

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

**Socio-Economic Monitoring at the  
Northeast Marine Management Area: Antigua**

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## EXECUTIVE SUMMARY

The Socio-economic Monitoring of the Northeast Marine Management Area (NEMMA) is a key component of the *Climate Resilient Eastern Caribbean Marine Managed Areas Network Project (ECMMAN)*. Preparatory work for this activity began in September of last year with the completion of a training workshop. Experts from the Centre for Resource Management and Environmental Studies (CERMES), The University of the West Indies, Cave Hill Campus, trained team members from various government agencies, statutory bodies and NGOs in the implementation of the SocMon Caribbean methodology. At that time monitoring variables were selected, the study area was defined and objectives of the study formulated. Four main objectives were defined for the assessment:

- To collect data on use patterns, perceived resource conditions and threats to adaptive coastal management;
- To understand the impact of conservation objectives on human use;
- To involve stakeholders in an integrated approach to monitoring of the NEMMA; and
- To measure a core set of variables that link the socio-economic context of NEMMA communities to ecological context of the area.

Due to time constraints it was decided the results could best be achieved by performing key informant interviews of critical stakeholder groups that operate within NEMMA. Twenty-two key informants were interviewed and their responses collated, analysed and compared to secondary data sources according to the monitoring variables. The information was then presented graphically, and through the use of maps generated using the SocMon Spatial tool. All of the objectives of the SocMon study were achieved through this assessment.

The results ultimately point to a need for improved management of the area. Presented below are key recommendations for improving monitoring and management efforts within NEMMA into the future.

- Follow up key informant interviews with more comprehensive stakeholder surveys for households within the NEMMA.
- Conduct follow up studies to verify and ground-truth informant recommendations for critical conservation areas, fisheries zones and reefs of importance.
- Conduct further studies to determine current usage of offshore islands and other critical habitats and seek to understand carrying capacities for these areas.
- Conduct studies to determine drivers of various threats identified by key informants.
- Implement measures to improve stakeholder participation in the development and management of the protected area.
- Implement public awareness activities to improve stakeholder knowledge about the area.
- Design and implement a robust, integrated and participatory management regime for the NEMMA that can act to halt and ultimately reverse the declines observed by key informants.



# 1 INTRODUCTION

## 1.1 ECMMAN

The *Climate Resilient Eastern Caribbean Marine Managed Areas Network (ECMMAN)* Project is a four-year, multi-million dollar project funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). It involves six beneficiary countries in the Eastern Caribbean and is being implemented by The Nature Conservancy in partnership with the Organisation of Eastern Caribbean Secretariat Social and Sustainable Development Division, UNEP-SPAW RAC through the Caribbean Marine Protected Areas Management Network (CAMPAM) and the Caribbean Regional Fisheries Mechanism (CRFM) (ECMMAN Factsheet). The central aim of the project is to improve climate resilience in participating countries by ensuring critical and sensitive marine ecosystems remain intact. This is to be achieved by enlarging the network of Marine Managed Areas (MMAs) across the six participating states, improving national infrastructure for managing these areas and involving local communities. The ECMMAN Project has four objectives:

1. Declare new Marine Managed Areas (MMAs) and strengthen existing MMAs;
2. Build strong constituencies for sustainable livelihoods and ocean use;
3. 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
4. Institute sustainability mechanisms to support the MMA network, including regional political commitments and actions, collaboration mechanisms on marine and coastal resources, and sustainable financing.

This SocMon assessment is one component of integrated monitoring being instituted by the ECMMAN Project. Others include ecological monitoring of various features including coral reefs and mangrove systems.

## 1.2 SocMon Caribbean

Socio-economic Monitoring for Coastal Management (SocMon) is a global initiative being implemented at the regional level with the goal of establishing socio-economic coastal and marine monitoring programmes globally at the site level (see [www.socmon.org](http://www.socmon.org)). The SocMon approach forms “part of a continuing regional program to enhance the understanding of communities and their relationship to coastal and marine resources.” (Bunce and Pomeroy 2003). It is no longer adequate to seek to manage these resources through traditional scientific approaches alone. Rather, as coastal managers, we must recognise that our dependence on, and use of the coastal and marine resources of the region necessitates an approach to management that integrates the human element.

SocMon Caribbean presents a set of guidelines for establishing site level socioeconomic monitoring programmes in the region (Bunce and Pomeroy 2003). It provides a prioritised list of useful socio-economic variables, data collection questions as well as tables for data analysis (Bunce and Pomeroy 2003). The overall aim of SocMon Caribbean is to:



- Provide a methodology for regularly collecting basic socio-economic data useful for coastal management at the site level; and
- Provide a basis for a regional system by which site-level data can feed into national, regional and international databases for comparison.

It is intended for use by marine coastal managers; including government agencies, non-governmental organisations, site level managers and local communities.

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 SocMon Spatial*

SocMon Spatial is a companion tool of SocMon developed by CERMES as a means of using participatory mapping techniques in order to visualise socio-economic data. This new approach links SocMon with GIS and provides the opportunity “for mapping and visualizing trends, attitudes and perceptions, and changes at appropriate geographic scales that could promote the uptake of SocMon at sites and the use of SocMon to inform...management and guide policy.” (Pena et al. 2012)

SocMon Spatial was utilised in this study by asking key informants to use printed maps to locate areas of concern, conservation significance or of importance to tourism and fisheries stakeholders.

### *1.4 Situation overview*

The Northeast Marine Management Area (NEMMA) is an area that is both critically significant for its importance to biodiversity conservation and the role it plays in the economic development of Antigua and Barbuda. The NEMMA is revered for its unique landscapes and natural beauty and holds some of the last remaining refuges for critically endangered and endemic reptile species and avifauna. On the other hand, the area is also under severe pressure from tourism interests, fishing operators and private developers. Despite ongoing conservation interventions aimed at improving the state of the natural environment, both by Government and Non-Governmental Organisations, the area has suffered a number of negative impacts as a result of these uses. Habitat alterations, overcrowding, pollution and improper disposal of solid waste are just a few of the drivers that threaten to deteriorate the natural environment in NEMMA. In recent years, the

threat of large scale coastal development that appears to be largely inconsistent with the conservation objectives of the protected area has caused many stakeholders to raise concerns about its future.

Despite this negative outlook, some bright spots do exist in the way the NEMMA is managed. The area is well recognised for its eco-tourism potential and has attracted international funding for conservation and rehabilitation work on the offshore islands. The work of the Environmental Awareness Group and the Offshore Islands Conservation Project is world renowned for successfully bringing one of the world's rarest snakes back from the brink of extinction. The area is also recognised as an Important Birding Area and includes one of the longest running turtle monitoring projects in the world, the Jumby Bay Hawksbill Project.

### 1.5 Goals and objectives

The monitoring goals and objectives for this assessment were established at a training workshop in September 2016. They were chosen based on the management intervention priority identified for the area - the zoning of the protected area - by the participating stakeholders. The critical monitoring goal for this assessment was:

*To inform decision-making for sustainable resource use through adaptive management within the Northeast Marine Management Area (NEMMA)*

The objectives were:

- To collect data on use patterns, perceived resource conditions and threats to adaptive coastal management;
- To understand the impact of conservation objectives on human use;
- To involve stakeholders in an integrated approach to monitoring of the NEMMA;
- To measure a core set of variables that link the socio-economic context of NEMMA communities to ecological context of the area.

### 1.6 Organization of report

This report is organised as detailed in Table 1 below.

**Table 1: Organisation of the report**

Section	Description
Section 1: Introduction	This section provides an introductory look at SocMon, outlines the situational overview of the study area and presents the goals and objectives of this study. It also introduces the reader to the ECMMAN Project
Section 2: Methods	Section two of the report details the planning process and preparatory activities that were undertaken by the project team. It gives a brief account of the training sessions that were undertaken, details the variables to be monitored, introduces the project team and provides information on the survey methodology used.
Section 3: Results	Section three of the report presents the results of the SocMon study in line with the agreed objectives. It begins with a description of the project area, detailing its community and ecological profile. It then

Section	Description
	presents the key informant interview results with the use of charts and diagrams
<a href="#">Section 4:</a> Discussion and Conclusion	Section four of the report seeks to analyse the results presented in section three. These results are compared and contrasted to other data sources in order to determine similarities and/or variances from other assessments.
<a href="#">Section 5:</a> Recommendations for Management and Monitoring	This section presents a number of recommendations on achieving continued monitoring in NEMMA.

## 2 METHODS

### [2.1 SocMon training](#)

One of the central components of the SocMon Caribbean approach to carrying out assessments is to ensure national and site level coastal managers are familiar with the monitoring guidelines and how to implement them. This is achieved through national and local workshops whereby local participants are given step-by-step guidance on applying the SocMon methods.

With the support of the ECMMAN Project a national SocMon training workshop was held in Antigua from September 26 – 28, 2016. Training was provided by regional experts from the Centre for Resource Management and Environmental Studies (CERMES) based at the Cave Hill Campus of the University of the West Indies. The workshop participants were gathered from a wide cross-section of government agencies, site level managers and NGOs. Over three days participants were guided on range of topics including: defining the study area, identification of stakeholders, planning and developing objectives and, selection of appropriate variables and parameters from the SocMon Caribbean guidelines and Global Coral Reef Monitoring Network-Caribbean (GCRMN-Caribbean) guidelines. Participants were also given a brief introduction to SocMon Spatial, and asked to consider what components of the SocMon assessment could be visualised spatially. One of the final activities of the initial training was the development of draft survey questions and testing these out among workshop participants. The key output of the workshop was a draft site monitoring plan that identified the goals and objectives of the study, defined the study area, identified key stakeholders and established the main indicators and variables to be monitored. During the workshop a field visit to a number of key areas within the NEMMA was conducted for scoping purposes and to better understand the socio-economic context of the area. See Pena (2017) for details on the training workshop. .

Following the September SocMon training workshop, a second workshop was held with the core local SocMon group along with additional members. The second training workshop focused on introducing members to the companion tool of SocMon, SocMon Spatial. Since members had previously considered which variables/indicators could be

visualised, the workshop was spent primarily introducing participants to the tools and techniques for applying SocMon Spatial and garnering participatory mapping information.

## 2.2 Preparatory activities

At the initial SocMon training workshop, participants spent a considerable amount of time carefully reviewing the range of variables/indicators and parameters available both within the SocMon Caribbean Guidelines and the GCRMN-Caribbean guidelines. The most relevant variables/indicators were then selected and prioritised based on their ability to achieve the overall goal and objectives of the study (Appendix1). The final list of variables chosen for assessment and monitoring are shown in Table 2.

**Table 2. Prioritised list of variables and parameters to be monitored**

### a) SocMon Caribbean Variables

Variable to monitor	Objective # 1, 2, 3	Priority High/Med/Low	Spatial info Feature/Attribute
<b>Demographics</b>			
K1. Study area	1, 2	H	F
K2. Population	1, 2	H	A
<b>Coastal and Marine Activities</b>			
K14/S10 Activities Household activities	1 - 2	H	F
K15/S11 Goods and services /household goods and services	1, 2	H	F/A
K16/S12 Types of use/Types of household uses	1, 2	H	A
K19. Use patterns	1, 2	H	F
K 20. Levels and types of impact	1, 2	H	F/A
<b>Governance</b>			
K31/S21. Stakeholder participation/Participation in decision making	1-3	H	None
<b>Attitudes and perceptions</b>			
S15. Non-market and non-use values	1, 2	H	A
S16. Perceptions of resource conditions	1, 2	H	A
S17. Perceived threats	1, 2	H	F
S24. Perceived coastal management solutions	1-2	H	A

### b) GCRMN Parameters

Parameter to Monitor	Objective # 1, 2, 3	Priority High/Med./Low	Spatial info Feature/Attribute
Tourism recreation	1, 2	H	None

Following the September workshop and subsequent SocMon Spatial training, team members and other stakeholders were again assembled on October 25, 2016 to provide input into the design of key informant interview guides. Utilising materials provided by

the UWI-CERMES, team members were divided into two groups and focused on developing questions for key stakeholder groups. The draft instruments were later refined through consultation with CERMES and finalised in early 2017. Once the key informant interview guides were finalised and approved, another meeting of the team was planned. Due to the time constraints and delays experienced by the project, it was at that time decided to review and further reduce the list of key informants to be interviewed to ensure enough time was available for data compilation, analysis and report writing.

### 2.3 SocMon team

The final SocMon team was chosen from among the participants of both the SocMon and SocMon Spatial workshops. Selected team members possessed expertise in a range of disciplines including fisheries and marine management, community engagement and spatial data analysis. The team is presented in Table 3. See Appendix 2 for more details on the composition of the team during initiation of data collection, data entry and report preparation.

**Table 3: SocMon Team Members and Their Roles**

Skill Requirement/Team Role	Names/affiliations of team leader and members
Coordination and management	Mykl Clovis-Fuller; EAG ECMAN
NEMMA Technical advisor	Mr. Julien Lawrence; NEMMA Manager
Fisheries Technical expert	Ms. Tricia Lovell, Senior Fisheries Officer
Fisheries Technical Expert – design of data collection instrument with inclusion of ecological link	Mr. Mark Archibald; Fisheries Officer
Community liaison and data collection	Mrs. Brenda Thomas-Odlum, Mrs. Sharon Dalso, Ms. Ruth Spencer
Spatial data collection and analysis	Ms. Raisa Spencer

### 2.4 Secondary data

Prior to completing the SocMon activity, the team undertook a review of secondary data sources and considered how they could assist in providing insight into the various variables to be monitored. Most of the secondary data sources were derived from reports and studies conducted under the OECS Protected Areas and Associated Livelihoods Project (OPAAL), which was funded by the Global Environment Facility (GEF). The information garnered from these secondary data sources were used to compare the results of the key informant surveys conducted through this project.

### 2.5 Key informants

During the September workshop, participants undertook a careful analysis of the stakeholders within the study area. This list was used to determine the key informants to be interviewed. Key informants were chosen so as to provide a representative view of the interests within NEMMA and based on geographical balance. Some informants were

chosen because of the roles they play in the management of the area or because they were subject matter experts. The final list of key informants is presented in Table 4.

**Table 4: Stakeholder Groups and Key Informants**

<b>Stakeholder group/interest</b>	<b>Location</b>	<b># of Informants Interviewed</b>
<b>Tour/Watersports Operators</b>		
Tour Operator (Antigua Adventure)		1
Eco-Tour operator (Stingray City)	Seatons	1
Watersports operators (40Knots Antigua Kite surfing)	Green Island	1
<b>Private business owners</b>		
Seamoss farmer	Seatons	1
Marina Operation	Shell Beach	1
<b>Community Based Organisations</b>		
CBO	Freetown/Barnes Hill	2
<b>Fishers</b>		
Sport Fisher	Hodges Bay/Jabberwock	1
Commercial Fisher	Mill Reef/Halfmoon Bay/Parham	6
Commercial Pelagic Fisher		1
<b>Subject Matter experts</b>		
Forestry and Wildlife	Forestry Unit	1
Island Conservation	EAG	1
Environmental Management	Department of the Environment	1
Fisheries	Fisheries Division	1
Tourism	Ministry of Tourism	1
Marine Turtle Monitoring	Antigua Barbuda Sea Turtle Project	1
Seabird Expert	EAG/ Birding Expert	1

## **2.6 Key informant interviews**

Although the initial discussions held at the September SocMon training workshop suggested that the project would conduct key informant interviews and household surveys, due to time constraints, it was later decided to focus on key informant interviews. Key informant interviews offered an opportunity to obtain information on a wide range of variables from individuals with sufficient knowledge and information on the area that could lead to a meaningful assessment.

Four members of the SocMon team conducted the interviews, and divided the list of key informants based on discipline and proximity to the team members. The final key informant interview guide utilised in the study consisted of ten questions, two of which were optional. All questions were designed to illicit a conversation whereby respondents were free to elaborate their own views and opinions. Several questions were designed in order to capture spatial information; therefore interviewers were also provided with maps

of the area. The final key informant interview guide is appended to this report as Appendix 3. Twenty-two key informants were interviewed.

### *2.7 Data entry and analysis*

All the data collected during the interview process were input onto an Excel spreadsheet. This datasheet presents a complete compilation of all the key informants and their responses to the interview questions. It also presents a narrative summary of each question across all key informants.

The interview data were reviewed and analysed to determine any emerging patterns and trends between various responses as recommended in the SocMon Caribbean Guidelines. This was done by considering each question separately, extracting distinctive responses and analysing the frequency (Appendix 4). The analysis considered to what extent the various interview questions successfully measured the priority variables of the research. In presenting the information, the results will be organised based on key variables rather than individual interview questions.

In addition to identifying trends, some interview questions also presented spatial characteristics of the NEMMA. The newly developed SocMon Spatial tool which integrates SocMon with participatory GIS (pGIS) was used to collect information on these spatial characteristics. During the interviews, key informants were presented with maps and asked to utilise them in answering a number of key questions that could be represented spatially. These maps were used to capture information on important tourism-based activities, key fishing areas, areas of concern and key conservation areas within the NEMMA. This information was then used to generate several GIS maps, which will be presented in the Results section of the report.

### *2.8 Communication for use*

The information garnered from this study will first be compiled and assembled into a primary report. This report will be made available to government departments, senior technicians and policy makers for their information. Information will also be summarised into presentation format to allow for dissemination to stakeholders, in particular the key informants who participated in the study.

## **3 RESULTS**

### *3.1 Site description*

#### *3.1.1 Community and ecological profile of study area*

The Northeast Marine Management Area is a large multi-use protected area located on the Northeast Coast of Antigua. Covering over 30 square miles, NEMMA is one of the largest protected areas in the country and includes acres of wetlands, coral reefs, seagrass bed communities and a number of small islands, cays and rocky outcrops. NEMMA is a crucial area for biological conservation in Antigua and Barbuda as it is the last refuge of the critically endangered and endemic Antigua racer snake. It also provides nesting and foraging habitat for endangered marine turtles, endemic species of lizards and a wide



array of birds including terns, laughing gulls, brown pelicans and the red-billed tropicbird.

With very few exceptions, the offshore islands of NEMMA are uninhabited and some are rarely visited by humans. A few islands, however, are often frequented by tourists and by locals who traditionally use these islands for picnics and camping during long weekends such as Easter or Pentecost.

NEMMA is a popular site for a range of tourism activities, ranging from eco- and adventure tours, to wildlife encounter tours and large day cruises on catamarans. The area is well known for its kayaking tours and Stingray City, which allows visitors to swim with stingrays in a safe and controlled environment.

Though many areas of the adjacent coastline of NEMMA remain relatively sparsely populated, several human settlements occur along the coast. However, with the impending Special Economic Zone development on the horizon (the so-called Yida Project) this is likely to change as some previously uninhabited areas have now been slated for large-scale development. In addition to community settlements a number of large hotels, marinas and industrial complexes are also located within and on the boundaries of NEMMA. Each large hotel along the coast of NEMMA, has associated with it at least one restaurant and there are also a number of other restaurants on the beach or on the offshore islands. Other coastal uses that impact the NEMMA include military installations, universities and other tertiary institutions, ferry docking facilities, desalination plants and the only international airport on the island.

### 3.2 Key informant data

The data from all key informants were compiled and assembled into a key informant data sheet. Respondent answers to each question were entered on the sheet following which a summary narrative of all responses was created and entered as well. While the full data sheet is appended to this report (Appendix 4), the summary narrative for each question is presented in Table 5 below.

**Table 5: Summary of Key Informant Answers to Survey Questions.**

Question	Summary Narrative
1	<p><i>What coastal and marine activities currently occurring in the NEMMA are of concern to you? Why? [Show Map and record location of activities]</i></p> <p>Many key informant expressed concerns about unsustainable fishing, net fishing and harvesting of undersized conchs. Some noted that use of some offshore islands and some areas on the mainland have resulted in deleterious impacts including: clearing of vegetation, trash, erosion, and killing of endangered wildlife. Almost all respondents expressed concerns about large-scale unsustainable development in the area that has impacted coastal ecosystems, in particular mangroves. Other identified issues included land-based pollution, oil spills and desalination.</p>
2	<p><i>In what ways have the condition of coastal and marine resources changed in the NEMMA over the last 5 years?</i></p> <p>Most key informants noted that the condition of the coastal and marine environment has declined having observed habitat degradation and declines in some wildlife (birds,</p>

Question	Summary Narrative
	marine turtles, snakes and fish). Some respondents, however, noted some improvements in the health of coral reefs, having observed some recruitment.
3a	<p><i>How important is the condition of the coastal (beaches, mangroves, offshore islands, wildlife) and/or marine environment (coral reefs, mangroves, seagrass, fish, water quality) to you in general (in terms of work, recreation, appreciation of its existence)? Explain. [S16]</i></p> <p>All key informants noted that these coastal and marine systems were either important or very important to their work and or private life. Many indicated that they actively used many of the areas on NEMMA for recreation or for their livelihoods. Several key informants focused on the key role mangroves play in providing ecosystem services to the adjacent communities.</p>
3b	<p><i>Which areas of the NEMMA would you consider most important for conservation/at risk? Why? [Show Map and record areas of importance or at risk]</i></p> <p>Key informants largely felt that at all aspects of NEMMA were important for conservation. Most noted the critical value of the offshore islands as well as mangroves, coral reefs and seagrass beds. Several key informants noted the role of the area's beaches in supporting sea turtle nesting.</p>
4	<p><i>What are the main threats/pressures to conditions of coastal and marine resources in the NEMMA? How do you think these could be addressed?</i></p> <p>Almost all the key informants expressed concern about the unsustainable development they have observed in NEMMA and many singled out the Yida development. The use of gillnets in NEMMA was also highlighted with several individuals proposing that this activity be banned in the area. Other issues included the impacts visitors have on offshore islands, solid waste management in these areas, land-based pollution, overfishing and natural disasters. Several individuals proposed artificial reefs as a means of promoting recovery, zoning for improved management, and education and outreach to promote more sustainable behaviour.</p>
5	<p><i>Some reefs provide more and better habitat for reef creatures, do you support measures to help protect them? What types of measures (e.g. restoration, protection, seasons, gear restrictions)? [S24] [Show Map]</i></p> <p>All key informants supported the employment of a range of measures to protect reefs in the NEMMA. There was wide support for the measures listed (restoration, protection, seasons and gear restriction) while some suggested zoning of the area, restricting/prohibiting fishing in NEMMA and the employment of artificial reefs. At least one individual suggested there was a need to protect the marine environment from land-based pollution.</p>
6	<p><i>Which coastal and/or marine activities should be managed or prohibited in the NEMMA? Why?</i></p> <p>Most key informants were in favour of the management of all activities in the area. Several individuals suggested that large-scale development should be prohibited while others recommended banning the use of gillnets in the area and the harvesting of certain.</p>
7	<p><i>Is enough being done by NEMMA management authorities to include stakeholders in decisions regarding management of the area? Explain.</i></p> <p>Persons largely felt that stakeholder inclusion in NEMMA management was largely absent. Most were unaware of any efforts to engage stakeholders while some felt there was a definite need to engage with certain groups (fishers, private sector) and local communities in the area.</p>

Question	Summary Narrative
8	<p><i>What are your views on future private developments within the boundaries of the NEMMA?</i></p> <p>While a minority of the individuals expressed the view that all development (and in particular large scale development) should be prohibited, most persons felt that development could be positive once it occurred in a sustainable way, adhered to the existing laws that governed the area and were done in a manner that promoted conservation. Several suggested that private development be limited to small-scale low impact development and restricted or prohibited on the offshore islands.</p>
9	<p><i>What is the MOST popular coastal or marine activity that tourists typically participate in within the NEMMA, and what locations are used most often for this activity? [K14/S10; GCRMN-Caribbean: Tourism Recreation] [Show Map and record locations]</i></p> <p>Activities identified by key informants ranged from land-based activities (such as camping and picnicking on islands and beaches) to sea-based activities including, kayaking, SCUBA diving, snorkeling, watersports, and yachting.</p>
10	<p><i>Where are the most popular fishing areas within the NEMMA? [Show Map and record locations]</i></p> <p>Only about half the interviewees responded to this question. Of those that responded, responses ranged from specific locations (e.g. five miles NE of Great Bird Island) to a more general description of fishing areas (e.g. fringing reefs or throughout the area).</p>

### 3.3 Use patterns, perceived resource conditions and threats to adaptive coastal management

Objective one of the SocMon study primarily measures the coastal and marine activity variables along with a number of variables focused on attitudes and perception as outlined in the SocMon Caribbean Guidelines.

**Table 6: SocMon Variables Relevant to Objective One**

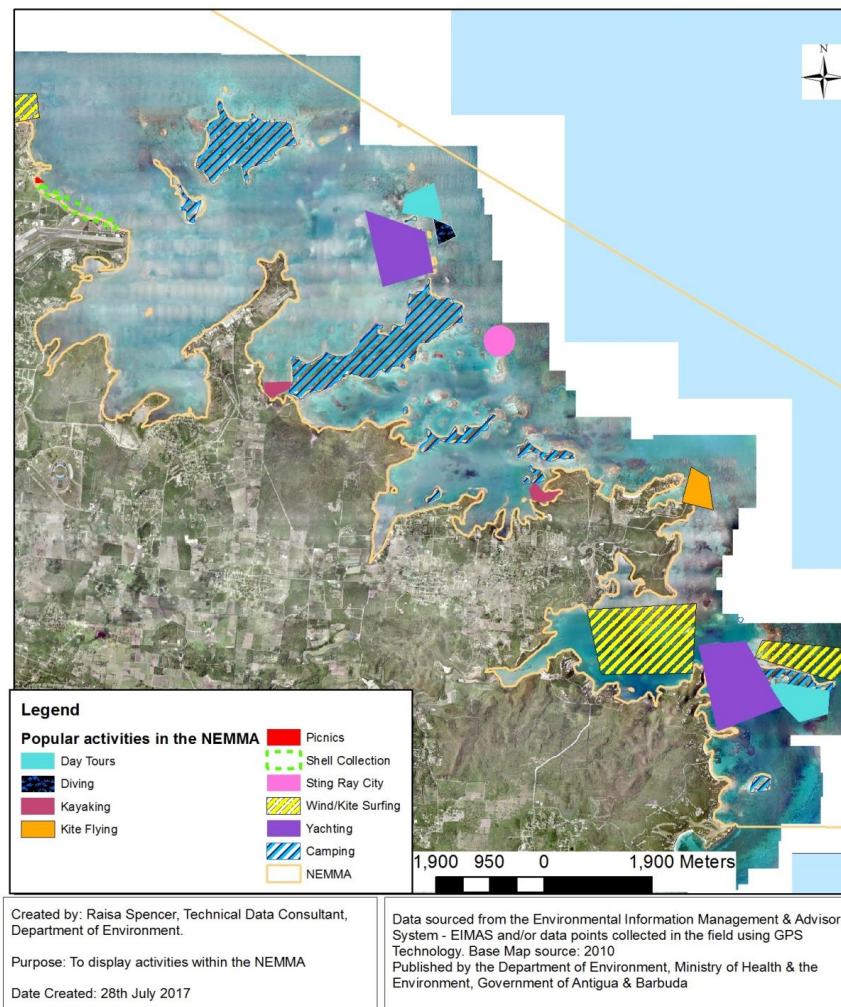
Variable to monitor	Objective # 1, 2, 3
<b><i>Coastal and Marine Activities</i></b>	
K14/S10 Activities/Household activities	1 - 2
K15/S11 Goods and services/household goods and services	1, 2
K16/S12 Types of use/Types of household uses	1, 2
Value of goods and services	1, 2
K19. Use patterns	1, 2
K 20. Levels and types of impact	1, 2
<b><i>Attitudes and Perceptions</i></b>	
S15. Non-market and non-use values	1, 2
S16. Perceptions of resource conditions	1, 2
S17. Perceived threats	1, 2
S21. Participation in decision making	1-3
S24. Perceived coastal management solutions	1-2

The key informant interview captured these variables through questions four, nine and ten.

### 3.3.1 Types and patterns of use

Variable K19 is concerned with the pattern of uses within the study area. This variable allows for spatial analysis by asking key informants to locate on a map where certain activities are occurring. This approach was taken by the SocMon key informant interviews when considering tourism and fishing uses in the area.

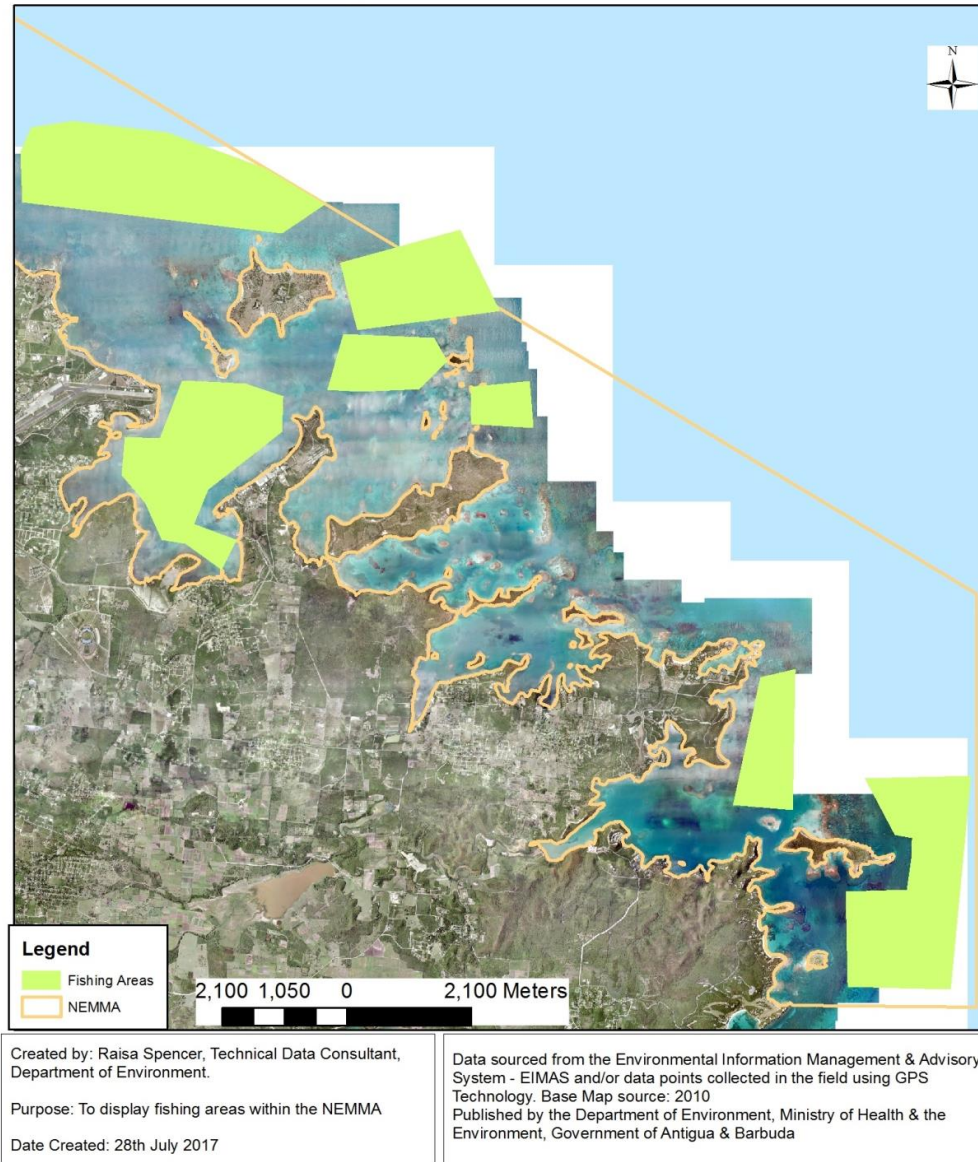
With regard to tourism uses, respondents largely focused on in-water activities and usage of the offshore islands. In addition to watersports, boating and Stingray City, most persons interviewed pointed to uses of the islands and beaches for camping and picnics, snorkelling and diving in the area and yachting. The most important areas for these activities were also highlighted and are presented in Figure 1.



**Figure 1: Map showing popular activities in NEMMA**

Question 10 of the SocMon key informant interview asked respondents to indicate the most important areas for fishing in the NEMMA. Only about half the interviewees

responded to this question with responses ranging from very specific locations to more generalised areas. Many individuals pointed to the fringing reefs of NEMMA as well as areas proximal to the offshore islands as being important for fishing. A few individuals singled out Great Bird Island, Green Island and Guiana Island in this regard. All the areas identified as being important for fishing and their extent are presented in Figure 2 below.



**Figure 2: Map showing important fishing areas in NEMMA**

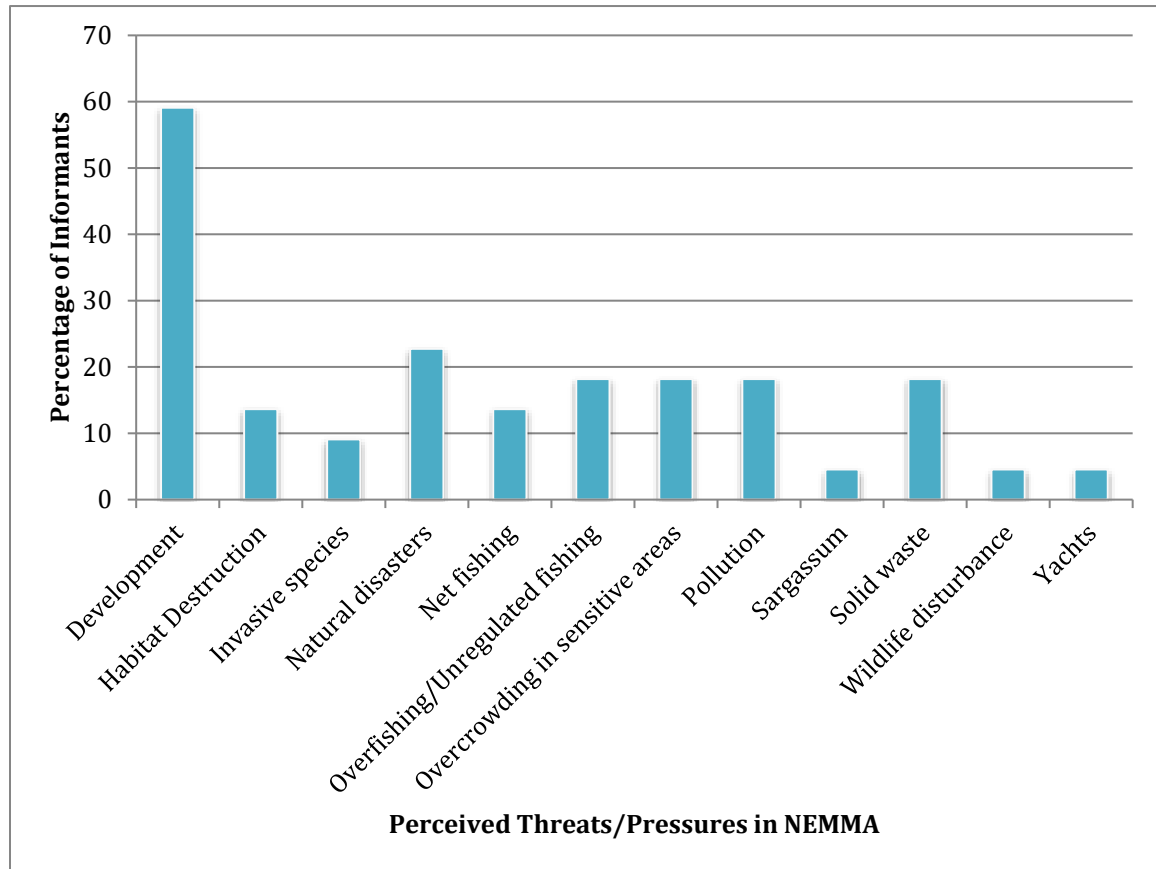
### 3.3.2 Perceived threats and solutions

Respondents were asked to identify the threats/pressures to the resource conditions in the NEMMA and to make recommendations on how such pressures should be addressed. By



far the most significant threat identified by key informants was the threat of large scale or unsustainable development in the area. More than half of the key informants felt that this was the greatest threat in the NEMMA. Several respondents expressed explicit concerns about the Antigua Barbuda Special Economic Zone Project (so-called Yida Development). Other identified hazards included: various aspects of fishing, invasive species, natural disasters, solid waste disposal in sensitive areas, yachting, and wildlife disturbance (

Figure 3).



**Figure 3: Perceived threats/pressures occurring in NEMMA, n = 22**

Recommendations on the management of identified hazards ranged from regulatory measures to soft enforcement actions such as education and outreach. Many key informants pointed to a need to enforce existing legislation while others recommended new regulations be established; to prohibit the use of gillnets, rezone the protected area and manage installed moorings. Investments in community programmes and alternative livelihood programmes were also recommended as viable options for managing resource threats.

### 3.4 Understanding the impact of conservation objectives on human use and state of the physical environment

In seeking to understand how conservation objectives have impacted human use and the state of the natural environment the following key variables are most critical:

- K14/S10 Marine and coastal activities;
- K15/S11 Goods and services/household goods and services;
- S16: Perception of resource conditions

The information garnered through this interview will be compared with secondary data sources, which present information from very early after the protected area was declared. Questions one and two of the key informant guide offered insight into the perceptions of respondents to activities of concern and the state of the NEMMA.

#### 3.4.1 Natural resource use and perceptions

Question one of the SocMon key informant interview asked respondents to indicate those activities currently occurring in NEMMA that were of concern to them. The majority of individuals (59%) identified fishing as a major concern with just under 41% noting they were concerned about the development occurring in the area. Other concerning activities included coastal erosion, dredging, habitat destruction, pollution from oil spills and land-based sources, and activities on the offshore islands (Figure 4).

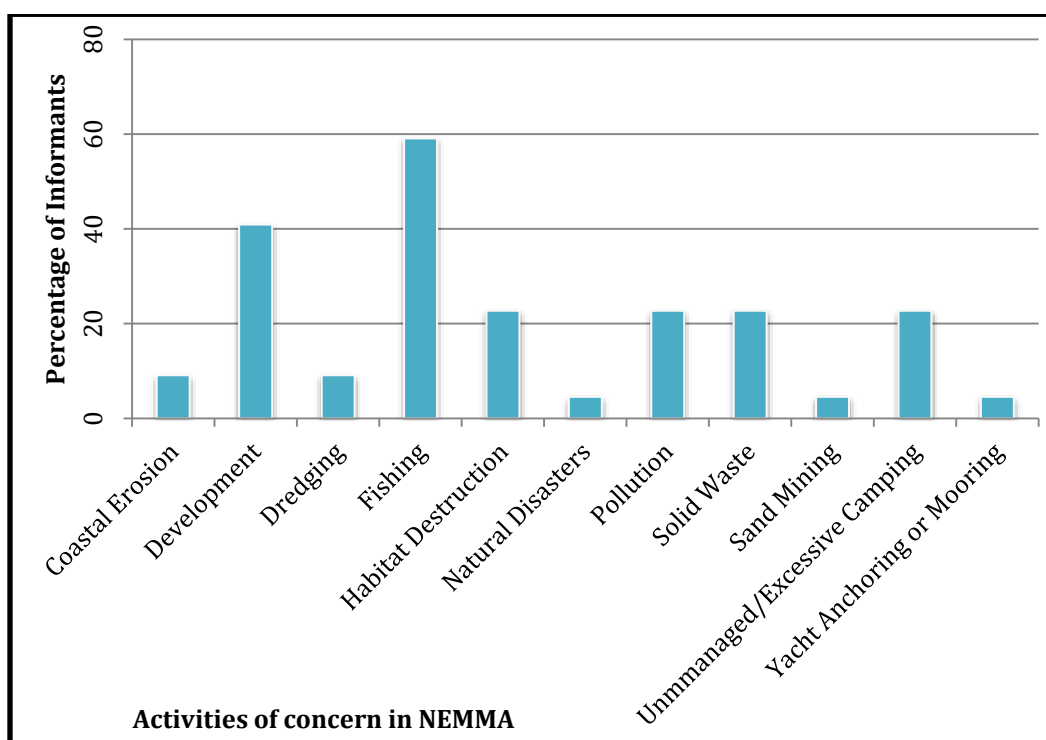
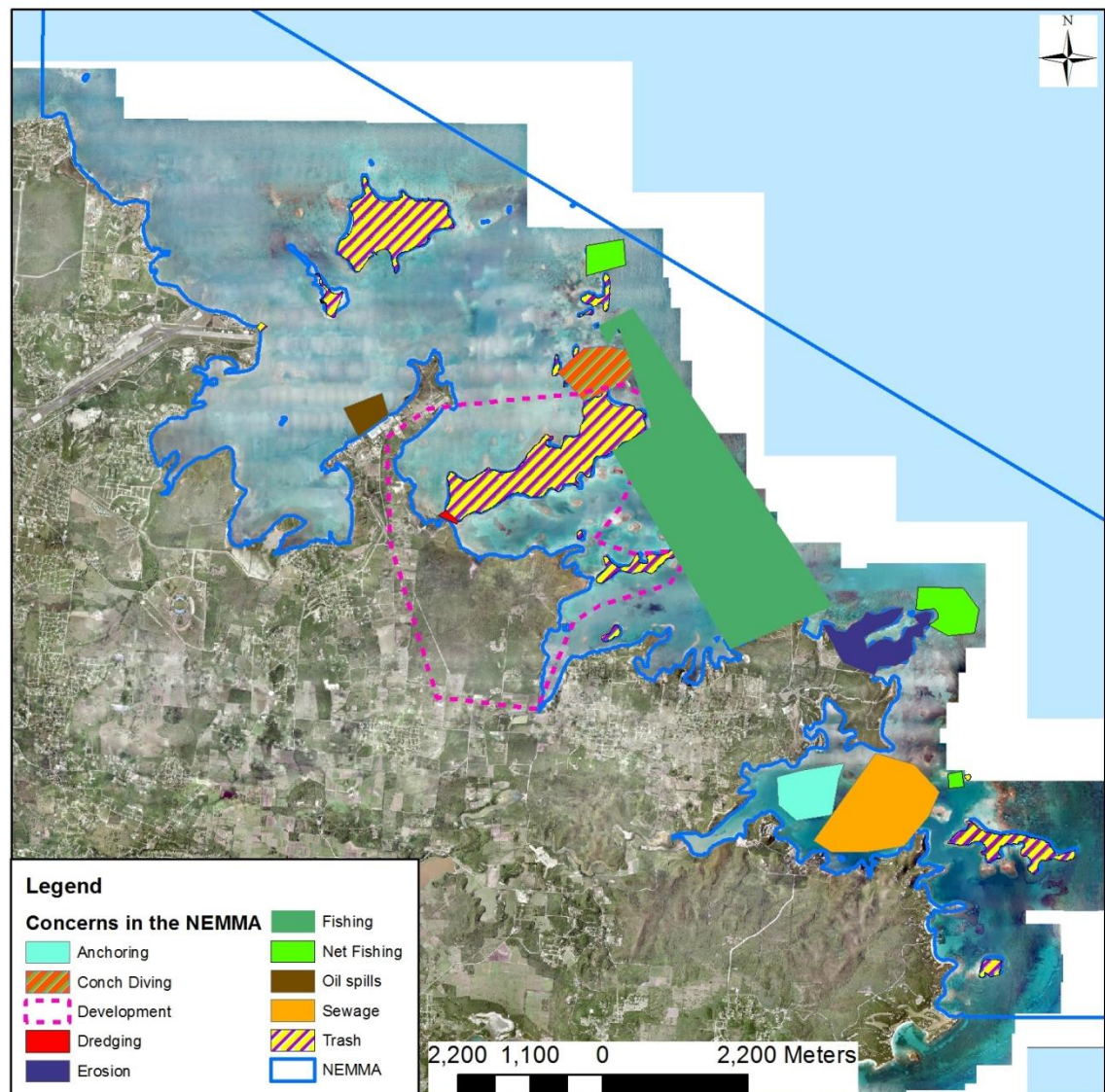


Figure 4: Activities occurring in NEMMA that were of concern to key informants, n = 22

Respondents were also asked to indicate on a map, the location in the NEMMA where these activities were occurring. The information garnered from each individual was then



compiled, assimilated and utilised to generate a GIS map outlining “Activities of Concern in NEMMA”. The map is presented in Figure 5 below.



Created by: Raisa Spencer, Technical Data Consultant,  
Department of Environment.

Purpose: To identify activities within the NEMMA of concern

Date Created: 28th July 2017

Data sourced from the Environmental Information Management & Advisory  
System - EIMAS and/or data points collected in the field using GPS  
Technology. Base Map source: 2010  
Published by the Department of Environment, Ministry of Health & the  
Environment, Government of Antigua & Barbuda



**Figure 5: Map Showing the Location of Concerning Activities in NEMMA**

Of the respondents who identified fishing as a concern, several categories of fishing were highlighted. Net fishing and spearfishing were most frequently cited, followed by unregulated fishing, trap fishing and fishing by foreign nationals (Figure 6).

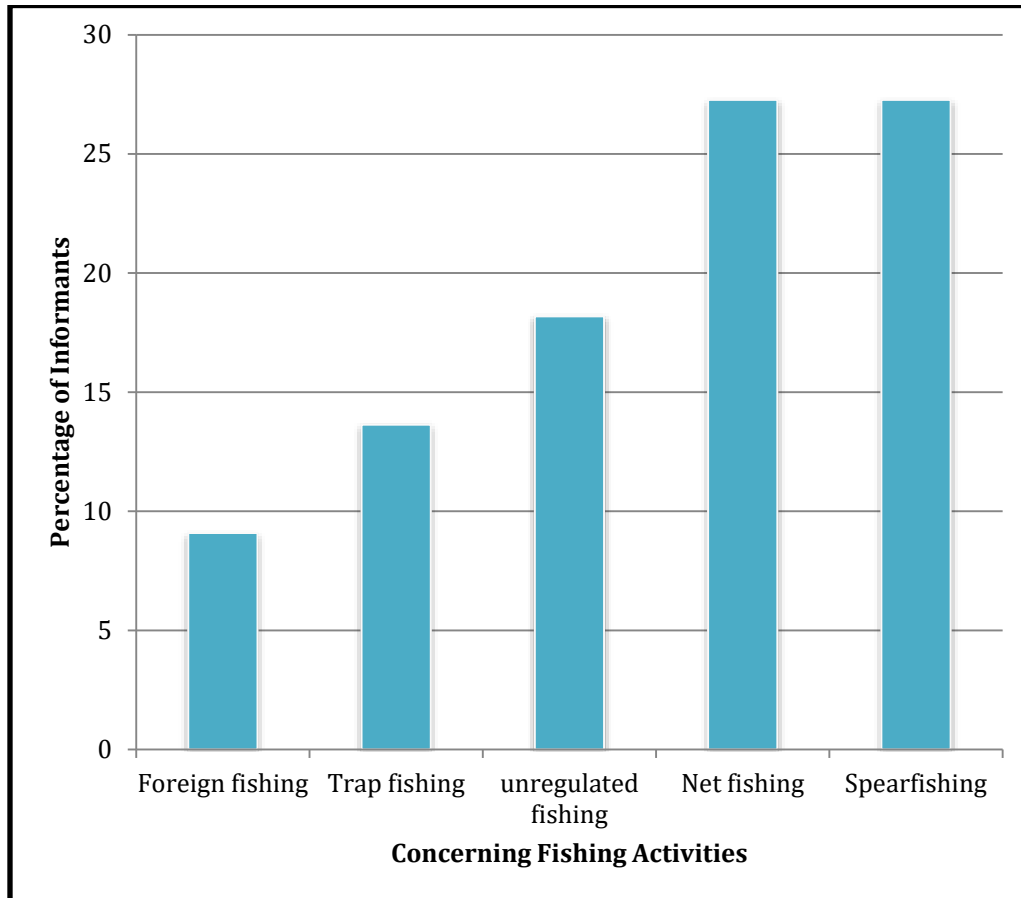


Figure 6: Types of fishing activities of concern to key informants, n = 22

### 3.4.2 Perceptions of resource conditions and successes in coastal management

Understanding how informants view the resource conditions in the NEMMA as compared to an earlier period offers the opportunity to understand whether the declaration of the protected area and establishment and implementation of conservation objectives has impacted the state of the natural environment, at least as perceived by key users of the area.

Informants were asked to comment on how the state of the natural environment in the NEMMA had changed over the last five years. Almost all of the respondents (86%) agreed that the conditions of the resources in the NEMMA had declined since 2012. Of those, four individuals noted there had been some improvements despite the overall decline. Two key informants noted there was improvement in the state of the environment while only one person felt that there had been no change (Figure 7). Some of the improvements observed by a minority of respondents included; increase in fish stocks for herbivorous species such as parrotfishes and doctorfishes, fewer invasive

species on offshore islands, and improvements in some coral reefs that have begun to show signs of coral recruitment.

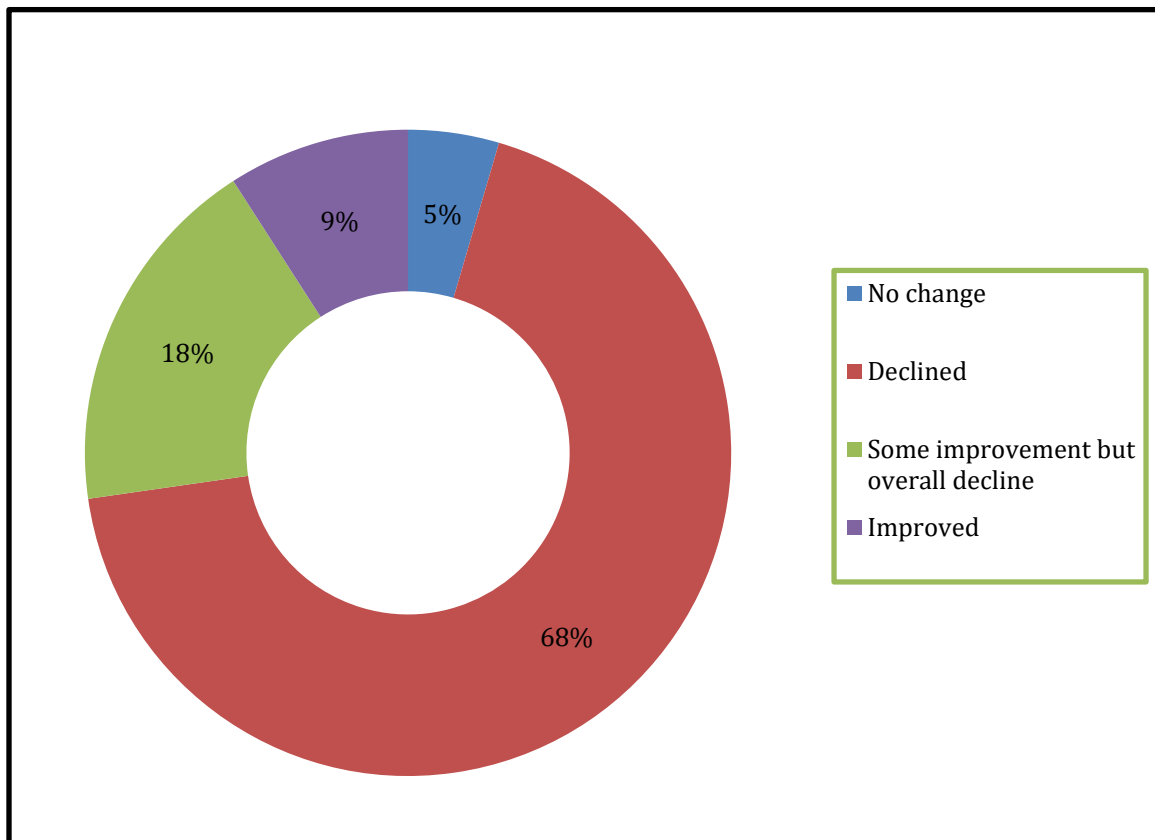


Figure 7: Respondent perception on the state of NEMMA compared to five years before, n = 22

### 3.5 To involve stakeholders in an integrated approach to monitoring of the NEMMA

The very nature of SocMon provides an avenue for stakeholders to inform management decisions for an area. The information gathered through key informant interviews, such as the one employed in this study can be very instrumental in guiding long term policy for management of the site. In addition to soliciting informant insight, the interview offered an opportunity to gauge from participants their perception of stakeholder involvement in the management process. This objective was measured by the following key variables are:

- K31: Stakeholder participation/S21: Participation in Decision Making
- S24: Perceived coastal management solutions

#### 3.5.1 Participation in Decision-Making

In question seven of the interview, interviewees were asked to consider to what extent stakeholders were involved in the management of the NEMMA. The results are quite revealing and indicate that despite stakeholder involvement in the early stages of planning for the NEMMA, stakeholders have largely felt excluded from the process since

then. More than 85% of respondents felt that stakeholder involvement was either non-existent or insufficient under the current regime. Two persons were unaware while one individual felt that involvement of stakeholders was sufficient (Figure 8).

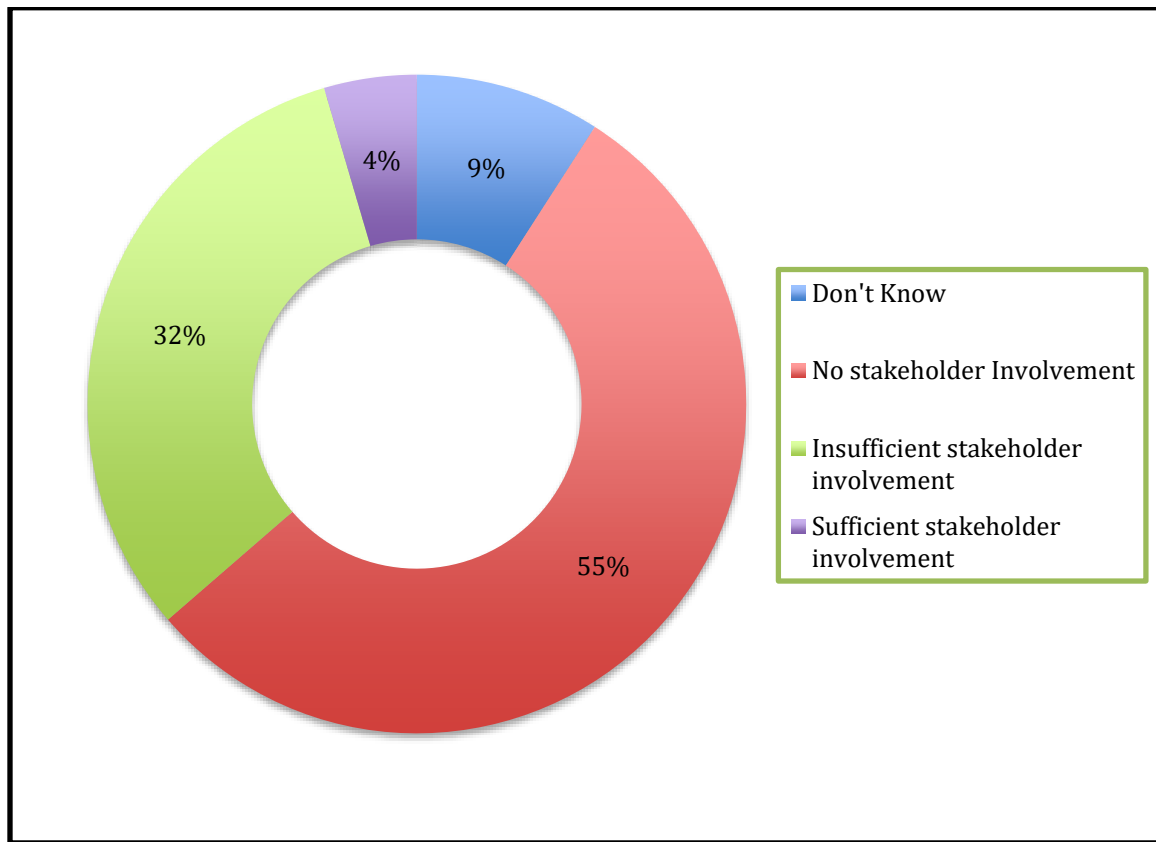


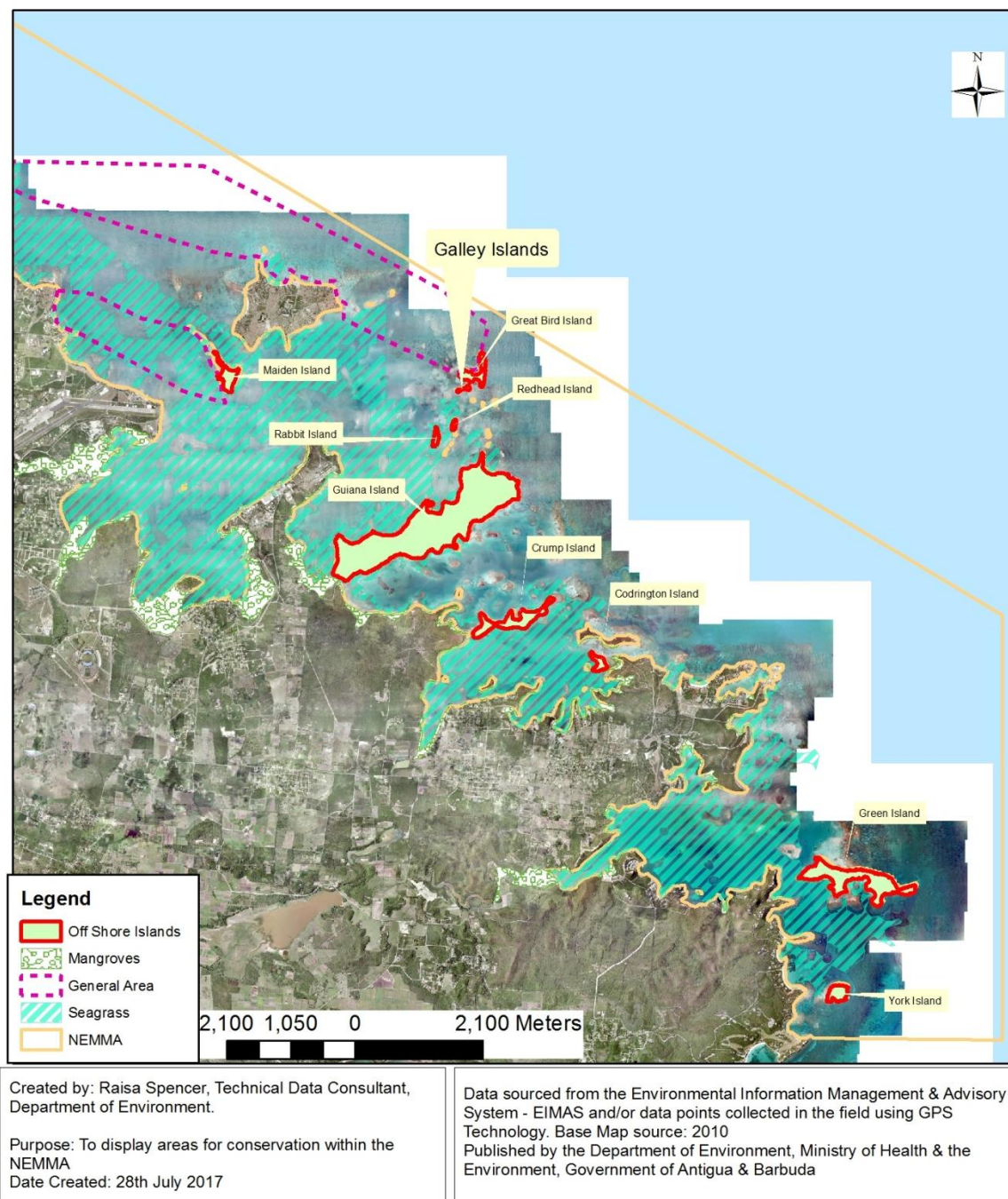
Figure 8: Respondent perception of stakeholder involvement in the management of NEMMA, n = 22

### 3.5.2 Perceived coastal problems and solutions

Questions three, five, six and eight of the SocMon key informant interview were designed to illicit informant views on management interventions that could be applied to improving the situation in the NEMMA. Question three focused on understanding how important marine and coastal areas of the NEMMA were to the respondents and sought their input on the main areas that required conservation. Question five focused on understanding informant views on conservation measures for coral reefs while question six asked them to consider which coastal activities should be prohibited or managed. Question eight asked respondents to consider how development in the NEMMA should be handled moving forward.

All respondents noted that the marine and coastal habitats of the NEMMA were important to their livelihoods and/or well-being. Many individuals noted that they directly utilised the resources of the NEMMA either for recreation or as an economic activity. Several respondents highlighted the significant importance of mangroves both to their livelihoods and for the services they provide to local communities. Areas recommended for conservation by the respondents are presented in Figure 9 below.

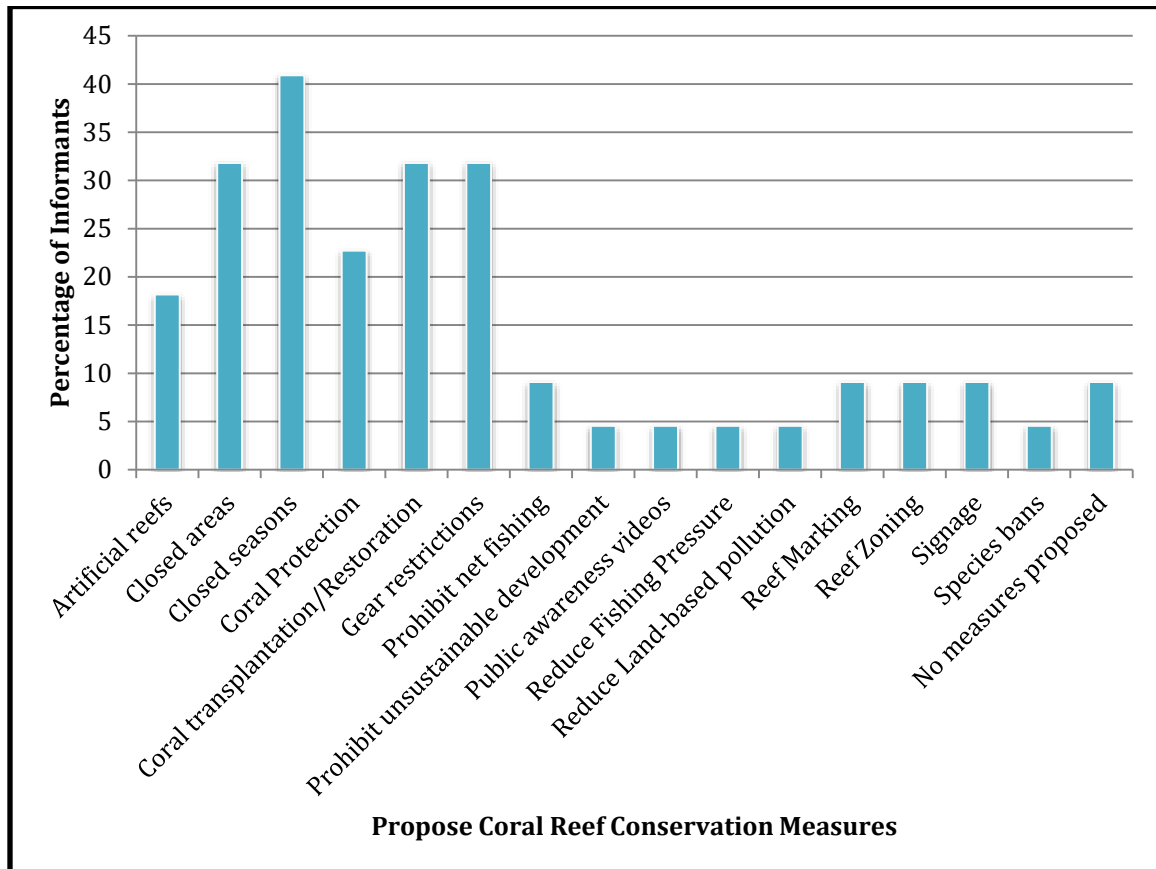




**Figure 9: Areas and ecosystems in NEMMA proposed for conservation by key informants**

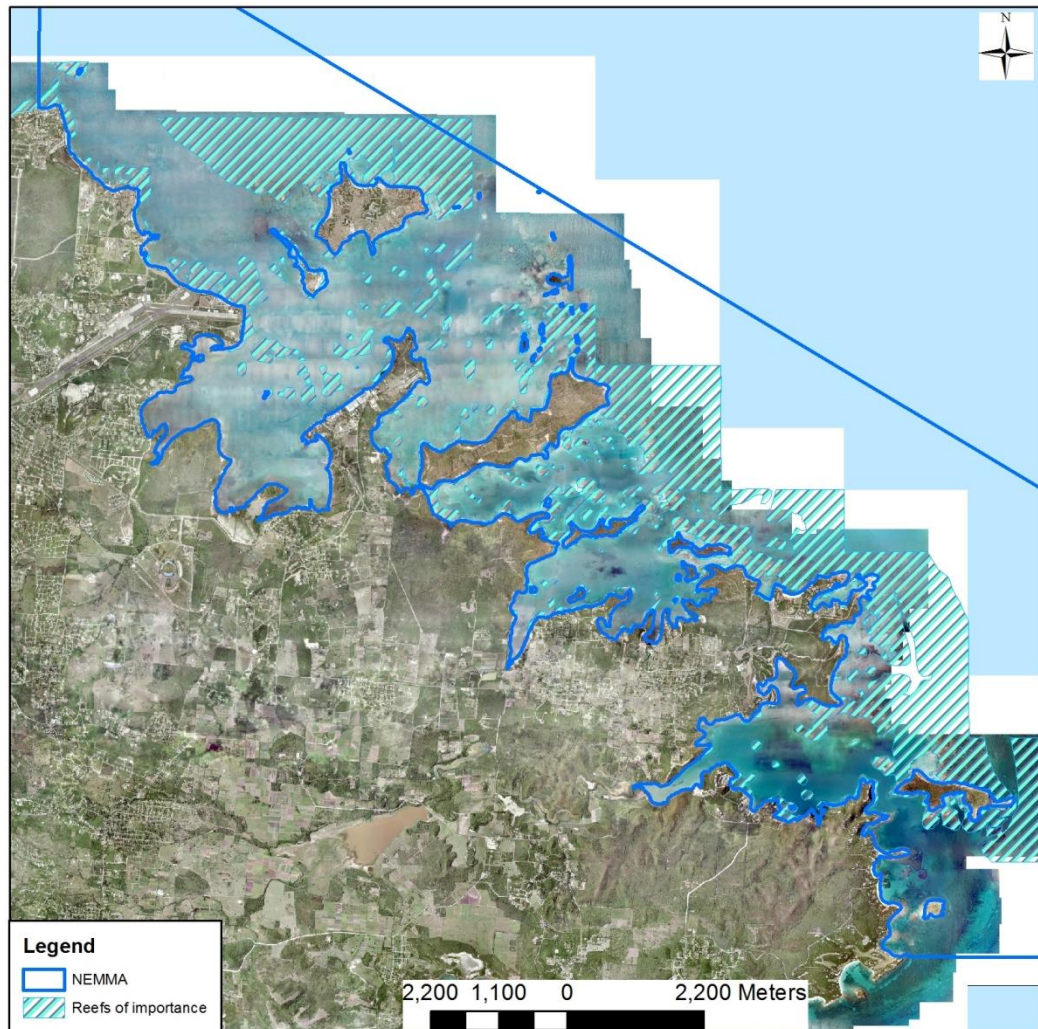
Question five asked respondents to indicate whether they would support measures for the conservation of coral reef areas in the NEMMA. All interviewees responded in the

affirmative to the suggestion that measures be employed for the conservation of coral reefs in the NEMMA. They were then asked to recommended measures that could be employed in this regard. Many respondents agreed with the four measures suggested in the interview guide (coral restoration, coral protection, seasons and gear restrictions) while others made additional recommendations for management. The most commonly recommended conservation measure was the employment of closed seasons (just over 40%). Thirty percent of informants recommended closed areas, gear restrictions and coral restoration as viable measures. Other suggestions included, artificial reefs, banning gillnet fishing, reef marking/zoning, signage and public awareness. See Figure 10.



**Figure 10: Coral reef conservation measures proposed by key informants, n = 22**

In addition to making recommendations of individual measures, respondents were also invited to identify critical reefs in the NEMMA where management interventions could be applied. Figure 11 shows those reefs that were pointed out by respondents as being important for conservation. Respondents largely focused on fringing reefs. Several of the reefs identified as important for conservation were also considered to be key fishing areas as well; e.g. east and northwest of Green Island, south of Great Bird Island and some areas north of Long Island.



Created by: Raisa Spencer, Technical Data Consultant,  
Department of Environment.

Purpose: To identify important reefs within the NEMMA

Date Created: 28th July 2017

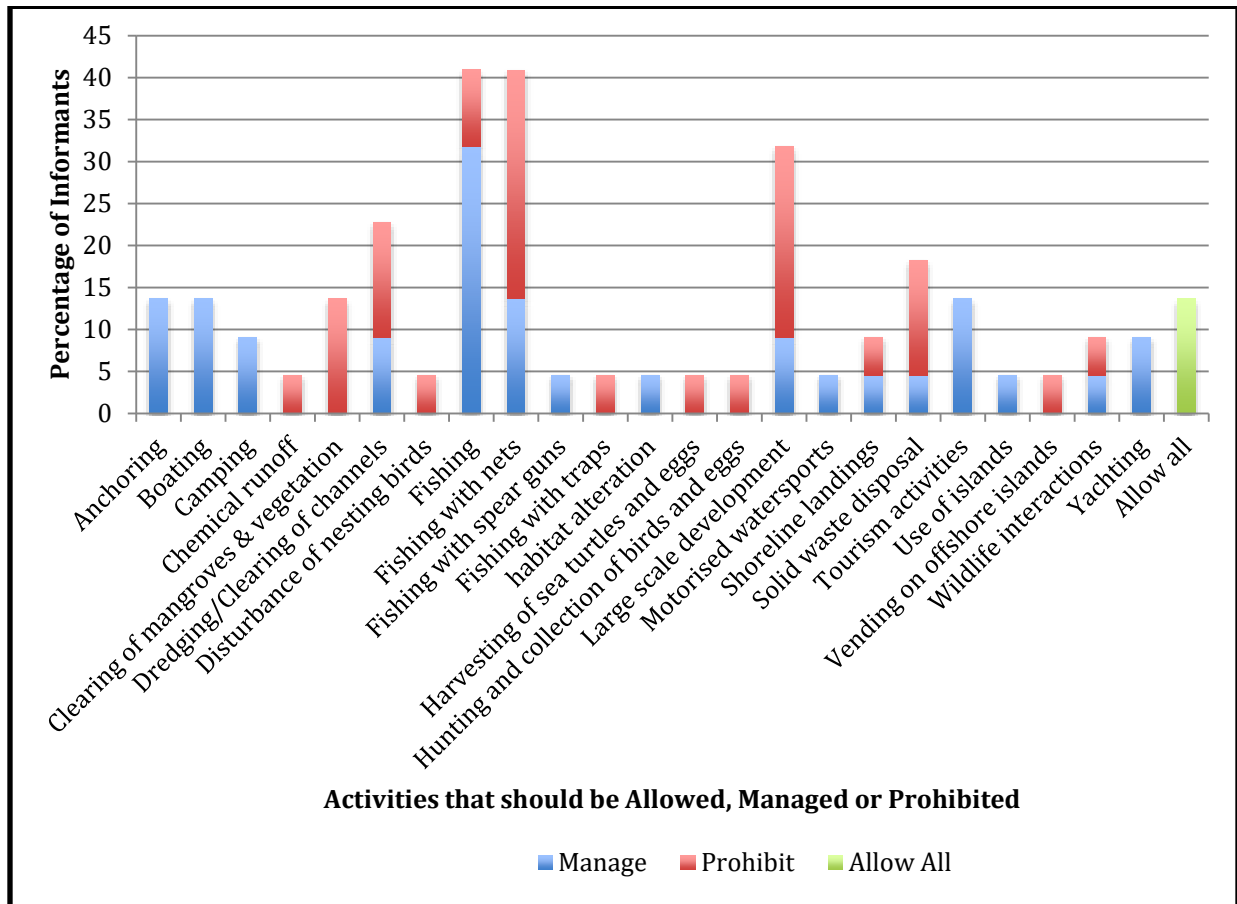
Data sourced from the Environmental Information Management & Advisory  
System - EIMAS and/or data points collected in the field using GPS  
Technology. Base Map source: 2010  
Published by the Department of Environment, Ministry of Health & the  
Environment, Government of Antigua & Barbuda



**Figure 11: Reefs recommended for conservation and Protection by Respondents**

Question six of the interview asked interviewees to comment on which coastal or marine activities should be prohibited or managed within NEMMA. In all, informants identified twenty-three distinct activities/threats that should be either prohibited or managed within NEMMA. Not surprisingly, respondents most frequently expressed concern about fishing activities and large-scale development. Forty-one percent of key informants recommended that both fishing and, specifically, net fishing should either be prohibited or managed by NEMMA authorities. Interestingly, more persons felt that net fishing should be completely prohibited (six out of nine individuals), while the opposite was true for general fishing activities in the NEMMA (Figure 12).





**Figure 12: Informant proposed activities that should be managed or prohibited in NEMMA, n = 22**

Question eight required persons to comment on their views of future private development in the area. Almost all key informants felt that future development in the NEMMA should either be prohibited or limited to small-scale/environmentally sustainable development that takes into consideration the conservation objectives of the protected area. Only one individual indicated that private development should be allowed to continue in NEMMA with no conditions. Figure 13 below illustrates this.

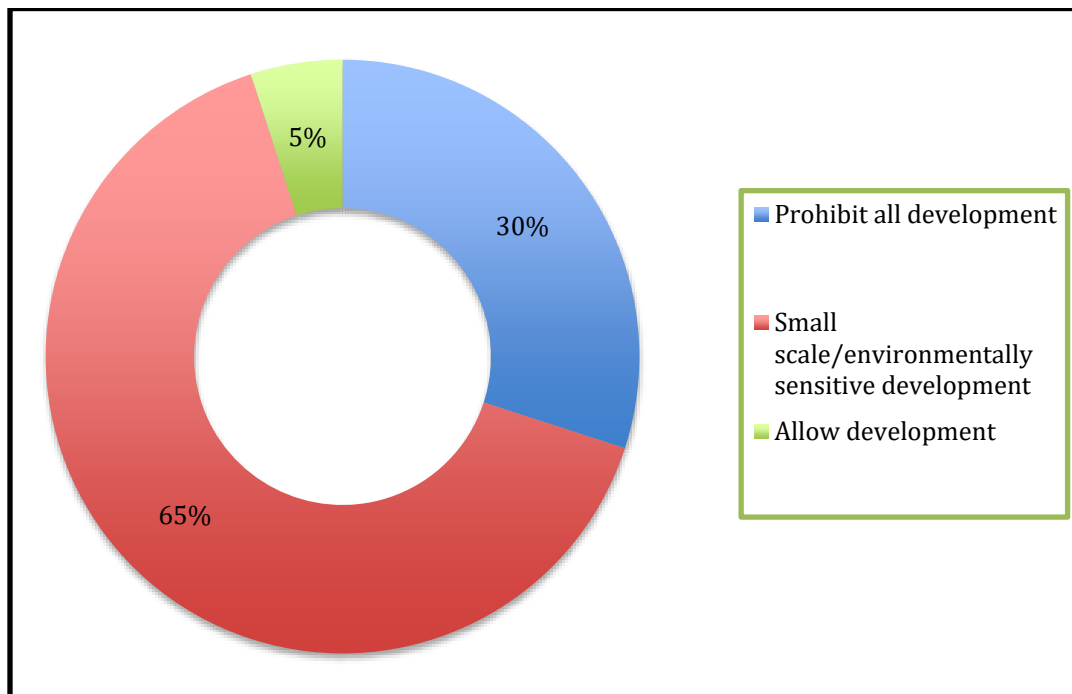


Figure 13: Informant views on future development in NEMMA, n = 22

### *3.6 To measure a core set of variables that link the socioeconomic context of NEMMA communities to ecological context of the area.*

This objective was ultimately integrated (combined) into the first two objectives ensuring the measurement of an appropriate core set of variables.

## **4 DISCUSSION AND CONCLUSIONS**

### *4.1 Use patterns, perceived resource conditions and threats to adaptive coastal management*

The current patterns of use for tourism in the NEMMA can be compared against those uses identified by Espeut (2006) and Jackson and Associates 2008. The Espeut report reviewed the livelihood opportunities that exist in the NEMMA. In that report he identified nine categories of use in the area and located these on a map including the following tourism uses:

- Hotels
- Restaurants
- Beach bathing
- Watersports
- Boating tours; and
- Stingray City

In the 2008 Management Plan, Ivor Jackson and Associates, presented an even wider scope of activities and uses for the area, identifying 17 categories of uses, eight of which were tourism related:

- Diving and snorkelling
- Beach recreation and swimming
- Kayaking and other water attractions
- Boat tours
- Yachting
- Recreational infrastructure
- Hotels and apartments
- Vending

In both reports, fishing was also identified as important activity for users in the area.

These key informants results clearly highlight that there has been no significant change in the patterns of use within the NEMMA over the past nine to ten years. Although none of the key informants identified the hotels or recreational infrastructure as a significant use, all other uses were identified by at least one key informant.

#### *4.2 Impact of conservation objectives on human use and state of the physical environment*

The conservation objectives of NEMMA are described in the Management Plan. They were determined through consultations with a range of stakeholders and largely aligned with the core objectives for protected area declaration outlined in the Fisheries Act. The conservation objectives of the NEMMA are to:

- Protect the biodiversity of the area
- Provide opportunities for scientific and socio-economic research, and for monitoring the impact of uses and management actions
- Maintain the quality of coastal waters
- Preserve and enhance the natural scenery and beauty of the area that are inherent in the relationships between land and seascapes
- Promote and manage tourism and recreational uses
- Provide public education, awareness and appreciation of the area's heritage
- Sustain traditional uses and livelihoods
- Promote economic and social benefits at the community and national levels

The implementation of conservation measures into any area should bring along with it a change in the types of destructive practices that could lead to overall declines in resource condition. Ideally, such implementation should result in an overall improvement in the way individuals utilise the area as well as an improvement in resource conditions.

Unfortunately, the key informant interviews have revealed that this cannot be concluded in case of the NEMMA. The overall perceived decline in resource condition noted by the key informants aligns quite well with the actual Reef Health Index (RHI) as outlined in the Antigua and Barbuda 2016 Coral Reef Report Card for the northeast corner of the island which encompasses the NEMMA and is referred to as Subregion 33 (Kramer et al. 2016; [www.CaribNode.org](http://www.CaribNode.org)). The overall reef health index reference value for the northeast corner of Antigua 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: “poor” reef condition due to high (12.1 - 25%) fleshy macroalgal cover; “critical” condition of commercial fish species due to low biomass values of <420

g/100m<sup>2</sup> versus  $\geq 1,680$  g/m<sup>2</sup> for reefs in “very good” condition; biomass of herbivorous fish on reefs within the NEMMA is “very good” ( $\geq 3,480$  g/100 m<sup>2</sup>); and “fair” coral cover of between 10 to 19.9%. It should be noted that there are reefs within the region that show high coral cover alongside high macroalgal cover, so the two are not directly opposed to each other within the reef environment. High macroalgal cover is more often related to nutrient overloading from anthropogenic (mostly land-based) sources; compounded by overfishing, macroalgae can dominate a reef ecosystem. Key informant perceptions of an increase in herbivorous fish and an increase in the condition of coral reefs with signs of coral recruitment are corroborated by these RHI reference values.

In 2008 Ivor Jackson and Associates identified fourteen existing threats to the NEMMA that needed to be managed in order to secure conservation objectives were met (Table 7).

**Table 7: Threats and impacts in NEMMA identified in the 2008 management plan**

THREATS	IMPACTS
<b>Marine Environment</b>	
Snorkelling and walking on reefs	<ul style="list-style-type: none"><li>▪ Marine depletion:</li><li>▪ Dwindling area of living reef</li><li>▪ Macroalgal overgrowth</li><li>▪ Low fish abundance and diversity</li><li>▪ Destruction of seagrasses and reef flats</li></ul>
Anchoring of boats on reefs	
Boat discharge	
Pollution from coastal industry and development	
Dredging for development	
Fishing methods (traps, ghost traps, nets, and spearfishing)	
Overfishing	
<b>Terrestrial Environment</b>	
Overcrowding	<ul style="list-style-type: none"><li>▪ Tranquillity of the site is being lost</li><li>▪ Heavy traffic disturbs already threatened wildlife populations</li></ul>
Noise disturbance	Boat/human traffic in close proximity to sensitive sites scares nesting seabirds and can be threatening to newborn chicks
Vegetation clearing	Removal of vegetation that serves as important coastal stabilisers and wildlife habitats
Improper waste disposal on offshore islands	Garbage and litter, as well as human waste pose a severe health hazard, opportunity for rat re-infestation and unsightly surroundings
Introduction of invasive species (via boats, luggage)	Black rats threaten endangered species, especially the racer snake
Development of offshore islands and surrounding coastline	Ecological damage and access restrictions
<b>General Issues</b>	
No legislation prohibiting harming, taking or killing of wildlife or species recovery plans at the national level	Wildlife decline or extinction due to human action

Resource conflicts: Fishermen and tour operators Wildlife and visitors (including pets) Users and developers	Overuse of certain sites, user conflicts and ecological damage
Lack of management capacity (financial, technical, institutional)	Management issues inadequately addressed at the national level
Absence of site-level management	Management issues inadequately addressed at the local level
Absence of a coordinated national policy framework systems plan for Protected Areas	Protected area programming driven by sector and sub-sector needs rather than systematic planning processes
Hurricanes	<ul style="list-style-type: none"> <li>▪ Destruction of marine and terrestrial habitats</li> <li>▪ Wildlife decline or extinction</li> </ul>

These identified threats and impacts are largely consistent with the identified coastal and marine activities that were most concerning to key informants during the interviews. Activities on the offshore islands identified by key informants correlate to the threats of overcrowding, noise, waste disposal and invasive species reintroduction highlighted by Jackson and Associates (2008). This is concerning as it clearly indicates that despite being a declared protected area since 2005, and despite the completion of a management plan and conservation objectives for the area, little has changed with regard to the threats and deleterious human uses. It is, therefore, not surprising that most persons opined that the state of the environment in NEMMA had degraded over the past five years.

#### *4.3 Involve stakeholders in an integrated approach to monitoring of the NEMMA*

The perceived lack of participation by stakeholders in the NEMMA is concerning, particularly since initial plans for the area, as outlined in the management plan, considered the creation of a Management Partnership between government, private sector and NGOs. Additionally the idea of stakeholder participation within management of NEMMA was central theme throughout the Plan as elucidated in:

- Several programme specific objectives:
  - Subprogramme 1B – Natural Resource Management: Promote stakeholder participation in management
  - Subprogramme 1C - Research and Monitoring of Environmental Quality and Resource Use: Disseminate and use local knowledge in resources management and;
- Methods and Processes for Implementing the Plan.
  - The participation of key resource users and other stakeholders in review, application and testing exercises of area zoning.

However, the stakeholder recommendations gathered through this key informant interview process provide a valuable opportunity to continue to solicit resource users' input into the management process moving forward. Although not as extensive, the

proposed management interventions recommended by key informants are in line with the management interventions envisioned for the area, both in the management plan and as suggested in Espeut (2006). In the Espeut report, participants to a workshop were asked to propose “project ideas” to be implemented in the NEMMA to improve management. These ideas were based on two thematic areas: fisheries and tourism. On the other hand, the management plan included a Regulatory and Zoning Plan for the area. It provided detailed, programmatic measures as well as methods and processes for their implementation.

The information from both these reports is compared to the full range of recommendations extracted from key informant responses to relevant questions and presented in the table below.

**Table 8: Comparative look at key informant recommendations as compared with conservation measures proposed by Espeut (2006) and the 2008 Management Plan.**

<b>Key Informant Recommendations</b>	<b>Espeut (2006) Report</b>	<b>2008 Management Plan</b>
Artificial reefs	*	
Boating	*	
Coral Protection		
Coral transplantation/Restoration		
Declare Closed areas		
Declare Closed seasons		*
Gear restrictions		
Manage Wildlife interactions		*
Manage Yachting		*
Manage/Prohibit Anchoring		*
Manage/Prohibit Chemical runoff		*
Manage/Prohibit Clearing of mangroves and other vegetation		*
Manage/Prohibit Dredging/Clearing of channels		
Manage/Prohibit Fishing		
Manage/Prohibit Fishing with nets		
Manage/Prohibit Fishing with spearguns		
Manage/Prohibit Fishing with traps		
Manage/Prohibit Motorised watersports		*
Manage/Prohibit Solid waste disposal		*
Manage/Prohibit Taking of Wildlife		*
Prohibit Disturbance of nesting birds		*
Prohibit Habitat alteration		
Prohibit Large scale development		
Prohibit Shoreline landings		
Prohibit unsustainable development		

Prohibit Vending on offshore islands		
Public awareness	*	
Reduce Fishing Pressure		
Reduce Land-based pollution		
Reef Marking	*	
Regulate Camping		*
Regulate Tourism activities		*
Regulate Use of islands	*	*
Signage		
Species bans		
Zoning	*	*

## 5 RECOMMENDATIONS FOR MONITORING AND MANAGEMENT

The key informant interviews were informative and revealing, but they also highlighted the need for a more thorough and in-depth SocMon assessment of the communities around the NEMMA. Additionally, it has pointed to the need for improved management and conservation of the Northeast Marine Management Area. To this end, the following key recommendations are presented:

- Follow-up key informant interviews with more comprehensive stakeholder surveys for households within the NEMMA.
- Conduct follow-up studies to verify and ground-truth informant recommendations for critical conservation areas, fisheries zones and reefs of importance.
- Conduct further studies to determine current usage of offshore islands and other critical habitats and seek to understand carrying capacities for these areas.
- Conduct studies to determine drivers of various threats identified by key informants.
- Implement measures to improve stakeholder participation in the development and management of the protected area.
- Implement public awareness activities to improve stakeholder knowledge about the area.
- Design and implement a robust, integrated and participatory management regime for the NEMMA that can act to halt and ultimately reverse the declines observed by key informants.



## 6 REFERENCES

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## 7 APPENDICES

### 7.1 Appendix 1: Initial Variables Chosen for Monitoring (\*these were refined on finalising the NEMMA site monitoring plan)

Monitored Variables	Obj # 1, 2, 3	Secondary and key sources of Information and comments on factors taken into account	Priority H/M/L	Spatial info F/A
<b>Demographics</b>				
K1. Study area	1, 2	Maps	H	F
<b>Coastal and Marine Activities</b>				
K14/S10 Activities Household activities	1 - 2	NEMMA Management Plan; OPAAL Documents	H	F
K15/S11 Goods and services (from activities)/household goods and services	1, 2	NEMMA Management Plan; OPAAL Documents	H	F/A
K16/S12 Types of use (of good/service)/Types of household uses	1, 2	NEMMA Management Plan; OPAAL Documents	H	A
Value of goods and services	1, 2	Some Information should be obtained from Fisheries Division	M	A
K19. Use patterns	1, 2	Primary data collection. SocMon Spatial will be key to mapping patterns of use and identifying overlaps of area usage	H	F
K 20. Levels and types of impact	1, 2	Obtained primary data collection	H	F/A
K21. Level of use by outsiders	1, 2	Obtained primarily from surveys	M	A
K22/S14 Household uses	1, 2	Obtained primarily from surveys	H	A
K23. Stakeholders	1-3	Obtained primarily from KIs	H	A
K24. Tourist profile	1, 2	Obtained from tour operators	H	A
<b>Governance</b>				
K31. Stakeholder participation	1-3	Community Development and the Registry. Interviews.	H	None
<b>Attitudes and Perceptions</b>				
S15. Non-market and non-use values	1, 2	Obtained from primary data - surveys	H	A
S16. Perceptions of resource conditions	1, 2	Obtained from primary data - surveys	H	A
S17. Perceived threats	1, 2	Obtained from primary data - surveys	H	F
S21. Participation in decision making	1-3	Obtained from primary data - surveys	M	None
S23. Perceived coastal problems	3	Obtained from surveys and KIs	H	A
S24. Perceived coastal solutions	1-2	Obtained from surveys and KIs	H	A
S26. Successes in coastal management	1-3	Obtained from surveys and KIs	H	None

Parameter to Monitor	Obj. # 1, 2, 3	Secondary and key sources of Information and comments on factors taken into account	Priority	Spatial Info F/A
Tourism arrivals	1, 2	Ministry of Tourism	H	None
Tourism recreation	1, 2	Key informants	H	None
Fishing pressure	1, 2	Key informants. SocMon Spatial will be important mapping heavily used areas	H	None

## 7.2 Appendix 2: SocMon Team

PLANNING PHASE	
<i>Team Member and Affiliation</i>	<i>Role</i>
Ms. Mykl Clovis-Fuller, EAG ECMMAN	Coordination and Management
Mr. Julien Lawrence, NEMMA Manager	NEMMA Technical Advisor
Ms. Tricia Lovell, Senior Fisheries Officer	Fisheries Technical Expert
Mr. Mark Archibald, Fisheries Officer	Fisheries Technical Expert – design of data collection instruments with inclusion of ecological link
Ms. Brenda Thomas Odlum, Community Development	Community Liaison and Data Collection
Ms. Sharon Dalso, Community Development	
Ms. Ruth Spencer, GEF Small Grants ECMMAN	
Mr. Jasiel Murphy, National Parks Authority	Spatial data collection and analysis
Mr. Jason Williams, Department of Environment	
Ms. Shanna Challenger	Communication and public Awareness
EXECUTION PHASE	
Mykl Clovis-Fuller	Conduct Interviews
Julien Lawrence	
Tricia Lovell	
Mark Archibald	
DATA ENTRY AND REPORT PREPARATION	
Ms. Mykl Clovis-Fuller	Coordination and Management
Ms. Tricia Lovell	Data Entry and Report Preparation
Ms. Raisa Spencer, Department of Environment	SocMon Spatial Map Preparation

## Key Informant Interview

This key informant interview is aimed at collecting data to assist with planning and management within the Northeast Marine Management Area (NEMMA). This interview is being facilitated by the ECMMAN project, a regional marine management strengthening initiative being implemented by the Environmental Awareness Group in collaboration with the Environment Division and Fisheries Division of Antigua and Barbuda. The Centre for Resource Management and Environmental Studies (CERMES), University of the West Indies is providing technical support for this study. All information given will be treated with the utmost confidence and used solely for the purpose stated. So that you know what is happening, you will receive a 1-page summary of the findings of our interviews with key informants.

Interviewee: \_\_\_\_\_ Location: \_\_\_\_\_

Interviewer: \_\_\_\_\_ Date: \_\_\_\_\_

- (1) What coastal and marine activities currently occurring in the NEMMA are of concern to you? Why? **[Show Map and record location of activities]**

- 
- (2) In what ways have the condition of coastal and marine resources changed in the NEMMA over the last 5 years?

- 
- (3a) How important is the condition of the coastal (beaches, mangroves, offshore islands, wildlife) and/or marine environment (coral reefs, mangroves, seagrass, fish, water quality) to you in general (in terms of work, recreation, appreciation of its existence)? Explain. *[S16]*

- 
- (3b) Which areas of the NEMMA would you consider most important for conservation/at risk? Why? **[Show Map and record areas of importance or at risk]**

- 
- (4) What are the main threats/pressures to conditions of coastal and marine resources in the NEMMA? How do you think these could be addressed?

- 
- (5) Some reefs provide more and better habitat for reef creatures, do you support measures to help protect them? What types of measures (e.g. restoration, protection, seasons, gear restrictions)? *[S24]* **[Show Map]**

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(6) Which coastal and/or marine activities should be managed or prohibited in the NEMMA? Why? *Persons should be made aware that management includes maintaining the same of something or is the process of moving towards more of something. Probe for reasons for suggestions.*

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(7) Is enough being done by NEMMA management authorities to include stakeholders in decisions regarding management of the area? Explain.

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(8) What are your views on future private developments within the boundaries of the NEMMA?

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Optional as relevant:

(9) What is the **MOST** popular coastal or marine activity that tourists typically participate in within the NEMMA, and what locations are used most often for this activity? [K14/S10; GCRMN-Caribbean: Tourism Recreation] **[Show Map and record locations]**

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(10) Where are the most popular fishing areas within the NEMMA? **[Show Map and record locations]**

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#### 7.4 Appendix 4: Key informant Data Sheet

<b>Interview #</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3a</b>
1	Net fishing and spearfishing are concern to me. Net fishing destroys the reefs and catches all the small fish. Spare fishers don't have fishing licenses and disregard the closed seasons.	Conditions have changed considerably in NEMMA. Mangroves have been destroyed for economic development that contributed to a decrease in mangrove snapper. Fishing and speedboats have also created a condition around the reefs where we see less fish because of the constant movement of boats over the reefs.	Mangroves and reefs are very important aspects of the ecosystem that must be in a healthy state. They are important habitat for some creatures
2	During the delivery of oil from oil boats to Crabbs power station oil sometimes spills into the sea and can be damaging to the ecosystem	Because the netfishing is not like before I have seen some improvements in the fish stocks: doctorfish and chubfish within the past five years.	The conditions of the coral reefs have improved considerably and that has resulted in an increase in fish. Prior to now the coral reefs were looking brown and had little or no life around them.
3	Net fishing and mangrove destruction. Net fishing destroys reefs and catches all the small fish. Mangroves are important habitat for fish. Destroying them will reduce the amount a fish available in the future.	Increase in sediment entering the sea and destroying corals caused by destruction of mangroves.	Mangroves are very important. They are filters, shelters and prevent erosion. They are important habitat and are sanctuary for marine species
4	Trash disposal on Great Bird Island	No major changes	Very important. It is necessary to encourage tourists to care for the environment and be socially responsible, particularly on Great Bird Island
5	Natural disasters such as hurricanes and unrestricted fishing by foreigners. Spearfishing and net fishing	Many areas have been fished out in the past five years	Mangroves are important to the health of the area since it serves as a nursery area for fish, provides coastal protection and natural filtration for the marine area
6	Parties at Barnacle Point which causes pollution and trash ending up in the water	There has been an increase in trash and pollution. Disposal of fish waste	Very important as sea life depends on them
7	Yida Project (east side of Crabbs Peninsula) and the removal of mangroves.	The landscape has changed significantly from the removal of mangroves. The removal of vegetation at Barnacle Point	Critical as they help with coastal water quality. Poor water quality leads to poor ecosystems, reduction of catch and fouling

<i>Interview #</i>	<i>Q1</i>	<i>Q2</i>	<i>Q3a</i>
			of gear.
8	Spearfishing from shore; Trap fishing	The amount of fish has reduced and there is more diving for fish and lobster. Reefs have deteriorated	Very important. The environment needs to be taken seriously
9	Fishing, ecotourism (Stingray City, Paddles, Great Bird Island) from Willikies to Shell Beach. Conch, lobster, reef fish, whelks spearfishing	Seabird population seems smaller around Great Bird Island as well as around, Galley, Rabbit and Readhead Islands, which may suggest lower fish stocks. Less coastal vegetation on Great Bird Island as a result of clearing by tour operators, more garbage on the island as well. Clearing of vegetation on Rabbit island. However there are fewer invasives.	Very important. Unspoilt quality is the major tourism value. They are also important for fisheries
10	Yida development, "dredging of Narrows Channel to maintain channel for boats. The shoreline at Great Bird Island's South Beach is deepening contributing to shoreline erosion. Large catamarans running motors at the shoreline. Increase in gill netting and spearfishing especially by foreign fishers.	NEMMA is degrading. There are less fish on the reefs.	Very important. The offshore islands, coastline and protected bays make Antigua unique and are critical for recreational users and tourism.
11	Unregulated fishing, around all fringing reefs; unsustainable development (e.g. Yida); power generation - pollution runoff	Reefs are not as alive and less fish observed	Healthy environment is needed for the fish. These habitats are also important for tourism.
12	Overnight net fishing North of Great Bird Island; Devil's Bridge Reef, nets at small beach on the West of Little Bird Island. Mega-yacht anchoring at Non-such Bay causing a sewage concern for Ayers Creek. Too many moorings at Great Bird Island and anchoring.	Lots of plastic is washing onshore. A lot of turtles, stingrays and sharks.	Very important. The location is sheltered and with good winds. Water quality is very important as well.
13	Spearfishing, net fishing and fish traps in all the fringing reefs. Coastal construction at Guiana Bay and Guiana Island	The area is more degraded; more mangroves have been cut down. The corals around Great Bird Island are okay but other reefs have high algae cover. Seagrass beds	Very important. Important for the business

<i><b>Interview #</b></i>	<i><b>Q1</b></i>	<i><b>Q2</b></i>	<i><b>Q3a</b></i>
		have been damaged from the sargassum influx. Less turtles observed.	
14	The community are frequent users of Shell Beach, Jabberwock. They use the area to harvest cockle whelks and for picnics. Concerns about the marinas, sand mining, potentially harmful hotels and development since the 1990s	The area has significantly degraded	The area is very important for feeding the community and to promote self-sufficiency. Food species are depleted, however and there is little benefit to the community from tourism.
15	Mill Reef to Long Bay; Fishing around Green Island, Mill Reef (fish pot and spearfishing), SCUBA diving. Green Island - picnics on weekends and holiday camps. Camping at Brown's Bay and Halfmoon Bay	The area is degraded. There is an influx of Sargassum that disrupts beach ecology; Mangroves have stayed the same; Fishermen go further to get fish, especially parrotfish.	These are important for livelihood as many depend on fishing full time. Others go to fishing between jobs or as a fall back for farmers. Important food source, opportunities for vendors. They are also used for recreation.
16	Development that breaks the laws protecting NEMMA, Large scale/high impact development, infrastructure on islands, damage of marine and coastal habitats (mangroves, reefs, seagrass) and inland vegetation. Unmanaged camping, campsite erection, and waste disposal. Unmanaged fishing throughout all reef areas.	Degraded	Very important - recreation, personal enjoyment and knowledge that it is there for others to enjoy. Also important for livelihoods.
17	Recreational activities on the offshore islands: camping, bonfires, parties with speakers, use of ATVs, and sightseeing in bird nesting areas. The litter left behind from picnics is a big problem and the unsanitary disposal of faecal matter, condoms and feminine products. Tours in sensitive bird-nesting areas and on and around coral. Heavy tours on specific areas of Great Bird Island, which lead to runoff into the marine environment. Unsightly vending on Great Bird Island and boats tying	I don't know how the marine environment has changed but on some offshore islands there has been introduction of invasive neem, and fire ants on all islands. Illegal and unsustainable development in NEMMA has also occurred (Yida). EAG team members have observed fewer snakes and birds and noted that birds have moved to quieter, less visited islands. Also the incidences of rat invasions have been noted on two islands. Great Bird Island and Green Island have become aesthetically unappealing through	Work: extremely important. I can appreciate how it provides livelihoods for fishers, sea moss growers, tour operators, conservation biologist researchers, restaurateurs, accommodation providers, storekeepers, and storage providers. Recreation: This is also extremely important for fellow residents and me. It provides a retreat from the stress of life on the mainland. Appreciating of its existence: Extremely important. Working in this field has allowed

<b>Interview #</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3a</b>
	up directly on the island.	misuse by humans who leave unattractive tarpaulin and palette structures, hideous and haphazardly placed bbq grills and a great amount of garbage.	me to learn of and appreciate the vast and immeasurable ecosystem services that the NEMMA provides with regard to protection from storms, food security, recreation, cultural and religious connections, economic needs, civic pride (rare and unique natural patrimony) and an important refuge for many of our country's unique, globally significant and rare plants and animals.
18	Presently the most prominent is the proposed development slated for Guiana Island. Also the land clearing at devil's Bridge for the expansion of Verandah Bay. Land clearing at Black Ghaut. These large-scale clearings could lead to landslides and coastal erosion and eventually destroy the area and its pristine state. Overfishing of queen conch, conch fishing during closed season and harvesting of undersized conch.	The biggest change is the quality of fish supply I have observed. This has forced me to no longer dive in the area. There seems to be a decline in the number of species observed. Parrotfish numbers have fallen as well as large grunts, angels and snappers.	I think it is critically important especially to livelihoods. In the fishing communities of Parham and Seatons, every family in some way benefits from the coastal environment, either directly by the protection they provide in extreme weather events or indirectly from tourism dollars they earn.
19	Fishing of undersize conch in some area and on fringing reefs. YIDA development and motorised boats throughout the area. Also concerned about the carrying capacity of NEMMA particularly on small islands.	Significant amount of buildings now along the coast. Removal and backfilling of mangrove wetlands by Yida development. There is an apparent reduction in fishing pressure as there appears to be alternative employment available to fishers (e.g. in tourism sector). Some reefs are regenerating on the Southwest of Guiana Island as there is re-growth of Acropora.	These areas are extremely important. I use these areas at least 1 to 2 times per week with my seamoss project. I have also done some artificial reefs in the area. I also use the beaches and swim in the area with my family quite often.
20	Hotel development to possibly include marina, dredging, desalination and golf courses etc.	There have been changes in the proposals for hotel developments altering the coastline.	The condition of coastal areas has directly impacted the health of marine ecosystems as well as the aesthetics.
21	Poor development, mangrove-clearing overuse of some offshore islands by tour groups and locals who camp on them. Land	In recent years coastal habitats have been destroyed for development. Large scale clearing of land has occurred, this could lead	These ecosystems are very important to my work in the fisheries sector and its sustainability. The nursery habitats such as

<i><b>Interview #</b></i>	<i><b>Q1</b></i>	<i><b>Q2</b></i>	<i><b>Q3a</b></i>
	clearing and killing of endangered wildlife on the islands.	to marine sedimentation. More human settlements and large tourism developments, which may impact water quality in the area. However, some reefs have begun to show recovery as recruitment is evident.	mangroves and seagrass beds are very important.
22	Camping, and inclusive parties on offshore islands. The concern here is the lack of clean up after these events, which will eventually affect the habitats within the area. Another concern has to do with unplanned development that is allowed to happen.	Not sure but I believe it has improved with the work of the Environmental Awareness Group and Fisheries. However, they are still under threat owing to unsustainable or poorly managed activities.	Very important in all areas. Important for my work in the field of tourism as this is what visitors want to see. The offshore islands, clean and clear waters. I use the beaches for relaxation so if they were to suddenly disappear it would be felt. I also have a personal love for the marine environment and would appreciate that it remains intact for my enjoyment and that of my children.

<i><b>Interview #</b></i>	<i><b>Q3b</b></i>	<i><b>Q4</b></i>	<i><b>Q5</b></i>
1	From Great Bird Island going to Jumby Bay resort. These areas are the most popular areas and the frequency of boat traffic could have a negative impact on the area.	Natural disasters such as hurricanes and storms. Nothing can be done about these phenomena except that we can comply with the meteorological office and take the necessary precautions when required.	Reefs are very important for reef creatures thus I support the idea of reef restoration. The implementation of artificial reefs could be the way forward. This method could help create more and better habitat for these creatures that could ensure and maintain sustainability. Net fishing should be totally prohibited since it can destroy the reefs.
2	The area between Great Bird Island and Long Island are most important for conservation of the area. That area should be zoned as no fishing.	Natural disasters, which are uncontrollable. However, we just need to be vigilant, observe and take the necessary precautionary measures whenever they are in the area	Reef marking and zoning reef areas help to protect and provide more and better habitat. Additionally, the implementation of artificial reefs could be another method that could help improve reef conditions and

<i>Interview #</i>	<i>Q3b</i>	<i>Q4</i>	<i>Q5</i>
			provide better habitat.
3	From Great Bird Island to the Jumby Bay area. Of course these areas are most for tourism activities.	Natural disasters such as hurricanes and storms. Net fishing and economic development. We can prohibit net fishing totally. We the people can oppose development in NEMMA. There is nothing we can do about natural disasters.	Reefs are very important, not only for the reef creatures but also for our beaches. They slow down the power of the sea from damaging beaches. To create the environment conducive for reef creatures, we should create artificial reefs to help enhance and develop them.
4	Great Bird Island is important for the wildlife. The social significance of the area is also important	Development and mangrove destruction	Yes
5	All mangrove habitat in NEMMA	Gill nets are negatively impacting reef fish. Restrict the use of gillnets to supply parrotfish exports	Prohibit development that impacts the coastal habitat. Prohibit gill nets and enforce closed seasons
6	Northwest area of NEMMA from Prickly Pear to Great Bird Island.	Pollution needs to be policed	Yes reefs to be marked and additional signage placed.
7	Bays around Guiana Island for their nursery functions. Mangroves in Guiana Island to Crabbs Peninsula	Land based development and land-based sources of pollution (e.g. agricultural runoff). Trash and coastal development	Reducing pressures from land based sources of pollution and reducing fishing pressure.
8	Shell Beach to Maiden Island, Great Bird Island and Guiana Island	Net fishing	Strict no fishing area should be established in the Great Bird Island area
9	All snake islands (Great Bird, Rabbit, Green, York) and the nesting islets surrounding Great Bird.	Large scale, unregulated and highly intense development. Politics seems to override the rule of law. People need to be empowered to have a say	Yes, as long as it does not lead to the complete exclusion of users
10	Protection of reefs from overfishing, for fisheries and tourism. Such fisheries controls could make a big difference.	Development including marinas and tourism infrastructure. Overfishing, invasive <i>Halophila</i> seagrass, Sargassum influxes shifting fish patterns.	Yes, except no coral replanting. Yes for seasons, no fishing zones and species bans.
11	Mangroves and seagrass beds at Narrows by Guiana Island. This is a habitat for juvenile fish	Overfishing around all the fringing reefs. This can be addressed by educating on fishers on diversifying their methods and by promoting alternative livelihoods for the younger generation	Yes: North of Long Island and Devil's Bridge to Green Island and around Great Bird Island should be declared no fishing zones.



<b>Interview #</b>	<b>Q3b</b>	<b>Q4</b>	<b>Q5</b>
12	Green Island, the Windward Beach of Green Island, and the Rest of NEMMA.	Fishing - outreach and education with the community of Willikies could help to address this. Yachting - this requires the management of yacht moorings. Also review the number of moorings, as some seem very close together or close to reefs.	Yes. All measures, signage.
13	All of NEMMA should be conserved. The areas currently under construction (Guiana Bay) are most at risk	Yida Development. This will open the way for unlimited development in the NEMMA. Rezoning of the coastline is required and adherence to existing laws.	The whole area should be enforced as no fishing.
14	All areas	Overfishing, development, pollution runoff, chemicals. Training and demonstration in alternatives to chemical use, more sustainable livelihoods. These can be addressed through investments in sustainable community development programs and through education in schools.	Yes, I support all measures.
15	The offshore islands - community members fish around them and camp. They are also important for tourism	Waste disposal and garbage during camping is an issue. Garbage collection should be provided.	Yes; seasons are good to allow fish to grow and regenerate. Yes to no-fishing zones as well.
16	All islands, mangroves, reefs and seagrass areas in bays along Guiana Island, Seatons, Willikies etc. They are all interconnected parts of the system that creates the protected shoreline areas that make NEMMA unique.	The main threats and pressures are those already identified in the response to question one. These can be addressed by adherence to laws, proper management and zoning in place, through enforcement warden presence and inter-sectoral management in place.	Yes to all measures
17	Most of the offshore islands for their recorded ability to support endemic, rare species and for the constant pressure being faced from anthropogenic sources and invasive alien species. Also areas of reviving coral reefs and seagrass beds.	Anthropogenic: cutting of trees, unsanitary disposal of waste, garbage, constant disturbance of wildlife and/or their habitat. To address the issue I suggest the use of wardens and fines, updating and enforcing the management plan. Unsustainable, illegal development. To	Yes to all of the suggestions. Also video and departure points (tour operator offices) depicting dying coral, the influence of people on coral health (picking, standing on etc) and what healthy coral can look like

<b>Interview #</b>	<b>Q3b</b>	<b>Q4</b>	<b>Q5</b>
		address this I suggest getting the support of local people Introduction and establishment of invasive alien species. To address this I suggest a strong education outreach campaign.	
18	Bird Island, Maiden Island, Guiana Island are the areas I think are o great conservation importance. All the beaches within the area as well as they serve as valuable nesting sites for turtles. The grass beds around Parham and Guiana Island, the southwester portion of the forest on Guiana Island and the whole of Great Bird Island are all very important	Tourism development projects	I am in full support of any measure put in place to protect the nearshore reefs to include the total ban on all fishing within nearshore reefs. However, measures must be in place to supplement families who presently depend on exploiting these nearshore resources.
19	The mangroves and small offshore islands. Bird Island to Fitches Creek. Mangroves along the coast for the most part are unbroken. This is a unique feature about NEMMA.	Hotel and other types of development. This can be addressed by simply following the legislation as the legislation sufficiently identifies what should be allowed. The laws need to be enforced.	Yes I would support measures. A lot of the die off being experienced may not necessarily be due to activities in Antigua and Barbuda. They could be a result of global pressures. I propose that artificial reef habitat programmes are viable in the absence of identifying reasons for the die off. The seamoss farm also provides habitat. Perhaps it could be expanded to other areas in NEMMA.
20	The coastline of NEMMA - development pressure	Tourism development and tropical cyclones.	Yes to all of the above measures.
21	Turtle nesting beaches at Jabberwock and Pasture Bay, the offshore islands (particularly the ones cleared of invasives), seagrass beds, mangroves and all fringing reefs.	Poor development and developers who don't respect the rule of law. High visitor numbers to the offshore islands during certain times of year. Land based pollution, solid waste and natural pressures such as storms	Yes, I would support both spatial management measures such as marine spatial planning/zoning as well as fisheries management measures (closed seasons, areas, gear bans etc.) I also support restoration efforts such as the ongoing OICP rat eradication program on small offshore islands.

<b>Interview #</b>	<b>Q3b</b>	<b>Q4</b>	<b>Q5</b>
22	Mangrove and seagrass areas. They are under threat and are important as nursery grounds, for buffering waves and as species protection areas.	Development and overcrowding which can lead to disruption of habitats. This may be addressed through enforcement of the relevant legislation, zoning of the area, encouraging alternative site use for recreational purposes and visitor management.	Yes I would support measures both active and passive. E.g. coral transplantation and fisheries management respectively. Temporary closures and gear restrictions.

<b>Interview #</b>	<b>Q6</b>	<b>Q7</b>	<b>Q8</b>
1	The area should be properly zoned as it relates to fishing. Spearfishing should be properly controlled and surveillance done to ensure compliance. Net fishing should be cut out because it catches small fish and destroy the reefs.	The management of NEMMA needs to include the stakeholders more in the decisions concerning management of the area. If that is done, we will see a more positive way forward in the area.	Future private developments within NEMMA could be a positive thing for Antigua's economy, particularly for all stakeholders if developers take into consideration the ecosystem and develop with that in mind and ensure the protection of the area.
2	Even though net fishing is conducted on a limited scale it should be managed or prohibited.	Enough is not being done by NEMMA Management authorities to include stakeholders in decision concerning the management of the area. More consultations should be done to get more ideas about the area.	I have no problem with private development as long as the investors are developing the area with the idea of protecting the ecosystem
3	Since fishing is important for me, some areas should be zoned for fishing. However net fishing should be prohibited because it destroys coral and catches all the small fish	I can't say nothing has been done but we are not seeing any results of anything being done.	We the people should strongly oppose any future developments in NEMMA because the ecosystem will eventually be destroyed.
4	None	Yes - we are kept involved in the process	The offshore islands should not be developed, as the local recreational value is too high. It may also lead to a displacement of small, local fishers.
5	Coastal development. It negatively impacts	No. There is no knowledge of management	Developments should be restricted

<b>Interview #</b>	<b>Q6</b>	<b>Q7</b>	<b>Q8</b>
	coastal habitats. Net fishing, it destroys the balance of marine life on the reef	other than Fisheries Division management	
6	No activities should be prohibited	No. More consultations are needed and managers need to update the stakeholders regularly.	I have no problem with private development as long as there is no restriction beach usage
7	None. Management should be tailored to meet livelihood and socioeconomic objectives.	No	Private development must be examined to ensure no adverse impacts will occur to livelihoods and the environment, there is no increased stress from land based sources of pollution and it enhances livelihoods of existing stakeholders
8	Net and trap fishing	No. Not seeing anything being done	No issue with proper development. However large-scale development has no place in the NEMMA.
9	Development without EIA/regulations, large-scale development and small-scale development with negative impact should be prohibited. Tourism should be regulated, yachts should be monitored and fishing practices regulated (by methods through species and seasonal regulations).	Fishers should be more involved in monitoring. There is minimal involvement of stakeholders.	Private development should be regulated and subject to EIAs. The EIA process should be more stringent. No large-scale development should be allowed and the Yida Development should also not be allowed.
10	Fishing, garbage and “boaties” on the islands from cruising. Dredging including damage to the seafloor. Development. Boat traffic and anchoring.	Definitely not. I have not observed any active management of the area. Stakeholders have not been included in NEMMA management bodies. Tour operators are not included as much as other groups such as fishers. Fishing continues throughout NEMMA.	Nonsuch Bay and Yida paved the way for new mass development. Laws to protect the marine environment should be upheld (mangroves, seagrass, dredging etc). The message that MPAs help fishermen and the economy needs to be communicated
11	Fishing should be prohibited. Illegal clearing of mangroves and dredging. Boats running aground, and tour operators grounding on the seafloor should all be prohibited.	No. Little active management. Fisheries Division needs to be more active monitoring	No development should be allowed close to the shorelines, on islands or in sensitive areas. No to Yida.
12	Net fishing should be regulated (soak times	The Willikies community needs to be more	There is some development potential south

<b>Interview #</b>	<b>Q6</b>	<b>Q7</b>	<b>Q8</b>
	limited) and/or prohibited in some areas. Motorised water sport activities such as wakeboarding and jet skis should be managed.	involved as a lot of users come from that area (campers, fishers etc.). More information and outreach is needed.	of Devil's Bridge. Carefully planned, low impact development could be beneficial. Not industrial type developments.
13	Fishing. The NEMMA regulations need to be enforced.	No. There is no NEMMA Management. Only had one interaction regarding NEMMA Management. Would like to see Coast Guard and wardens active on the water.	There should be no private development in the NEMMA. It should be used for conservation. The infrastructure to support Yida would overwhelm the area and degrade the ecosystems.
14	Chemical runoff and use in upstream areas, development, dredging and improper garbage disposal.	No - not aware of anything being done.	The area should be protected for conservation, eco-tourism. No developments.
15	Not sure. Waste disposal should be better managed.	There is room for improvement. Fishermen need to be included in more dialogue outside of dealing with illegal incidents. There is not much awareness of what NEMMA means outside fishing regulations. More outreach needed.	There should be no more private developments. It should be left natural, as it is a unique area. Some areas should be protected from building.
16	Development, anchoring and shoreline landings, camping reef fishing, net fishing wildlife interactions. These should all be strictly managed.	No. There is very little ongoing communication with stakeholders and many are not aware of what NEMMA is.	Development should be very limited to small scale, low impact development with strict EIA stipulations. Development on islands (e.g. Guiana Island) should only be conservation or eco-tourism oriented and small islands should be off limits to any development.
17	Firstly, zoning needs to be established. Activities that should be prohibited: harvesting of sea cucumbers, birds (including whistling ducks and their eggs - primarily by the Chinese. Disturbance of nesting birds, vending on offshore islands, killing sea turtles and/or harvesting their eggs, cutting trees.	I am not sure. I am not aware of the various decisions that Fisheries must take regarding NEMMA and whether all the relevant stakeholders are involved.	The Fisheries Act says that it is illegal once the development does not support or enhance conservation. Therefore, I am completely against it.
18	I am in full support of a ban on net fishing	I think more could be done in the area	As long as they are managed wisely and we

<b>Interview #</b>	<b>Q6</b>	<b>Q7</b>	<b>Q8</b>
	within the NEMMA. Spearfishing I believe should be allowed but closely monitored and heavy fines placed on violators. In my experience as a diver I see more nets smothering reefs and ghost pots at the bottom than anything else. The fishnets do not disintegrate. They seem to stay on the reefs forever.	especially as it relates to communication with the local fishers. I see a vast disconnect with the local man and his complaints. Most of the locals are in support of management, but there is a misunderstanding of how it affects them. They won't come to the meetings so NEMMA needs to go to them	have a zoning plan that was developed with scientific data not on the personal convictions of individuals I am all for it.
19	All activities should be managed; fishing tours, boating, modifications to reefs and banks and clearing/dredging of channels. Development also need to be managed, however large-scale hotel development should be prohibited. Equipment operators should be held responsible for clearing mangroves.	No. NEMMA is practically non-existent.	I have no problem with private development but they should follow the laws and be done properly. Laws should be enforced.
20	Dredging	Doesn't know	They should have greater restrictions and require EIAs.
21	All activities both commercial and recreational should be managed. Some forms of fishing should be prohibited (e.g. use of gill nets). Use of some islands should be restricted, particularly those islands that are important for racer snake and seabird nesting.	More needs to be done. Although consultations and meetings have been held in the past these have since ceased.	Private development could be allowed to go ahead once they respect the rule of law and are in line with the conservation objectives of the area. Some large-scale development should be prohibited.
22	Unsustainable development whether industrial or recreational. This could have the largest negative effect on livelihoods and species habitat in the area.	It is done, however possibly more involvement of the private sector stakeholders may be needed	I am for development, however it appears as if these developments will not allow the traditional use of the areas for locals. This should not be so and these developments need to adhere to the regulations pertaining to that and the preservation of habitats.



<i>Interview #</i>	<i>Q9</i>	<i>Q10</i>
1	Scuba diving at Hellsgate.	Northwestern portion of NEMMA.
2	Stingray city encounter tour is very popular.	Five miles northeast of Great Bird Island
3	Scuba diving and snorkelling are the most popular activities that tourists typically participate in within NEMMA. Locations used most often are Great Bird and Hellsgate Islands.	The Northwestern side of NEMMA is the most popular fishing area.
4	Snorkelling, kayaking, hiking and swim with the rays	East and North of Great Bird Island
5	Snorkelling and picnics on Green Island	North to south coast of Green Island.
6	Shell collection at Shell Beach	North of Great Bird Island to South near Guiana Island.
7	Yachting - Green Island and Great Bird Island; Day tours; kayaking and Stingray City.	Little Bird Island; the area between Great Bird and Guiana Island and Parham Harbour.
8	Day tours; Stingray City	Bird Island and Parham Harbour
9	Snorkelling around Great Bird Island and beach picnicking on Great Bird Island.	Not known
10	Sightseeing and snorkelling via boat charters, Great Bird Island, Seatons kayaking, Green Island, West of Narrows Bay.	Kettle bottom shoal, Above stingray city; Conch fishing - Great Bird Island and Exchange Island; Lobster fishing - between Prickly Pear and Long Island.
11	Not answered	Fringing reefs
12	Sailing, kiting, windsurfing. The area is sheltered from swells and east winds make the perfect conditions for these types of activities.	Not answered
13	Stingray City, Boat tours through NEMMA, Bird Island site seeing and snorkelling, Kite boarding at Green Island and Jabberwock, Kayaking at Mercer's Creek, Guiana Bay and Bird Island.	Not answered
14	Not answered	All the fringing reefs
15	Boating throughout the area	Not answered
16	Tourism - boat tours, sightseeing and snorkelling in the area of Great Bird Island and Green Island.	Fringing reefs
17	Kayaking (Cardington Island, Green Island, and close to Guiana Island. Snorkelling around Great Bird Island and around Stingray City. Visiting the stingrays at Stingray City.	Not sure but I observe thousands of discarded conch shells on practically every island I have visited or circumnavigated. I have also observed fish pots off many of the offshore islands.
18	I suspect it is for the aesthetics and the beach experiences I doubt many visit the area for the local marine life	Not answered
19	Day tours on the offshore islands particularly Bird Island. Stingray City tour and kayak tours.	Fishing happens all over. No particular location that people gravitate to.

<b><i>Interview #</i></b>	<b><i>Q9</i></b>	<b><i>Q10</i></b>
20	Boating and boat tours throughout the area	Not answered
21	Ecotours (kayaking in Seatons and West of Guiana Island), day charters and catamaran tours. Stingray City, yachting and picnicking.	Not answered
22	Beach lunch and snorkel stops by boater. Yachting. Tourism on offshore islands; Bird Island, Green Island and Prickly Pear.	Not answered

### 7.5 Appendix 5: SocMon Project Budget

Description of Expense	Cost (XCD)
Secondary data review	\$400.00
Survey design	
- Technical input	\$1000.00
- Administrative (production, printing, visual tools, equipment etc.)	\$500.00 **
Data collection	
- KI Interviews	\$800.00
- Briefing for data collectors	\$100.00
- Community data collection	\$400.00
- Coordination and logistics	\$300.00**
Data interpretation and analysis	
- Data entry	\$1500.00
Report Production and review	
- Report preparation	\$1200.00
Communications, summary outline, validation meetings	\$600.00**

\*\* In-kind costs