

Establishing a socio-economic monitoring program for the Narrows to inform marine conservation and decision-making in St. Kitts and Nevis

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EXECUTIVE SUMMARY

Socio-economic monitoring (SocMon) in Nevis began in May 2008 with a training workshop. SocMon Nevis was part of a regional project *Socio-economic monitoring by Caribbean Fishery Authorities* (Fisheries SocMon) funded by a US International Coral Reef Conservation grant and implemented by the Center for Resource Management and Environmental Studies (CERMES) of the University of the West Indies, Cave Hill Campus, and the Caribbean Regional Fisheries Mechanism (CRFM).

The study area chosen for socio-economic monitoring, The Narrows, the area between St. Kitts and Nevis, and the site of a proposed marine protected area (MPA) encompassing the Booby Island Shoal. The site was thought to be an important candidate for the study since the proposed MPA will be one of a number of MPAs in a larger Marine Management Area (MMA) expected to cover both St. Kitts and Nevis and implemented by the National Integrated Coastal Zone Management Programme of the Federation. Furthermore, The Nature Conservancy (TNC) is currently working with the government and people of St. Kitts and Nevis on a pilot project to develop a national marine zoning design that can provide for and balance all marine uses. Although the Narrows is not considered a MPA, with the recent interest in managing coastal and marine resources, the development of a comprehensive socio-economic database based on the baseline data collected in this study is timely and may be used to inform conservation and guide decision-making.

ACKNOWLEDGEMENTS

The Ministry of Agriculture (MOA), in the Nevis Island Administration, profoundly thanks all the key stakeholders (fishers, households, business and other public and private sector organizations) both within and outside the study area in St. Kitts and Nevis for their invaluable contribution and cooperation during the administration of the various questionnaires. The MOA is eternally grateful to the members of the Steering Committee (Winston Hobson, Audra Barrett, Karen McDonald, Arthur Anslyn, Graeme Browne, Justin Farrier, and Laurel Arthurton) for their unwavering support in ensuring the success of the project.

The MOA would also like to thank the Department of Fisheries (Nevis), the Department of Physical Planning (Nevis), the Department of Statistics and Economic Planning (Nevis), the Department of Statistics (St. Kitts) and the Department of Conservation (St. Kitts).

Profound thanks to Patrick McConney and Maria Pena, Senior Lecturer and Project Officer, respectively, CERMES, The University of the West Indies, Cave Hill Campus, Barbados.

FOREWORD FROM CERMES

The CERMES team very much appreciates the hard work and dedication shown by several in Nevis, but especially by Laurel Athurton, who took the initiative to lead the project when it was in jeopardy. Although assistance was provided in analyzing and interpreting the data, the write up was not finished by the authors as intended. Yet, some useful information was generated and is worth sharing. In this spirit, and in the context of author-ownership, the CERMES team has packaged here the main products of the project, on behalf of the authors, with as little non-author input as possible for a publication of this nature.

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1 INTRODUCTION

1.1 Socio-economic monitoring by Caribbean fishery authorities (Fisheries SocMon)

Socio-economic monitoring at Nevis is part of a regional project, *Socio-economic monitoring by Caribbean fishery authorities (Fisheries SocMon)* implemented in 2007 by the Centre for Resource Management and Environmental Studies (CERMES), The University of the West Indies, Cave Hill Campus, Barbados. The goal of the project is to increase and improve the use of site-specific socio-economic information in fisheries and coastal management decision-making by fisheries stakeholders in five locations: Barbados, Dominica, Grenada, Nevis and St. Vincent and the Grenadines (Pena and McConney 2008).

After a successful application to the project, Nevis selected the Narrows as the study site of interest for socio-economic monitoring (see Section 1.2; Pena 2008). A workshop to train participants in the SocMon Caribbean methodology and therefore build capacity in socio-economic monitoring for the site as well as to develop a sustainable SocMon site monitoring plan for the Narrows was held on 28 May 2008, facilitated by CERMES (see Pena 2008). Upon completion of training and selection of the SocMon team to conduct the socio-economic assessment, a sub-grant of US\$2,500 was disbursed for site assessment and monitoring at the study site. This report provides the results and recommendations from the monitoring.

1.2 Situation overview

In an effort to strengthen the management of the Narrows between St. Kitts and Nevis, a socio-economic monitoring program was initiated in May 2008. The Federation of St. Kitts and Nevis through its National Integrated Coastal Zone Management Programme has proposed the creation of a Marine Protected Area Systems Plan (MPAP). Additionally, a marine component for Nevis' protected areas – Nevis Peak National Park and Camps River Watershed – has been proposed (Potter et al. 2009). In addition, The Nature Conservancy (TNC) is currently working with the government and people of St. Kitts and Nevis on a pilot project to develop a national marine zoning design that can provide for and balance all marine uses. Although the Narrows is not considered a Marine Protected Area (MPA), with the recent interest in managing coastal and marine resources, the development of a comprehensive socio-economic database of baseline data collected in this study is timely and may be used to inform conservation and guide decision-making. The study area is particularly important since the various proposals for management of coastal and marine resources will include the Narrows. It is hoped that socio-economic assessments will be conducted routinely to systematically collect data for future use and will perhaps be used to guide the establishment of a Marine Protected Area in the area or marine management for a wider area (there is a TNC/USAID-funded project underway to address this).

Fishing is the most important activity at the site under study. It is also a traditional area for harvesting lobster, conch, finfish and turtle nesting. The majority of the fishers are members of the Fishermen's Cooperative Society (on both islands). Tourism is the second major social and economic activity, which is developing rapidly with the main activities

including snorkeling, scuba diving, kayaking, and sport fishing. Fishing and other tourism-related activities occur throughout the year.

The Narrows was identified by the Department of Fisheries for study because of the importance of the area to key stakeholders. Both primary and secondary data were used to validate the data collected in the project.

1.3 Goals and objectives

The goals and objectives for the Nevis SocMon were determined through a participatory process by participants at the SocMon training workshop and are provided below.

| Goal | Objective(s) |
|--|---|
| To collect socio-economic data to inform marine conservation and development decision-making | Determine trends in socio-economic benefits from resource use |
| | Determine how coastal and marine ecosystems provide benefits |
| | Enhance awareness of ecosystem services provided |
| | Involve resource users in monitoring |

1.4 Organisation of report

This report is divided into four sections. Section 1 provides an overview of the SocMon process in Nevis as well as information on the study site relevant to monitoring. The goals and objectives for monitoring are described. In Section 2, the methodology of the SocMon assessment – data collection, data analysis and validation of the results – is detailed. The results of the site assessment are provided in Section 3 accompanied by relevant data charts. A description of the validation workshop held to provide feedback to stakeholders is also provided in this section. The report concludes with Section 4 in which the results of the assessment are discussed and recommendations for management are made.

2 METHODS

2.1 Data collection

The data for the study were collected primarily by questionnaires developed specifically to address the monitoring objectives. Three different questionnaires were designed by the SocMon team specifically targeting fishers, small business operators, and households (see Appendices 1-3). These stakeholders were considered to be the three most critical users of the area. Relevant information/material provided by UWI representatives during the SocMon training workshop were utilized in the development of these questionnaires (See Pena 2008). The questionnaires were designed to provide information on demographics, marine activities conducted, attitudes and perceptions, perceived threats and problems and material style of life.

A total of 98 questionnaires were administered - 29 fisherfolk, 49 household and 20 small business operators.

Interviews were held with fishers within the prescribed boundaries (3 miles of the coastal area) of St. James Parish on Nevis and the Peninsula on St. Kitts (See Figure 2). Twenty interviews were conducted in Nevis (in different villages in the St. Thomas Parish) and nine interviews were administered in St. Kitts. The areas surveyed were:

| Nevis | St. Kitts |
|---------------|------------------|
| Newcastle Bay | Turtle Beach |
| Long Haul Bay | Major's Bay |
| Oualie Beach | Cockleshell |

The households surveyed were in 13 areas within the study site. The areas covered by the survey included:

| Nevis | St. Kitts |
|------------------------------------|------------------|
| Newcastle | Turtle Beach |
| Potworks Settlement | Major's Bay |
| Cades Bay | Cockleshell |
| Camps | |
| Shaw's Road | |
| Rawlins Pasture | |
| Oualie Beach | |
| Medical University of the Americas | |
| Mount Nevis | |
| Barnaby | |

Twenty questionnaires were administered to small business operators within the prescribed boundaries of St. James Parish on Nevis to the Peninsula on St. Kitts. In Nevis, the small business operators surveyed were distributed over Oualie Beach and surrounding areas. In St. Kitts, small businesses targeted were located in Turtle Beach, Cockleshell Bay and South Friar's Beach. Secondary data were also collected.

2.2 Data analysis

Preliminary data analysis using Microsoft Excel was conducted from 7-8 October 2009 by Laurel Arthurton and Karen McDonald with assistance from Maria Pena (CERMES). The data analysis was completed shortly afterwards once outstanding questionnaires had been submitted. Preliminary data analysis was necessary in order to inform the validation meeting.

2.3 Validation of results

In order to confirm the data collected and to provide feedback to stakeholders a validation meeting was held on 9 October 2009. Approximately 15 participants were invited and included representatives from the Statistical Department, Nevis Historical Society, fisherfolk and small business operators. Ms. Laurel Arthurton provided an overview of the Nevis SocMon project, its goals and objectives and the results of the preliminary data analysis (see Appendix 4).

3 RESULTS

3.1 Fishers data

3.1.1 Demographics

All persons interviewed were males. Greater than half of respondents (59%) were over 50 years while the minority (14%) was in the 31-40 year old range.

Eighty-three percent of the respondents received primary school education, 14% received a high school education, while only three percent (3%) attained a college education. Just over three-quarters (76%) of the respondents depend on fishing as their primary source of income, while 24% listed other sources of income such as bartending, farming, construction, heavy equipment operation and pension.

The most common household size comprised four adults (38%) and one child (35%). No fisherman reported any females in the household being involved in fishing. The majority of respondents (83%) noted their average monthly income from fishing (after taking out operating expenses) to be greater than EC\$500, with most fishers (52%) making between EC\$501 - \$1000 (Figure 1).

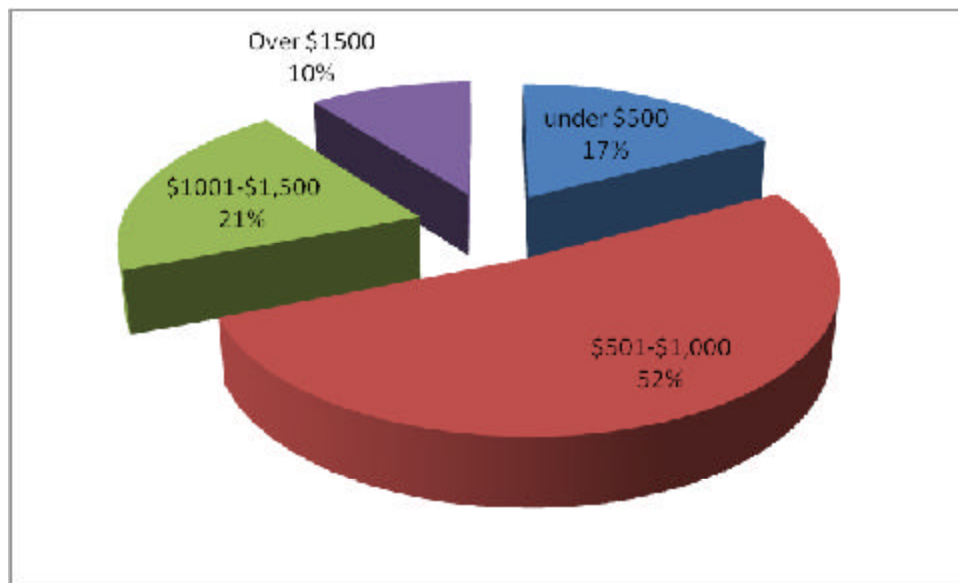


Figure 1 Average monthly income from fishing

3.1.2 Fishing activities

With the exception of one fisher who fishes four days each week in the Narrows, all other fishers fish for one to three days weekly. However, the majority of fishers (52%) fish at least two days per week (Figure 2).

The majority (90%) of the fishers have been fishing in the Narrows for over 10 years (Figure 3). When asked if they would consider changing their occupation, 81% of the fishers said no, while 19% said yes. The majority of respondents (68%) indicated that they would recommend fishing as a career. However, 32% said they will not recommend fishing as a career to their children.

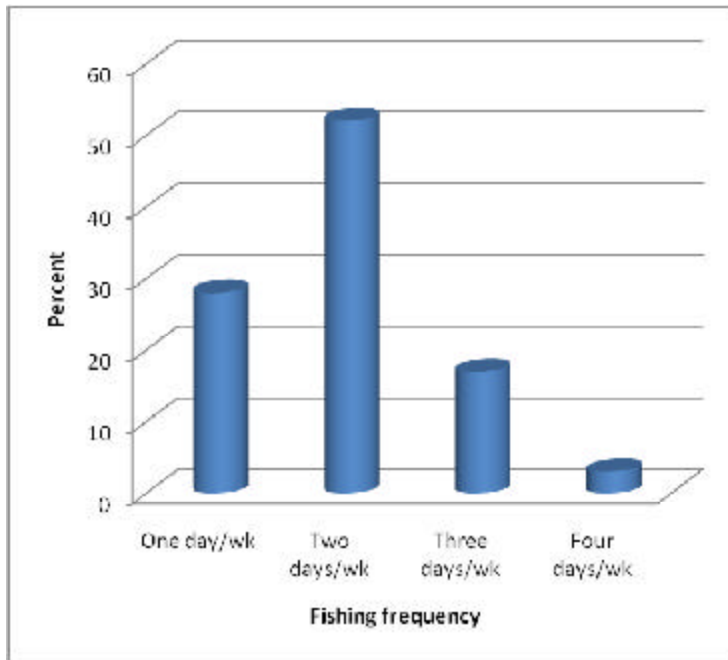


Figure 2 Frequency of fishing in the Narrows

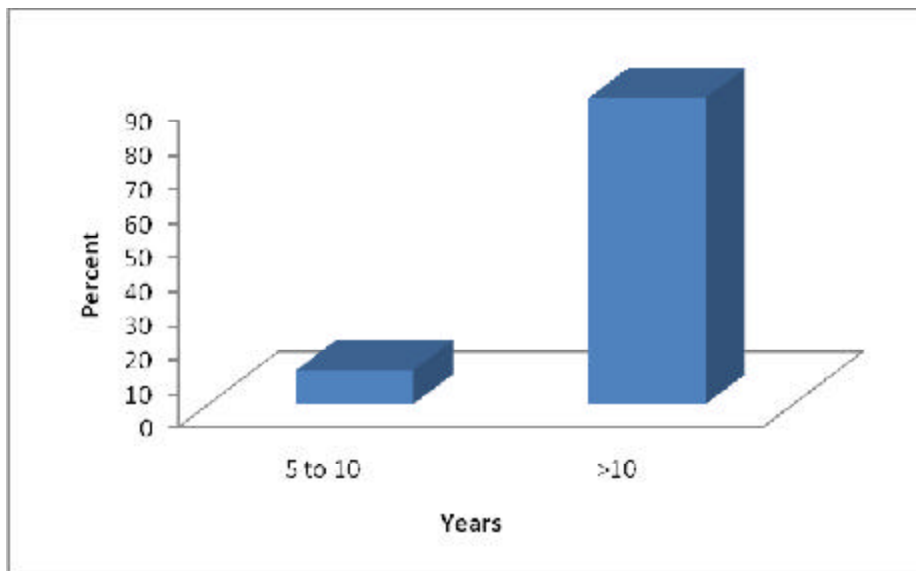


Figure 3 Number of years spent fishing in the Narrows

The majority of the fishers (94%) travel with a partner to sea with the majority (86%) of crews comprising two persons (Figure 4). The majority of fishing vessels (89%) are made of wood, while only 7% are made of fiberglass. Except for one fisher who specializes in seine fishing and another who specializes in diving, the majority of fishers engage in line and/or pot fishing (Figure 5). When combined, equipment or gear ownership is quite low with only 37% of fishers owning a combination of nets, boats, VHF radios, spear guns and fish pots. In general, out of all types of equipment/gear, boat and fish pot ownership was the highest (76% and 72%, respectively) whereas net ownership was lowest (10%).

Just under one-quarter of fishers own a VHF radio (21%) (Figure 6). Of all the fishers interviewed greater than 80% in all cases played multiple roles in the fishing industry as vendors (93%), gear builders/repairers (86%) and boat owners (83%). Just over half of the fishers are also boat builders/repairers (52%). Very few fishers are also mechanics (14%) and suppliers (3%). The types of fish caught in the Narrows are parrotfish, snappers, grunts, hinds, wenchman, groupers, gars, doctor fish, porgies, snappers, mahi-mahi (dolphin), butters, conch, lobsters, goat fish, ballahoos, kings, and old wives.

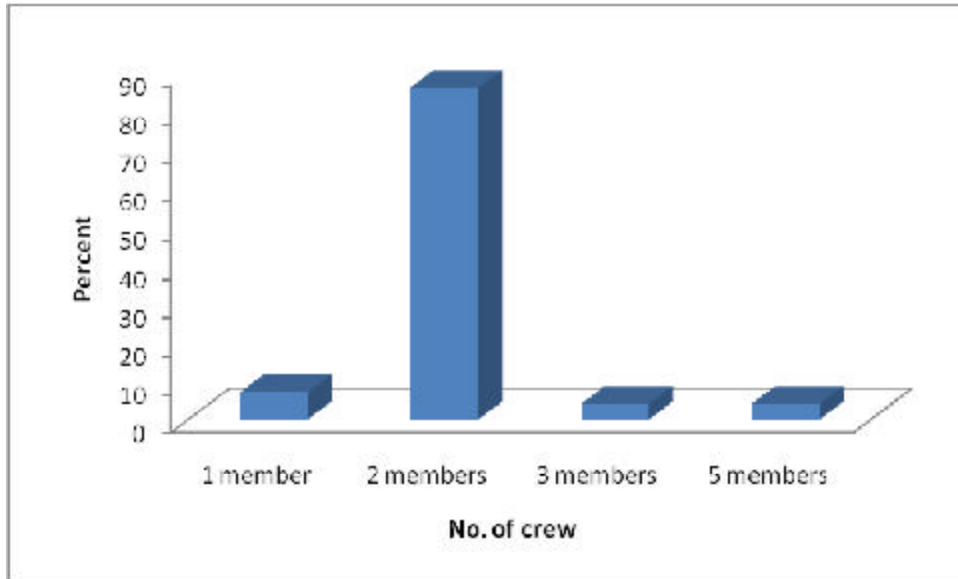


Figure 4 Boat crew composition

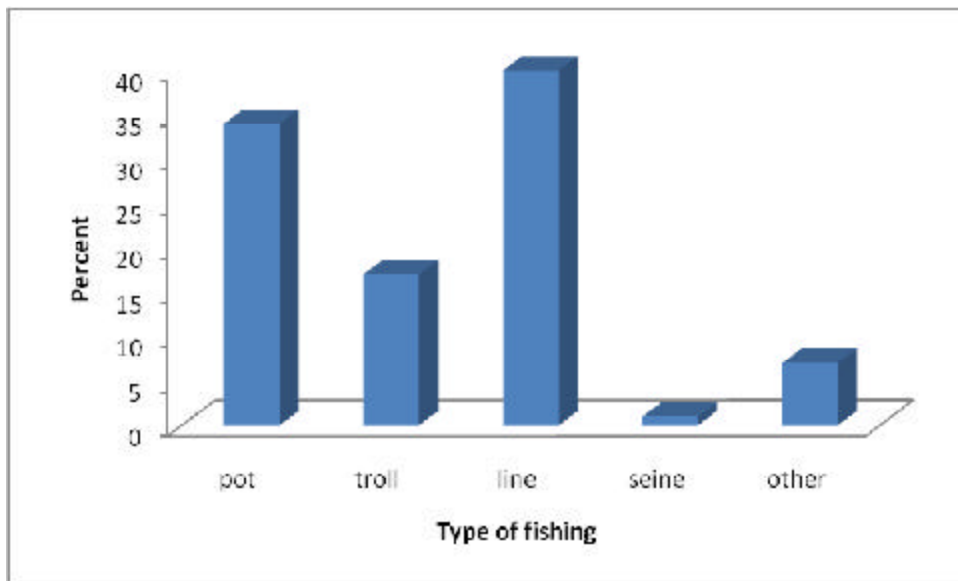


Figure 5 Types of fishing practiced in the Narrows

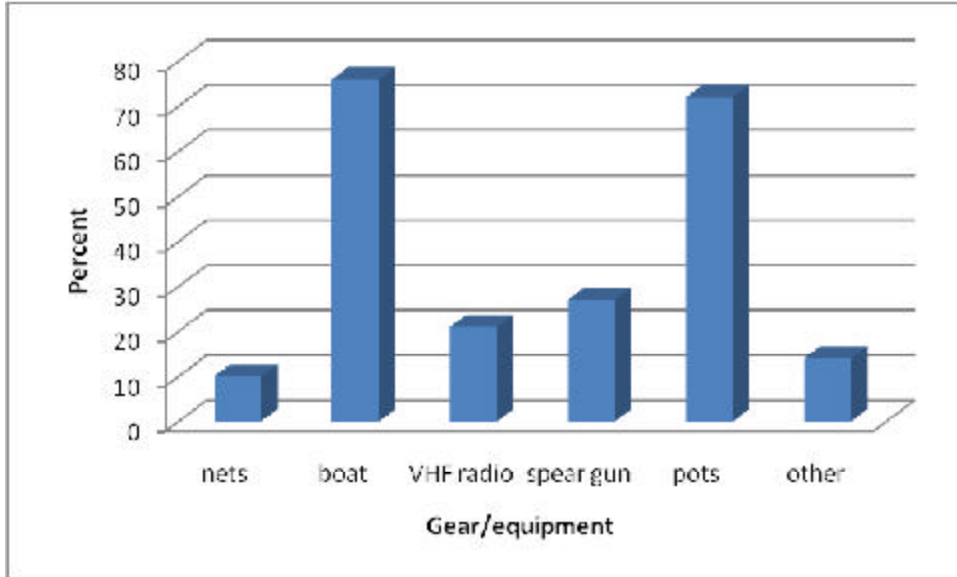


Figure 6 Gear and equipment ownership

Only a small proportion of fishers market their fish with the Fishermen’s Cooperative Society, while the majority dispose of their fish within the community (93%) including hotels/restaurants (55%), and their households (69%). Just over half (52%) of the fishers are members of a Cooperative Society.

3.1.3 Attitudes and perceptions

The overwhelming majority of the fishers (93%) thought the fisheries conditions were either very good (45%) or good (48%) five years ago (Figure 7). Most fishers (75%) believe that fisheries resource conditions have worsened over the last five years and currently are in a bad (58%) or very bad (17%) state (Figure 8). They also believed that hurricanes destroyed fishing beds and severely impacted the fishery resources. Changes in the climate, beach erosion, increased boat traffic in the area, run-off from quarries, volcanic eruption from Montserrat, and seine fishing were also listed as being detrimental

to the fish stocks in the area.

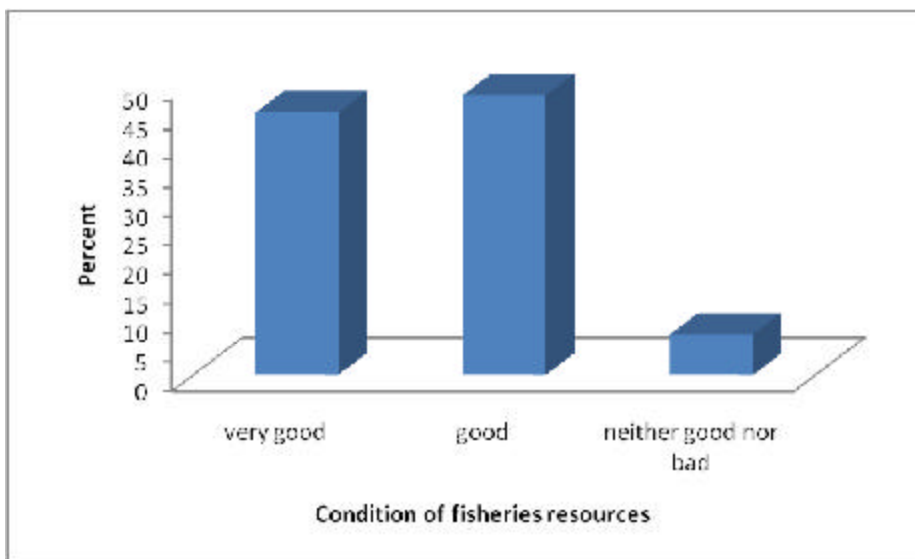


Figure 7 Perceived condition of fisheries resources in the Narrows five years ago

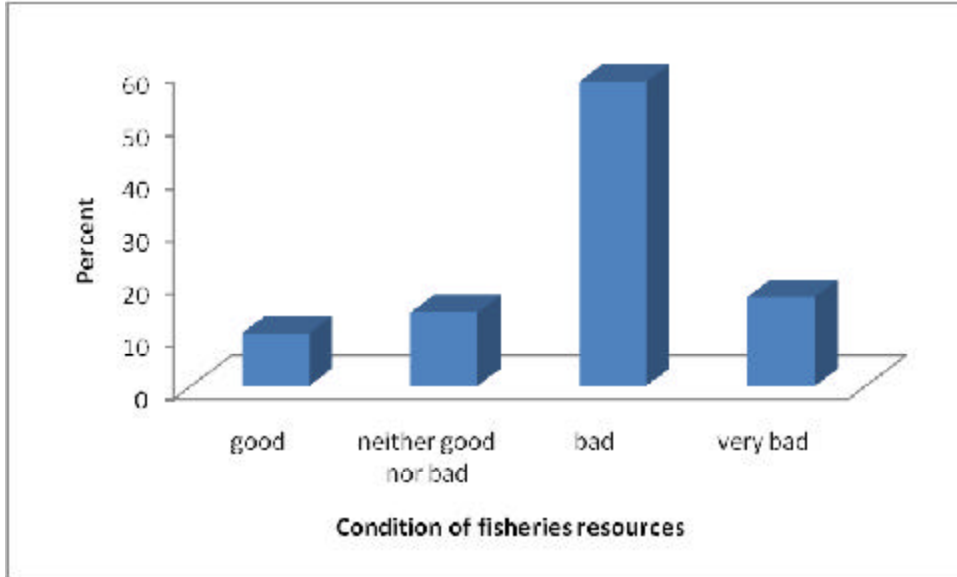


Figure 8 Perceived condition of fisheries resources in the Narrows currently

The overwhelming majority (93%) of fishers feel that government and fisherfolk should work together to solve problems in fisheries. Two-thirds of respondents (66%) felt that fisherfolk are capable of resolving problems in the Narrows whereas one-third were unsure of this. Eighty-three percent of the respondents will support the Narrows being managed by the Government along with another group (such as an NGO, Fishing Cooperative, etc) (Figure 9). Additionally, the majority of the fishers (83%) will support of the establishment of an Advisory Committee for the management of the Narrows.

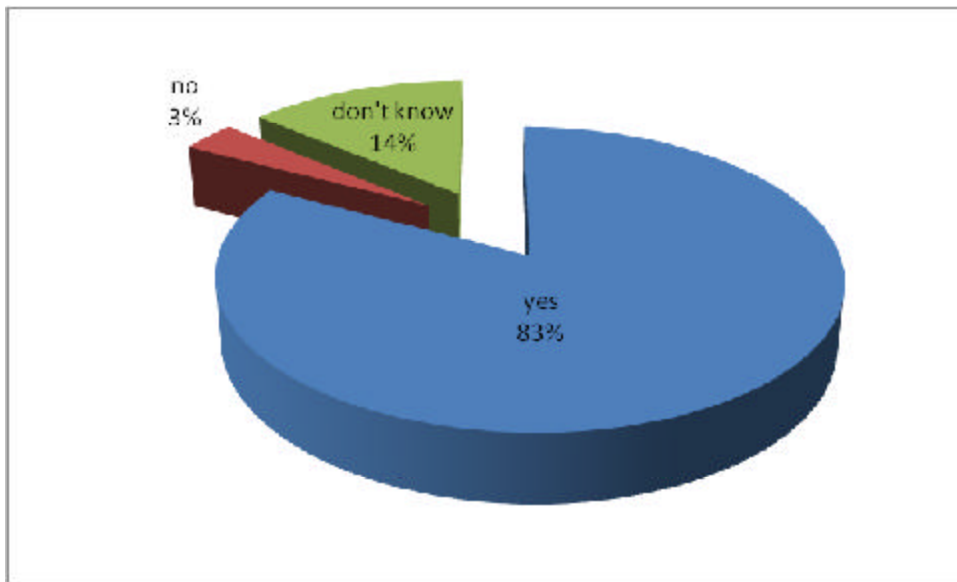


Figure 9 Support for partnered management of the Narrows

Awareness of the Narrows becoming a MPA was split almost equally with 52% of fishers being aware and 48% unaware of this. Awareness of existing rules and regulations governing the Narrows in relation to marine and coastal usage is high for all activities, being greater than 50% in all cases - 97% for commercial fishing, 93% for sportfishing,

69% for mangrove use, 69% for resort development, and 97% for tourism snorkel/diving (Figure 10).

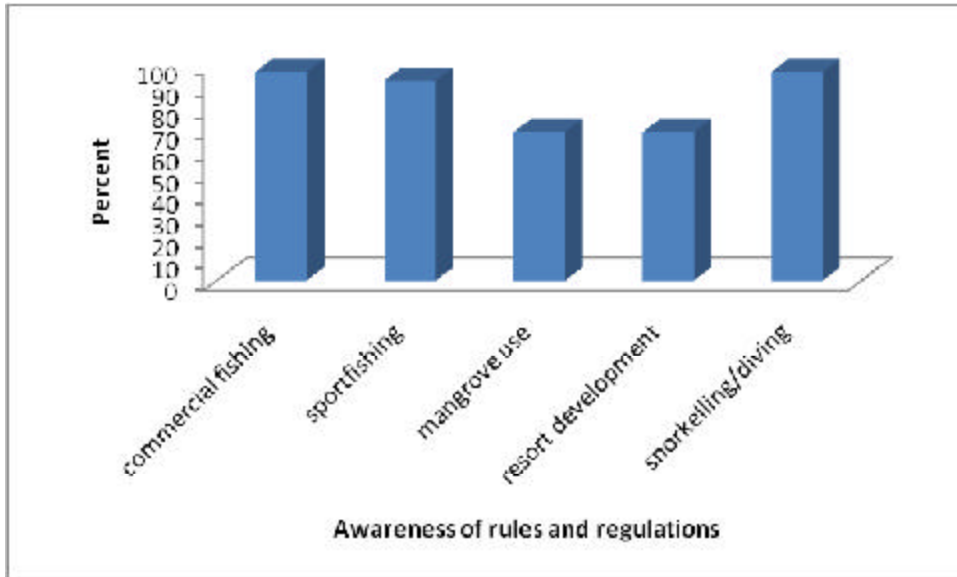
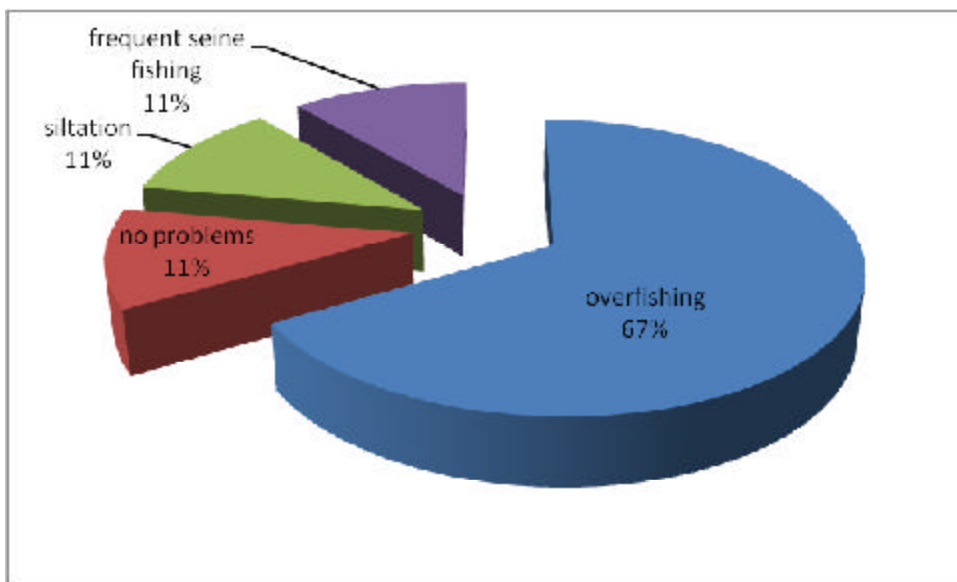


Figure 10 Awareness of rules and regulations pertaining to coastal resource use

3.1.4 Threats and problems

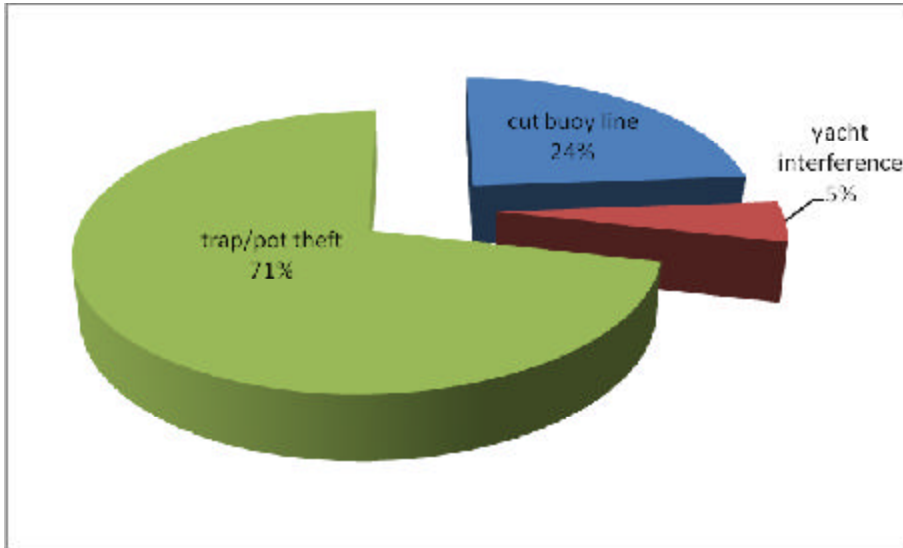
Respondents were asked to state three major problems with the marine resources at the Narrows as well as provide three possible solutions to remedy the problems identified. Of the nine applicable responses, greater than three-thirds of fisherfolk noted overfishing of marine resources due to unsustainable practices as well as overcapacity (too many fishermen in the area) as a major problem (67%). Other problems included siltation from land run-off and frequent seine fishing (11% each). Some fishers believed there were no



problems in the area (Figure 11).

Figure 11 Major problems for the Narrows' resources

It should be noted that 48% of the problems listed were not relevant to this question as they pertained to general problems of fishers themselves instead of problems affecting the marine resources of the Narrows. For example, out of these 42 responses, trap or pot theft was noted by the overwhelming majority of fishers (71%) as a significant problem in the



Narrows followed by cut buoy lines (24%) and yacht interference (5%) (Figure 12).

Figure 12 Problems affecting fishing operations in the Narrows

Although not relevant to the specific question, the data still provide baseline information on primary problems directly affecting the fishing operations in the area.

The suggested solutions to problems affecting marine resources included: enforcement of penalties; area management; area monitoring; development of guidelines for fishers and others; all stakeholders to make decisions to protect the area; use of larger nets for beach seine and no turtle nettings allowed.

Regarding problems affecting fishing operations, solutions included: exposure of fishers who steal from others; reporting of infractions; fishers working together; personalization of buoys; the availability of modern fishing equipment and techniques; and the placement of navigation routes for large boats.

3.1.5 Material style of life

A limited number of questions were asked to ascertain ownership of certain assets (such as stereo, phone, vehicle, freezer, and house) by the respondents. The results indicate that 86% of the respondents own a stereo, 44% owned a vehicle, 96% owned a phone, 86% owned a freezer, and 76% owned a dwelling house.

3.1.6 Additional comments

It was felt that the Department of Fisheries should play a more vital role with the fishers and that the Government should allow fishers to use 1.25 inches mesh size wire.

3.2 Household data

3.2.1 Demographics

Together almost three-quarters (74%) of respondents interviewed were between 21 to 50 years of age (Figure 13). Greater than half of the householders had a secondary/high school level of education (53%) with a reasonable percentage attaining a tertiary education (20%) (Figure 14). The majority of respondents (25%) reported household size to be 4 persons. Employment in the hotel industry provided the main source of income for the majority of the respondents (23%). Jobs included waitressing, bartending, restaurant management, chefs and hoteliers. The second and third top sources of income were income derived from student grants (14%) and domestic work (10%). Only one household had a female who was involved in the fishing industry but the type of involvement was not specified.

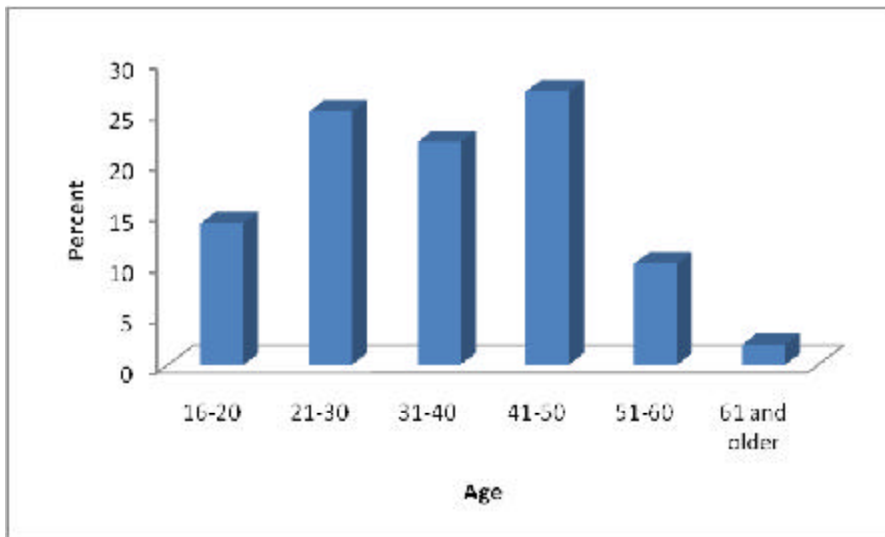


Figure 13 Age of household respondents

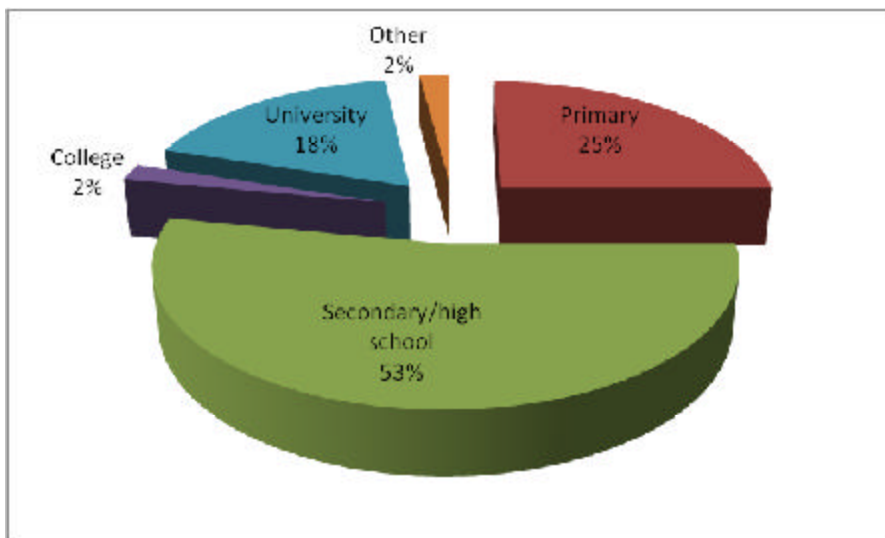


Figure 14 Educational level of householders

3.2.2 Coastal and marine activities

More than half of the households (65%) said fish caught in the Narrows was not used for household consumption (Figure 15). The majority of householders and their families (80%) have visited the Narrows. The majority of the respondents (43%) visit the Narrows on special occasions/holidays. Under normal circumstances the households do not frequent the Narrows. Greater than half (67%) of the respondents thought the people in the community can work together to solve problems within the fishing and tourism industries (Figure 16). All households (100%) thought both the government and the community should work together to solve problems in the fishing or tourism industries. The majority (84%) of the respondents would support the Narrows being managed in partnership with government and other groups, such as a NGO or a Fishing Cooperative.

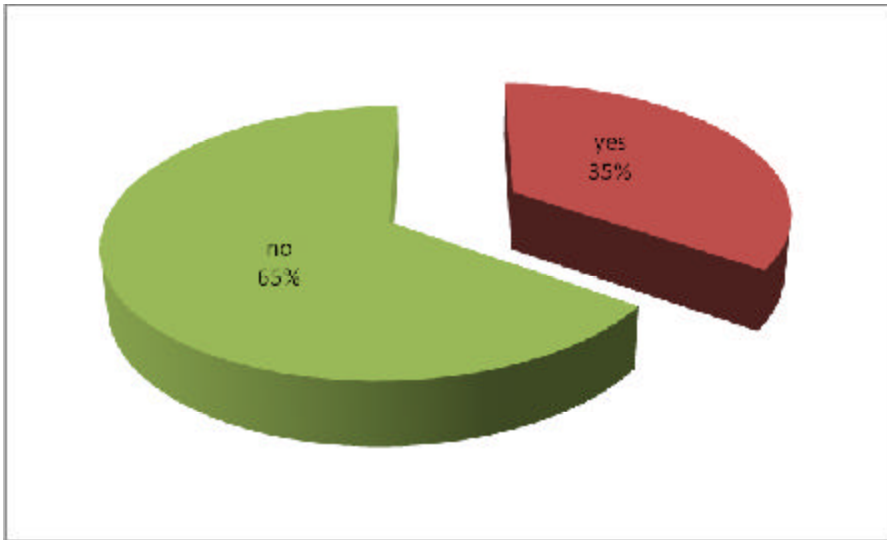


Figure 15 Household consumption of fish

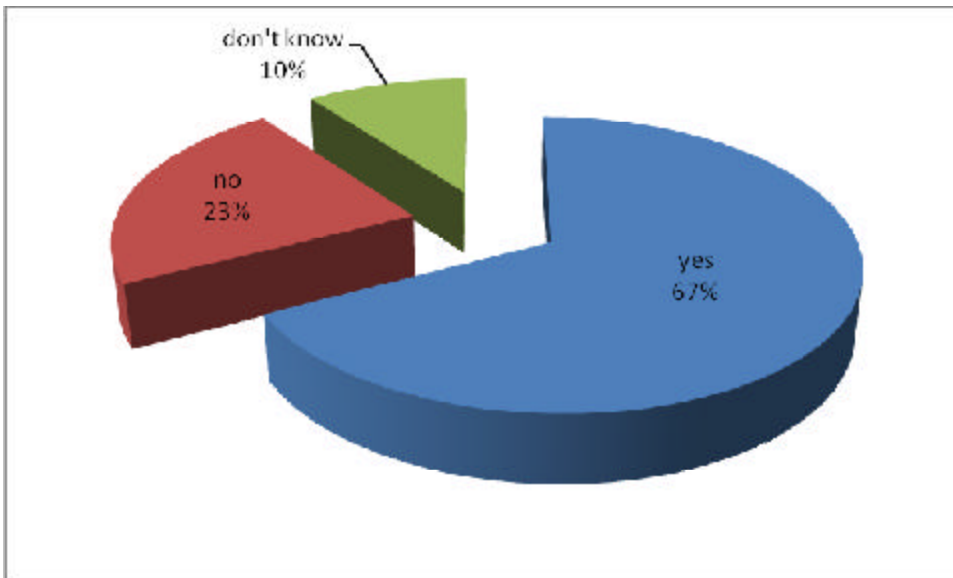


Figure 16 People in the community can work together to solve fishing and tourism problems

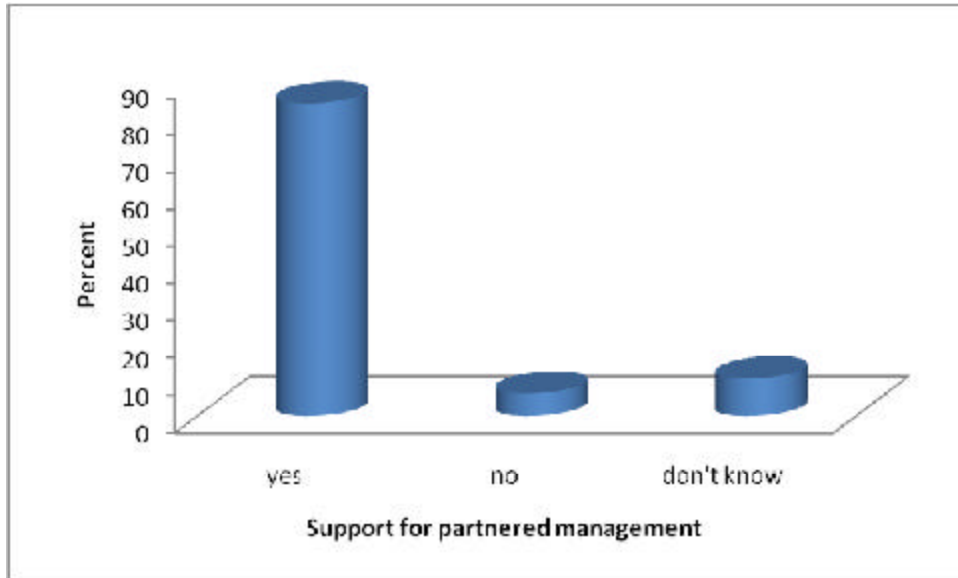


Figure 17 Support for partnered management for the Narrows

3.2.3 Attitudes and perceptions

Householders were asked numerous questions about the importance and benefits of MPAs; management of fisheries including whether enforcement and penalties were adequate; children’s awareness of marine conservation and tourism and its benefits to the community and householders themselves. In general the majority of respondents felt positively about these issues with exception of management of fisheries in the area.

Overall, the overwhelming majority of people interviewed (90%) believed MPAs to be beneficial to the marine resources of St. Kitts and Nevis. Most people (80%) strongly agreed or agreed that a MPA is important for coral reefs and indicated that participation in management decisions regarding any marine reserve establishment was important to them (71%). Additionally, approximately 68% of householders believed that fishers would respect marine reserve regulations once implemented. Children’s awareness about marine conservation seems to be inadequate as the majority of respondents either agreed or strongly agreed that they need to learn more about this at school. (Figures 18-22).

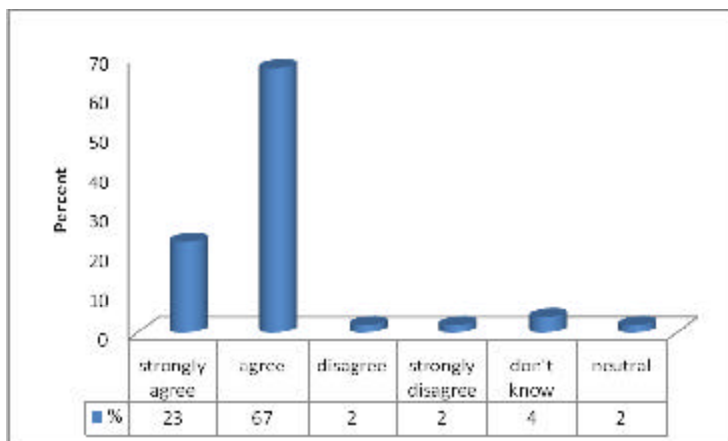


Figure 18 MPAs are beneficial to marine resources of St. Kitts and Nevis

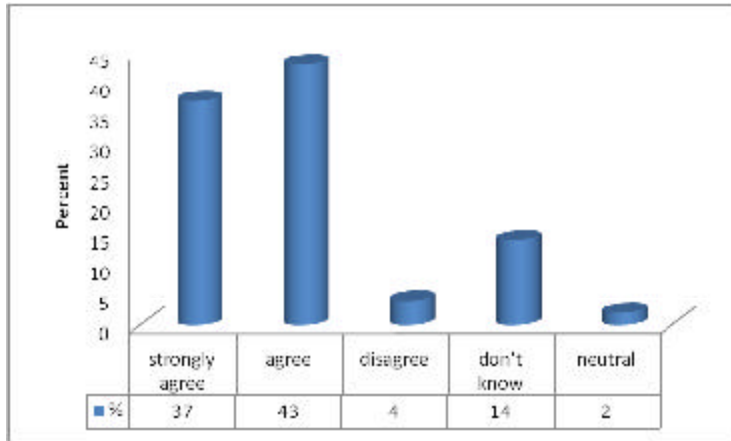


Figure 19 MPAs are important for protecting coral reefs

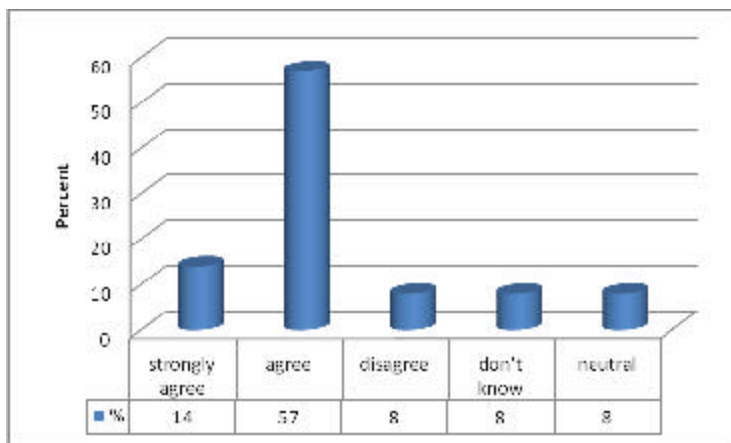


Figure 20 Participation in management decisions regarding MPA establishment is important

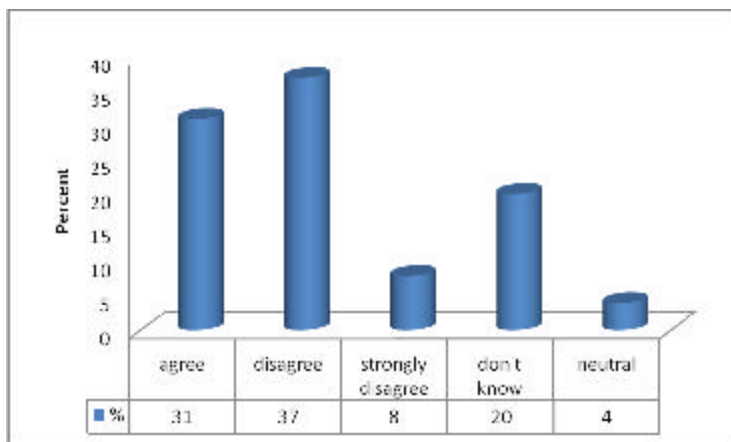


Figure 21 Most fishermen will respect marine reserve regulations

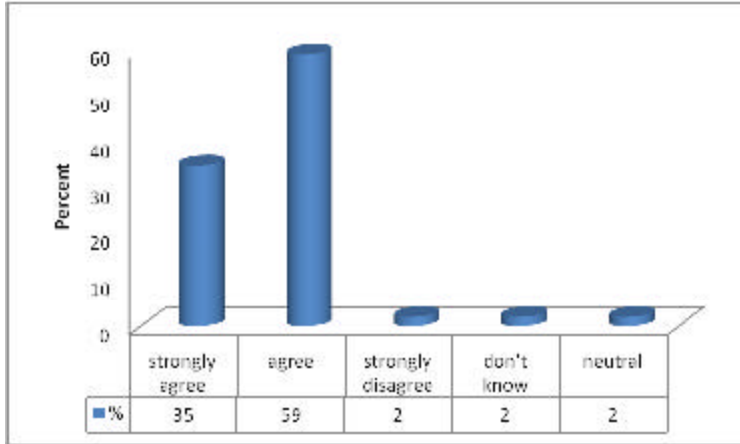


Figure 22 Children need to learn more about marine conservation at school

Just over half of the householders (55%) strongly believed that fisheries are not adequately managed or associated fisheries regulations are not enforced (Figure 23). It should be noted that a fairly large percentage (27%) did not know whether fisheries were appropriately managed. Additionally, nearly three-quarters of respondents (63%) either agreed or strongly agreed that penalties for illegal fishing should be increased (Figure 24).

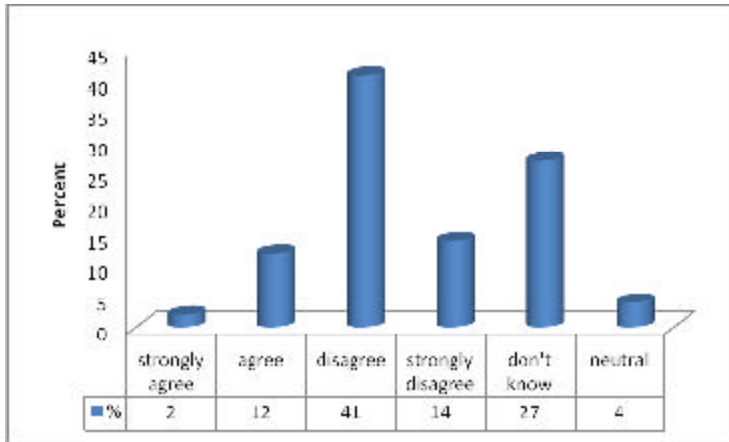


Figure 23 Fisheries are adequately managed and enforced

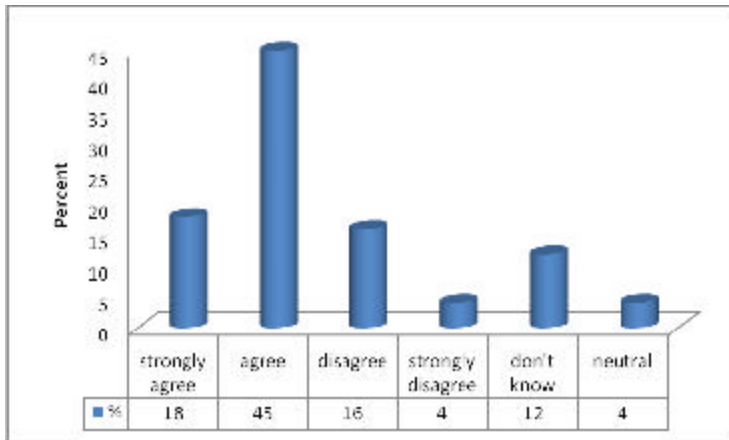


Figure 24 Penalties for illegal fishing should be increased

Protection of mangroves in coastal areas of the Narrows appears to be of priority to householders since 90% of them indicated this was important and should be implemented (Figure 25).

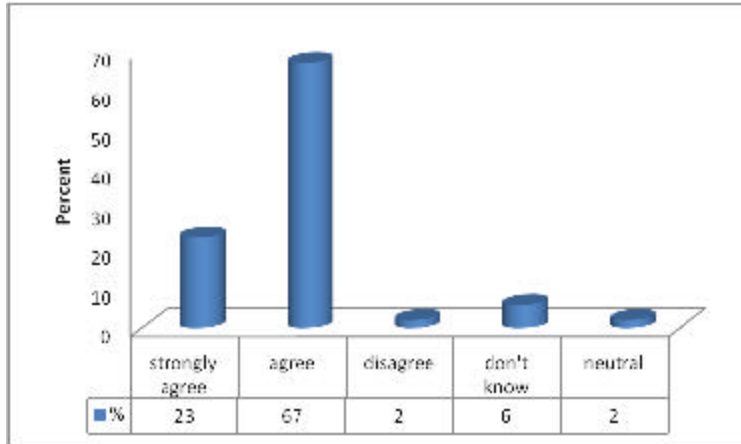


Figure 25 Mangroves should be protected at the coastal areas of the Narrows

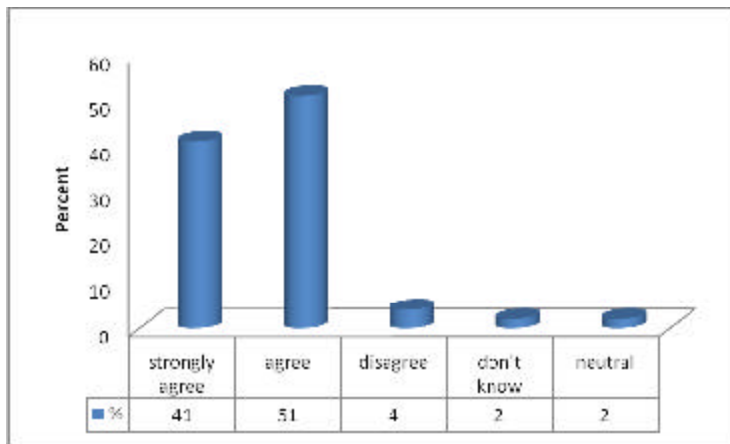


Figure 26 Tourism has been good for your community

Generally respondents feel that tourism has been good both for their communities and their household. However, they apparently believe that the industry has been more beneficial to communities (92%) than to individual households (76%) (Figures 26 and 27).

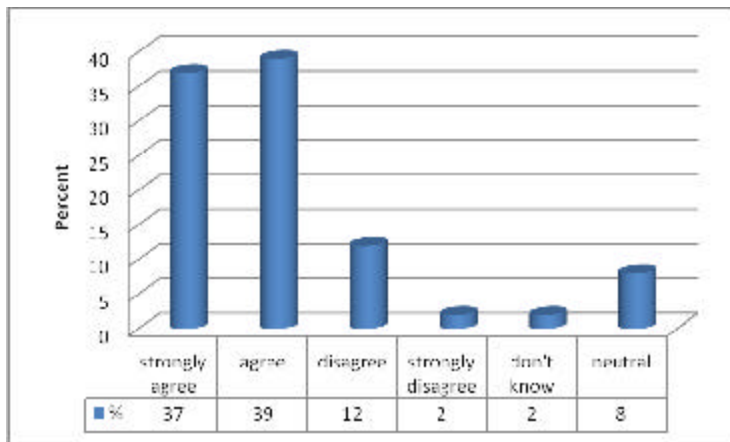


Figure 27 Tourism has been good for your household

3.2.4 Threats and problems

The primary problems for marine resources identified by respondents were pollution and garbage (16%) and bad fishing practices (11%). The majority of the householders were unable to provide suggestions of problems. The main suggestions for solving the problems impacting marine resources included were the need for public education and awareness about coastal and marine resources (12%); the need for more regulations pertaining to marine resources and the enforcement of such regulations (5%); appropriate and proper waste management (5%) and the need for coastal cleanups and conservation (5%). Interestingly, in the case of the latter solution, respondents suggested that communities be paid to conduct these cleanups. As with the problems, a large percentage of respondents did not answer the question.

3.2.5 Narrows attributes and activities

Accessibility, beach and fishing quality, availability of restaurants/entertainment, recreation and clear water are all highly regarded attributes that are important to people when using the Narrows. The majority of respondents in all cases (37% and higher) indicated these attributes were the most important to them. Clear water and beach quality were listed as the most important attributes of the Narrows by the majority of householders interviewed (59% and 57% respectively; Figure 28).

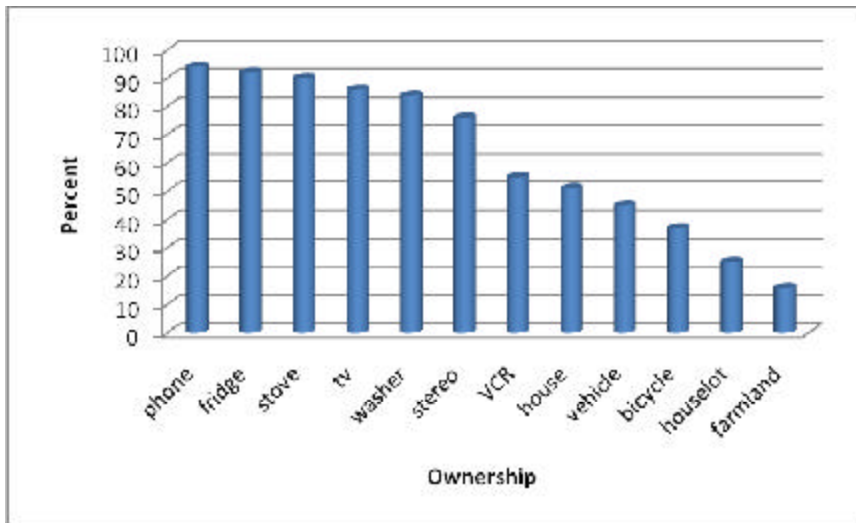


Figure 28 Attributes of the Narrows of most importance to people

The activities that people are most interested or interested in when visiting the Narrows are swimming (70% of respondents), and beach walking and sunbathing (64%). Visiting historic and archaeological sites also seems to be quite important to those surveyed with just over half (56%) expressing an interest in this type of activity within the area. Interest and disinterest in sailing and snorkeling was divided almost equally among respondents. In the case of sailing 25% of respondents in both cases expressed interest and little interest in this activity, and 27% were most interested in snorkeling whereas 25% were least interested in this activity. The activity of lowest interest overall to respondents was power-boating with 58% expressing either little or no interest in it.

Drug trafficking, heavy motor boating/power boating, marina establishment, beach bonfires, dumping/littering, sand mining, jet skiing, and garbage disposal were listed as activities that people thought should not be allowed in the Narrows. Of these heavy motor boating/power boating was the activity that most respondents (12%) felt should not be allowed in the area. In general the question was poorly answered with just over half of the respondents (51%) providing answers that were not applicable.

3.2.6 Material style of life

Ownership of household appliances was generally high with over 75% of householders owning phones, refrigerators, stoves, televisions, washers and stereos. House ownership was fairly high with 51% of households owning their houses. Land ownership, both house lots and farmland was very low, 25% and 16%, respectively.

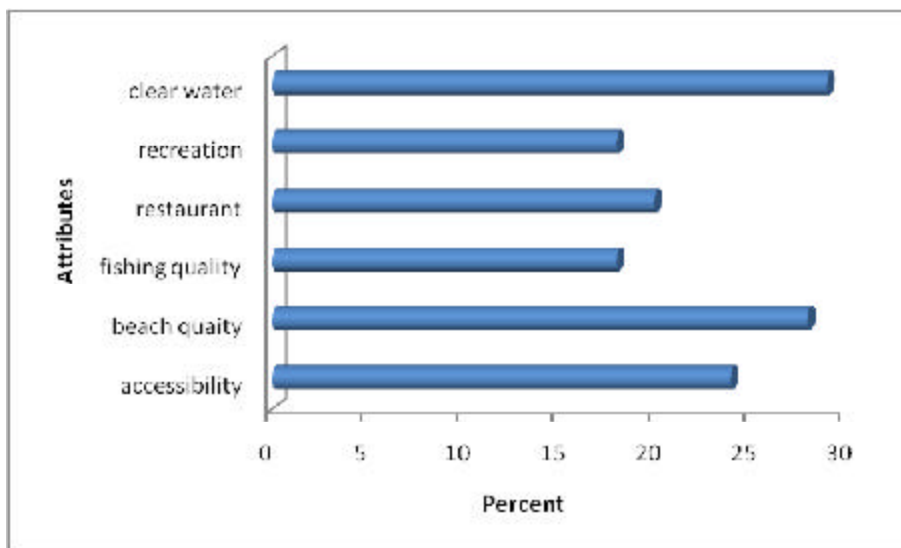


Figure 29 Respondent material style of life

3.2.7 Additional comments

Respondents advised that the MPA must be handled sensitively since fishing is a survival activity. There is need for management and security (police and people monitoring). They are wary about a bridge being built over the Narrows to join the twin islands.

3.3 Small business operator data

3.3.1 Demographics

A range of small business operators were targeted for interview, with the majority being restaurant or bar operators (Figure 30).

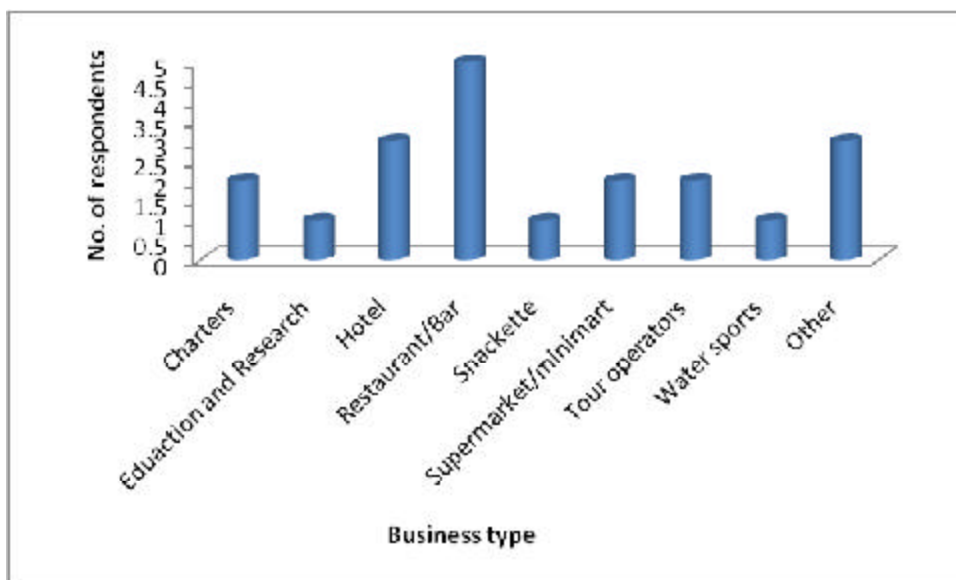


Figure 30 Type of business operated by respondents

The majority of small business owners (60%) have been operating in the area for over 10 years. The remaining operators were either newly established or have been operating for up to 10 years (Figure 31).

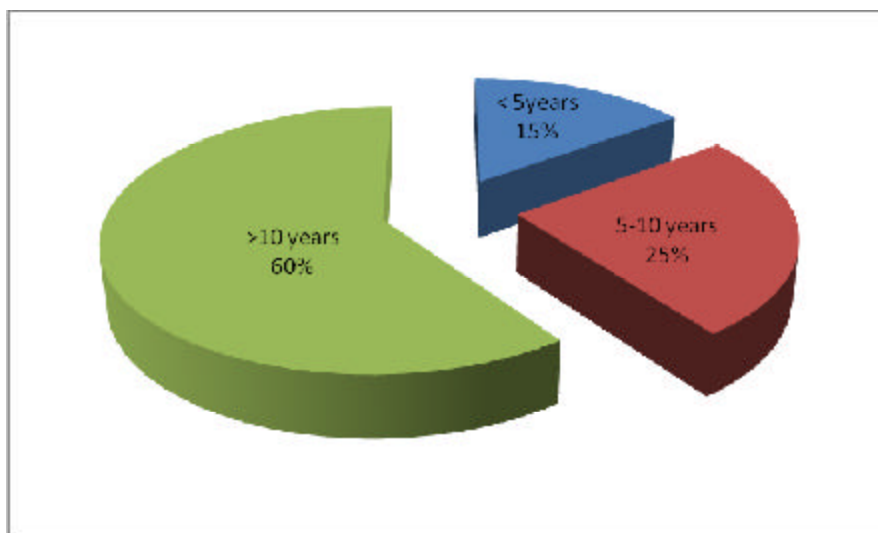


Figure 31 Years of business operation

Sixty-five percent of small business operators purchase fish from local fish vendors in their areas with pot fish (reef fish) being the most commonly (55% of respondents) purchased type of fish. Dolphin and lobster are also purchased quite frequently (45% each) by business operators.

3.3.2 Coastal and marine activities

Considering the location of the majority of businesses within the area, as well as the type of business, many of the respondents were unable to comment on the current or past (five years ago) condition of the fisheries resources. However, a few respondents noted

possible reasons for changes over the years, specifically, coral bleaching, overfishing, climate change, and lack of conservation measures undertaken. The results of the survey also revealed that twelve businesses regularly purchase lobster, conch, and dolphin or wahoo from the fishers in the area.

3.3.3 Threats and problems

Greater than half (65%) of the respondents believe the health of the marine environment (coral reef, fish, water quality, beaches) is extremely important to their businesses (diving, snorkeling, hotel, restaurant, etc). None of the respondents felt their business contributed to the degradation of the marine environment (coral reef, fish, water quality, beaches) in any way.

The majority of small business operators (25%) cited sustainability of their businesses as the main reason for the importance of a healthy environment to their businesses. Other reasons provided included that a healthy environment was important to their businesses as a food resource (20%), for tourism (10%) and fish availability (5%).

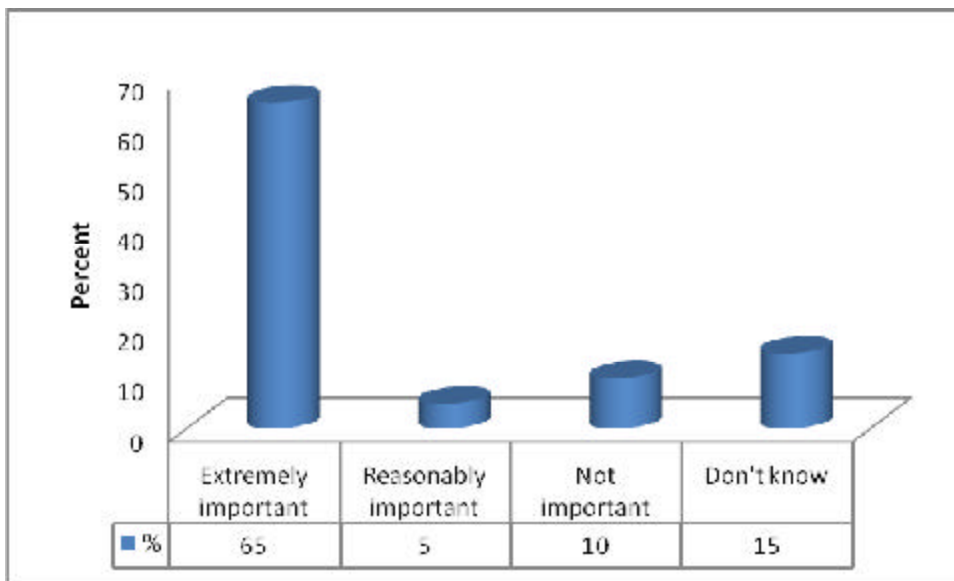


Figure 32 Importance of the health of the marine environment to business operations

The majority of small business operators (70%) noted that there had been environmental changes to the shoreline within the past five years. Changes on land and underwater were observed by smaller proportions of respondents (45% and 15%, respectively; Figure 33). It should be noted that the majority of these changes (45%) were positive in nature.

Problems regarding marine resources were thought to include overfishing (10%), sand mining (2%), pollution (3%), unsustainable fishing practices (2%), coral bleaching (2%), land runoff (3%), and the negative impacts from hurricanes (2%). Respondents indicated that possible solutions to these problems included protected area management; restriction or control of fishing; more regulation and monitoring of fishing; and education and awareness-raising. This question was also poorly answered with two-thirds of the respondents not answering it.

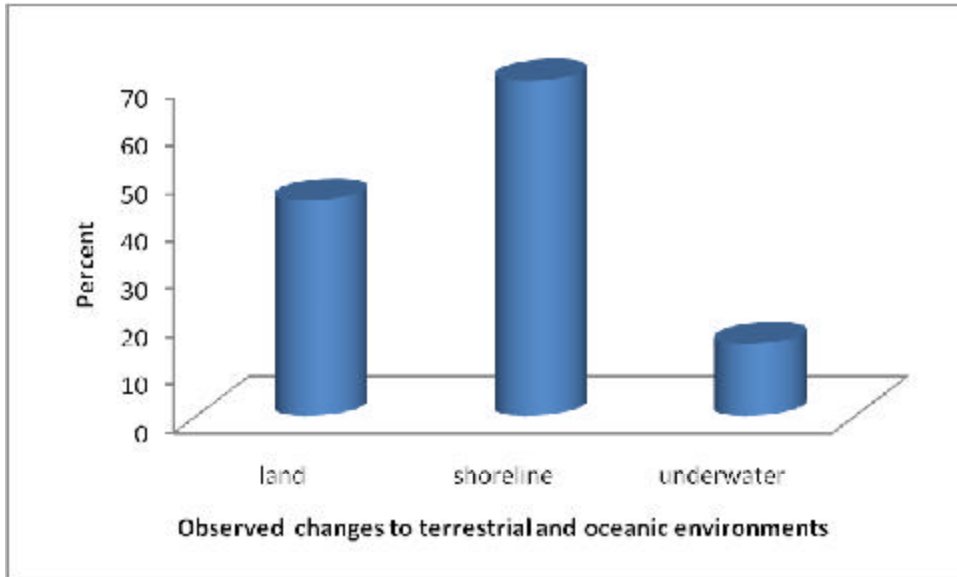


Figure 33 Changes to land, shoreline and underwater environment within the past five years

3.3.4 Attitudes and perceptions

Respondent knowledge of conditions of fisheries resources five years ago and currently was poor overall as evidenced by the large percentage of not applicable responses and non-responses (75% for conditions five years ago and 85% for current conditions). However of those who answered the question, fishery resources have apparently been in poor condition since the early 2000s. Twenty-five percent of the respondents believed that fisheries resources five years ago were neither good nor bad or in a bad condition and fifteen percent believe that current conditions vary from neither good nor bad to very bad (Figures 34 and 35).

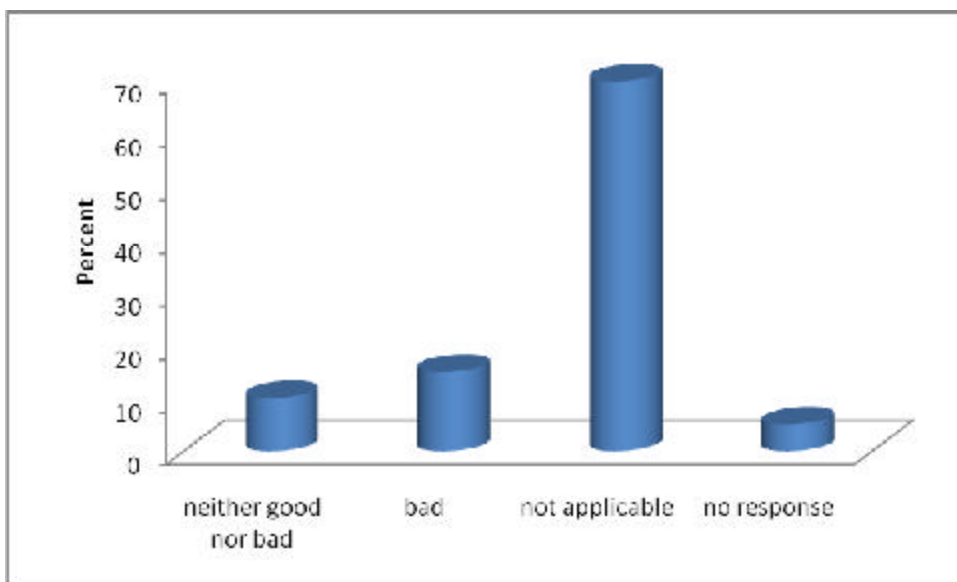


Figure 34 Condition of fisheries resources five years ago

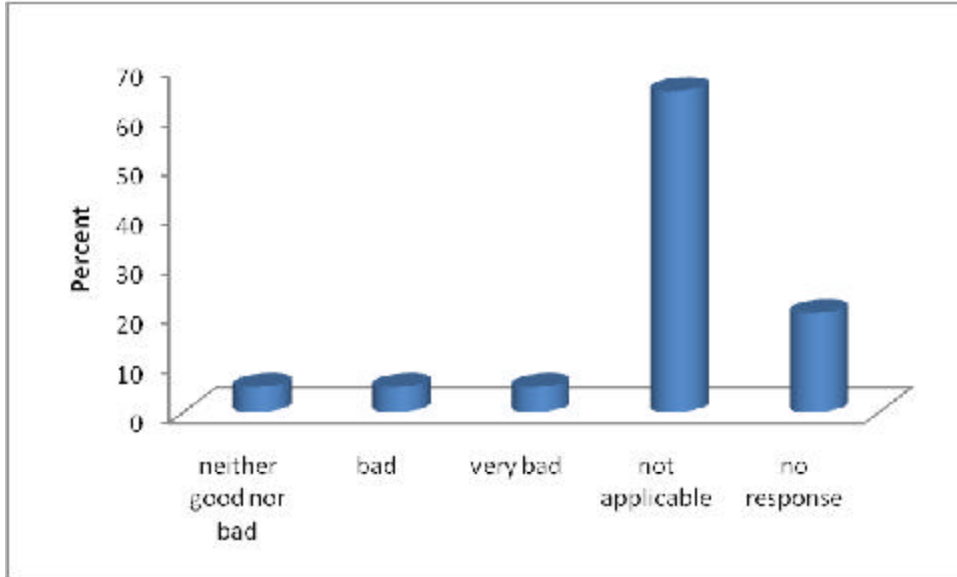


Figure 35 Current condition of fisheries resources

The majority of the respondents (75%) are not aware of the Narrows becoming a MPA. Awareness of existing rules and regulations governing the Narrows in relation to commercial fishing, sport fishing, mangrove use, resort development, and tourism (snorkeling/diving) is quite low with only 30% of respondents being aware of regulations regarding commercial fishing, mangrove use and tourism; and 25% with knowledge on regulations regarding sport fishing and resort development (Figure 36). However, the majority (85%) are willing to support of the establishment of an Advisory Committee for the management of the Narrows. Just over half of the respondents (55%) said they would assist in MPA management by reporting infractions (25%), assisting with enforcement of regulations (20%) and conducting water quality monitoring (10%).

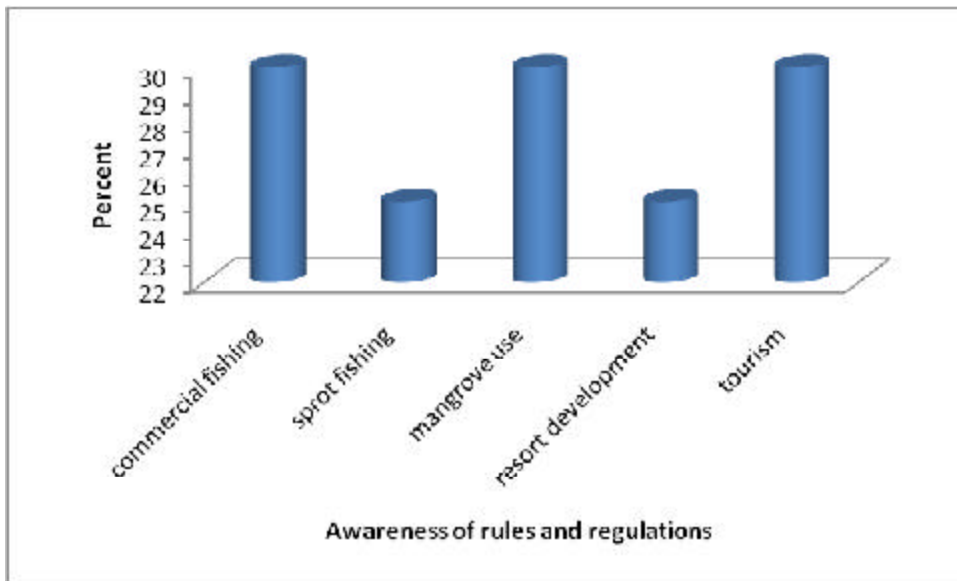


Figure 36 Awareness of rules and regulations in the Narrows

Small business operators were asked numerous questions about the importance of MPAs; management of fisheries including whether enforcement and penalties were adequate; participation in management decision-making and support for MPA establishment in the Narrows. In general the majority of respondents felt positively about these issues with the exception of the adequacy of the enforcement of regulations in the area.

90% of respondents believe that a MPA is important for protecting coral reefs in the Narrows (Figure 37). Additionally, 75% of respondents strongly agreed or agreed that a conservation zone would help to sustain fish stocks in the Narrows (Figure 38).

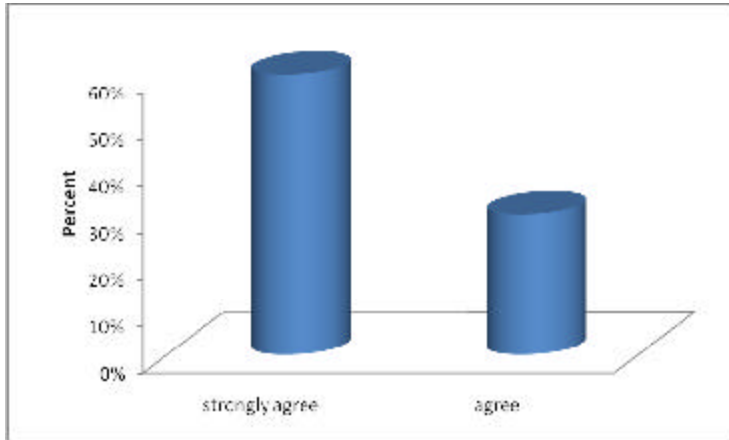


Figure 37 A MPA is important for protecting coral reefs

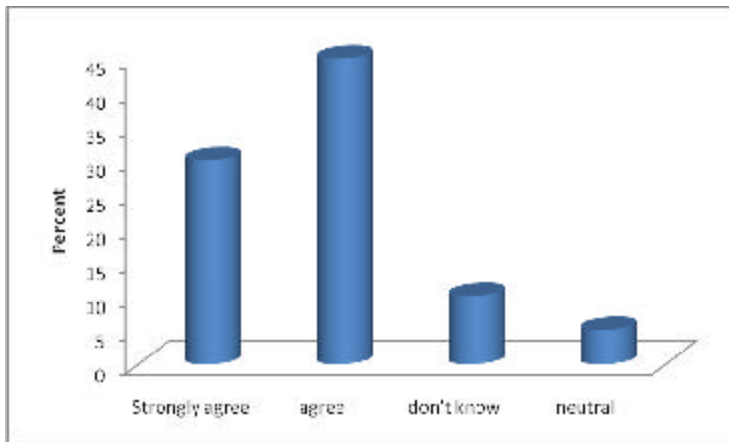


Figure 38 Conservation zone will sustain fish stocks

Sixty-eight percent of the small business operators surveyed indicated they would support the establishment of a MPA for the Narrows (Figure 39) with the majority (70%) stating that participation in management decisions regarding the Narrows is important to them (Figure 40).

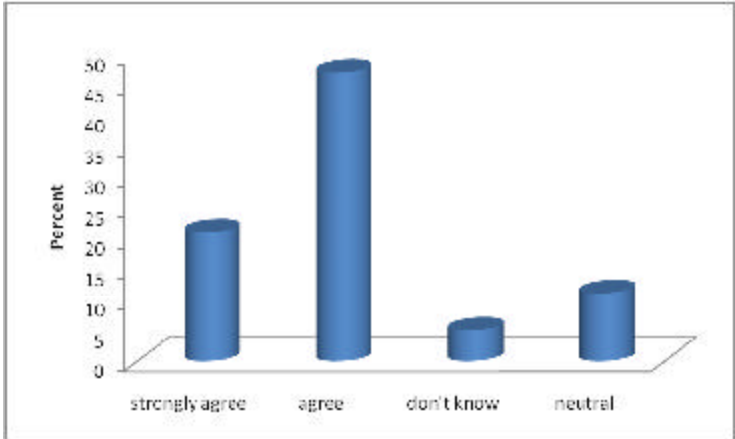


Figure 39 You will support the establishment of a MPA for the Narrows

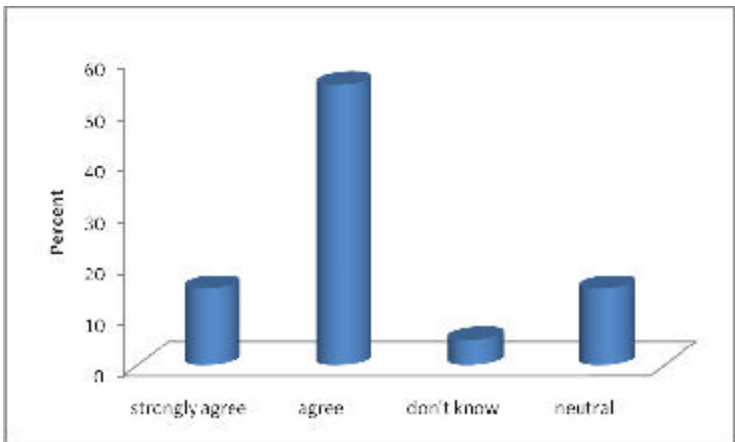


Figure 40 Participation in management decisions about the Narrows is important to you

Equal percentages of respondents (50%) believe that penalties for illegal fishing should be increased and mangroves should be protected (Figures 41 and 42).

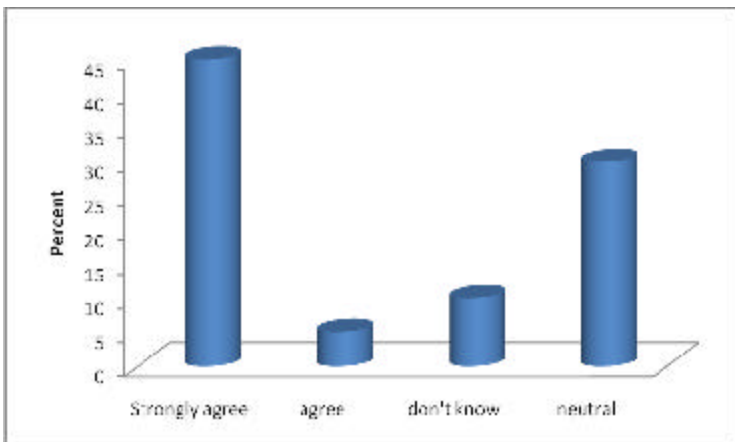


Figure 41 Penalties for illegal fishing should be increased

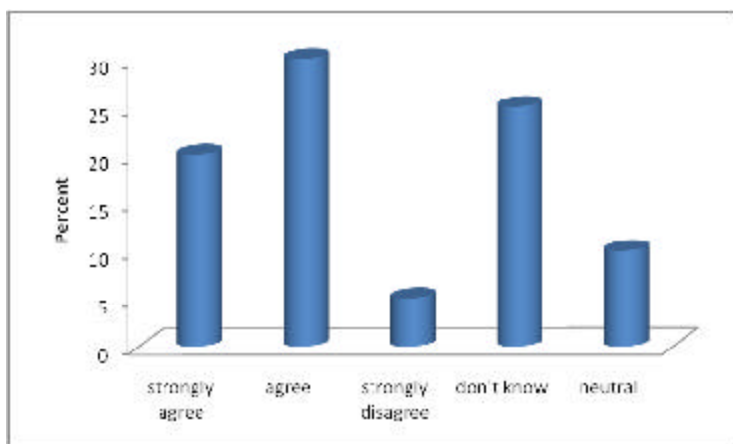


Figure 42 Mangroves should be protected

Forty percent of respondents believe that the enforcement of regulations is inadequate whereas, a large proportion (30%), do not know whether it is adequate or not (Figure 43).

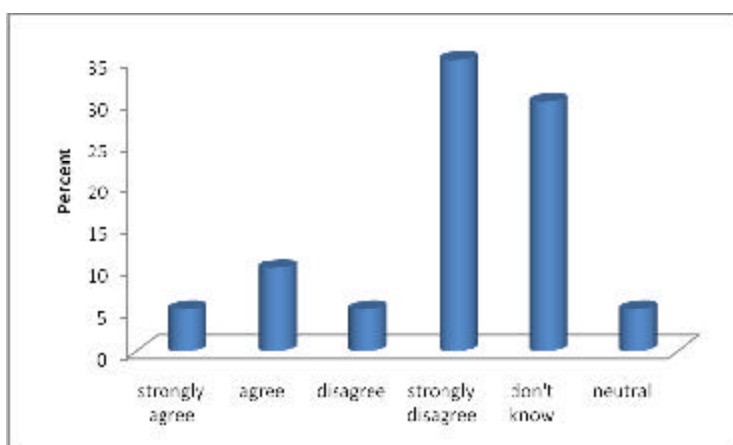


Figure 43 Enforcement of regulations is adequate

3.3.5 Material style of life

| Material style of life | % ownership |
|------------------------|-------------|
| Phone | 85 |
| Fridge | 80 |
| Stove | 80 |
| Vehicle | 80 |
| Stereo | 75 |
| TV | 75 |
| Washer | 75 |
| Land | 70 |
| House | 65 |
| VCR | 50 |
| House lot | 40 |
| Bicycle | 30 |
| Boat | 30 |
| Gear/equipment | 30 |

Ownership of appliances was high in all cases with 50% or more of the respondents owning a phone, refrigerator, stove, vehicle, stereo, TV, VCR and washer. House and landownership was also quite high being 65% and 70% respectively.

3.3.6 Important attributes

In terms of activities the respondents participate in when they visit the Narrows, swimming and beach walking/sunbathing are the activities they seem most interested in. Eighty-five percent of respondents are most interested and interested in swimming while over half (65%) are interested or most interested in beach walking/sunbathing. Dining and entertainment is of high to fair interest

among 50% of the small business operators. One-quarter of those interviewed are most interested and interested in snorkeling in the Narrows. Interest in power boating, snorkeling, turtle watching and education/research in the Narrows was very low and generally equally dispersed among all categories of interest, from most interested to least interested at 5% each. In general, this lack of interest may also be perceived from the high percentage of respondents (75% and over) who did not indicate their interest in these activities.

With respect to participation in other activities that are not currently available in the Narrows only two out of 20 respondents noted that they would like to take part in reef monitoring and educational programs.

3.3.7 Additional comments

One respondent encouraged the Department to keep up the good work.

4 CONCLUSION

This section of the report was unfinished on submission of the draft report and as such had to be completed by CERMES. The data presented in this final report are those that were analysed during a site visit to Nevis by the Project Investigator, Maria Pena, from 7-9 October 2009. It should be noted that at that time, a few fisherfolk questionnaires were overdue and as such were not analysed. These were later added to the dataset by the SocMon team but this updated dataset was not provided to CERMES up to the time of compiling this report.

In general, the primary data collection activity achieved the site monitoring goal of collecting socio-economic data to inform marine conservation and development decision-making. Information on primary sources of income, awareness of the importance of MPAs, management of fisheries and enforcement of regulations, knowledge of marine resource conditions, problems affecting marine resources, attributes of and activities of interest in the Narrows, has been collected and will be useful in providing baseline information on perceptions and attitudes of stakeholders for decision-making with respect to the establishment of a MPA for the area or implementation of marine zoning in the Narrows.

Fishing and employment in the tourism industry are the main sources of primary income among stakeholders in the area. Therefore conservation and successful management of the marine resources in the Narrows is important and will enhance the sustainability of these sectors. In addition, there is a long history of fishing and establishment of businesses (most of which are restaurants and bars) for more than 10 years. Based on the long history of fishing in the area, fishers reluctance to change occupation, and existence of long-standing businesses, any implementation of a MPA or zoning of the marine area must consider the impact of such conservation measures on livelihoods in the area.

Generally both fisherfolk and small business owners believe that the condition of marine resources has declined over the past five years. However, their opinion of the past condition of these resources varies, with fishers recognizing either very good or good conditions, and small business operators perceiving that conditions were neither good nor bad or bad. Small business owner knowledge of marine resource conditions seemed quite

low due this stakeholder group's overall poor response to this question. This is particularly surprising since 65% of the small businesses targeted were either directly or indirectly linked to the marine environment – charters, hotel, restaurant/bar, tour operators and watersports operators. Therefore it is assumed these stakeholders would have had greater familiarity with marine resources and survey response would have been high. Although knowledge of resource conditions was poor, small business owners recognise the importance of a healthy marine environment to the sustainability of their businesses. Therefore any management measures to conserve or enhance the marine environment in the Narrows will be more than likely supported by this group of stakeholders.

The fishers perception of resource conditions in the Narrows may be the most accurate since they are directly dependent on these resources for their livelihoods. It should be noted that householders were not asked to provide their opinions on resource conditions. The exclusion of this stakeholder group was an oversight. Information on stakeholders perceptions of marine resource conditions indicates the level of awareness of natural history among different groups and will indicate those stakeholders who would be more receptive to conservation measures and provide more support for such measures. This information is also useful in the determination of which stakeholders should be the target of awareness-raising drives.

Both fisherfolk and householders believe that a collaborative effort between government and stakeholders could work to solve problems in the Narrows. Support for partnered management (between government and a group such as an NGO or fishing cooperative) of the area amongst these stakeholders was also very high and greater than 80% in both cases. Support for the establishment of a management advisory committee for the Narrows was also high amongst fisheries and small business owners. These results indicate that stakeholders are willing to play a role in the management of resources on which they depend and therefore should be involved in any future management and decision-making processes in the Narrows. These processes should be participatory in nature. It should be noted that householders were not surveyed regarding their opinions on responsibility for problem solving, partnered management and the establishment of an advisory committee for management. As stakeholders adjacent to the Narrows, their opinions on these matters should also have been sought for a more complete understanding on how governance is viewed among different stakeholder groups.

Fishers seem generally to have a greater awareness of plans for the Narrows as well as existing rules and regulations governing the area than small business owners. Households were not surveyed on their awareness of future plans for the area or rules and regulations pertaining to the area. With regards to future plans for the establishment of a MPA in the Narrows, just over half of the fishers surveyed were aware of this proposal. However, a significant percentage of them (48%) claimed no awareness to such a plan. Small business owners are particularly ill-informed of future plans for the Narrows. Awareness-raising activities must be increased to reach a larger number of fishers and should be introduced to inform small business owners of future developments in the area.

Awareness of such development is crucial to these stakeholders who are dependent on the resources in the Narrows for their livelihoods and businesses.

Fishers again showed greater awareness of rules and regulations governing the Narrows than small business owners. The fishers are particularly well informed on regulations pertaining to commercial and sport fishing, tourism activities, mangrove use and development. Awareness of these rules and regulations is particularly low among small business owners (between 25-30%). With the implementation of a MPA or marine zoning of the area, all stakeholders should have a good awareness of the rules and regulations applying to the area. This will aid in the enforcement of such rules and regulations and will result in effective and successful management of the area. Stakeholders may inadvertently violate rules and regulations if they are unaware of their existence. All stakeholders within the area of management should therefore have reasonable knowledge of these rules and regulations. As such, baseline information on householder awareness is also important and this stakeholder group should have been surveyed on this.

Material style of life was not consistently surveyed across the three stakeholder groups. For example, fishers were surveyed for minimal asset ownership whereas householders and small business owners were surveyed more thoroughly. In general material style of life was good across all stakeholder groups with fishers and small business owners showing high ownership of assets and household appliances. Ownership was lower for householders. Fishers showed greater house ownership than householders and small business operators. This data collected provides a reasonable baseline for determining the economic impact of MPA implementation or marine zoning.

The majority of fish caught in the Narrows by fishers is used for their own household use with just over half sold to hotels and restaurants in the area. Just over half of the small business operators purchase fish from local vendors for use at home or in their business. There is therefore a fairly high dependence and demand for this resource by these stakeholders in the area. Any conservation tools implemented or decisions made should take food security of the community into consideration. Surprisingly, a fairly large percentage of householders interviewed do not consume fish caught in the Narrows. Perhaps householders prefer other species to those caught in the Narrows.

The majority of householders have visited the Narrows but under normal circumstances do not frequent the area. The Narrows attributes of most importance to this group were clear water and beach quality. Small business owners were not asked to identify the attributes of most importance to them when using the Narrows. In general householders and small business operators were most interested in participating in recreational activities such as swimming, and beach walking and sunbathing. With the implementation of a MPA or marine zoning in the area, multi-use zoning will be necessary to accommodate and allow recreational activities common in the Narrows.

5 REFERENCES

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- Pena M. and P. McConney. 2008. Socio-economic monitoring by Caribbean fishery authorities: Partnerships and preparation, October 2007 – April 2008. Report No. 1. 28pp.
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6 APPENDICES

Appendix 1: Fishers SocMon questionnaire

FISHERFOLK QUESTIONNAIRE

Interviewer:
Respondent #:
Date and time:
Location:

Demographics

1. How old are you?

16 to 20

21 to 30

31 to 40

41 to 50

51 to 60

61 or older

2. What is your level of education?

Primary

(2) Secondary/High School

(5) Other _____

(3) College

(4) University

3. How many people live in your household? *(Circle appropriate number)*

Adults (16 and older)

(1) (2) (3) (4 or more)

Children (under 15 years)

(1) (2) (3) (4 or more)

4. Is fishing your primary source of income?

Yes

No

If No, please list them: _____

5. What is your average monthly income from fishing (after taking out operating expenses)?

Under \$500

\$1,001 to \$1,500

\$501 to \$1,000

Above \$1,500

6. Are any other members in your household presently employed?

Yes

No

7. Are there any females in your household who are involved in the fishing sector?

Yes

No

If yes, please list the area of involvement: _____

Coastal and Marine/Fishing Activities

8. What role do you play in the Industry? (Tick all that apply)

- | | |
|---|---|
| <input checked="" type="checkbox"/> Fisher | <input checked="" type="checkbox"/> Gear builder/repairer |
| <input checked="" type="checkbox"/> Boat owner | <input checked="" type="checkbox"/> Outboard engine mechanic |
| <input checked="" type="checkbox"/> Fish vendor | <input type="checkbox"/> Equipment supplier (sale of gear, equipment) |
| <input checked="" type="checkbox"/> Boat builder/repairer | |

9. In what type of fishing are you engaged? (Tick all that are named)

- | | |
|---|--------------------------------|
| <input type="checkbox"/> Pot | <input type="checkbox"/> Line |
| <input type="checkbox"/> Trolling | <input type="checkbox"/> Seine |
| <input type="checkbox"/> Other (Please specify) | <u>Diving spear fishing</u> |

10. What equipment/gear do you own? (Tick all that apply and prompt to find out nos.)

- | | |
|---|---|
| <input type="checkbox"/> Nets _____ | <input type="checkbox"/> Spear Gun <u> </u> |
| <input type="checkbox"/> Boat <u> </u> | <input type="checkbox"/> Fish pots _____ |
| <input checked="" type="checkbox"/> VHF Radio <u> </u> | <input type="checkbox"/> Other (Please specify) _____ |

11. Do you own the vessel?

- Yes No _____

12. How many crew members are usually on your boat?

- | | |
|----------------------------|---------------------------------------|
| <input type="checkbox"/> 1 | <input checked="" type="checkbox"/> 3 |
| <input type="checkbox"/> 2 | <input type="checkbox"/> 4 |

13. What type of vessel do you own, rent or borrow?

- | | |
|--|-------------------------------------|
| <input type="checkbox"/> Power <u> </u> | <input type="checkbox"/> Sail _____ |
|--|-------------------------------------|

14. What type of hull material is the boat made of?

- | | | |
|-------------------------------------|--|---|
| <input type="checkbox"/> Fiberglass | <input checked="" type="checkbox"/> Wood | <input type="checkbox"/> Other (identify) _____ |
|-------------------------------------|--|---|

15. What is the vessel length? 19 ft

16. How often do you use the gear as selected Question 10?

- | | |
|--|---|
| <input type="checkbox"/> Once each week | <input type="checkbox"/> Three times each week |
| <input type="checkbox"/> Twice each week | <input checked="" type="checkbox"/> More than three times each week |

17. How much do you spend per week on the following items?

- | | |
|------------------------------|--|
| Gas | <u>\$ 400.00</u> |
| Boat maintenance | _____ |
| Storage rental | _____ |
| Crew share | <u>split equally after take out @ gas.</u> |
| Equipment repair/replacement | _____ |
| Other (Please specify) | _____ |

18. How days in a week do you fish in the Narrows? (Show Map)

- One day/week Five days a week
 Two days/week Six days/week
 Three days/week Seven days/week
 Four days/week

19. What are the top 4 species that you target in the Narrows? (Please state)

- a) Lobster c) Doctan
b) Parrot d) gunt

20. On average, how much (in pounds) fish do you catch per day/week?

- | | | | | | | |
|------------|--------------------------|-----------|-------------------------------------|-----------|-------------------------------------|--------------|
| Reef fish: | <input type="checkbox"/> | 25-50 lbs | <input type="checkbox"/> | 51-100lbs | <input checked="" type="checkbox"/> | over 100 lbs |
| Conch: | <input type="checkbox"/> | 25-50 lbs | <input type="checkbox"/> | 51-100lbs | <input type="checkbox"/> | over 100 lbs |
| Lobster: | <input type="checkbox"/> | 25-50 lbs | <input checked="" type="checkbox"/> | 51-100lbs | <input type="checkbox"/> | over 100 lbs |
| Pelagic: | <input type="checkbox"/> | 25-50 lbs | <input type="checkbox"/> | 51-100lbs | <input type="checkbox"/> | over 100 lbs |

21. On average, how much reef fish, conch, or lobster caught in the Narrows do you eat and sell in a week? (Please specify the amount assuming that you catch a minimum of 100 lbs in a week)

Eat:

- Reef fish: 5-15lbs
Conch: 5-10lbs
Lobster: 5-10lbs
Eat All:

Sell:

- Reef fish: 85-95lbs
Conch: 90-95lbs
Lobster: 90-95lbs
Sell All:

22. How many years have you fished at the Narrows?

- a. Less than 5 years
b. 5-10 years
c. More than 10 years

23. Where do you market most of your catch, in St. Kitts or Nevis?

- | | |
|--|--|
| <input type="checkbox"/> Cooperative | <input checked="" type="checkbox"/> Hotels/Restaurants |
| <input checked="" type="checkbox"/> Neighborhood/community | <input type="checkbox"/> St. Kitts |
| <input checked="" type="checkbox"/> Own use | <input checked="" type="checkbox"/> Nevis |
| <input type="checkbox"/> Other _____ | |

24. What factors impact your fishing operations in the Narrows and how?

| Factor/Issue | No Impact | Positive Impact | Negative Impact | Comment (Why?) |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------|
| Fish migratory patterns | <input checked="" type="checkbox"/> | | | Sometimes |
| Fish population (perceived) | <input checked="" type="checkbox"/> | | | Sometimes |
| Boat(s) / (size, structure & design) | <input checked="" type="checkbox"/> | | | |
| Crew | <input checked="" type="checkbox"/> | | | |
| Weather | | | <input checked="" type="checkbox"/> | Can't get to fish |
| Facilities at the landing site | <input checked="" type="checkbox"/> | | | |
| Boat engine(s) (Horsepower, type) | <input checked="" type="checkbox"/> | | | |
| Occupations not related to fisheries | <input checked="" type="checkbox"/> | | | |
| Access to/availability of fishing equipment | | <input checked="" type="checkbox"/> | | |
| Access to finance/credit | <input checked="" type="checkbox"/> | | | |
| Fuel availability & cost | <input checked="" type="checkbox"/> | | | |

25. How would you describe the condition of fisheries resources five years ago in the Narrows?

- very good good neither good, nor bad
 bad very bad

26a. How would you describe the conditions of fisheries resources today in the area of study?

- very good good neither good, nor bad
 bad very bad

26b. Why do you think the conditions have or have not changed?

changing of weather

27. Do you think that fisher folk can work together to solve the problems in the Narrows?

- Yes No Don't know

28. Should the government alone, the fisher folk alone or both, work to solve a problem in the fishery?

- Government only Fisher folk only Both Don't Know

29. Would you support the Narrows being managed in partnership between government and another group? Such as an NGO, Fishing Cooperative, etc.

- Yes No Do not know

Attitudes and Perceptions

30. Are you aware of the Narrows becoming a Management Protected Area?

- Yes No

31. Are you aware of existing rules and regulations governing the Narrows in relation to:

- | | | |
|---------------------------|---|--|
| a. Commercial fishing | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| b. Sport fishing | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| c. Mangrove use | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| d. Resort Development | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| e. Tourism snorkel/diving | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

32. Are you a member of a fishing Co-operative or any other Organization?

- Yes No

If yes, what is the name of organization? _____

33. Are you in support of the establishment of an Advisory Committee for the management of the Narrows?

- Yes No

34. Would you change to another occupation that provided equal or more income than fishing?

- Yes No

35. If yes, would you be interested in:

- | | |
|---|--|
| <input type="checkbox"/> Tour guide | <input type="checkbox"/> Sport fishing guide |
| <input type="checkbox"/> Aquaculture | <input type="checkbox"/> Researcher |
| <input type="checkbox"/> Technician | <input type="checkbox"/> SCUBA guide |
| <input type="checkbox"/> Kayaking guide | <input type="checkbox"/> Other |

36. Would you recommend fishing as a career for your children?

- Yes No

Why? This getting hard in this area

37. Indicate degree of agreement with the following statements using the scale: (Place your choice before each phrase, sentence or question)

- | | |
|--------------------|-----------------------|
| (1) Strongly Agree | (4) Strongly Disagree |
| (2) Agree | (5) Don't Know |
| (3) Disagree | (6) Neutral |

- 1 a) A Marine Protected Area is important for protecting the coral reef system
3 b) The conservation zone will help to sustain fish stocks
6 d) Penalties for illegal fishing should be increased
2 e) Mangroves should be protected
2 f) Enforcement of regulations is adequate
2 g) Participation in management decisions about the Narrows is important to you
2 h) You will support the establishment of a Marine Protected Area for the Narrows

Threats and problems

38. What do you think are the top three major problems for the Narrows' resources?

Problems:

- 1 Run off from Quarry
- 2
- 3

39. What do you think are the possible solutions to these problems?

Solutions:

- 1 Stop letting the waste go into the ocean.
- 2 Government should enforce the regulations
- 3

Material Style of Life

40. Do you have or own the following: (Tick all that apply)

- | | |
|---|---|
| <input checked="" type="checkbox"/> Stereo | <input checked="" type="checkbox"/> Phone |
| <input checked="" type="checkbox"/> Vehicle | <input checked="" type="checkbox"/> Freezer |

41. Do you own the house that you occupy?

- | | |
|---|-----------------------------|
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
|---|-----------------------------|

42. ANY ADDITIONAL COMMENTS

Appendix 2: Household questionnaire

HOUSEHOLD QUESTIONNAIRE

Interviewer:
Respondent #:
Date and time:
Location:

Name of Interviewer: _____ Respondent #: _____
Date: _____ Time: _____
Location: _____

Demographics

- How old are you? _____
 16 to 20 41 to 50
 21 to 30 51 to 60
 31 to 40 61 or older
- What is your level of education?
(1) Primary (3) College
(2) Secondary/High School ✓ (4) University
(5) Other _____
- How many people live in your household? 5
- Which job provides your household with the most income? (List in order of importance)
1st. Cleaning, 2nd. _____, 3rd. _____
- Are there any females in your household who are involved in the fishing industry?
 Yes No
If Yes, Please state (fisher? fish processor? etc)

Coastal and Marine/Fishing Activities

- Is the fish caught at Narrows by your family used for food by the household?
 Yes No
- Have you or any of your children visited the Narrows?
 Yes No
If No, please state why: _____
- Do you think that people in your community can work together to solve problems in the fishing or tourism industries?
 Yes No Don't know _____

9. Should the government alone, the community alone or both, work to solve the problem in the fishing or tourism industries?

Government only People only Both

10. Would you support the Narrows being managed in partnership between government and another group? Such as an NGO, Fishing Cooperative, etc.

Yes No Don't know

11. Indicate degree of agreement with the following statements using the scale: (Place your choice before each phrase, sentence or question)

(1) Strongly Agree (4) Strongly Disagree
(2) Agree (5) Don't Know
(3) Disagree (6) Neutral

- 5 a) A Marine Protected Area is important for protecting the coral reef system
3 b) Fisheries are adequately managed and enforced.
2 c) Penalties for illegal fishing should be increased
2 d) Mangroves should be protected at the coastal areas of the Narrows
3 e) Participation in management decisions about the establishment of a Marine Reserve is important to you
2 f) Most fishermen respect the marine reserve regulations.
5 g) Marine protected areas are beneficial to St. Kitts-Nevis marine resources.
2 h) Children need to learn more about marine conservation at school.
2 i) Tourism has been good for your community.
3 j) Tourism has been good for your household.

12. How often your family patronize the restaurants and other businesses in the selected areas of the Narrows?

Twice weekly Three times weekly
 Every day Special Holidays
 Other (Specify) _____

Threats and problems

13. What do you think are the top three major problems for the marine resources?

1. Pollution from Air Ghaut
2. losing the beach - cannot walk without getting wet.
3. _____

14. What do you think are the possible solutions to these problems?

1. cannot solve problem of ghaut.
2. Don't know what to do to save the beach
3. _____

Material style of life

15. Do you have or own the following: (Tick all that apply)

| | | |
|---|--|---|
| Farm land <input checked="" type="checkbox"/> | Own house lot <input type="checkbox"/> | Own house <input checked="" type="checkbox"/> |
| Vehicle <input checked="" type="checkbox"/> | Bicycle <input checked="" type="checkbox"/> | Washer <input checked="" type="checkbox"/> |
| VCR <input checked="" type="checkbox"/> | Phone <input checked="" type="checkbox"/> | TV <input checked="" type="checkbox"/> |
| Stereo <input type="checkbox"/> | Refrigerator <input checked="" type="checkbox"/> | Stove <input checked="" type="checkbox"/> |

Important Attributes

16. Which of the attributes stated below are important to you when using The Narrows? (Tick all that applies)

| | Most important..... | | | | Least important |
|-------------------------------|---------------------|-------|-------|-------|-----------------|
| Accessibility | 1 | 2 | 3 | 4 | 5 |
| Quality of beaches | 1 | 2 | 3 | 4 | 5 |
| Quality of fishing | 1 | 2 | 3 | 4 | 5 |
| Restaurants/ Entertainment | 1 | 2 | 3 | 4 | 5 |
| Recreation | 1 | 2 | 3 | 4 | 5 |
| Clear water | 1 | 2 | 3 | 4 | 5 |
| Other (identify) | 1 | 2 | 3 | 4 | 5 |

17. When you visit the Narrows what activities you are most or least interested to participate in?

| | Most interested..... | | | | Least Interested |
|---|----------------------|-------|-------|-------|------------------|
| Beach walking & Sun bathing | 1 | 2 | 3 | 4 | 5 |
| Sailing | 1 | 2 | 3 | 4 | 5 |
| Power- boating | 1 | 2 | 3 | 4 | 5 |
| Swimming | 1 | 2 | 3 | 4 | 5 |
| Snorkeling | 1 | 2 | 3 | 4 | 5 |
| SCUBA diving | 1 | 2 | 3 | 4 | 5 |
| Dining/entertainment | 1 | 2 | 3 | 4 | 5 |
| Viewing historical/ Archaeological sites | 1 | 2 | 3 | 4 | 5 |
| Fishing | 1 | 2 | 3 | 4 | 5 |
| Sea turtle watching | 1 | 2 | 3 | 4 | 5 |
| Other (identify) | 1 | 2 | 3 | 4 | 5 |

18. How often do you participate in the activities? (Please tick as apply)

| | | | | |
|---|---------------------------------|----------------------------------|---|--------------------------------|
| Beach walking & Sun bathing | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input checked="" type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| Sailing | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input checked="" type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| Power- boating | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| Swimming | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input checked="" type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| Snorkeling | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input checked="" type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| SCUBA diving | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| Dining/entertainment | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input checked="" type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| Viewing historical/ Archaeological sites | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input checked="" type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| Fishing | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input checked="" type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| Sea turtle watching | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input checked="" type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |
| Other (identify) | <input type="checkbox"/> Weekly | <input type="checkbox"/> Monthly | <input checked="" type="checkbox"/> Special Occasions | <input type="checkbox"/> Other |

19. Are there any other activities that you would like to participate in that are not currently available? (Identify)

_____ No _____

20. What activities should NOT be allowed at the Narrows? (Please specify)

_____ No _____

21. ANY ADDITIONAL COMMENTS

Appendix 3: Small business owner questionnaire

SMALL BUSINESS OWNERS QUESTIONNAIRE
(TO INCLUDE HOTELS, RESTAURANTS, WATER TAXI, DIVERS / SNORKELLERS)

Interviewer:
Respondent #:
Date and time:
Location:
 Fisher Business Owner/Manager

- Name of Business QUAKIE
- What year was your business established? 3/1/1990
- How long have you been operating from this location? *Please circle appropriate response*
a. Less than 5 years b. 5 - 10 years c. Over 10 years
- What was the deciding factor for operating from this location? Tourism
- Do you purchase fish from local fish vendors in your area?
 Yes No
If No, please state other sources: _____
- What species of fish do you normally purchase from fishers who use the area?
a. lobster b. conch c. mixed/pot fish d. dolphin/wahoo etc.
not sure
- How do these fishing factors/issues impact your business in the Narrows and why?

| Factor/Issue | No Impact | Positive Impact | Negative Impact | Comment (Why?) |
|---|-------------------------------------|-------------------------------------|-----------------|----------------|
| Fish migratory patterns | | | | Sometimes |
| Fish population (perceived) | | | | N/A |
| Boat(s) / (size, structure & design) | | | | N/A |
| Crew | | | | N/A |
| Weather | | <input checked="" type="checkbox"/> | | |
| Facilities at the landing site | | <input checked="" type="checkbox"/> | | |
| Boat engine(s) (Horsepower, type) | <input checked="" type="checkbox"/> | | | |
| Occupations not related to fisheries | | | | N/A |
| Access to/availability of fishing equipment | | | | N/A |
| Access to finance/credit | | | | N/A |
| Fuel availability & cost | | | | N/A |

8. On average, how many of your customers are fishers, divers, snorkellers, tourists, tour-guide operators, and locals?

| | | | |
|---------------|---|--|--|
| Fishers | <input checked="" type="checkbox"/> 1-5 | <input type="checkbox"/> 6-10 | <input type="checkbox"/> Ten and over |
| Divers | <input type="checkbox"/> 1-5 | <input checked="" type="checkbox"/> 6-10 | <input type="checkbox"/> Ten and over |
| Snorkellers | <input type="checkbox"/> 1-5 | <input checked="" type="checkbox"/> 6-10 | <input type="checkbox"/> Ten and over |
| Tourists | <input type="checkbox"/> 1-5 | <input type="checkbox"/> 6-10 | <input checked="" type="checkbox"/> Ten and over |
| Tour operator | <input checked="" type="checkbox"/> 1-5 | <input type="checkbox"/> 6-10 | <input type="checkbox"/> Ten and over |
| Locals | <input type="checkbox"/> 1-5 | <input checked="" type="checkbox"/> 6-10 | <input type="checkbox"/> Ten and over |

9. Are there problems with visitor access to your business?

Yes No

If Yes, explain _____

10. How important, do you think the health of the marine environment (coral reef, fish, water quality, and beaches) is to your business?

Extremely important Reasonably important
 Not important Don't Know _____

Please state why? That's why they come

11. Do you think that your business contributes to degradation of the marine environment (coral reef, fish, water quality, beaches) in any way?

Yes No

Explain _____

12. Do you see your business as being profitable?

Yes No _____

13. Do you intend on expanding your business within the next five to ten years?

Yes No

Please specify how or in what way _____

Yachtsmen, Water Taxis, Other Boatmen

14. How often during a given week do you and your guests patronize (visit) local restaurants and other businesses in the Narrows area or carry passengers to these places? *Please tick one.*

[Peak: December - April] Off-Peak [May - November]

Peak: Twice weekly Three times weekly

Every day Other (Specify) _____

Off-peak: Twice weekly Three times weekly

Every day Other (Specify) _____

15. Are there problems with mooring/anchorage?

Yes No

Explain _____

Divers/Snorkellers

16. Rate the current condition of the following dive/snorkel sites, the state of coral and water quality and the abundance and diversity of marine life. *N/A*

| Site | State of Coral | Abundance of Marine Life | Diversity of Marine Life | Avg. no. of divers | |
|---------------------------|----------------|--------------------------|--------------------------|--------------------|-------|
| | | | | Week | Month |
| Booby Shoal | | | | | |
| Nags Head | | | | | |
| Cockle Shell | | | | | |
| Cow's Shoal | | | | | |
| Mosquito Bluff | | | | | |
| Turtle Bar | | | | | |
| Newcastle Reef | | | | | |
| Nisbett's Plantation Reef | | | | | |
| Major's Bay | | | | | |
| The Grid Iron Reef | | | | | |

Key: E=Excellent G=Good A=Average P=Poor D= Don't know

17. How much do you spend per week (whichever respondent is more comfortable supplying) on the following items? *N/A*

Gas _____ Boat maintenance _____ Storage rental _____
 Crew _____ Equipment repair/replacement _____
 Material _____ Other _____

18. Are there problems with dive/snorkel access or prohibition/restriction?

Yes No

If yes, explain _____

19. How would you describe the condition of fisheries resources five years ago in the Narrows?

very good good neither good, nor bad
 bad very bad

20a. How would you describe the conditions of fisheries resources today in the area of study?

very good good neither good, nor bad
 bad very bad

20b. Please explain why you think the conditions have or have not changed?

Threats and problems

21. How important is the health of the marine environment (coral reef, fish, water quality, beaches) to your business (driving, snorkeling, hotel, restaurant, etc)?

- Extremely important Reasonably important
 Not important Don't Know _____

Why? _____

22. Do you think your business contribute to the degradation of the marine environment (coral reef, fish, water quality, beaches) in any way?

- Yes No

Explain _____

23. Do you think that divers/snorkellers contribute to the degradation of the marine environment (beaches, coral reef, fish, and water quality) in any way?

- Yes No

Please explain _____

24. Have you observed any oceanic/environmental changes within the past 5 years on

- | | | |
|--------------------------------|---|-----------------------------|
| Land | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| Shoreline | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| Underwater | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Are they positive or negative? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

Please state positive or negative changes: _____

25. What do you think are the top three major problems for the marine resources? (Please list)

1. _____
2. _____
3. _____

26. What do you think are the possible solutions to these problems? (Please list)

1. _____
2. _____
3. _____

Material style of life

27. Do you have or own any of the following: (Tick all that apply)

- | | | |
|---|---|--|
| <input checked="" type="checkbox"/> Land | <input checked="" type="checkbox"/> House lot | <input type="checkbox"/> House |
| <input checked="" type="checkbox"/> Vehicle | <input checked="" type="checkbox"/> Bicycle | <input type="checkbox"/> Washer |
| <input checked="" type="checkbox"/> VCR | <input checked="" type="checkbox"/> Phone | <input checked="" type="checkbox"/> TV |
| <input checked="" type="checkbox"/> Stereo | <input checked="" type="checkbox"/> Refrigerator | <input type="checkbox"/> Stove |
| <input checked="" type="checkbox"/> Boat | <input type="checkbox"/> Snorkelling gear/equipment _____ | |

Attitudes and Perceptions

28. Are you aware of the Narrows becoming a Management Protected Area?

Yes No

29. Are you aware of existing rules and regulations governing the Narrows in relation to:

- | | | |
|---------------------------|---|-----------------------------|
| a. Commercial fishing | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| b. Sport fishing | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| c. Mangrove use | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| d. Resort Development | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| e. Tourism snorkel/diving | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

30. Are you in support of the establishment of an Advisory Committee for the management of the Narrows?

Yes No

31. Indicate degree of agreement with the following statements using the scale: *(Place your choice before each phrase, sentence or question)*

- | | |
|--------------------|-----------------------|
| (1) Strongly Agree | (4) Strongly Disagree |
| (2) Agree | (5) Don't Know |
| (3) Disagree | (6) Neutral |

- 1 a) A Marine Protected Area is important for protecting the coral reef system
1 b) The conservation zone will help to sustain fish stocks
2 d) Penalties for illegal fishing should be increased
1 c) Mangroves should be protected
2 f) Enforcement of regulations is adequate
1 g) Participation in management decisions about the Narrows is important to you
1 h) You will support the establishment of a Marine Protected Area for the Narrows

32. If a MPA were to be established how would you help?

- (a) Reporting all infractions
 (b) Conduct water quality monitoring
 (c) Assist with enforcement of regulations
 (d) Other

Important Attributes

33. When you visit the Narrows what activities do you participate in?


| | Most interested..... |Least Interested | | | |
|-----------------------|----------------------|-----------------------|---|---|---|
| Beach walking & | | | | | |
| Sun bathing | 1 | 2 ✓ | 3 | 4 | 5 |
| Sailing | 1 | 2 | 3 | 4 | 5 |
| Power- boating | 1 | 2 | 3 | 4 | 5 |
| Swimming | 1 | 2 ✓ | 3 | 4 | 5 |
| Snorkeling | 1 | 2 | 3 | 4 | 5 |
| SCUBA diving | 1 | 2 | 3 | 4 | 5 |
| Dining/ entertainment | 1 | 2 | 3 | 4 | 5 |
| Viewing historical/ | | | | | |
| Archaeological sites | 1 | 2 | 3 | 4 | 5 |
| Fishing | 1 | 2 ✓ | 3 | 4 | 5 |
| Sea Turtle watching | 1 | 2 | 3 | 4 | 5 |
| Education & Research | 1 | 2 | 3 | 4 | 5 |
| Other (identify) | 1 | 2 | 3 | 4 | 5 |

34. Are there any other activities that you would like to participate in that are not currently available? (Identify) _____

35. What activities should NOT be allowed at the Site? (Identify)

36. ANY ADDITIONAL COMMENTS


Appendix 4: Validation meeting slides



Socio economic monitoring by Caribbean fishery authorities: The Nevis story

Validation meeting to share preliminary results
9 October 2009
Ministry of Agriculture
Nevis Island Administration

Study area



- Proposed marine protected area (MPA) encompassing the Narrows and the Booby Island Shoal

Goal and objectives for monitoring

Goal

- Collect socio-economic data to inform marine conservation and development decision-making

Objectives

- Determine trends in socio-economic benefits from resource use
- Determine how coastal and marine ecosystems provide benefits
- Enhance awareness of ecosystem services provided
- Involve resource users in monitoring

Project activities

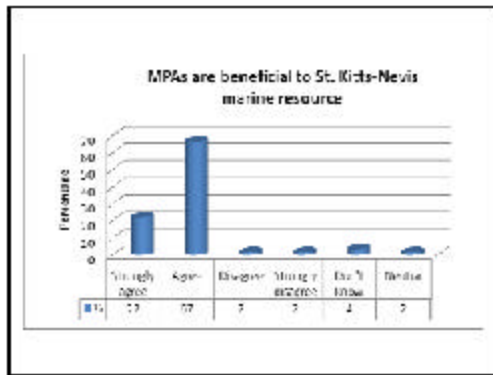
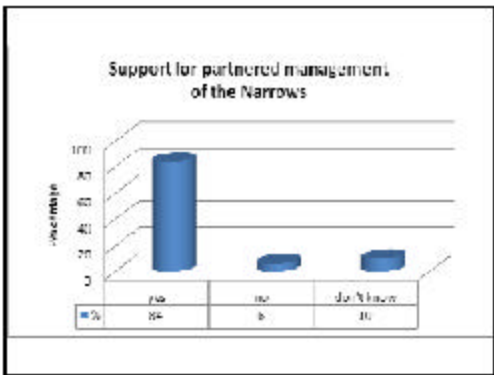
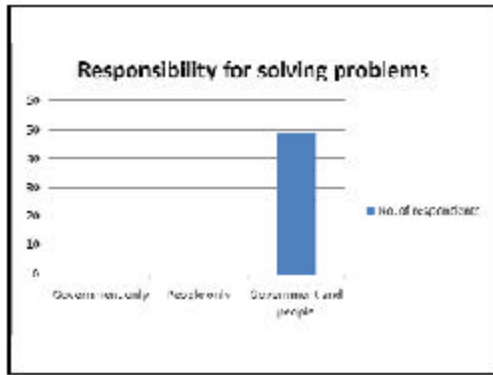
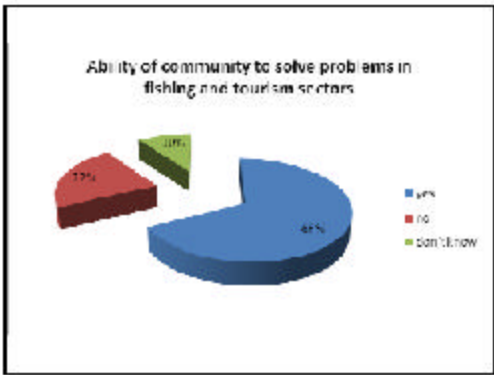
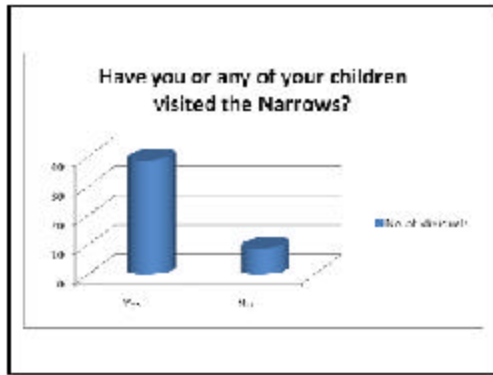
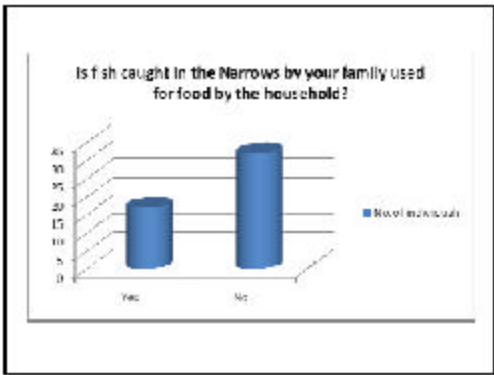
- SocMon training workshop (20-22 May 2008): 14 persons trained in SocMon Caribbean methodology
- SocMon team formed
- Surveys designed (household, fisherfolk, small business operator)
- Preliminary data analysis conducted
- Validation meeting to share monitoring results

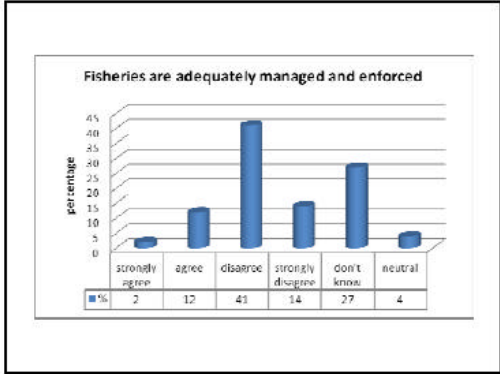
Surveys

- Household surveys N = 19
- Fisherfolk surveys N = 29
- Small business operators N = 20

Household data

- 10 areas surveyed
 - Newcastle
 - Portworks Settlement
 - Ceds Bay
 - Camps
 - Shaws Road
 - Rumours
 - Nisbet
 - Kewlins pasture
 - Ouelie Beach
 - Medical University of Americas

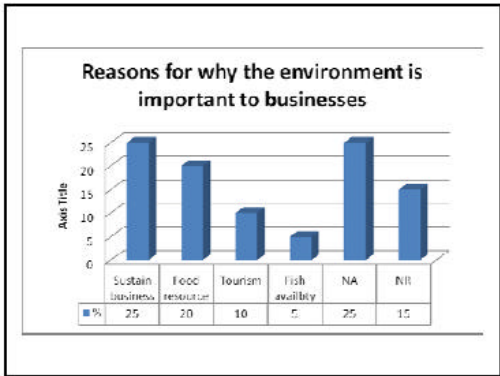
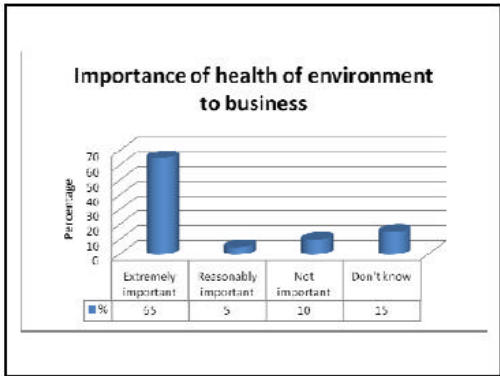
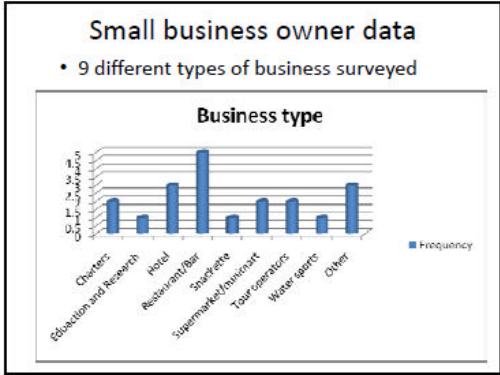
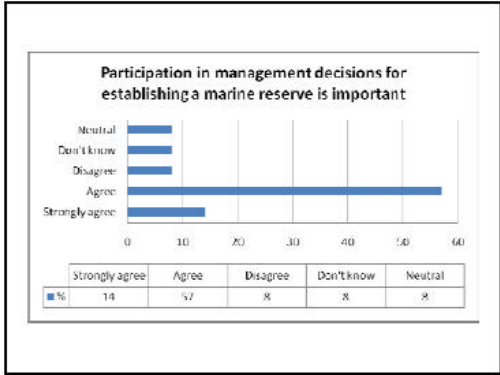


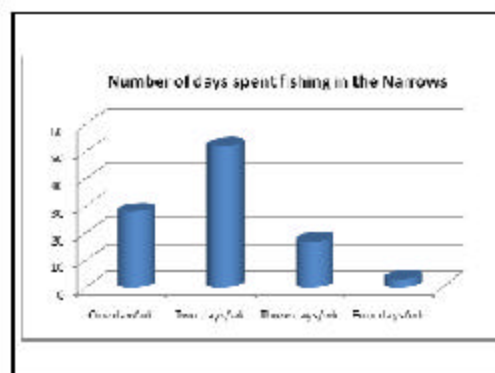
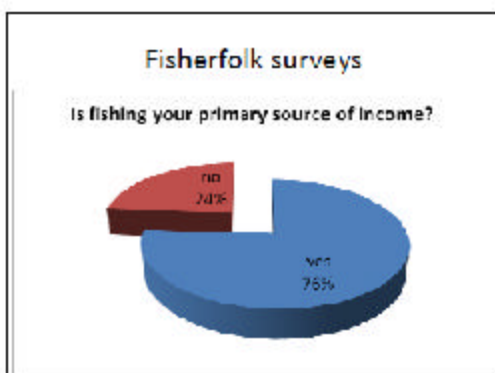
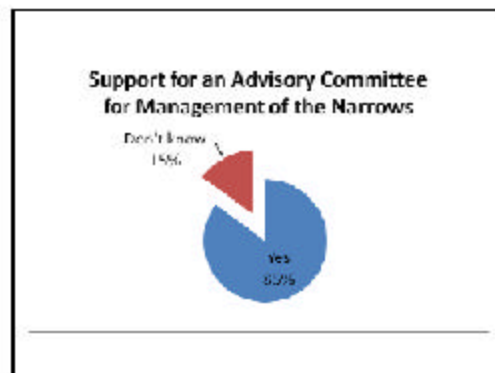
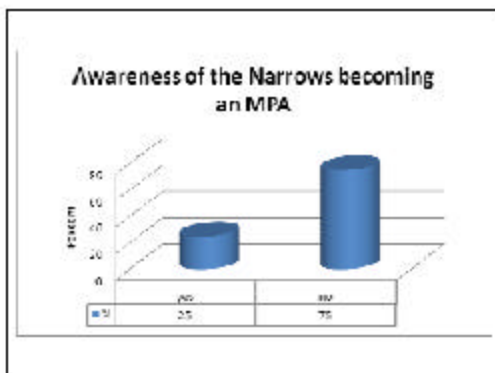
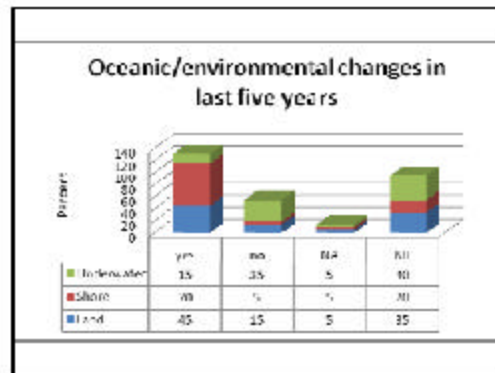
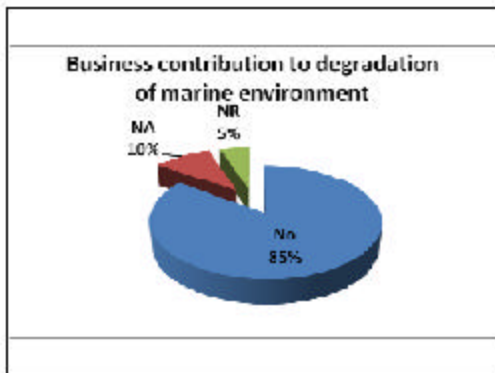


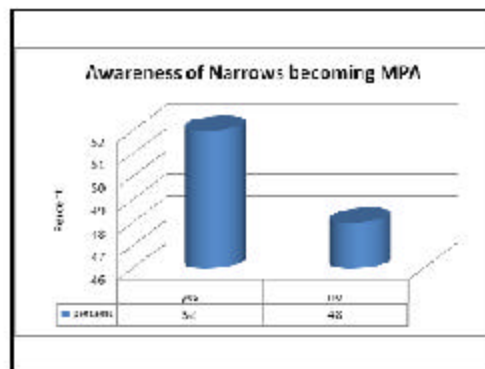
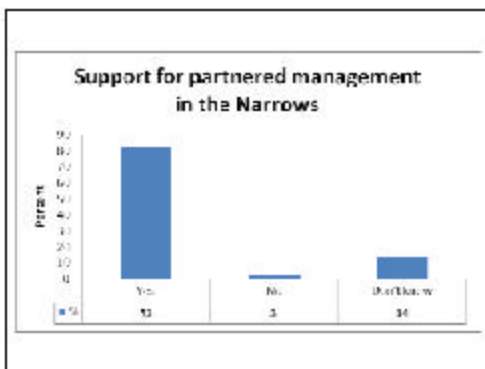
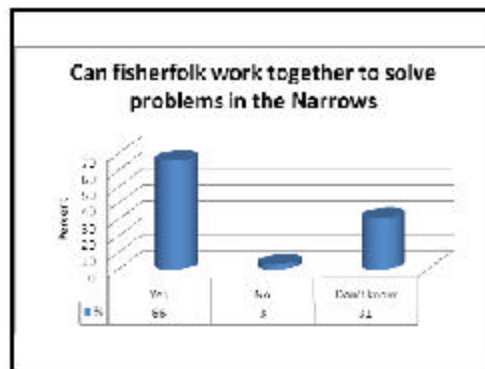
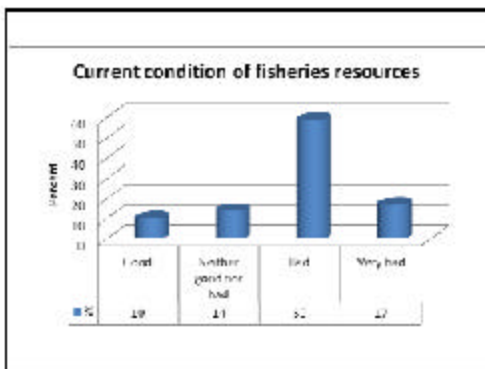
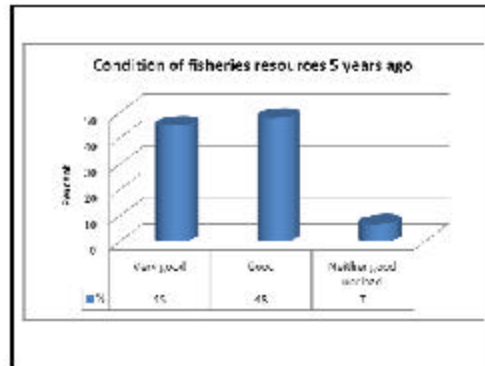
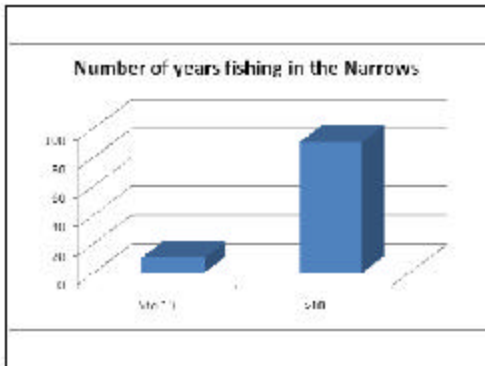
Top three major problems for marine resources in the Narrows

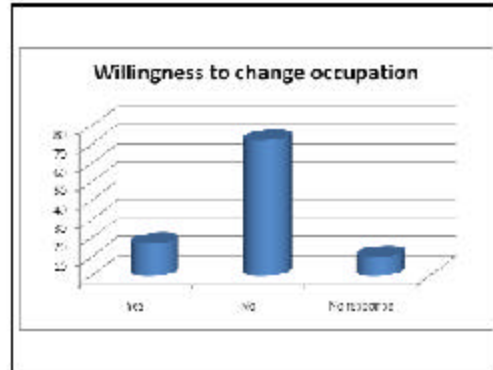
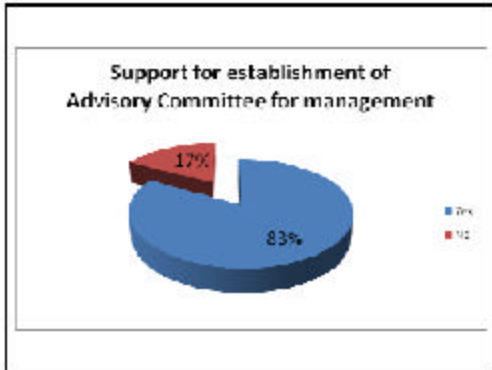
- Pollution and garbage: 16%
- Bad fishing practices: 11%
- Erosion: 4%

N.B. 5% of respondents thought there were no problems for marine resources in the Narrows









Summary

- Baseline data that may be used in future monitoring and to guide marine conservation and decision-making
- May be used to guide The Nature Conservancy(TNC)/USAID Marine Zoning project for St. Kitts-Nevis