

SOUFRIERE MARINE MANAGEMENT AREA – CASE STUDY

1.0 Overview

History

Soufriere is located on the central west coast of the Caribbean island of St Lucia. It is bordered by a narrow submarine shelf which supports the island's most diverse and productive reefs. The land terrain comprises a series of steep, volcanic ridges separated by fertile valleys, fringed in the south by two spectacular volcanic plugs: the Pitons. Virtually no tourist leaves the island without spending at least a short time in the picturesque town of Soufriere.

The area is rich in terms of its agricultural fertility, tourism potential and coastal fishery resources. Traditionally, agriculture and fishing have provided two main sources of employment and income. However, with the increased focus on development of the tourism industry, fishermen -the traditional users of the area- found themselves competing on a daily basis with a variety of tourism related users.

Main actors involved:

Stakeholders involved in the management of the SMMA were numerous and diverse. These included a variety of government and non-government organisations, as well as community groups and other interested persons.

Government:

- Ministry of Agriculture, Forestry and Fisheries
- Ministry of Tourism
- Ministry of Planning
- Ministry of Health
- Customs and Excise Department
- Government Information Service
- Parks and Beaches Commission
- St Lucia Royal Police Force
- ENCORE Project (local site team)
- Organisation of Eastern Caribbean States (regional organisation)

Non Government:

- Soufriere Development Foundation
- Caribbean Natural Resources Institute
- Dive Operators
- Yachting Sector
- St Lucia Tourist Board
- Hotel and Tourism Association
- St Lucia Air and Sea Ports Authority

- St Lucia National Trust

Community groups and other persons:

- Fishermen's Cooperative
- Hoteliers
- Soufriere Water Taxi Association
- Soufriere Town Council
- Concerned citizens
- Copra manufacturers

Ecosystem, species and genetic resources concerned:

The coastal area of Soufriere comprises sandy plains, boulders with coral veneer, patch reef and narrow fringing reefs. The reefs within this area are some of the healthiest and most diverse on the island.

Benefit-sharing arrangements:

To ensure an equitable sharing of benefits from the use of these coastal/marine resources, an agreement regarding the use of these resources, was drawn up by all the stakeholders through a wide process of consultation. Today, management arrangements are such that it allows for continued participation from all stakeholders.

Time-frame addressed:

1986 to present

Relevance to CBD:

The SMMA has effectively illustrated the importance of participation/consultation in the conservation and sustainable use of marine biodiversity and the fair and equitable sharing of benefits to be derived from the use of marine resources. It is worth noting that the mission statement of the SMMA is:

*To contribute to national and local development, particularly in the **fisheries and tourism** sectors, through the management of the Soufriere coastal zone based on the principles of sustainable use, cooperation among resource users, institutional collaboration, active and enlightened local participation, and equitable sharing of benefits and responsibilities among stakeholders.*

2.0 Description

The area comprises sandy plains, boulders with coral veneer, patch reef and narrow fringing reefs. The reefs within this area are some of the healthiest and most diverse on the island. Compared to reefs along the north west coast, the

reefs surrounding the Pitons have been fairly protected from the many stresses (such as heavy sedimentation and liquid waste pollution) affecting many of the island's reefs.

Nearshore resources along the coast of Soufriere are considered high value resources, in that they attract many tourists for snorkelling and diving activities, support a variety of commercially important fish species and offer an aesthetically pleasing environment for yachters. Before the onset of the SMMA, the high level of use of the area by fishers and persons involved in tourism activities such as yachting, diving and snorkelling, had led to conflict among users and destruction of the fragile nearshore habitats. However, recent surveys carried out in the area are extremely encouraging and show that all of the reserve areas within the SMMA show increases in commercial fish biomass.

The number of coral species recorded for the SMMA reefs is probably very conservative, since studies have been confined to a maximum depth of twenty (20) meters and the reefs extend well beyond this depth, thus eliminating deep water species.

Current literature states that virtually all of the reefs of the Lesser Antilles are at risk. This risk is as a result of sedimentation from upland deforestation, pollution, poor agricultural practices, coastal development and added fishing pressures. In addition, St Lucia lies in the path of tropical storms, including hurricanes which play a significant role in the destruction of reefs. Since the passage of Hurricane Georges (1998) through the region, the incidence of coral bleaching around the island has increased. In fact, this phenomenon has been observed worldwide and is reported as a possible response to natural factors such as changes in water temperature, salinity levels and ultraviolet light. However, in the case of the SMMA, only *Diplora labyrinthiformes*, *Siderastrea radians* and *Montastrea annularis* appeared to have been affected, with *D. labyrinthiformes* being most affected and *M. annularis* being the least affected. The passage of Hurricane Lenny (1999) also took its toll on reefs within the SMMA accounting for over 50% of coral destruction in some areas.

The most common coral species present within the area are *Montastrea annularis* and *Porites asteroides*, which also make up the more important reef builders. *Dictyota* species and *Caulerpa racemosa* are the most common species of macroalgae.

During a survey in 1998, a total of 248 species were identified. These included: eleven (11) species of algae (not including micro (turf) species), ten (10) species of cnidaria (other than corals), fifty (50) species of corals, eight (8) species of molluscs, fourteen (14) species of sponges, eleven (11) species of echinoderms, fifteen (15) species of arthropods, eight (8) species of annelids and 121 species of fish (see Appendix). The database of the DOF had a further forty-seven (47) species of fish recorded for the Soufriere region. In addition, one species of

echinoderm (possibly *Euapta lappa* – beaded sea cucumber) and possibly nineteen (19) different species of sponges have been observed, but not identified. It has not been possible to identify all observed sponge species due to resource constraints.

Other organisms occasionally observed within the area include: *Ocyropsis crystallina* (winged comb jellies), *Ocyropsis maculata* (spot-winged comb jelly), *Mnemiopsis maccadyi* (sea walnut), *Tripneustes ventricosus* (West Indian white sea egg), *Meoma ventricosa* (red heart urchin), limpets, whelks, periwinkles and terrestrial crabs (ghost sand crabs).

The SMMA agreement establishes 5 different types of zones within the area, and these are as follows:

1. Marine reserves: These are declared under the Fisheries Act Number 10 of 1984 for the purpose of protecting the natural resources they contain. No extractive activity is allowed and entry into a reserve is subject to approval by the Department of Fisheries. For the purpose of stock replenishment and scientific research, the Department of Fisheries may designate some reserves as Sanctuaries.
2. Fishing priority areas: these areas are declared under the Fisheries Act Number 10 of 1984 for the purpose of maintaining and sustaining fishing activities which take priority over any other use of the area.
3. Recreational areas: these are terrestrial (beaches) and marine (swimming and snorkelling) areas which are reserved for public access and recreation.
4. Yachting areas: specific areas are designated to facilitate pleasure boats and yachts and for the protection of the bottom substrate.
5. Multiple use areas: these areas are where activities are regulated by existing legislation, notably the Fisheries Act and by provisions the SMMA Management Agreement (2000). Activities that may take place in these areas include fishing, diving, snorkelling and other recreational activities.

This zoning system caters to the myriad of users of the area and yet provides protection for some of the island's critical marine resources.

3.0 Purpose of benefit-sharing arrangement

In 1986 a number of fishing priority areas and marine reserves were created as an attempt to resolve conflicts between Soufriere fishermen and the growing tourism sector. However, the conflict persisted and continued to escalate. Further, uncontrolled use of coastal and marine resources in the area began to take a toll on these resources and reefs showed signs of degradation while the large carnivorous fish such as groupers and snappers declined considerably in number, some species all but disappearing altogether. However, with the onset of the SMMA, the fair and equitable sharing of benefits (use of resources) have allowed sustainable use and conservation of resources and prevented a case of ‘tragedy of the commons’.

4.0 Process for establishing arrangement

In 1992, a joint effort by the Soufriere Development Foundation, Department of Fisheries and the Caribbean Natural Resource Institute devised an approach to define and resolve the conflicts. The process ensured a wide-scale, multiple representation by interest groups and government agencies at a series of consultations which allowed all users of the area to express concerns and make recommendations.

It should be noted that before major consultations were held, separate meetings were held with individual user groups such as the fishermen to strengthen and prepare them for negotiations and bargaining within the wider conference of users.

As a result of all consultations a “Preliminary Agreement on the Use and Management of Marine and Coastal Resources of the Soufriere Region” was drawn up and this apportioned the coastal zone in such a way so as to allow for the myriad of desired coastal activities to coexist, facilitating all users. The Cabinet of Ministers approved this agreement in March, 1994.

In 1997 the Technical Advisory Committee (TAC) of the SMMA, which comprises representatives of all stakeholder groups and individuals requested a review of the SMMA’s institutional arrangements. This process of review officially began in November 1997 and was funded under the Fonds Francais pour l’Environnement Mondial (FFEM) Project. The first phase of the process involved the review of the SMMA, including its strengths and weaknesses and the second phase involved the formulation of a more efficient structure for the management of the Soufriere Marine Management Area (see section 6.0).

5.0 Content and Implementation of arrangement

Following the institutional review of the SMMA, which involved much consultation and discussion, the Cabinet of Ministers approved the following:

- By-laws of a Soufriere Marine Management Association, which provides the new institutional basis for the management of the area.
- An agreement to manage the Soufriere Marine Management Area.

Note that the by-laws were prepared under the provisions of the Companies Act Number 19 of 1996 to establish the Soufriere Marine Management Association and regulate its operations, and under the provisions of the Fisheries Act Number 10 of 1984, sections 18 and 19, to establish the Local Fisheries Management Authority and define its responsibilities.

It is also worth noting that in the new structure, the Stakeholder Committee (formally the TAC) consisting of broad representation of stakeholders remains an integral part of the SMMA, in keeping with its promotion of consultation and participation in management.

The day-to-day running of the SMMA is manned by a manager and 4 wardens who are based in Soufriere. User fees and the sale of souvenirs provide the revenue to cover the cost of staffing and maintenance of infrastructure (e.g. mooring and demarcation systems). However, responsibility of the overall management of the SMMA belongs to a board of directors which comprises 10 parties (see section 6.0) and an advisory body, the Stakeholder Committee. Notable, fees generated by the SMMA are occasionally used to support community projects with a conservation theme.

A scientific committee has also been established to ensure that the objectives of a Research and Monitoring Programme are met. Responsibilities of this committee include:

- Evaluation of the effectiveness of specific management decisions.
- Formulation and coordination of an overall plan and programme for research and monitoring.
- Dissemination of information.
- Coordination of the activities of external researchers.
- Provide a field terrain for the development of new knowledge about the marine and coastal resources, institutional development, sustainable resource uses and other aspects which can be tested within the SMMA.

6.0 Policy, legislation and administrative context

The Soufriere Marine Management Association formed under the Companies Act Number 19 of 1996 oversees the overall management of the SMMA. This association is guided by an ‘Agreement to Manage the Soufriere Marine Management Area.’ The parties which entered into this agreement comprise the Board of Directors for the SMMA and include the following:

- Ministry with responsibility for Fisheries.
- Ministry with responsibility for Planning, Development and the Environment.
- Ministry with responsibility for tourism.
- St Lucia Air and Sea Ports Authority.
- National Conservation Authority.
- St Lucia Dive Association.
- St Lucia Hotel and Tourism Association.
- Soufriere Fishermen’s Cooperative.
- Soufriere Regional Development Foundation.
- The Soufriere Water Taxi Association.

The institutional and legal arrangements for the management of the SMMA are governed by the following:

- All Parties retain individual management authority for areas and sectors under their jurisdiction.
- The legal framework for the establishment and management of the SMMA if the Fisheries Act, and ultimate responsibility rest with the relevant Minister.
- Employees under the Association are made authorised officers under the Fisheries Act, and as such are empowered to enforce the provisions of both the Fisheries Act and the by-laws of the Association.
- The Association has established a Stakeholder Committee.

According to the Agreement, the Stakeholder Committee includes a broad membership to ensure representation of stakeholders and this committee meets at least once per quarter. Further, all major proposals for management and development produced or being considered by management agencies of the Association, and related to the SMMA, must be presented to the Stakeholder Committee for advice.

7.0 Impact on conservation

Over the years the SMMA has had to deal with a number of unexpected problems. One such problem involved the illegal use of marine reserves by new persons entering the fishing industry due to the temporary closure of the Copra factory and a major hotel in the area. However, continued negotiations and ongoing consultations appear to reduce the negative impacts of these problems. Studies

have highlighted positive impacts in that there has been an increase in the following:

- Fish biomass within marine reserves.
- Fish biodiversity (increased number of fish species observed per count in annual censuses).

8.0 Lessons learned and replicability

- Some of the earlier problems experienced by the SMMA resulted from an unintended omission of one sub-group of users of the area. It is thus critical that before consultations begin all users, including sub-groups, identified and brought on board.
- Community participation is vital if no-take zones (strict marine reserves) are to be effective. It is essential that at the outset of the management plan to identify and include all the different stakeholders.
- The top-down approach to management, which was quite often used in the past to resolve issues of conflict, requires high investment into enforcement capacity. But, a participatory approach requires much less enforcement as users are sensitised and have consented to management procedures prior to their establishment.
- If no-take zones cover a sufficiently large proportion of the area, are interspersed with fishing areas, and there is good compliance with no-take regulations, the benefits of marine reserves can build up very rapidly.
- It is important to have continuous involvement of the stakeholders as this allows potential conflicts to be addressed before reaching a critical stage.

The experience of the SMMA has now been used to establish a similar system (Canaries/Anse la Raye Marine Management Area) encompassing the coastal area of the two adjacent villages immediately north of Soufriere. The SMMA experience has also be drawn upon by other islands in the region who have embarked on similar projects.

APPENDIX

Species Lists

Fish Species

Family	Species	Common Name
Acanthuridae	<i>Acanthurus coeruleus</i>	Blue tang
Acanthuridae	<i>Acanthurus bahianus</i>	Ocean surgeonfish
Acanthuridae	<i>Acanthurus chirurgus</i>	Doctorfish
Antennidae	<i>Antennarius multiocellatus</i>	Longlure frogfish
Apogonidae	<i>Apogon maculatus</i>	Flamefish
Apogonidae	<i>Apogon lachneri</i>	Whitestar cardinalfish
Aulostomidae	<i>Aulostomus maculatus</i>	Trumpetfish
Balistidae	<i>Canthidermis sufflamen</i>	Ocean triggerfish
Balistidae	<i>Monacanthus setifer</i>	Pygmy filefish
Balistidae	<i>Aluterus schoepfi</i>	Orange filefish
Balistidae	<i>Cantherhines pullus</i>	Orange spotted filefish
Balistidae	<i>Balistes vetula</i>	Queen triggerfish
Balistidae	<i>Melichthys niger</i>	Black durgon
Balistidae	<i>Cantherhines macrocerus</i>	White spotted filefish
Belonidae	<i>Belonidae sp.</i>	Needlefishes
Belonidae	<i>Tylosurus crocodilis</i>	Houndfish
Blennidae	<i>Ophioblennicus atlanticus</i>	Redlip blenny
Bothidae	<i>Bothus lunatus</i>	Peacock flounder
Carangidae	<i>Caranx bartholomaei</i>	Yellow jack
Carangidae	<i>Selar crumenophthalmus</i>	Bigeye scad
Carangidae	<i>Seriola dumerili</i>	Greater amberjack
Carangidae	<i>Trachinotus goodei</i>	Palmoeta
Carangidae	<i>Caranx hippos</i>	Crevalle jack
Carangidae	<i>Caranx lugubris</i>	Black jack
Carangidae	<i>Decapterus punctatus</i>	Round scad
Carangidae	<i>Decapterus macarellus</i>	Mackerel scad
Carangidae	<i>Uraspis secunda</i>	Cottonmouth jack
Carangidae	<i>Caranx ruber</i>	Bar jack
Carangidae	<i>Sparisoma atomarium</i>	Greenblotch parrotfish
Carangidae	<i>Caranx latus</i>	Horse eye jack
Carangidae	<i>Elagatis bipinnulata</i>	Rainbow runner
Chaetodontidae	<i>Chaetodon ocellatus</i>	Spotfin butterflyfish
Chaetodontidae	<i>Chaetodon aculeatus</i>	Longsnout butterflyfish
Chaetodontidae	<i>Chaetodon striatus</i>	Banded butterflyfish
Chaetodontidae	<i>Chaetodon capistratus</i>	Foureye butterflyfish
Chaetodontidae	<i>Coryphopterus lipernes</i>	Peppermint goby
Chaetodontidae	<i>Chaetodon sedentarius</i>	Reef butterflyfish
Cirrhitidae	<i>Amblycirrhitus pinos</i>	Redspotted hawkfish
Clinidae	<i>Acanthemblemaria sp.</i>	Blenny
Clupeidae	<i>Sardinella sp.</i>	Sardines
Congridae	<i>Conger triporiceps</i>	Manytooth conger
Congridae	<i>Heteroconger halis</i>	Brown garden eel

Coryphaenidae	<i>Coryphaena hippurus</i>	Dolphinfish
Exocoetidae	<i>Hirundichtys affinis</i>	Fourwing flyingfish
Exocoetidae	<i>Hemiramphus brasiliensis</i>	Ballyhoo
Gobiidae	<i>Coryphopterus glaucofraenum</i>	Bridled goby
Gobiidae	<i>Coryphopterus personatus/hyalinus</i>	Masked/Glass goby
Gobiidae	<i>Xanthichthys ringens</i>	Sargassum triggerfish
Gobiidae	<i>Gobiosoma evelynae</i>	Sharknose goby
Gobiidae	<i>Gnatholepis thompsoni</i>	Goldspot goby
Gobiidae	<i>Gobiosoma genie</i>	Cleaning goby
Gobiidae	<i>Gobiosoma randalli</i>	Yellownose goby
Gobiidae	<i>Gobiosoma sp.</i>	Goby
Grammatidae	<i>Grama loreto</i>	Fairy basslet
Grammistinae	<i>Rypticus saponaceus</i>	Greater soapfish
Haemulidae	<i>Haemulon album</i>	White margate
Haemulidae	<i>Haemulon parra</i>	Sailor's choice
Haemulidae	<i>Haemulon carbonarium</i>	Caesar grunt
Haemulidae	<i>Haemulon flavolineatum</i>	French Grunt
Haemulidae	<i>Haemulon chrysargyreum</i>	Smallmouth grunt
Haemulidae	<i>Kyphosus sp.</i>	Chub
Haemulidae	<i>Haemulon aurolineatum</i>	Tomtate
Haemulidae	<i>Haemulon sciurus</i>	Blue striped grunt
Haemulidae	<i>Haemulon striatum</i>	Striped grunt
Haemulidae	<i>Haemulon macrostomum</i>	Spanish grunt
Holocentridae	<i>Plectrypops retrospinis</i>	Cardinal soldierfish
Holocentridae	<i>Myripristis jacobus</i>	Blackbar soldierfish
Holocentridae	<i>Holocentrus rufus</i>	Longspine squirrelfish
Holocentridae	<i>Holocentrus adscensionis</i>	Squirrelfish
Holocentridae	<i>Holocentrus coruscum</i>	Reef squirrelfish
Holocentridae	<i>Holocentrus marianus</i>	Longjaw squirrelfish
Holocentridae	<i>Plectrypops retrospinis</i>	Cardinal soldierfish
Intermiidae	<i>Inermia vittata</i>	Boga
Istiophoridae	<i>Makaira nigricans</i>	Blue marlin
Kyphosidae	<i>Caranx lugubris</i>	Blackjack
Labridae	<i>Halichoeres garnoti</i>	Yellowhead wrasse
Labridae	<i>Clepticus parrae</i>	Creole wrasse
Labridae	<i>Thalassoma bifasciatum</i>	Bluehead wrasse
Labridae	<i>Halichoeres maculipinna</i>	Clown wrasse
Labridae	<i>Halichoeres poeyi</i>	Blackear wrasse
Labridae	<i>Halichoeres bivittatus</i>	Slippery dick
Labridae	<i>Bodianus rufus</i>	Spanish hogfish
Labridae	<i>Halichoeres radiatus</i>	Pudding wife
Lutjanidae	<i>Rhomboplites aurorubens</i>	Vermilion snapper
Lutjanidae	<i>Lutjanus buccanella</i>	Blackfin snapper
Lutjanidae	<i>Lutjanus campechanus</i>	Red snapper

Lutjanidae	<i>Etelis oculatus</i>	Queen snapper
Lutjanidae	<i>Lutjanus vivanus</i>	Silk snapper
Lutjanidae	<i>Ocyurus chrysurus</i>	Yellowtail snapper
Lutjanidae	<i>Lutjanus mahogoni</i>	Mahogany snapper
Lutjanidae	<i>Lutjanus apodus</i>	School master
Lutjanidae	<i>Lutjanus griseus</i>	Gray snapper
Lutjanidae	<i>Lutjanus synagris</i>	Lane snapper
Lutjanidae	<i>Lutjanus analis</i>	Mutton snapper
Malacanthidae	<i>Malacanthus plumieri</i>	Sand tilefish
Mullidae	<i>Mulloidichthys martinicus</i>	Yellow goatfish
Mullidae	<i>Pseudupeneus maculatus</i>	Spotted goatfish
Muraenidae	<i>Gymnothorax miliaris</i>	Goldentail morray
Muraenidae	<i>Muraena robusta</i>	Stout morray
Muraenidae	<i>Enchelycore nigricans</i>	Viper morray
Muraenidae	<i>Gymnothorax moringa</i>	Spotted moray
Muraenidae	<i>Gymnothorax miliaris</i>	Goldtail moray
Muraenidae	<i>Channomuraena vittata</i>	Broadbanded moray
Octopodidae	<i>Octopus briareus</i>	Caribbean reef octopus
Ophichthidae	<i>Myrichthys ocellatus</i>	Goldspotted eel
Ostraciidae	<i>Lactophrys bicaudalis</i>	Spotted trunkfish
Ostraciidae	<i>Lactophrys triqueter</i>	Smooth trunkfish
Ostraciidae	<i>Lactophrys polygonia</i>	Honeycomb cowfish
Pempheridae	<i>Pempheris schomburgki</i>	Glassy sweeper
Pomacanthidae	<i>Holacanthus tricolor</i>	Rock beauty
Pomacanthidae	<i>Pomacanthus paru</i>	French angel
Pomacanthidae	<i>Centropyge aurantonotus</i>	Flameback angelfish
Pomacanthidae	<i>Holacanthus ciliaris</i>	Queen angelfish
Pomacentridae	<i>Chromis cyanea</i>	Blue chromis
Pomacentridae	<i>Chromis multilineata</i>	Brown chromis
Pomacentridae	<i>Stegastes partitus</i>	Bicolor damselfish
Pomacentridae	<i>Microspathodon chrysurus</i>	Yellowtail damselfish
Pomacentridae	<i>Abudefduf saxatilis</i>	Sergeant major
Pomacentridae	<i>Stegastes diencaeus</i>	Longfin damselfish
Pomacentridae	<i>Stegastes fuscus</i>	Dusky damselfish
Pomacentridae	<i>Abudefduf taurus</i>	Night sergeant
Pomacentridae	<i>Stegastes variabilis</i>	Cocoa damselfish
Pomacentridae	<i>Stegastes leucosticus</i>	Beaugregory
Pomacentridae	<i>Stegastes planifrons</i>	Three spotted damselfish
Pomacentridae	<i>Chromis insolata</i>	Sunshine fish
Priacanthidae	<i>Priacanthus arenatus</i>	Big eye
Priacanthidae	<i>Priacanthus cruentatus</i>	Glasseye snapper
Scaridae	<i>Scarus taeniopterus</i>	Princess parrotfish
Scaridae	<i>Sparisoma viride</i>	Stoplight parrotfish
Scaridae	<i>Scarus iserti</i>	Striped parrotfish
Scaridae	<i>Sparisoma aurofrenatum</i>	Redband parrotfish

Scaridae	<i>Sparisoma rubripinne</i>	Redtail parrotfish
Scaridae	<i>Scarus vetula</i>	Queen parrotfish
Scaridae	<i>Sparisoma chrysopteron</i>	Redfin parrotfish
Scaridae	<i>Scarus guacamaia</i>	Rainbow parrotfish
Sciaenidae	<i>Equetus punctatus</i>	Spotted drum
Sciaenidae	<i>Equetus acuminatus</i>	Highhat
Sciaenidae	<i>Equetus lanceolatus</i>	Jackknife fish
Scombridae	<i>Menticirrhus littoralis</i>	Gulf kingfish
Scombridae	<i>Tunnus albacares</i>	Yellowfin tuna
Scombridae	<i>Euthynnus alletteratus</i>	Little tunny
Scombridae	<i>Thunnus atlanticus</i>	Blackfin tuna
Scombridae	<i>Thunnus obesus</i>	Bigeye tuna
Scombridae	<i>Katsuwonus pelamis</i>	Skipjack tuna
Scombridae	<i>Acanthocybium solandri</i>	Wahoo
Scombridae	<i>Thunnus alalunga</i>	Albacore tuna
Scombridae	<i>Sarda sarda</i>	Atlantic bonito
Scombridae	<i>Scomberomorus regalis</i>	Cero
Scombridae	<i>Scomberomorus cavalla</i>	King mackerel
Scorpaenidae	<i>Scorpaena plumieri</i>	Spotted scorpionfish
Serranidae	<i>Hypoplectrus puella</i>	Barred hamlet
Serranidae	<i>Serranus tigrinus</i>	Halequin bass
Serranidae	<i>Epinephelus adscensionis</i>	Rock hind
Serranidae	<i>Epinephelus cruentatus</i>	Grasby
Serranidae	<i>Epinephelus guttatus</i>	Red hind
Serranidae	<i>Epinephelus fulvus</i>	Coney
Serranidae	<i>Hypoplectrus chlorurus</i>	Yellowtail hamlet
Serranidae	<i>Liopropoma rubre</i>	Peppermint bass
Serranidae	<i>Hypoplectrus guttavarius</i>	Shy hamlet
Serranidae	<i>Hypoplectrus aberrans</i>	Yellowbelly hamlet
Serranidae	<i>Serranus baldwini</i>	Lantern bass
Serranidae	<i>Hypoplectrus nigricans</i>	Black hamlet
Sphyraenidae	<i>Sphyraena barracuda</i>	Great barracuda
Synodontidae	<i>Synodus intermedius</i>	Sand diver
Tetraodontidae	<i>Chilomycterus antillarum</i>	Web burrfish
Tetraodontidae	<i>Canthigaster rostrata</i>	Sharpnose puffer
Tetraodontidae	<i>Diodon hystrix</i>	Porcupine fish
Tetraodontidae	<i>Diodon holocanthus</i>	Balloonfish

Species of algae

Phylum	Species	Common Name
Chlorophyta	<i>Halimeda discoidea</i>	Large leaf watercress algae
Chlorophyta	<i>Halimeda lacrimosa</i>	Bulbous lettuce leaf alga
Chlorophyta	<i>Caulerpa racemosa</i>	Green grape alga
Chlorophyta	<i>Udotea cyathiformis</i>	Mermaid's teacup
Chlorophyta	<i>Ventricaria ventricosa</i>	Sea pearl
Cyanophyta	Not identified	Fuzz ball algae
Phaeophyta	<i>Dictyota sp.</i>	Y Branched algae
Phaeophyta	<i>Hydroclathrus clathratus</i>	Swiss cheese algae
Phaeophyta	<i>Lobophora variegata</i>	Encrusting fan-leaf alga
Rhodophyta	Not identified	Crustose coralline algae
Rhodophyta	<i>Galaxaura sp.</i>	Tubular thicket algae

Species of cnidaria (not including corals)

Order	Species	Common Name
Actinaria	* <i>lucida</i>	Knobby anemone
Actinaria	<i>Lebrunia coralligens</i>	Hidden anemone
Actinaria	<i>Lebrunia danae</i>	Branching anemone
Ceriantharia	<i>Arachnanthus nocturnus</i>	Banded tube-dwelling anemone
Hydroida	<i>Macrorhyncia robusta</i>	Stinging bush hydroid
Hydroida	<i>Gymnangium sp.</i>	Feather hydroid
Hydroida	<i>Halopteris carinata</i>	Thread hydroid
Zoanthidea	<i>Zoanthus pulchellus</i>	Mat zoanthid
Zoanthidea	<i>Palythoa caribaeorum</i>	White encrusting zoanthid
Zoanthidea	<i>Palythoa grandis</i>	Sun zoanthid

* Genera for this species was recently reclassified and is not available

Species of corals

Family	Species	Common Name
Acroporidae	<i>Acropora palmata</i>	Elkhorn coral
Agariciidae	<i>Agaricia humilis</i>	Low relief lettuce coral
Agariciidae	<i>Agaricia agaricites</i>	Lettuce coral
Agariciidae	<i>Agaricia lamarcki.</i>	Sheet coral
Anthothelidae	<i>Iciligorgia schrammi</i>	Deep water sea fan
Anthothelidae	<i>Erythropodium caribaeorum</i>	Encrusting gorgonian
Antipathidae	<i>Antipathes lenta.</i>	Hairnet black coral
Antipathidae	<i>Antipathes sp.</i>	Black coral
Astrocoeniinae	<i>Stephanocoenia michilini</i>	Blushing star coral
Briareidae	<i>Briareum asbestinum</i>	Corky sea finger
Caryophyllidae	<i>Catalaphyllia jardinei</i>	Elegant coral
Caryophyllidae	<i>Eusmilia fastigiata</i>	Smooth flower coral
Ellisellidae	<i>Ellisella barbadensis</i>	Devil's sea whip
Faviidae	<i>Favia fragum</i>	Golf ball coral
Faviidae	<i>Montastrea annularis</i>	Boulder star coral
Faviidae	<i>Cladocora arbuscula</i>	Tube coral
Faviidae	<i>Montastrea cavernosa</i>	Great star coral
Faviidae	<i>Diplora strigosa</i>	Symmetrical brain coral
Faviidae	<i>Diplora clivosa</i>	Knobby brain coral
Faviidae	<i>Diplora labyrinthiformis</i>	Grooved brain coral
Faviidae	<i>Manicina areolata</i>	Rose coral
Faviidae	<i>Colpophyllia natans</i>	Boulder brain coral
Faviidae	<i>Meandrina brasiliensis</i>	Rose coral
Gorgoniidae	<i>Pterogorgia citrina.</i>	Yellow sea whip
Gorgoniidae	<i>Pseudopterogorgia sp.</i>	Sea plume
Gorgoniidae	<i>Gorgonia mariae</i>	Wide-mesh sea fan
Gorgoniidae	<i>Gorgonia ventalina</i>	Sea fan
Meandrinidae	<i>Dendrogyra cylindrus</i>	Pillar coral
Meandrinidae	<i>Meandrina meandrites</i>	Maze coral
Meandrinidae	<i>Dichocoenia stokesii</i>	Elliptical star coral
Milliporidae	<i>Millepora alcicornis</i>	Branching fire coral
Milliporidae	<i>Millepora squarrosa</i>	Box fire coral
Mussidae	<i>Mussa angulosa</i>	Spiny flower coral
Mussidae	<i>Isophyllastrea rigida</i>	Rough star coral
Mussidae	<i>Mycetophyllia danaana</i>	Low ridge cactus coral
Mussidae	<i>Scolymia sp.</i>	Disk coral
Oculinidae	<i>Oculina diffusa</i>	Diffuse Ivory bush coral
Plexauridae	<i>Eunicea sp.</i>	Sea rod
Plexauridae	<i>Plexaura flexuosa</i>	Bent sea rod
Plexauridae	<i>Pseudoplexaura sp.</i>	Porous sea rod
Plexauridae	<i>Plexaurella sp.</i>	Slit pore sea rod
Pocilloporidae	<i>Madracis mirabilis</i>	Yellow pencil coral

Pocilloporidae	<i>Madracis decactis</i>	Ten ray star coral
Poritidae	<i>Porites colonensis</i>	Honey comb plate coral
Poritidae	<i>Porites asteroides</i>	Mustard hill coral
Poritidae	<i>Porites porites</i>	Finger coral
Poritidae	<i>Porites divaricata</i>	Finger coral
Seriatoporidae	<i>Madracis pharensis</i>	Encrusting star coral
Siderastreidae	<i>Siderastrea radians</i>	Lesser starlet coral
Siderastreidae	<i>Siderastrea siderea</i>	Massive starlet coral

Species of molluscs

Family	Species	Common Name
Amphineura (class)	<i>Acanthopleura granulata</i>	Fuzzy chiton
Limidae	<i>Lima scabra</i>	Rough file clam
Loliginidae	<i>Sepioteuthis sepioidea</i>	Caribbean reef squid
Octopodidae	<i>Octopus briareus</i>	Caribbean reef octopus
Strombidae	<i>Strombus gigas</i>	Queen conch
Strombidae	<i>Strombus ranius</i>	Hawkwing conch
Cypraeidae	<i>Cypraea cinerea</i>	Atlantic gray cowrie
Ovulidae	<i>Cyphoma gibbosum</i>	Flamingo tongue

Species of porifera

Class	Species	Common Name
Demospongia	<i>Pseudoceratina crassa</i>	Branching tube sponge
Demospongia	<i>Aplysina fistularis</i>	Yellow tube sponge
Demospongia	<i>Ages conifera</i>	Brown tube sponge
Demospongia	<i>Callyspongia vaginalis</i>	Branching vase sponge
Demospongia	<i>Callyspongia plicifera</i>	Azure vase sponge
Demospongia	<i>Xestospongia muta</i>	Giant barrel sponge
Demospongia	<i>Sphaciospongia vesparium</i>	Loggerhead sponge
Demospongia	<i>Iotrochota birotulata</i>	Green finger sponge
Demospongia	<i>Halisarca sp.</i>	Blue encrusting sponge
Demospongia	<i>Amphimedon compressa</i>	Erect rope sponge
Demospongia	<i>Siphonodictyon coralliphagum</i>	Boring sponge
Demospongia	<i>Ectoplasie ferox</i>	Brown encrusting octopus sponge
Demospongia	<i>Siphonodictyon coralliphagum</i>	Variable boring sponge
Demospongia	<i>Niphates digitalis</i>	Pink vase sponge

Species of echinoderms

Class	Species	Common Name
Crinoidea	<i>Davidaster rubiginosa</i>	Golden crinoid
Crinoidea	<i>Analcidometra armata</i>	Swimming crinoid
Echinoidea	<i>Diadema antillarum</i>	Long-spined sea urchin
Echinoidea	<i>Tripneustes ventricosus</i>	West Indian sea egg
Echinoidea	<i>Meoma ventricosa</i>	Red heart urchin
Echinoidea	<i>Echinometra viridis</i>	Reef urchin
Echinoidea	<i>Eucidaris tribuloides</i>	Slate-pencil sea urchin
Ophiuroidea	<i>Schizostella bifurcata</i>	Sea rod basket star
Ophiuroidea	<i>Astrophyton muricatum</i>	Giant basket star
Holothuroidea	<i>Holothuria mexicans</i>	Donkey dung sea cucumber
Ophiuroidea	<i>Ophiothrix suensonii</i>	Sponge brittle star
Ophiuroidea	<i>Ophionereis reticulata</i>	Reticulated brittle star

Species of arthropods observed in the study area.

Family	Species	Common Name
Not known	<i>Thoracica sp.</i>	Sessile barnacles
Diogenidae	<i>Paguristes puncticeps</i>	White speckled hermit
Diogenidae	<i>Paguristes cadenatia</i>	Red reef hermit
Graspidae	<i>Graspidae sp.</i>	Rock runners/spray crabs
Majidae	<i>Stenorhynchus seticornis</i>	Yellowline arrow crab
Majidae	<i>Mithrax pilosus</i>	Hairy clinging crab
Palaemonidae	<i>Periclimenes sp.</i>	Cleaning shrimp
Palinuridae	<i>Panulirus argus</i>	Caribbean spiny lobster
Palinuridae	<i>Panulirus guttatus</i>	Spotted spiny lobster
Palinuridae	<i>Justitia longimanus</i>	Red band lobster
Scyllaridae	<i>Scyllarides sp.</i>	Slipper lobster
Portunidae	<i>Potunus sebae</i>	Ocellate swimming crab
Rhynchocinetidae	<i>Rhynchocinetes rigens</i>	Red night shrimp
Stenopodidea	<i>Stenopus hispidus</i>	Banded coral shrimp

Species of annelids observed in the study area.

Family	Species	Common Name
Amphinomidae	<i>Hermodice carunculata</i>	Bearded fireworm
Sabellidae	<i>Bispira brunnea</i>	Social feather duster
Sabellidae	<i>Bispira variegata</i>	Variegated feather duster
Sabellidae	<i>Anomobaea orstedii</i>	Split-crown feather duster
Sabellidae	<i>Sabellastarte magnifica</i>	Magnificent feather duster
Serpulidae	<i>Spirobranchis giganteus</i>	Christmas tree worm
Serpulidae	<i>Vermiliopsis sp.</i>	Blushing star coral fanworm
Terebellidae	<i>Eupolymnia crassicornis</i>	Spaghetti worm