

Marine resource user profiles in the Grenadines Marine Resource Space-Use Information System (MarSIS)

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ABSTRACT

The transboundary Grenadines island chain lies on the Grenada Bank stretching some 120 km between two countries, Grenada and St. Vincent and the Grenadines. There are over 30 islands, of which 9 have permanent settlements. Marine-based activities are the foundation of the economies of the Grenadine islands in which fishing and tourism are the major sources of employment. It is recognised that a better understanding of the abundance and distribution of key marine resources, marine resource users and the patterns of use is critical to planning and the sustainable use of these resources for social and economic development. The area has been chosen as a site for the development of an integrated participatory marine space use information system (MarSIS). MarSIS will aid in marine planning as a tool to highlight areas for special management attention such as: critical habitats; representative marine ecosystems; areas of high aesthetic value and cultural importance; areas important for livelihoods: fishing grounds; marine-based tourism; areas of highest human threat; as well as areas which currently or potentially are locations of space-use conflict. This paper summarises the methods used in the MarSIS stakeholder identification and assessment to create activity profiles for the various direct marine resource users (including fishers, divers, yachting companies, water-taxis, day tours, ferries and shippers) of the Grenadines. These profiles will be used to help identify community interests and aid the planning of subsequent participatory resource mapping exercises. It is envisioned that through stakeholder involvement in a transparent fashion during all stages of the development of the MarSIS, social transformation through local empowerment and capacity building will aid effective collaborative management. This may allow for more efficient sustainable resource management and use, integrated development and improved relationships between government agencies, NGO's and communities.

KEY WORDS: marine resource user profiles, stakeholder analyses, participatory research

Perfil de los usuarios de los recursos marinos vivos en las Granadinas Sistema de Información de Utilización de Espacio de los Recursos Marinos (MarSIS)

La cadena de islas trans-fronterizas de las Granadinas se encuentran en el bajío Granadino alargándose aproximadamente 120 Km. entre dos naciones soberanas, Grenada y San Vicente y las Granadinas. Existen aproximadamente 30 islas, de las cuales 9 se encuentran permanentemente habitadas. Las actividades con base marina comprenden el fundamento de la economía de las islas Granadinas en donde la pesca y el turismo constituyen la mayor fuente de empleo. Se reconoce que una mejor comprensión de la abundancia y distribución de recursos marinos claves, los usuarios de los recursos marinos y patrones de uso son críticos para la planificación y el uso sostenible de estos recursos para el desarrollo social y económico. El área ha sido seleccionada como un sitio para el desarrollo de un sistema participativo integral de información de utilización de espacio de los recursos marinos (MarSIS). MarSIS apoyara el manejo marino como una herramienta para realzar áreas de atención especial de manejo tales como: habitats críticos; ecosistemas marinos representativos; áreas de gran valor estético e importancia cultural; áreas importantes para la subsistencia; sitios importantes para la pesca; áreas importantes para turismo marino; áreas mas vulnerables a amenaza humana; así como áreas que actualmente o potencialmente son locaciones para conflicto de uso espacial. Este documento resume el patrón de análisis participativo e inventario compilado hasta la fecha de varios usuarios de recursos marinos (incluyendo pescadores, buzos, compañía de yates, taxis acuáticos, tour diarios, ferrys, y transportistas marítimos) de las Granadinas y el método utilizado para crear perfiles de usuarios de recursos marinos. Estos perfiles serán utilizados para identificar intereses comunales y ayudar en la planificación subsecuente de mapeo participativo de recursos. Se vislumbra que a través del involucramiento de las partes interesadas de una manera transparente durante estas etapas del desarrollo de MarSIS, la transformación local involucrando empoderamiento local y desarrollo de capacidades ayudara el manejo colaborativo efectivo. Esto también permitirá una utilización y manejo de recursos sostenibles más eficiente, desarrollo integrado y mejoramiento de las relaciones entre agencias de gobierno, ONGs y comunidades.

PALABRAS CLAVES: Perfil de usuario de recursos marinos, investigación participativa, desarrollo de capacidades

INTRODUCTION

The transboundary Grenadine island chain lies on the Grenada Bank stretching some 120 km between two countries, Grenada and St. Vincent and the Grenadines (Figure 1). There are over 30 islands, islets and cays of which nine have permanent settlements (CCA 1991a; CCA 1991b). Of these nine two are private resort islands. The largest islands have towns and communities with public and private supporting infrastructure. Marine resource use (including fishing and marine-based tourism) is of vital importance to the people of the Grenadines (Sustainable Grenadines Project 2005). Private sector businesses include: resorts, hotels, guest houses, restaurants, SCUBA and snorkel dive operations, day charters, yachting tourism (including bareboat, charter and live-aboard cruisers), cruise ships, ferries and shipping companies. Tourism is a key sector for employment and revenue. The number of visitors to the Grenadines has increased steadily in recent years and tourism development is proceeding apace (ECLAC 2004). Fishing is the other main source of employment and livelihood and CCA (1991a; 1991b) reported that some 85-95% of adult males in the Grenadines are fishers or active in related sectors. Fisheries resources consist of shallow-shelf reef fish, lobster, conch, deep-water (slope and bank) demersal fish,

coastal pelagics, sea turtles and sea urchins (Mahon 1990). Most fisheries in the Grenadines are small-scale artisanal, with fishers typically operating independently on a subsistence level with little or no organisation (Chakalall *et al.* 1994).

It has been realised that for coastal resource planning and management to be successful; coastal resources cannot be managed from a biophysical focus alone. Community attitudes towards, and uses of coastal resources have serious implications on the biophysical health of marine resources and likewise the management of coastal resources have equally serious implications for the socio-economic health of the human communities (Bunce *et al.* 2000; Bunce and Pomeroy 2003). Effective coastal resource management must balance the sustainable use, resource protection and conservation within the communities' need for food security, livelihood and equitable use of resources. Therefore, multi-sectoral collaboration and meaningful community participation is required to successfully maximise management efforts (Walters *et al.* 1998). Furthermore, information gathered must be accepted by and accessible to all stakeholders in a transparent and equitable fashion.

The Grenadine islands have been chosen as a site for the development of an integrated participatory transboundary marine space-use information system (MarSIS). MarSIS will aid marine planning by highlighting areas for special management attention such as: critical habitats; representative marine ecosystems; areas of high aesthetic value and cultural importance; areas important for livelihoods, fishing grounds and marine-based tourism; areas of highest human threat and space use conflict. The Grenadines MarSIS will be developed to integrate a range of transboundary information on the marine resources, biodiversity and ecosystems of the Grenada Bank together with the social aspects of marine resource use patterns and corresponding activity profiles of users in a participatory geographical information system (PGIS). By including the social frame of reference and incorporating local knowledge and perspectives into the GIS database, important information gaps can be filled, potential problems can be identified and planning and management priorities focused accordingly (Walters *et al.* 1998; Corbett *et al.* 2006). Moreover, involving a range of stakeholders in the information gathering and research processes allows for a participatory framework for comanagement and equity in decision making processes, community support, empowerment and social change (Chuenpagdee *et al.* 2004; Rambaldi *et al.* 2005; Corbett *et al.* 2006).

A stakeholder assessment, including government, marine resource users (MRUs) and communities is a key aspect of the Grenadines MarSIS research. A better understanding of the various stakeholders is essential in order to plan appropriate, equitable and transparent participation amongst stakeholders. By incorporating a range of stakeholder participation mechanisms, the MarSIS research aims

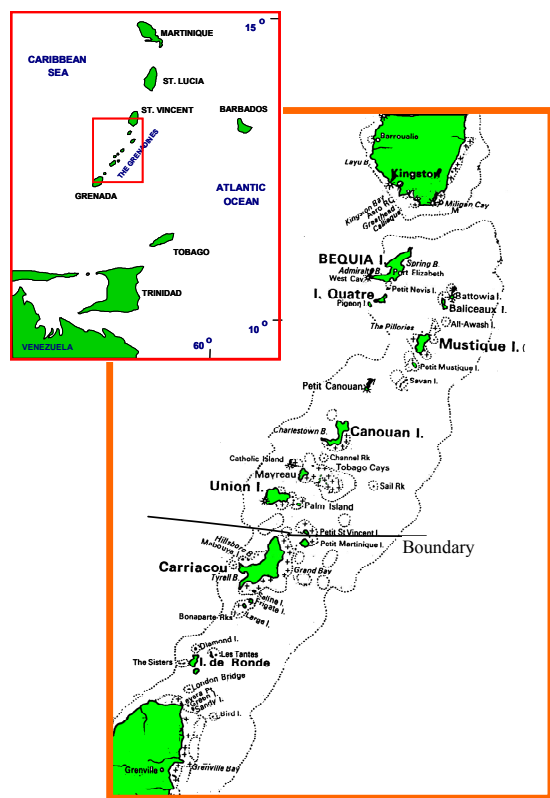


Figure 1. Geographic location and details of the Grenadine islands of the transboundary Grenada Bank.

to strengthen stakeholder capacity for more integrated transboundary planning and management initiatives between government, NGO's and communities of the Grenadines.

This study briefly profiles the methods and results utilised for a part of the Grenadines MarSIS stakeholder assessment; Grenadine-based marine resource users. This part of the stakeholder assessment included an inventory (including the distribution, abundance and demographics) of the various Grenadine marine resource users as well as their perceived marine environmental problems, causes and solutions.

METHODS

The Grenadine MRU stakeholder assessment was based on the SocMon methodology (Bunce *et al.* 2000; Bunce and Pomeroy 2003) achieved through a combination of secondary data review, key informant interviews, observations and surveys of marine resource users in each of the various Grenadine islands. Existing secondary data was

Table 1. Breakdown of MRUs interviewed in the Grenadines MRU rapid assessment inventory.

MRU	Number
Day Tour	27
Dive Shop	9
Ferries	7
Ships	5
Charter Yacht Co.	7
Fishers	267
Water-taxis	122
Total	444

collected over a nine month period from a variety of sources including governments, NGOs, community groups and the University of the West Indies in order to better understand the management and status of marine resources and their uses within the Grenadine Islands. During May of 2006, a MRU stakeholder scoping exercise was undertaken across 11 islands to identify and better understand the various Grenadine-based marine resource users. This exercise consisted of MRU observations and key informant interviews to better understand the overall population, existing marine resources, their uses and the number of marine resource users, marine-based infrastructure, formal associations and occupational structure for each Grenadine island. In addition, a preliminary identification of marine areas of importance, environmental issues and marine space-use conflicts was pursued to guide further MarSIS research initiatives. Grenadine MRU stakeholders, including the private sector, identified for MarSIS research were sub-categorised by user group. These include: dive shops, day tours (general, sailing and sport-fishing), water-taxi operators, fishers, yacht charter companies, ferries and ships. Fishers will be further categorised by landing site and consequently will be analysed by fishery type (*i.e.* baitfish, conch, lobster, reef fish, bottom fish and pelagics).

During the stakeholder scoping exercise key informants were interviewed using a semi-structured open-ended questionnaire. A minimum of three key informants of each MRU group were identified with the assistance of The Sustainable Grenadines Project. Moreover, to attain a more representative sample of the current marine resources, users, community issues and space-use activities on the Grenada Bank, MRU key informants were selected from across the various islands, countries and MRU groups.

During June-July 2005 and 2006, rapid assessment inventories were conducted for each of the various Grena-

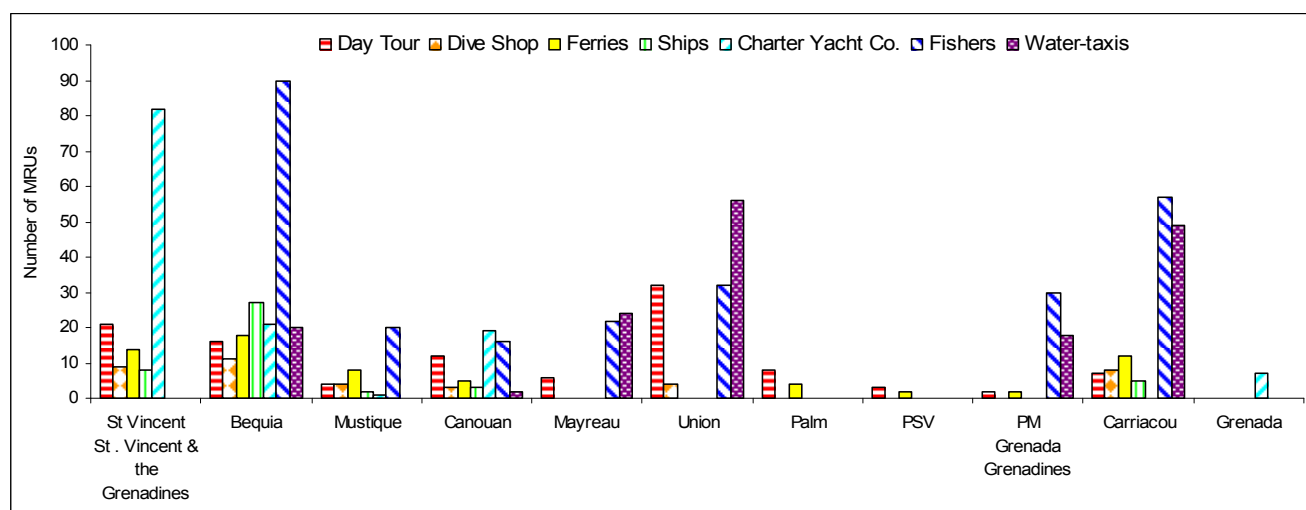


Figure 2. Distribution (abundance and location) of Grenadine MRUs currently operating within the Grenada Bank.

dine MRU groups. A total of five persons attempted to locate and interview all Grenadine-based MRUs (including water-taxi operators, fishers, dive shops, day tours, charter yacht companies, ships, ferries). For each MRU, a rapid (10-15 minute) survey was administered in order to obtain demographic information and identify their attitudes towards and perceptions of the Grenadine marine environment. This inventory was accomplished by visiting each Grenadine island and utilising the “snowball approach”; whereby each MRU that was interviewed was asked to name others operating within the island and the location where they could be found until no new persons/operations were identified. Therefore, an attempt was made to make this survey an inventory of all Grenadine MRUs.

RESULTS

Fifty-seven key informants were interviewed across 11 islands during the MRU data scoping exercise. During the MRU inventory, 444 MRUs were interviewed consisting of: 169 water-taxi operators, 267 fishers, 9 dive shop operators, 27 day tour operators, 6 charter yacht companies, 7 ferry operators and 5 ship owners (Table 1).

A total of 826 Grenadine MRUs were found to be employed on 519 boats currently operating on the Grenada Bank (Table 2). Seventy-six percent of MRUs (or 629 individuals) were found to originate from the St. Vincent Grenadines. Overall, the largest numbers of MRUs were found on the islands of Bequia (203), St. Vincent (143), Carriacou (138) and Union Island (124) (Figure 2). The mainland of St. Vincent consists of a larger diversity and

Table 2. Distribution (by number of persons employed) of Grenadine marine resource users categorized by island.

MRU	St. Vincent & the Grenadines								Grenada Grenadines		
	St Vincent	Bequia	Mustique	Canouan	Mayreau	Union	Palm	PSV	PM	Carriacou	Grenada
Day Tour	21	16	4	12	6	32	8	3	2	7	0
Dive Shop	9	11	4	3	0	4	0	0	0	8	0
Ferries	14	18	8	5	0	0	4	2	2	12	0
Ships	8	27	2	3	0	0	0	0	0	5	0
Charter Yacht Co.	82	21	1	19	0	0	0	0	0	0	7
Fishers	0	90	20	16	22	32	0	0	30	57	0
Water-taxis	0	20	0	2	24	56	0	0	18	49	0
Total	134	203	39	60	52	124	12	5	52	138	7
Percent (%)	16	25	5	7	6	15	1	1	6	17	1

Table 3. Grenadine MRUs identified problems currently facing the Grenadine marine environment.

Identified problems with the Grenadine marine environment	Frequency	Percent
Garbage / pollution	11	23
Harassment / theft	6	13
Illegal fishing practices	18	38
Overfishing	4	8
Anchoring on reefs	5	10
Ignorance of marine environment	1	2
Docking facilities at ports	2	4
Lack of moorings & poor quality of existing moorings	1	2
	48	100

Table 4. Grenadine MRUs perceived causes of identified marine environmental problems.

Percieved causes of marine environmental problems	Frequency	Percent
Ignorance / lack of education	9	25
Greed	5	14
No enforcement or management	18	50
Poverty	2	6
Too many fishers	1	3
Government politics	1	3
	36	100

number (134) of MRUs utilizing the marine resources of the Grenada Bank as compared to the Grenadine MRUs operating from the mainland of Grenada (7). Fishers were found to be the largest MRU group within the inventory and comprised of 267 persons or 33% of all Grenadine MRUs identified. Water-taxi operators (21%), and charter yacht companies (16%) were also amongst the other largest MRU groups identified in this inventory (Table 2). Dive shops provided the smallest (39) number of employees for any MRU group in this inventory. Marine-based tourism is the source of income for 54% of Grenadine MRUs' (dive shops, day tours, charter yacht companies, water-taxis).

The vast majority (91%) of Grenadine MRUs were found to be male. There were no females employed in shipping or water-taxiing; and only one female fisher and one female working within the sportfishing industry. Charter yacht companies were found to provide the largest employment source for females in which a total of 22 women were employed (Figure 3).

A total of 519 Grenadine boats were identified as being owned and operated by Grenadine MRUs. Fishing boats (162), charter yachts (152) and water-taxis (122) are the most numerous Grenadine MRU boats identified (Figure 4). Sixty-four percent of all Grenadine boats in-

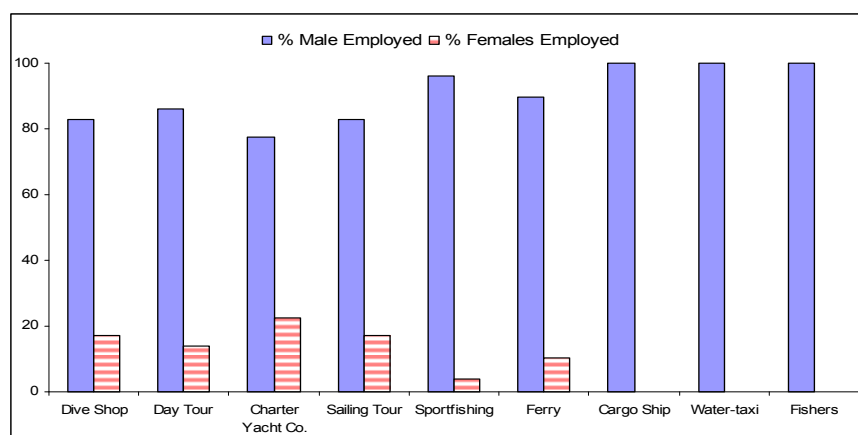


Figure 3. Proportion of MRUs employed by gender.

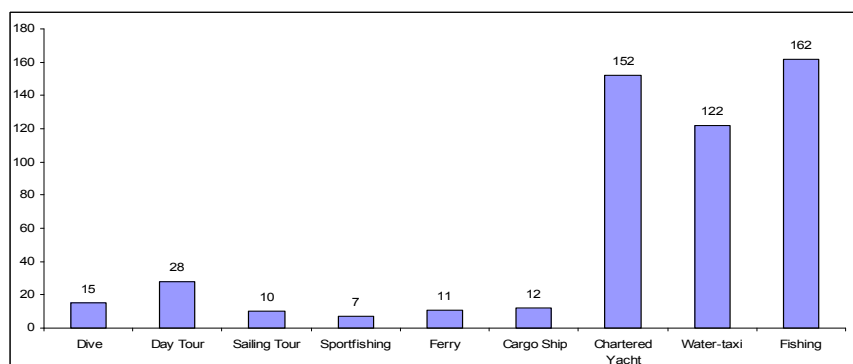


Figure 4. Number of Grenadine MRU boats operating in the Grenadines.

Table 5. Grenadines MRUs recommended solutions to identified Grenadine marine environmental problems.

Recommended solutions to marine environmental problems	Frequency	Percent
Education	12	25
Enforcement / penalties	23	48
Alternative livelihoods	2	4
Increased marine management	5	10
Ban spears / longer closed fishing seasons	1	2
Leave area alone	1	2
No solution	4	8
	48	100

cluded in this inventory are reported to be involved in marine-based tourism activities.

Respondents were asked to state the largest problem or issue they believe is currently facing the marine environment of the Grenadines. Only 16% of all MRUs believe that there are currently no problems within the Grenadine marine environment; whereas the vast majority (84%) of respondents identified a problem. Fishing-related activities (46%) (whether illegal practices or overfishing) was the problem most frequently identified as currently affecting the marine environment of the Grenadines. Other identified problems included garbage/pollution (23%) and harassment/theft (13%) in the Grenadines (Table 3). Approximately half (49%) of all MRUs believe that a lack of marine management/enforcement within the Grenadines is the main cause of these identified problems (Table 4). Ignorance/lack of education about the importance of the marine environment (25%) as well as greed (14%) were also amongst the largest perceived causes of Grenadine marine environmental problems. An overwhelming (61%) number of all Grenadine MRUs recommend management initiatives as solutions to the problems facing the Grenadines marine environment (Table 5). MRU management-based recommendations included: increased enforcement/ penalties (49%), increased marine management (10%) and increased fishing closed-seasons/gear restrictions (2%). An additional twenty-five percent of MRU respondents believe that increased education on the importance of the marine environment would help solve the identified problems.

DISCUSSION

The importance of Grenadine marine resources must not be underestimated. This inventory exemplifies the large diversity of Grenadine MRUs and the importance of marine resources to the livelihoods of these people. Unfortunately, it is believed that this inventory may underestimate the actual number of Grenadine MRUs currently operating on the Grenada Bank. It is believed that due to the time-frame available to conduct these surveys (which occurred during the 'closed' lobster season as well as during the 'low' season for tourism whereby many MRU's either leave the island or switch to land-based activities during these periods) many of the Grenadine MRUs were not surveyed and included in the results of this inventory. In particular, the actual number of Grenadine MRUs (namely fishers and marine-based tourism operators) may be severely underestimated and is likely considerably higher than reported within this inventory. Furthermore, ship owners generally were not as willing to participate in the inventory as other MRUs. As a result, only 5 of an estimated 16 ship owners would participate in this inventory and therefore findings may not be representative of this MRU group.

Overall, two-thirds of Grenadine MRUs inventoried were found to be of Vincentians as compared to Grenadian MRUs. By island, the largest diversity and number (or 25%) of all Grenadine MRUs were found on Bequia, de-

spite Carriacou having the largest population. Furthermore, Grenadine MRUs operating from the mainland of St. Vincent comprise a significantly higher diversity and abundance of MRUs as compared to the Grenadine MRUs deriving from the mainland of Grenada. These findings support the perception that St. Vincent and the Grenadines is more reliant on the marine resources of the Grenada Bank.

The importance of fishing and marine-based tourism within the Grenadines is reflected in this inventory of MRUs. Overall, fishers were the largest MRU group identified and consisted of one third of all Grenadine MRUs identified. Similarly, fishing boats comprised the largest number of vessels operated by Grenadine MRUs. It must be noted that despite the high number of water-taxi vessels reported, many water-taxi operators are also fishers and therefore the total number of water-taxi boats may also be counted as fishing vessels and may be double-counted in some cases. Charter yachts consist of a third of all Grenadine boats reported in this inventory emphasizing the strong influence of yachting tourism within the Grenadines.

Grenadine MRUs are dominated by males. Relatively no females were found to work in the industries of shipping, water-taxiing and fishing. Although marine-based tourism MRU groups comprised the largest proportions of female MRUs it must be noted that the majority of these females were reported to work as either office administrators, cleaning / maintenance or onboard working in the kitchen.

An overwhelming majority of MRUs believe that there are problems within the marine environment of the Grenadines. Fishing practices (whether illegal activities or overfishing) were identified by Grenadine MRUs as the largest problem. Other illegal activities such as garbage and pollution, harassment and theft, as well as anchoring on the reefs were other key issues identified. Not surprisingly, half of respondents believe that the cause of these identified marine problems is due to a lack of active marine management and enforcement across the Grenadines. Furthermore, the majority of all respondents recommend some form of increased marine management initiatives as a solution to these identified problems.

This study only reports on part of the MarSIS stakeholder assessment; resident Grenadine marine resource users. Through observation and the key informant interviews, the importance of the influence of 'outsider' or foreign marine resource users operating in the Grenadines, including tourists and foreign-based (namely Martinique) yacht charter companies and fish trading vessels, must not be underestimated. As identified during the stakeholder scoping exercise, Grenadine MRUs believe that Martinique charter yachts comprise more than half of all charter yachts currently operating in the Grenadines. Additionally, it has been shown by Gill (*CERMES MSc Thesis 2005*) that the majority of shallow inshore reef fish caught by Grenadine fishers are exported on fish trading vessels to Martinique. Quantifying these stakeholders and their influence within

the Grenadines must be included in further MarSIS research initiatives.

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