and around the Grand Anse bay, and where exactly? [K14/S10; K12/S7]

- ☐ Fishing  
☐ Dive operation  
☐ Watersports operation  
☐ Tour guiding  
☐ Craft vending  
☐ Water taxi services  
☐ Day charter operation  
☐ Beach chair/umbrella rentals  
☐ Hotel or other tourism staff  
☐ Other, please specify\_\_\_\_\_

***\*Show map here and mark activities on it. Clearly record location extent for each activity. If fishing is chosen identify on the map, the species caught (lambi, lobster, reef fish, offshore fish species, urchins etc.) and the areas they fish for these species.***

- b) How many days in an average week do you or members of your household spend in the Grand Anse bay making a living from the resources there? [NEW: Livelihood Dependency].

☐ days

20.

- a) To what extent do you think you will be affected if the MPA is established and management actions are enacted? [NEW: Management impacts]

- ☐ Affected  
☐ Somewhat affected  
☐ Not at all affected  
☐ Don't Know

- b) Explain your answer.

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21.

- a) If management actions are implemented in the GAMP, the following could occur.  
Rate your level of agreement with each statement. [NEW: Management impacts]

	Strongly Agree 1	Agree 2	Neither agree nor disagree 3	Disagree 4	Strongly Disagree 5
Loss of livelihood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved health of the marine ecosystems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved livelihoods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduction in income	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increases species populations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduced access to the GAMP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protection of the marine biodiversity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved economy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- b) What other possible management impacts (positive and/or negative) do you anticipate if the GAMP is established? [NEW: Management impacts]

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22.

- a) Are you or members of your household interested in giving up what you do now in the Grand Anse bay (e.g. fishing, dive operation etc.) to change to something else entirely?

[ ] Yes [ ] No [K12/S7 or NEW: Alternative Livelihoods]

- b) If YES, why do you want to do this?

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- c) What other income-generating activities do you or other members of your household want to get involved in but have not yet done so? [K12/S7 or NEW: *Alternative Livelihoods*]

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- d) What if anything, has or will prevent you or others in the household from trying a livelihood you think is better? [K12/S7 or NEW: *Alternative Livelihoods*]

- ☐ Too old to try something different  
☐ Family tradition  
☐ Lack of available opportunities  
☐ Not interested in trying something new  
☐ Lack of money or assets (e.g. land, property, vehicle etc.) to try something different  
☐ No time to train for anything else  
☐ Other, please specify\_\_\_\_\_

<b>C. Identify stakeholder perceptions of threats to coastal resources in Grand Anse</b>
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23.

- a) Do you know of any sources of pollution into the Grand Anse bay?

☐ Yes ☐ No

- b) If YES, where are the sources?

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- c) *\*Show map here and ask respondent to identify areas within (or outside) the GAMPAs that are pollution sources (e.g. an eroded bank that needs to be restored, a beach that needs recycling/garbage cans etc.)*

24. How much of a threat are the following to the marine ecosystems and resources in Grand Anse bay? [K20/S17]

Threats	No threat 1	Moderate Threat 2	Serious Threat 3	Don't know 4
Liquid pollution e.g. oil, raw sewage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solid pollution e.g. marine trash, debris, plastics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overfishing – commercial fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overfishing – recreational fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Illegal fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive/exotic species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste discharge (Yachts etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal and upland development e.g. Marinas, hotels, resorts, housing, tourism operation, golf courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural disasters e.g. Hurricanes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sea level rise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased sea water temperatures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agriculture Impacts (sedimentation/erosion or increased pollutants like fertilizers/pesticides)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. How do you think these threats or problems might be addressed or solved? [S24]

Threats	Solutions
Liquid pollution e.g. oil, raw sewage	
Solid pollution e.g. marine trash, debris, plastics	
Overfishing – commercial fishing	
Overfishing – recreational fishing	
Illegal fishing	
Invasive/exotic species	
Waste discharge (Yachts etc.)	

Threats	Solutions
Coastal and upland development e.g. Marinas, hotels, resorts, housing, tourism operation, golf courses	
Natural disasters e.g. Hurricanes	
Sea level rise	
Increased sea water temperatures	
Agriculture Impacts (sedimentation/erosion or increased pollutants like fertilizers/pesticides)	
Other, please specify_____	

26. To what extent do you believe each of the following user groups impact the marine ecosystems and resources in the Grand Anse bay? [K20; K23]

User Group	No Impact 1	Slight Impact 2	Moderate Impact 3	Serious Impact 4	Extreme Impact 5
Swimmers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recreational fishers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commercial fishers - seine nets, pots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commercial fishers – dive fisheries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Subsistence fishers (for personal ONLY)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recreational Scuba divers/snorkelers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motorized and non-motorized boaters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yachties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If "other" was identified, please state here \_\_\_\_\_

27.

a) Are you in favour of the establishment of a MPA in Grand Anse bay? [NEW: MPA support]

[ ] Yes [ ] No

Q#\_\_\_/ID #\_\_\_

- b) Explain your answer. *(For either response, YES or NO, ask the person to provide reasons for their support or non-support)*

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28. Is there anything in particular that you would like management to focus on once the GAMPA is established? *[NEW: Management Priorities]*

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29. Would you be willing to support the GAMPA by taking the following actions? Tick **ALL** that apply [K31].

- ☐ Organize or participate in coastal clean-ups  
☐ Planting trees to reduce erosion  
☐ Stop using plastic bottles and bags  
☐ Other, please specify\_\_\_\_\_

<b>D. Demographics</b>
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30. Gender *(observed)*

- ☐ Male  
☐ Female

31. What is your current age? \_\_\_\_\_ (# of years old) *[K5/S1]*

32. What is your last level of formal education reached?

- ☐ Primary school  
☐ Secondary school  
☐ A-level/College/Associate Degree  
☐ University (e.g. Bachelors, Masters, PhD)  
☐ Professional, Technical and Vocational School



Q#\_\_\_/ID #\_\_\_

33. What is your main source of income? (*Most of your income comes from this activity*)  
[S9 or K12/S7]

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34. What, if anything, is your secondary source of income? [S9 or K12/S7]

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35. What proportion of your income, if any at all, is derived from your income-generating activities in the Grand Anse bay?

- ☐ <25%
- ☐ 25-50%
- ☐ 51-75%
- ☐ 76-100%

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**Thank you for participating!**  
**Your effort in completing this survey is valuable to us.**