Sandy Island/Oyster Bed Marine Protected Area Management Plan

Version 1
June 2007

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Acknowledgements

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1. Introduction

1.1 Purpose and Scope

This management plan was developed for the Sandy Island/Oyster Bed Marine Protected Area (SIOBMPA) by The Nature Conservancy (TNC), through the Grenadines Parks in Peril Project and funded by a grant from the United States Agency for International Aid (USAID), in collaboration with the Grenada Ministry of Agriculture, the Caribbean Regional Environmental Programme (CREP), and the Carriacou Environmental Committee (CEC). This management plan is designed to provide the long term vision of the SIOBMPA and guide near term (3-5 years) objectives and activities. The development of this plan followed The Nature Conservancy's Conservation Action Planning (CAP) process. This process utilized a series of workshops to develop goals, identify priority conservation resources and their condition, identify human activities impacting the resources, and develop objectives and strategies for improving or maintaining the resources within the SIOBMPA. The workshops included a wide range of stakeholders from the community of Carriacou, the Government of Grenada and scientists from St. George's University. This plan is the culmination of the ideas generated by the local community through these workshops. A financial analysis and business plan for its implementation is also included at the end of this document.

This management plan is part of an adaptable and iterative management process. It is designed to provide guidance for the near term, but is also open to modifications based on periodic evaluations of management actions. The monitoring program included in the plan is designed to provide the framework for the evaluation of the effectiveness of the management actions. Each action undertaken by management will be evaluated to ensure that it is achieving the objectives set forth through this plan. This plan should be revised after a period of five years to reflect the results of the monitoring program.

A sunset view from a beach in Carriacou

1.2 Background

The Sandy Island/Oyster Bed Marine Protected Area (SIOBMPA) was first considered for protected status in 1988 when Grenada developed a *Plan and Policy for a System of National Parks and Protected Areas*. The area proposed, referred to as Lauriston Point, was slightly smaller than the proposed area for the SIOBMPA and consisted of Sandy Island, Mabouya Island and the sea surrounding these islands. It was selected because of its proximity to the capital of Carriacou and the quality of its ecosystems. Although this area was identified as a priority conservation area, it wasn't until locally driven support lead three different organizations to provide support towards its implementation that the process towards establishing the marine protected area began.

In 2001 the Caribbean Regional Environmental Programme (CREP) initiated the "Grenada Amenity Area" project in Carriacou. The main objective of this project was to increase the capacity of Carriacou to manage and utilize the resources of the SIOBMPA in a sustainable manner by establishing a MPA. CREP formed a local partnership with an organization in Grenada called the Carriacou Environmental Committee (CEC) to work towards establishing the SIOBMPA.

In 2003, the *Marine Protected Area (MPA) Planning for Carriacou and Petite Martinique* identified the establishment of a MPA in the Grenadine Islands as a priority area for action. The intent of the report was to acquire the "information pertaining to MPA development in Carriacou and Petite Martinique, develop a proposal for the Sandy Island/Oyster Bed MPA and present stakeholder views on the feasibility of, and possible problems with, implementing the proposal."

Most recently, The Nature Conservancy (TNC) and the Government of Grenada signed a Memorandum of Understanding to work towards the implementation of the Programme of Work (PoW) on protected areas in Grenada. One of the early activities of this agreement was to participate in the development of a management plan for the SIOBMPA along with other organizations already working in the area.

1.3 Legislative Authority

In 1994, Grenada declared its commitment to establish protected areas by ratifying the Convention on Biological Diversity. As a member of the Convention on Biological Diversity, Grenada committed to preserve ten percent of its terrestrial and marine habitat.

In March 2006, at the eighth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 8), the Grenada cabinet approved the *Declaration of Commitment: 'The Grenada 25-25 Declaration'* which announced Grenada's goal to "effectively conserve at least 25% of the near-shore marine resources and at least 25% of the terrestrial resources across Grenada by 2020". This declaration significantly increases the area that Grenada had previously committed to protect in the Convention on Biological Diversity.

In 2000, *The St. George's Declaration of Principles for Environmental Sustainability in the OECS* was accepted by member states of the Organisation of Eastern Caribbean States (OECS) as the framework to ensure a healthy environment amongst member states. The establishment

of the SIOBMPA will help to fulfill the principles set forth in the declaration. For instance, one of the goals of the SIOBMPA is "to sustainably manage the fisheries resources of the area and encourage traditional fishing practices" which will help fulfill St. George's Principle 11, to "Ensure the Sustainable Use of Natural Resources."

The *National Environmental Policy and Management Strategy for Grenada* was developed by the Government of Grenada in 2005 to establish a broad policy framework for environmental management in Grenada. The purpose of the document was to develop a procedure for Grenada to implement *The St. George's Declaration of Principles for Environmental Sustainability in the OECS.* The document seeks to formalize the legal process of enforcing protected area management. It states that "The Government of Grenada will pursue its efforts towards the establishment of an integrated, efficient and effective legislative framework for environmental management."

Grenada has adopted several legal provisions/instruments leading to the formation of marine protected areas, including:

- Beach Protection Act Cap 29
- Birds and Other Wildlife (Protection) Act Cap 34
- Fisheries Act Cap 108
- Fisheries Conservation Regulations (SRO#24, 1995)
- Fisheries (Marine Protected Areas) Order (SRO#77, 2001)
- Forest, Soil and Water Conservation Act Cap 116
- National Parks and Protected Areas Cap 203
- Oil in Navigable Waters Act Cap 206
- Physical Planning and Development Control Act, No. 25 of 2002
- Ports Authority Act Cap 247
- Territorial Sea and Maritime Boundaries Act Cap 318
- Tourist Board Act Cap 321

With the enactment of the Beach Protection Act Cap 29, it is now required to acquire a permit to dig or remove specific materials, including sand, from beaches or the seashore. This Act was designed to regulate mining of sand from the beaches.

The Birds and Other Wildlife (Protection) Act Cap 34 made it illegal to kill or wound any wild bird, or to take any wild bird nests or eggs. It also established a closed season for lobsters, turtles, and oysters.

The Fisheries Act Cap 108 allows for any area of fishery waters and surrounding land to be designated as a marine reserve by the Prime Minister of Grenada when special measures are necessary to protect the natural resources of that area. The Fisheries (Amendment) Act of 1998 amends the Fisheries Act Cap 108 to replace "marine reserves" with "marine protected areas." It also allows for the sustainable use of marine protected areas as well as the protection and preservation of historic monuments and other artifacts of ecological significance.

As a result of The Fisheries (Marine Protected Areas) Order (SRO#77, 2001) two marine protected areas were established on the main island of Grenada. Wolburn/Clarks Court Bay Marine Protected Area is located on the southeast coast and includes Hog Island and Calivigny Island. Moliniere/Beausejour Marine Protected Area is located on the west coast and includes Beausejour Bay, Flamingo Bay, and Dragon Bay. Both MPAs are managed by the Fisheries Division of the Ministry of Agriculture.

The Physical Planning and Development Control Act changed the legislative framework for protected areas by creating the Planning and Development Authority. This Authority is responsible for developing a physical plan for Grenada that includes the development of industry and commerce, tourism, agriculture, forestry, fishing, health, the environment, fresh water, and energy. The Act also prohibits development of land without permission from the Authority.

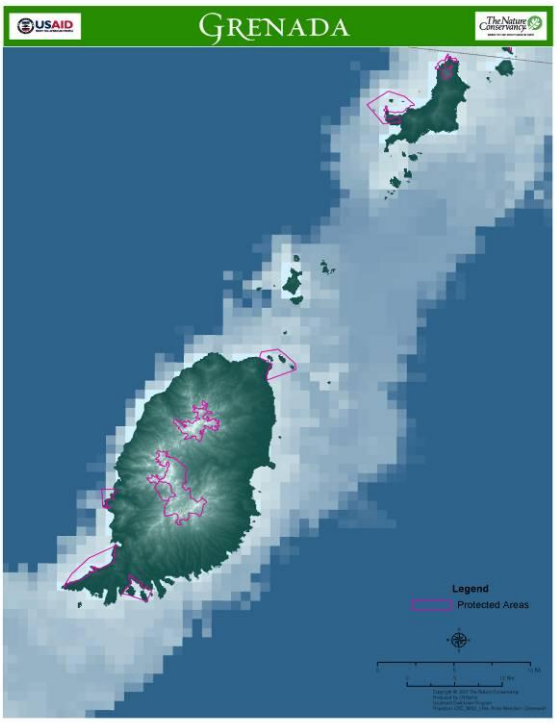
Finally, the Tourist Board Act Cap 321 established a tourist board responsible for all aspects of the tourist industry. The role of the board is to enhance the attractiveness of Grenada with special reference to entertainment, conservation of local flora and fauna, deep sea fishing, and handicrafts.

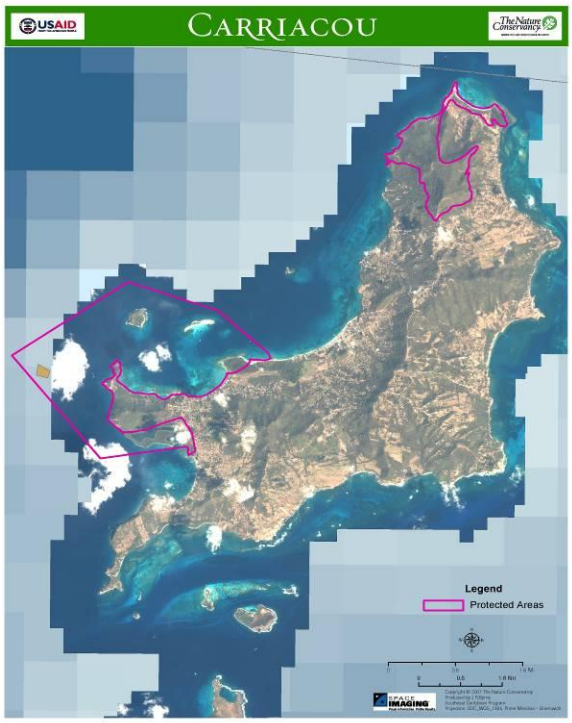
A view of Hillsborough Bay with Mabouya and Sandy Island located just above and to the left of the cannon.

1.4 Regional Setting

The Sandy Island/Oyster Bed Marine Protected Area (SIOBMPA) is located on the island of Carriacou in Grenada. The country of Grenada encompasses three inhabited islands: Grenada, Carriacou, and Petite Martinique. Although Grenada is often known as the "tri-island state" for

its three inhabited islands, it also includes several small uninhabited islands and cays. Located at the southern most edge of the Windward Islands, the average temperature of 25 to 27 ˚C is tempered by the northeast trade winds. The dry season lasts from January through May, while the wet season lasts from June through December. The overall rainfall for Grenada averages 78 inches per year, but varies significantly by region and season. Grenada is home to almost 90,000 residents and hosts about 150,000 visitors each year.

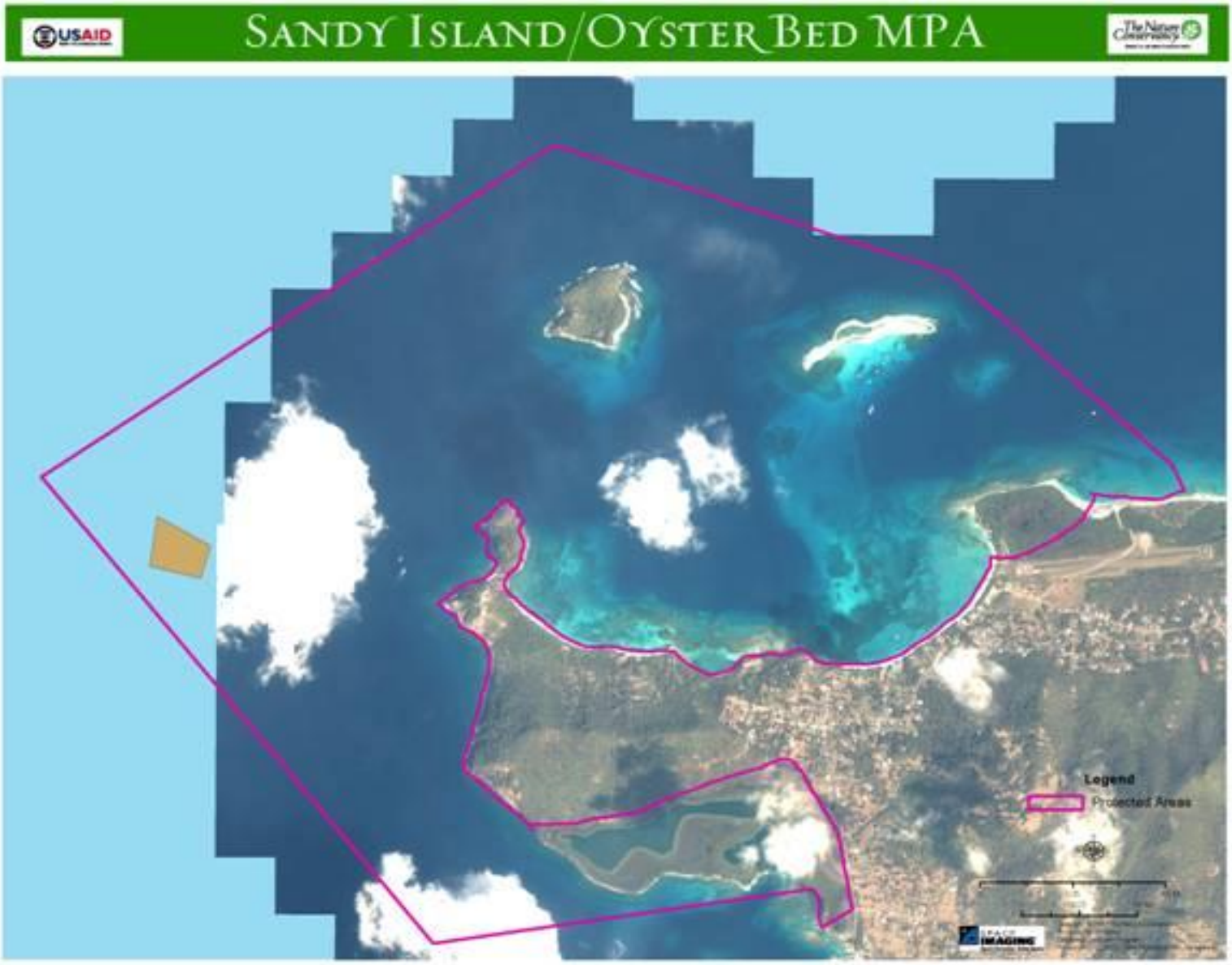




Carriacou, the largest of the Grenadine islands in Grenada, is part of a chain of small islands, rocks and cays situated in between the main islands of Grenada and St. Vincent that are commonly known as the Grenadines. The islands are the summits of ancient submerged volcanic mountains formed 50 million years ago. Carriacou is located at 12˚ 28'N & 61˚ 28'W and is approximately 33.7 sq km. The name Carriacou originated from the original inhabitants, the Caribs, who aptly named it the "land surrounded by reefs." Carriacou is home to about 8,000 residents, most of whom are subsistence agriculturalists or fishermen. Carriacou is also known for its boat-building and derives much of its income from tourism. Freshwater is limited in Carriacou as there are no rivers and the island receives less rain than the main island of Grenada. The terrain consists of hills, small mountains, and valleys.

The SIOBMPA comprises an area of 787 hectares on the southwest coast of Carriacou. Beginning on the Northern end, the protected area encompasses the mangroves of Lauriston Pt. in Hillsborough Bay, the shoreline through L'Esterre Bay, Pt. Cistern, and the north end of Tyrrel Bay including its mangrove system. The SIOBMPA also extends out into the sea and encompasses Sandy Island, Mabouya Island, and the Sister Rocks. The area within the SIOBMPA has extensive reef development, mangroves and seagrass beds. The mangroves are renowned as the habitat for the mangrove oyster, and serve as nursery grounds for several species of fish. The mangroves of Tyrrel Bay are especially important to local boat owners who use the area to secure

their boats during tropical storms. Sandy Island, with its postcard quality scenery and white sandy beach surrounded by turquoise waters is a cultural landmark for the people of Carriacou.



2. Management Plan

2.1 Goals

Over twenty-five stakeholders from the Carriacou community attended the first management planning workshop in 2005, including dive and tour operators, fishermen, police, hotel and grocery store owners, and representatives from government, women's groups, local

NGO's, TNC and CREP. A set of goals (listed below) was developed for the SIOBMPA during this workshop. These goals provide the strategic focus for the management of the SIOBMPA. The established goals are indicative of the long-term desired effect that the SIOBMPA will have on the resources of the area and the community of Carriacou and Grenada.

1. **Conserve the coastal and marine ecosystems through effective management for current and future generations.**

2. **Ensure that all stakeholders/communities are empowered and fully engaged in the management of the park.**

3. **Ensure that SIOBMPA is an integral part of a marine protected areas network in the Grenadines, the Caribbean and more broadly, the world.**

4. **Increase socio-economic benefits to the community of Carriacou and the wider Caribbean while preserving the cultural value of the SIOBMPA.**

5. **Increase awareness and knowledge about the resources of the SIOBMPA.**

Setting Goals at the First Stakeholder Workshop in Carriacou

2.2 Priority Conservation Resources

The priority conservation resources were also selected at the first stakeholder workshop. The stakeholder participants were divided into small groups to decide on the conservation resources which should be established as a priority for conservation within the MPA. In the selection process it was emphasized that all of the characteristic ecosystems of the area should be included in the management plan. The small groups then reconvened to discuss these priorities.

The number of priority resources selected by the groups ranged from seven to thirteen. Five priority resources were common to all of the groups and they were first selected as final priority resources. Two additional priority resources were selected through an open discussion. By nesting some individual resources within a larger classification, all of the resources selected by the groups were addressed. The final selected priority resources are coral reefs, mangroves, seagrass beds, reef fish, sea turtles, sandy beaches, and offshore islands. These resources represent multiple levels of biological organization, and ensure the functionality of the system as a whole. The following is a description of the selected priority resources and a brief discussion of their condition and distribution within the SIOBMPA.

2.2.1 Coral Reefs

Although coral reefs comprise less than one percent of the ocean, they are home to 25 percent of marine life and are amongst the most biologically diverse ecosystems on earth. Having existed for over 200 million years, they are also the oldest ecosystem on earth. Although coral reefs have persevered through periods of decline due to natural changes in the environment, they are now disappearing at an alarming rate mostly due to human activity. Yet, coral reefs are essential to the health and survival of marine life, as well as humans, who depend on them for sustenance and income. Local communities living near coral reefs rely heavily upon reef ecosystems for fishing and tourism industries. Additionally, healthy coral reefs provide coastal protection against currents, waves, and severe weather by dissipating wave energy. Recently, coral reefs have been found to have beneficial medicinal purposes; specifically, they have been utilized for anti-cancer drugs, painkillers, and bone grafts. Coral reefs are home to thousands of species of reef fish, sponges, coral polyps, and other living creatures. All of these creatures are reliant upon a healthy coral reef for shelter, food, and protection. A loss of reef habitat will also mean the loss of all of these creatures.

Several of the coral reef systems on Carriacou Island exist within the SIOBMPA. There are patch reef systems existing on the west end of L'Esterre Bay, just north of Tyrell Bay and west of the mangroves, and on the west end of Pt. Cistern. Furthermore, each of the four islands within the park boundaries has contiguous reef systems. Sandy Island has coral reef along its entire northern side and along the east end of its southern side. Mabouya Island has patch reef structures on the northwest and northeast sides of the island and the Sister Rocks are surrounded by reefs.

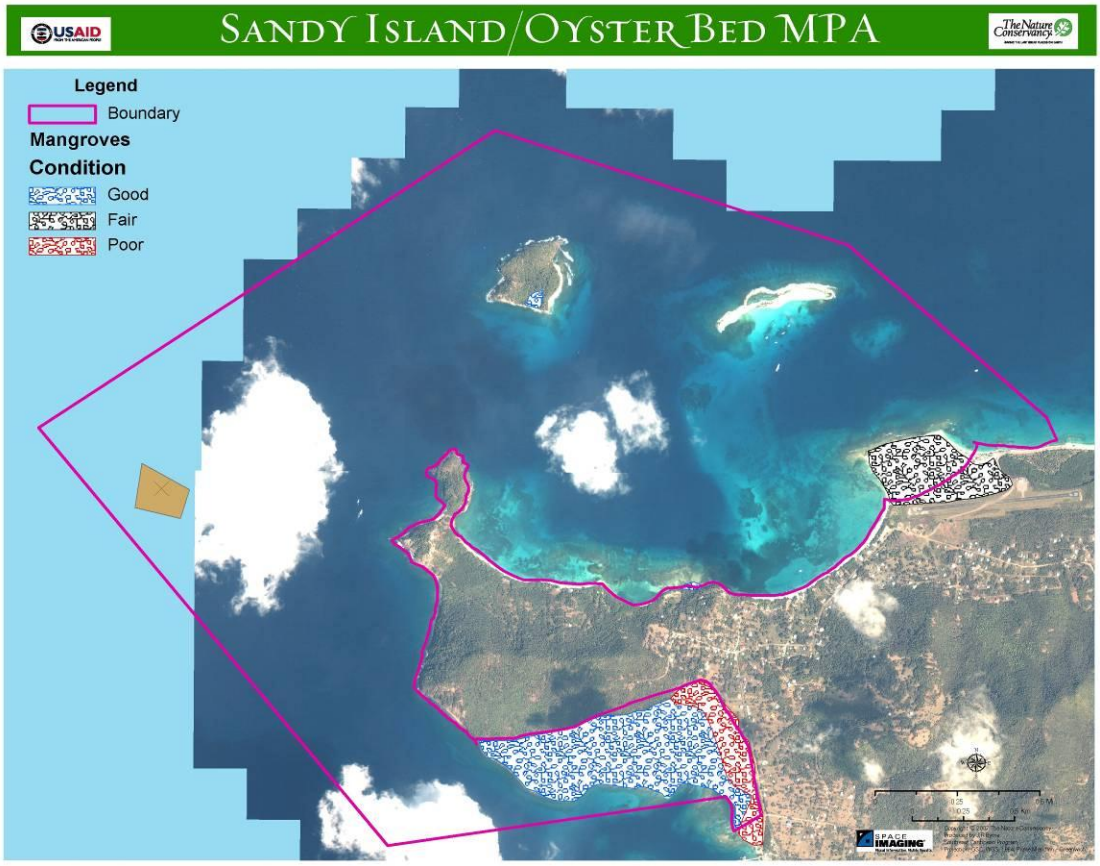
2.2.2 Mangroves

Red Mangroves (*Rhizophora mangle*)

Mangroves are salt-tolerant plants that grow along tropical and sub-tropical coasts. They require warm temperatures, calm near shore waters, and low-lying coastal land. Their unique structures serve several important roles in marine ecosystems. The dense root system, especially prevalent in the Red Mangroves, protects coral by filtering land-based sediment that would otherwise flow into the ocean and obstruct sunlight from reaching the coral. The roots also provide nutrient-rich detritus and protection for larvae and juvenile fish, resulting in an ideal fish and shellfish breeding ground and nursery. Mangrove trees are also home to various species of birds. Furthermore, mangroves are valuable to humans, especially in times of severe weather. The roots are able to absorb high levels of wave energy; fishermen often protect their boats by docking them within the mangroves. The mangroves also protect the land behind them from erosion and flooding.

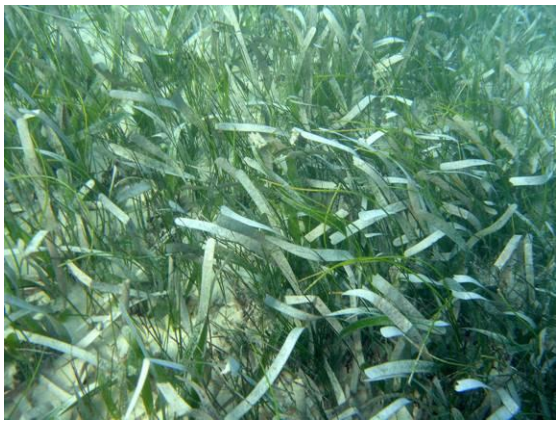
Protection of the mangroves will also protect the Grenadian Bank Tree Boa (*Corallus grenadensis*), locally called serpents, and the Grenadian Bank Tree Boas are endemic to Grenada and the Grenadines, where they can be found in the mangroves of Tyrrel Bay and Lauriston Pt. This Grenadian Bank Tree Boa and the Mangrove Oyster were originally considered as priority conservation resources but were then nested under the priority resource "Mangrove". It was felt that any actions addressed at protecting their habitat (mangroves) will also protect the snake.

The SIOBMPA will include several important sections of Carriacou's mangroves. The mangroves of Pt. Cistern, Tyrrel Bay, Lauriston Pt., L'Esterre Bay, and Mabouya will all be within the SIOBMPA boundaries. The mangroves of Tyrrel Bay are especially important to the people of Carriacou. The area is renowned for its oyster beds growing upon the roots of the red mangrove trees and local boaters use this area to secure their boats during severe weather.



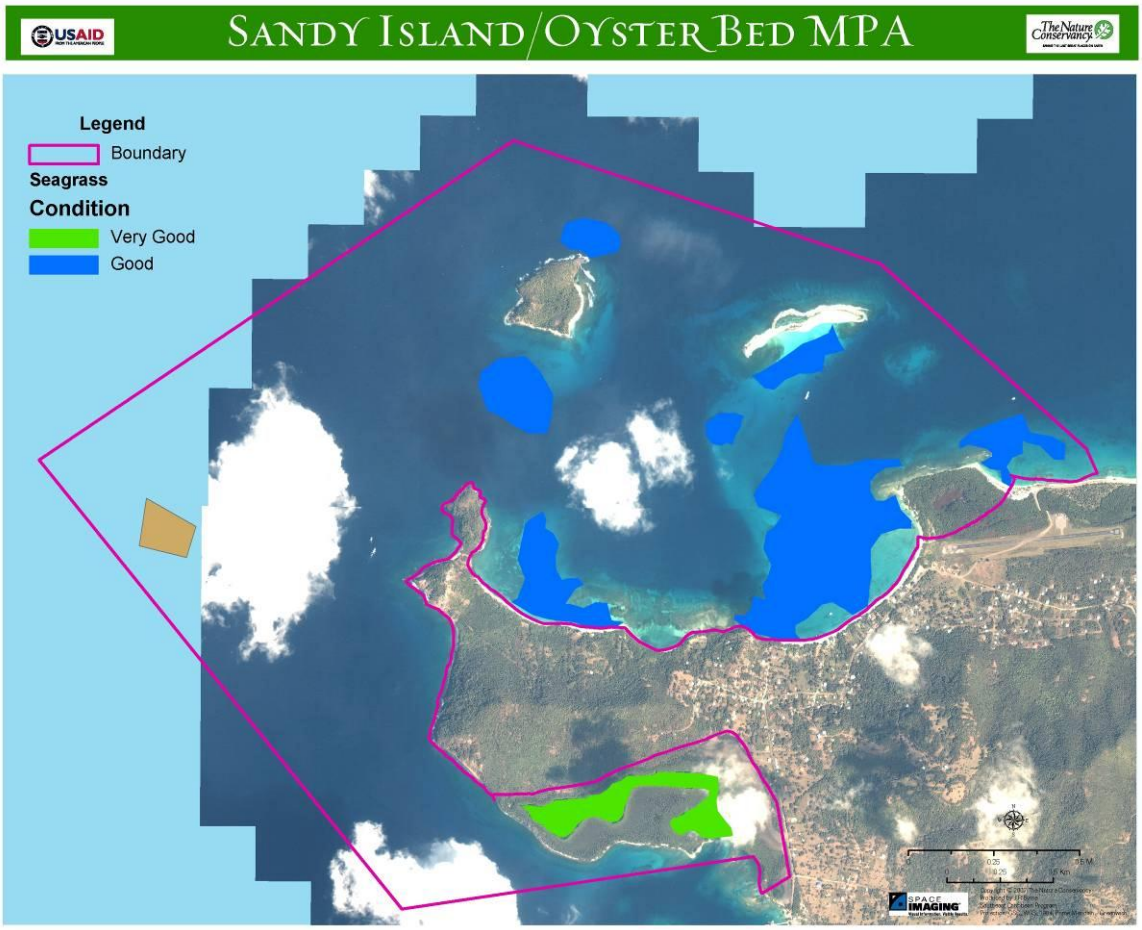
2.2.3 Seagrass Beds

Seagrass beds are best developed in lagoon areas and play an integral role in the well-being of a marine ecosystem. Seagrass beds trap and stabilize sediment, resulting in better water clarity and light penetration which are necessary conditions for coral reefs to flourish. The extensive root system of seagrass beds limits erosion by holding the sand substrate together, preventing extensive shifting of sand during storms. Seagrass also provides important habitat and refuge from predators for juvenile reef fish. Furthermore, green sea turtles, several herbivorous fish, echinoderms, mollusks, and birds feed on the seagrass.



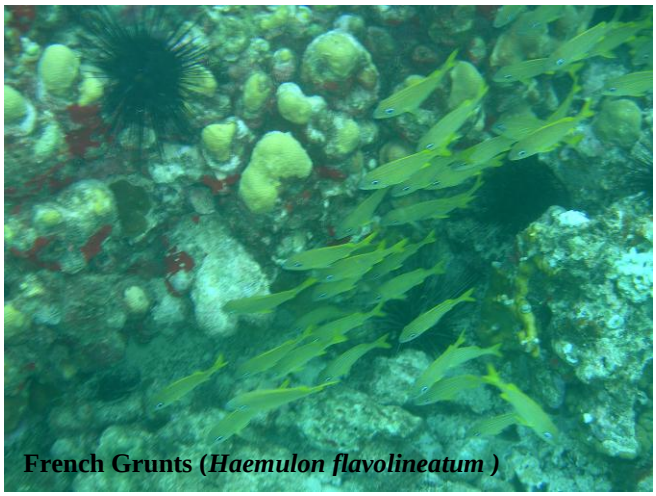
Turtle Grass (*Thalassia testudinum*) & Manatee Grass (*Syringodium filiforme*)

Seagrass beds are located throughout the SIOBMPA; clusters are located near Sandy Island, Mabouya Island, Pt. Cistern, L'Esterre Bay, and Lauriston Pt. The species of seagrass found in SIOBMPA include turtle grass (*Thalassia testudinum*) and manatee grass (*Syringodium filiforme*).



2.2.4 Reef Fish

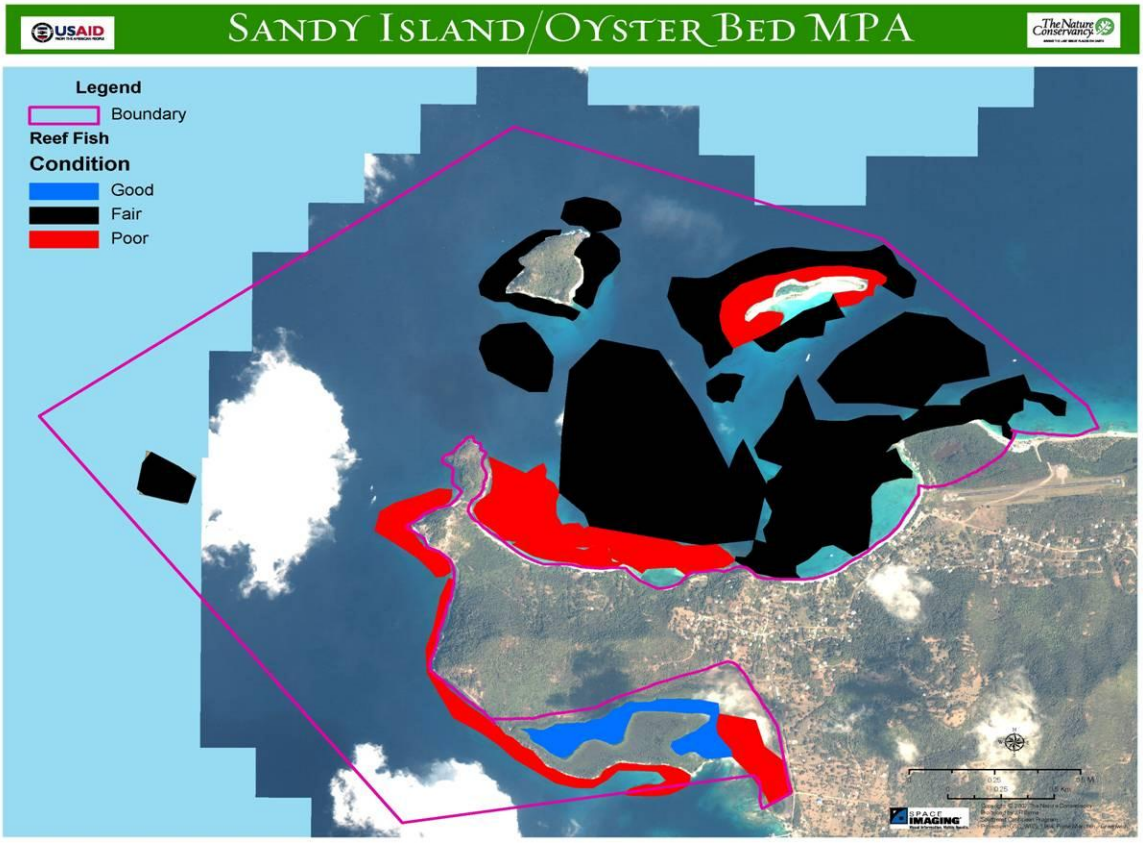
A healthy community of reef fish includes an assorted array of fish, crustaceans (i.e. shrimp, crabs, lobsters), mollusks (i.e. conch, squid, octopus), and echinoderms (i.e. sea stars, sea urchins, sea cucumbers). Each species plays an integral role in the structure of the reef and associated habitats such as seagrass and mangroves. A gap in this structure, caused by the loss of one species, may result in the loss of several other species and/or habitats that are dependent upon that species' role for survival. For example, sea urchins survive by eating algae. Declines in the sea urchin population causes algae to build-up on coral and effectively suffocate it. This loss in-turn results in a loss of many species dependent upon coral for survival. Although reef fish spend much of their adult life in and around the reef, many species of juvenile reef fish utilize mangroves and seagrass beds as


French Grunts (*Haemulon flavolineatum*)

nursery grounds where they derive protection and sustenance. In order to effectively protect reef fish, all of the habitats utilized throughout their lifecycle must be protected.

Along with providing several benefits to the marine ecosystem, reef fish also supply people with numerous benefits. The commercial fisheries industry is a major segment of the economy for local communities. Several reef fish species, including lobster, conch, snapper, grouper, and grunts, provide sustenance and additional income to communities. Unregulated fishing has resulted in a serious decline in these species, which has affected the overall health of the marine ecosystem, and the well-being of fishermen who find it increasingly difficult to make a living from the industry.

The results of regulated fishing areas in other locales have been positive. The size and abundance of reef fish has increased within the boundaries of the regulated area, plus spillover to areas outside of the boundaries has replenished fishermen's stocks of fish. Furthermore, tourism has become an increasingly important source of income for local communities. Tourists, especially scuba divers and snorkelers, are attracted to healthy marine ecosystems with diverse and flourishing populations of reef fish.



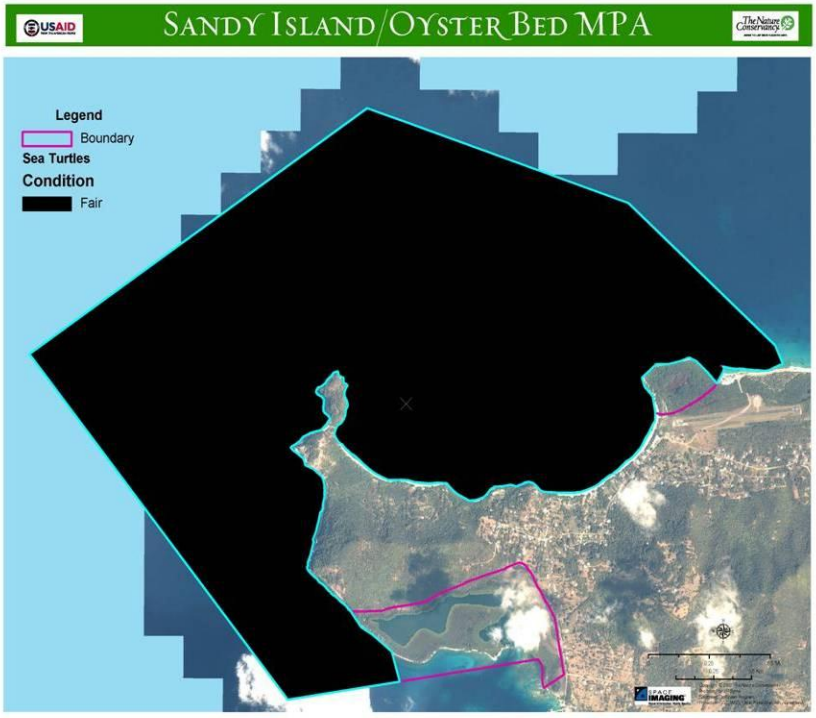
2.2.5 Sea Turtles

The habitats within the boundaries of the SIOBMPA support two species of sea turtles. The hawksbill turtle (*Eretmochelys imbricata*), which is classified as critically endangered and the green sea turtle (*Chelonia mydas*), which is classified as endangered by the *IUCN Red List of Threatened Species.*

The hawksbill sea turtle is named for its narrow head and hawk-like beak. An adult weighs between 65-90 kilograms and can reach 0.75-0.95 meters in carapace length. They live near coastal reefs, rocky areas, estuaries, and lagoons and feed on sponges, anemones, squid, and shrimp.

The green sea turtle can be distinguished from other sea turtles by the single pair of prefrontal scales (in front of the eyes) rather than the two pairs of prefrontal scales that are common to other species. An adult weighs between 135-180 kilograms and can reach 1.0-1.2 meters in carapace length. They live near coastlines, bays, protected shores, and especially in areas with seagrass beds. As juveniles, they feed on worms, young crustaceans, aquatic insects, grasses and algae. As adults, their diet consists primarily of seagrass and algae.

Sea turtles are of particular importance to sandy beaches and seagrass. The un-hatched eggs and eggshells provide nutrients to the sand dunes that support beach vegetation and consequently prevent erosion to beaches. Seagrass is dependent upon grazing for regeneration and overall health. As there are very few animals that eat seagrass, green sea turtles are vital to the health of this ecosystem.

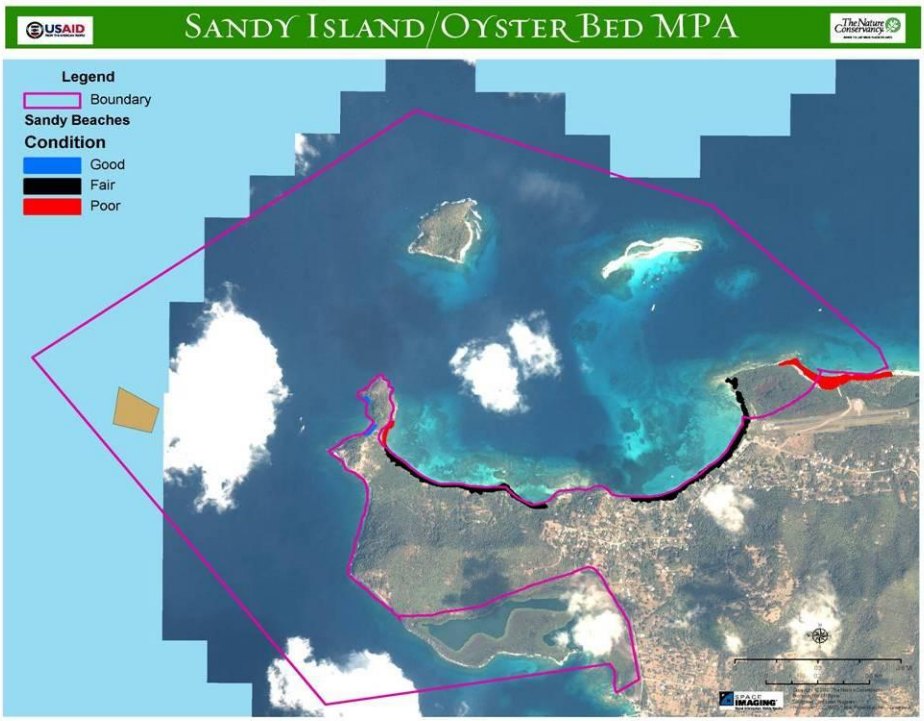


Sandy Island, Lauriston Pt., and the west side of the beach just south of Pt. Cistern are used as nesting sites and L'Esterre Bay is an important feeding ground for both species of sea turtles.

2.2.6 Sandy Beaches

Sandy Island Beach

Sandy beaches serve a considerable ecological role in marine health. They support various species of insects, crustaceans, polychaetes, and mollusks. Moreover, adult sea turtles build nests and lay their eggs on sandy beaches. The survival of these species is dependent upon the protection of these nesting sites. Sandy beaches play an important role in the tourism industry as well. They are often the most attractive landscape for tourists looking to relax in the sun. Maintaining sandy beaches that are clean and inviting brings income to the local community by attracting tourists. Within the SIOBMPA sandy beaches can be found on the west side of Pt. Cistern and all along L'Esterre Bay through the park border in Hillsborough Bay.



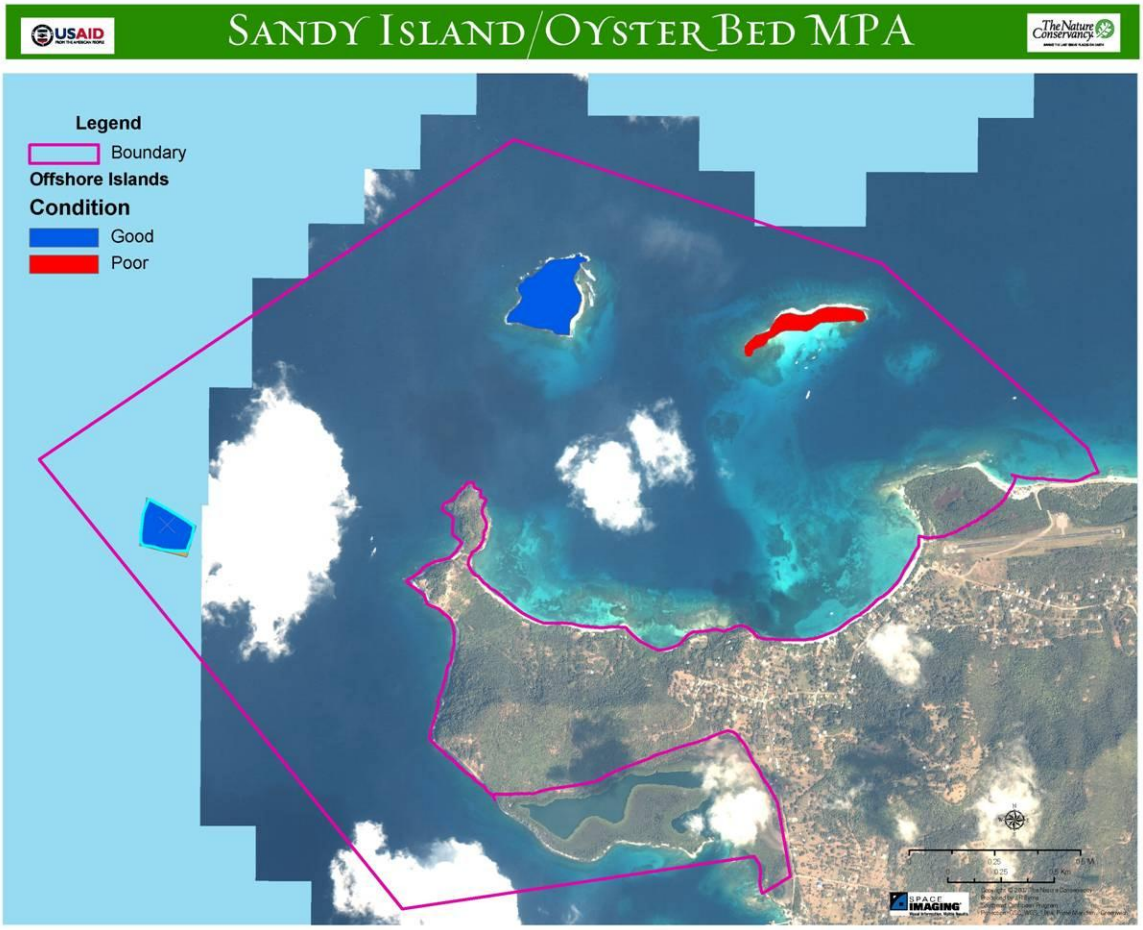
2.2.7 Offshore Islands

The SIOBMPA contains four offshore islands: Sandy Island, Mabouya Island, and the Sister Rocks. All four islands are utilized for recreational purposes such as scuba diving, snorkeling, and sunbathing.

Sandy Island is located about 1 kilometer north of Lauriston Pt. and is about 150 meters in length. Although the island is more accurately categorized as a sandbar, it is often displayed as the "postcard" island image of the Caribbean and is enjoyed by tourists and Carriacouans alike. The island is used as a nesting site for sea turtles and some seabirds, but has very little vegetation or capacity to support animal life. Seagrass beds can be found on both the north and south sides of the island. Coral reefs are located on the north and west ends of the island.

Mabouya Island is located one kilometer north of Point Cistern. The island is volcanic in origin and is composed of basaltic rock. The area is approximately 200 by 300 meters and the elevation rises to 38 meters. The island is lush with vegetation and contains mangroves on the southern end. It is home to a diverse community of reptiles and brown pelicans. The sea surrounding the island includes an extensive network of coral reefs which are home to a diverse population of reef fish.

The Sister Rocks are two small islands located 1.2 kilometers west of Point Cistern. The westerly rock is about 40 meters in diameter while the easterly rock is slightly bigger at 50 meters in diameter. The elevation of both islands rises to about 19 meters. The Sister Rocks are separated by a narrow channel that is 30 meters wide and 5 meters deep. Like Mabouya islands, the Sister Rocks support a large population of pelicans.



Conservation Resources' Condition Summary

The workshop participants mapped out the occurrence of each specified resource and indicated the overall condition of the resource based on their collective opinion. This information was considered the local expert opinion and was supplemented with existing scientific data. In October 2005, The Nature Conservancy and the Government of Grenada led a rapid assessment of the coral reef ecosystems in the SIOBMPA and surrounding waters. These surveys followed the Atlantic and Gulf Rapid Reef Assessment (AGRRA) protocol. Volunteers from the local community and Fisheries division were trained on AGRRA protocol prior to surveying. The resulting data was incorporated into the assessment of the condition of coral reefs and reef fish. Additional scientific data collected throughout the project was incorporated into the ranking of the condition of the resources and rankings were updated appropriately. Table 1 reflects the overall condition of the resources.

Table 1 – Conservation Resources' Condition

The resources were ranked based on the following scale:
Very Good: As close to "natural" as possible.
Good: May require some human intervention for maintenance.
Fair: Requires human intervention for maintenance.
Poor: Will be irreversibly damaged without human intervention

Conservation Resources		Condition
1	Coral Reefs	**Fair**
2	Mangroves	**Good**
3	Seagrass Beds	**Fair**
4	Sea Turtles	**Fair**
5	Sandy Beaches	**Fair**
6	Offshore Islands	**Good**
7	Reef Fish	**Fair**
Site Biodiversity Health Rank		**Fair**

2.3Existing Uses

In January 2006, the Fisheries Biology Unit of the Grenada Division of Fisheries in conjunction with CREP and CEC conducted a Resource User Assessment. This assessment was conducted through personal interviews with the resource users around Carriacou. The study revealed the types of activities occurring in the park and the intensity and purpose of each of those activities. Each activity was categorized by its level of usage. An area is considered "very heavily used" by a certain activity when twenty or more people participate in that activity on a daily basis for at least a six month season. An area is considered "heavily used" when fifteen or more people participate at least three days per week for at least a six month season. An area is considered "moderately used" when less than ten people participate two to three days per week in a six month season. Finally, an area is considered "lightly used" when there is mostly subsistence or pleasure usage and little commercial use.

Snorkeling Around Sandy Island

The primary activities occurring within the park include recreational diving, recreational use, water taxi/charter craft usage, anchoring, pot fishing, spear fishing, and seine fishing. Recreational diving occurs most frequently around The Sister Rocks and Mabouya Island where it is a "very heavily used" activity. It is also "moderately used" along the coast between Pt. Cistern and Tyrrel Bay. Recreational uses such as swimming, sun bathing, snorkeling, beach activities, and rock fishing are "very heavily used" in and around the sandy beach areas on Sandy Island and along L'Esterre Bay. These activities are also "lightly used" throughout the rest of the SIOBMPA. Water taxis, pleasure crafts, and charter crafts are "very heavily used" for transporting people back and forth from Carriacou, Sandy Island, and Mabouya Island. Anchoring is "very heavily used" around Sandy Island. Pot fishing is currently "moderately used" along the shore from Pt. Cistern to Tyrrel Bay and "very heavily used" in most of the rest of the SIOBMPA. Spear fishing is currently "moderately used" along the shore from Pt. Cistern to Tyrrel Bay and "very heavily used" in the area surrounding The Sister Rocks and within L'Esterre Bay. Finally, seine fishing is "moderately used" around Mabouya Island, Sandy Island and in L'Esterre Bay.

2.4 Threats

During the second planning workshop held in December 2005, the participants identified and ranked the stresses impacting the resources based on a scale of low, medium or high. The stresses were defined as key ecological attributes that have been altered, resulting in a decrease in the condition of the resources. The participants ranked these stresses based on their Severity of Damage (the level of damage to the conservation resource that can reasonably be expected within ten years under current circumstances) and the Scope of Damage (the geographic scope of impact on the conservation resource at the site that can reasonably be expected within ten years under current circumstances). Table 2 illustrates the summary of these stress rankings.

Table 2 – Stresses Summary Table

Stresses (Altered Key Ecological Attributes) Across Systems		Coral Reefs	Mangroves	Seagrass Beds	Sea Turtles	Sandy Beaches	Offshore Islands	Reef Fish
1	Abundance of food resources	-	-	-	Medium	-	-	-
2	Community architecture	High	-	-	-	-	-	-
3	Community architecture (decreased vegetation)	-	-	-	-	-	Medium	-
4	Community architecture (loss of vegetation)	-	-	-	-	High	-	-
5	Connectivity among communities & ecosystems (Fragmentation)	-	Low	-	-	-	-	-
6	Depredation & parasitism	Low	-	-	-	-	-	-
7	Hydrologic regime - (timing, duration, frequency, extent)	-	High	-	-	-	-	-
8	Population size & dynamics (decrease in pop.)	-	-	-	High	-	-	-
9	Population size & dynamics (Disruption of Sand Source)	-	-	-	-	Low	-	-
10	Population structure & recruitment (age distribution)	-	-	-	-	-	-	High
11	Population structure & recrutement (habitat destruction)	-	-	-	-	High	-	-
12	Population structure & recruitment (physical damage)	High	High	Low	-	-	-	-
13	Presence / abundance of key functional guilds	High	-	Medium	-	-	-	High
14	Presence / abundance of keystone species	-	-	-	-	-	-	High
15	Size / extent of characteristic communities / ecosystems (Habitat Destruction)	-	-	-	-	-	-	Medium

During the second planning workshop, participants identified and ranked the human activities that are sources of stress on the conservation resources. These activities were ranked based on their Contribution and Irreversibility to each stress. The following table illustrates the summary of these rankings and the threat ranking that each activity poses to the resource and the whole ecological system.

Table 3 – Threat Summary Table

	Threats Across Systems	Coral Reefs	Mangroves	Seagrass Beds	Sea Turtles	Sandy Beaches	Offshore Islands	Reef Fish	Overall Threat Rank
1	Over-fishing	Medium	-	Low	Medium	-	-	High	Medium
2	Inappropriate Development	-	High	-	Low	Medium	-	-	Medium
3	Clearing	-	-	-	-	High	Low	-	Medium
4	Dredging	Low	High	-	-	-	-	-	Medium
5	Pollution	Medium	Medium	Medium	Low	Medium	-	Medium	Medium
6	Inappropriate Boat Operations	Medium	Low	Low	Low	-	-	Medium	Medium
7	Inappropriate Fishing Practices	Medium	-	Low	Low	-	-	Medium	Medium
8	Illegal Fishing	-	-	-	Medium	-	-	Medium	Medium
9	Weather (Hurricanes, etc)	Medium	-	-	-	Low	Low	-	Low
10	Erosion	-	-	Low	Medium	-	-	-	Low
11	Sewage Discharge	Medium	-	-	-	-	-	-	Low
12	Removal of Mangroves	-	Medium	-	-	-	-	-	Low
13	Inappropriate Land Use	Low	Low	Low	Low	-	-	-	Low
14	Destruction of Mangroves	Low	-	Low	-	-	-	-	Low
15	Inadequate Drain Maintenance	-	-	Low	-	-	-	-	Low
16	Over-visitation	-	-	-	-	-	Low	-	Low
Threat Status for Resources and Site		Medium	High	Medium	Medium	Medium	Low	Medium	High

2.5 Conservation Objectives and Strategies

During the third workshop, participants created a total of 18 conservation objectives and determined strategies to accomplish them. The objectives had to meet the criteria of accomplishing either a reduction in the impact of a threat or improving the condition of the

resource. The objectives are specific in purpose, bound by the project timetable, and have a measurable outcome. Several of the strategies will support more than one objective. The following tables illustrate the objectives developed for the park and the strategies for achieving them. Additionally, information on the program area of the business plan, other objectives supported by a specific strategy, the conservation resources that are affected, the threats that are addressed and a benefit analysis of the actions are included for each strategic action. Cost information and responsible party for most of the strategies has been estimated and is also included.

2.5.1 Objective 1: Prevent further loss of vegetation resulting from human activity by 80 percent within two years.

Strategic Actions	Financial Functional Area and Program	Other objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
1.1: Control vegetation loss within the park using regulations developed by the park authority **Action step 1.1.1:** Develop regulations and incorporate existing Forestry legislation on vegetation loss.	Resource Management & Protection: Patrolling and Enforcement	3. Eliminate the human destruction of mangroves within three years. 16. Stabilize the shoreline to reduce erosion within the next five years.	Mangroves Offshore Islands Sandy Beaches	-Clearing -Weather (Hurricanes, etc.) -Removal of Mangroves -Destruction of Mangroves	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Medium	**n/a**	Ranger
1.2: Promote sustainable harvesting practices	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Offshore Islands	-Clearing -Removal of Mangroves -Destruction of Mangroves	**Benefits:** Medium **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.06 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 7,200	Ranger

Strategic Actions	Financial Functional Area and Program	Other objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
1.3: Create a fire pit and firewood or coal selling program	Commercial & Commodity Uses: Timber and Forest Products	n/a	Offshore Islands Sandy Beaches	-Clearing	**Benefits:** Medium **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.04 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 7,200	Forestry
1.4: Foster the development of ecotourism and sustainable forestry	Community Development & Outreach: Sustainable Livelihoods & Training	n/a	Mangroves Sandy Beaches Offshore Islands	-Clearing -Erosion -Removal of Mangroves -Destruction of Mangroves	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** High	**n/a**	Manager

2.5.2 Objective 2: Develop a re-vegetation program and implement it within six months of damage.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
2.1: Strengthen the local forestry department's nursery	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Mangroves Sandy Beaches Offshore Islands	-Clearing -Erosion -Removal of Mangroves -Destruction of Mangroves	**Benefits:** High **Threat Abatement Benefit:** - **Conservation Resource Enhancement:** High	**One-time Direct Cost**: 0 **Average # of People per Year**: 0.04 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 7,200	Forestry
2.2: Identify sensitive areas already negatively impacted	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Sandy Beaches Offshore Islands Mangroves	-Clearing -Erosion -Removal of Mangroves -Destruction of Mangroves	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** High	**n/a**	Forestry

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
2.3: Develop a re-vegetation fund	Management & Administration: Financial Management and Administration	n/a	Offshore Islands Sandy Beaches	-Clearing -Erosion	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.01 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 360 **Annual Other Costs:** 0 **Years:** 1 **Cost in EC$:** 360	Assistant Manager

2.5.3 Objective 3: Eliminate the human destruction of mangroves within three years.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
3.1: Prevent boats tying-up in the mangroves during non-emergency times.	Resource Management & Protection: Patrolling and Enforcement	1. Prevent further loss of vegetation by human activity by 80 percent within two years. 7. Eliminate anchoring in seagrass beds, mangroves and coral reefs in the Park within one year.	Mangroves	-Inappropriate Boat Operations -Removal of Mangroves -Destruction of Mangroves	**Benefits:** Medium **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # People per Year:** 0.06 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 7,200	Ranger

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
3.2: Prevent the cutting of rods for fish pots.	Resource Management & Protection: Patrolling and Enforcement	1. Prevent further loss of vegetation by human activity by 80 percent within two years.	Mangroves	-Removal of Mangroves -Destruction of Mangroves	**Benefits:** Medium **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # People per Year:** 0.06 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 7,200	Ranger
3.3: Removal of derelict vessels and other debris.	Resource Management & Protection: Wildlife Management and Habitat Restoration	8. Establish a Park free from abandoned boats by January 2011.	Mangroves	-Removal of Mangroves	**Benefits:** High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**n/a**	Contract/ Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
3.4: Enforce Forestry Legislation on Mangrove cutting (upon approval of legislation).	Resource Management & Protection: Patrolling and Enforcement	1. Prevent further loss of vegetation by human activity by 80 percent within two years.	Mangroves	-Removal of Mangroves -Destruction of Mangroves	**Benefits:** Medium **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # People per Year:** 0.06 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 7,200	Ranger

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
3.5: Install awareness signage.	Tourism & Recreation: Visitor Education and Interpretation	n/a	Mangroves	-Removal of Mangroves -Destruction of Mangroves	**Benefits:** Medium **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # People per Year:** 0.01 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 240 **Annual Other Costs:** 0 **Years:** 1 **Cost in EC$:** 240	Ranger
3.6: Continuous consultation with stakeholders and land owners	Community Development & Outreach: Stakeholder Engagement	n/a	Mangroves	-Removal of Mangroves	**Benefits:** Medium **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # People per Year:** 0.03 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 720 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 3,600	Ranger

2.5.4 Objective 4: Replace 20 percent of the lost mangrove population within five years.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
4.1: Establish a replanting program. **Action step 4.1.1:** Collect seedlings **Action step 4.1.2:** Cultivate plants **Action step 4.1.3:** Organize volunteers **Action step 4.1.4:** Site preparation **Action step 4.1.5:** Plant vegetation	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a		-Removal of Mangroves -Destruction of Mangroves	**Benefits:** High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.04 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 7,200	Forestry

2.5.5 Objective 5: Eliminate sewage disposal in the MPA within the next five years.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
5.1: Establish a park monitoring protocol for sewage disposal before operation of MPA	Resource Management & Protection: Scientific Monitoring and Research	n/a	Coral Reefs	-Sewage Discharge	**Benefits:** Medium **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** High	**n/a**	TNC/Fisheries
5.2: Develop and implement park regulations.	Law & Policy: Policy & Regulations	n/a	Mangroves Coral Reefs Seagrass Beds	-Sewage Discharge	**Benefits:** Very High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** High	**n/a**	Fisheries/Rangers

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
5.3: Setup monitoring (patrol) regime.	Resource Management & Protection: Patrolling and Enforcement	n/a	n/a	-Pollution -Inappropriate Boat Operations -Sewage Discharge	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** -	**One-time Drct Cost:** 0 **Average # People /Year:** 0.13 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 3,120 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 15,600	n/a
5.4: Create Sensitization programs	Research, Education & Awareness: Awareness Raising and Communications	n/a	Coral Reef	-Sewage Discharge	**Benefits:** Medium **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** High	**One-time Drct Cost:** 0 **Average # People /Year:** 0.09 **Average Cost /Person per Year:** 36,000 **Annual Labor Cost:** 3,240 **Annual Other Costs:** **Years:** **Cost in EC$**16,200	Assistant Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
5.5: Implement national legislation regarding sewage disposal.	Law & Policy: Legislation	15. Prevent the alteration of coastal dynamics and process by the construction of coastal man-made structures.	Coral Reefs Sandy Beaches	-Inappropriate Development -Erosion -Sewage Discharge	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** High	**n/a**	Manager
5.6: Address Charter Companies about sewage disposal.	Law & Policy: Voluntary Standards	n/a	Coral Reefs	-Sewage Discharge	**Benefits:** High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** High	**n/a**	Manager/Fisheries

2.5.6 Objective 6: Eliminate inappropriate disposal of solid waste within the Park by January 2009.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
6.1: Develop and implement a public awareness campaign for the general public and targeted groups (fishermen, schools, beach vendors, boaters, etc)	Research, Education & Awareness: Awareness Raising and Communications	7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park within one year. 8. Establish a Park free from abandoned boats by January 2011. 10. Increase reef fish biomass by 20 percent in the next four years. 11. Eliminate fishery regulation violations within the Park within one year. 13. Develop a MPA based turtle conservation program in two years. 16. Stabilize the shoreline to reduce erosion within the next five years.	Coral Reefs Reef Fish Mangroves Seagrass Beds Sea Turtles Sandy Beaches	-Over fishing -Inappropriate Development -Clearing -Pollution -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.09 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 3,240 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 16,200	Assistant Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
6.2: Encourage enforcement of existing laws against litter within the Park.	Resource Management & Protection: Patrolling and Enforcement	n/a	n/a	-Pollution - Inappropriate Boat Operations - Inappropriate Fishing Practices -Over visitation	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** -	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.25 **Average Cost per Person per Year:** 2,400 **Annual Labor Cost:** 6,000 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 30,000	Ranger
6.3: Provide/upgrade solid waste receptacles and frequency of collection within the Park.	Facility Operations & Maintenance: Buildings, Grounds, and Utilities	n/a	n/a	-Pollution - Inappropriate Boat Operations -Over visitation	**Benefits:** Very High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:**	**n/a**	Manager/ Contractor
6.4: Encourage more effective Carriacou-wide solid waste collection.	Research, Education & Awareness: Awareness Raising and Communications	n/a	n/a	-Pollution	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:**	**n/a**	Manager

2.5.7 Objective 7: Eliminate boat anchoring in sea grass beds, mangroves and coral reefs in the Park within one year.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
7.1: Develop a mooring buoy program within the Park which targets sea grass beds, mangroves and coral reefs using public consultation. Action step 7.1.1: Acquire and install mooring buoys. Action step 7.1.2: Conduct a carrying capacity and docking system study. Action step 7.1.3: Establish visit limits. Action step 7.1.4: Maintain mooring buoys.	Resource Management & Protection: Zoning and Boundaries Facility Operations & Maintenance: Mooring Buoys and Navigation Markers	9. Regulate the number of vessels visiting Sandy Island at one time, based on carrying capacity within one year.	Coral Reefs Seagrass Beds Mangroves Offshore Islands	-Inappropriate Boat Operations -Removal of Mangroves -Destruction of Mangroves -Over visitation	**Benefits:** High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Medium	**One-time Direct Cost:** 0 **Average # People per Year:** 0 **Average Cost per Person per Year:** 0 **Annual Labor Cost:** 0 **Annual Other Costs:** 0 **Years:** 0 **Cost in EC$:** 0	Fisheries Managers Rangers

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
7.2: Implement mooring buoy program within the Park.	Resource Management & Protection: Zoning and Boundaries	9. Regulate the number of vessels visiting Sandy Island at one time, based on carrying capacity, within one year.	Coral Reefs Mangroves Seagrass Beds Offshore Islands	-Inappropriate Boat Operations -Over visitation	**Benefits:** High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Medium	**One-time Direct Cost**: 0 **Average # People/ Year:** 0.02 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 480 **Annual Other Costs**: 0 **Years:** 1 **Cost in EC$:** 480	Ranger
7.3: Establish regulations for anchoring within mangrove areas in the Park during emergencies.	Resource Management & Protection: Zoning and Boundaries	3. Eliminate the human destruction of mangroves within three years.	Mangroves	-Inappropriate Boat Operations -Removal of Mangroves -Destruction of Mangroves	**Benefits:** High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 5,000 **Average #People per Year:** 0 **Average Cost per Person/Year:** 0 **Annual Labor Cost:** 0 **Annual Other Costs**: 0 **Years:** 0 **Cost in EC$**: 5,000	Fisheries Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
7.4: Develop and implement a public awareness campaign for the general public and targeted groups (fishermen, schools, beach vendors, boaters, etc)	Research, Education & Awareness: Awareness Raising and Communications	6. Eliminate disposal of solid waste within the Park by January 2009. 8. Establish a Park free from abandoned boats by Jan. 2011. 10. Increase reef fish biomass by 20 percent in the next 4yrs 11. Eliminate fishery regulation violations within the Park within one year. 13. Develop a MPA based turtle conservation program in two years. 16. Stabilize the shoreline to reduce erosion within the next five years.	Reef Fish Coral Reefs Mangroves Seagrass Beds Sea Turtles Sandy Beaches	-Over fishing -Inappropriate Development -Clearing -Pollution -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	**One-time Dirct Cost**: 0 **Average # People/Year**: 0.09 **Average Cost per Person per Year**: 36,000 **Annual Labor Cost**: 3,240 **Annual Other (or override) Costs:** 0 **Years:** 5 **Cost in EC$:** 16,200	Assistant Manager

2.5.8 Objective 8: Establish a Park free from abandoned boats by January 2011.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
8.1: Initiate policies, via establishment of Park Regulations that prohibit the abandonment of boats within the Park.	Management & Administration: Policy Planning, & Emergency Preparedness	n/a	Mangroves	-Inappropriate Boat Operations -Removal of Mangroves	**Benefits:** High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.01 **Average Cost per Person per Year:** 45,000 **Annual Labor Cost:** 450 **Annual Other Costs:** 0 **Years:** 1 **Cost in EC$:** 450	Manager
8.2: Remove all abandoned boats from the Park.	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Mangroves	-Inappropriate Boat Operations	**Benefits:** - **Threat Abatement Benefit:** - **Conservation Resource Enhancement:** -	**n/a**	n/a

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
8.3: Work with the Port Authority and the Fisheries Department to initiate the development of policies for removing abandoned boats, including enforcement issues.	Management & Administration: Policy Planning, & Emergency Preparedness	n/a	Mangroves	-Inappropriate Boat Operations	**Benefits:** Medium **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.04 **Average Cost per Person per Year:** 4,500 **Annual Labor Cost:** 1,800 **Annual Other Costs:** **Years:** **Cost in EC$:** 1,800	Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
8.4: Develop and implement a public awareness campaign for the general public and targeted groups (fishermen, schools, beach vendors, boaters, etc).	Research, Education & Awareness: Awareness Raising and Communications	6. Eliminate disposal of solid waste within the Park by January 2009. 7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park within one year. 10. Increase reef fish biomass by 20 percent in the next four years. 11. Eliminate fishery regulation violations within the Park within one year. 13. Develop a MPA based turtle conservation program in two years. 16. Stabilize the shoreline to reduce erosion within the next five years.	Reef Fish Coral Reefs Mangroves Seagrass Beds Sea Turtles Sandy Beaches	-Over fishing -Inappropriate Development -Clearing -Pollution -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.09 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 3,240 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 16,200	Assistant Manager

2.5.9 Objective 9: Regulate the number of vessels visiting Sandy Island at one time, based on carrying capacity within one year.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
9.1: Develop mooring buoy program within the Park, targeting sea grass beds, mangroves and coral reefs, with public consultation. **Action step 9.1.1:** Acquire and install mooring buoys. **Action step 9.1.2:** Conduct a carrying capacity and docking system study. **Action step 9.1.3:** Establish visitation limit. **Action step 9.1.4:** Maintain mooring buoys.	Resource Management & Protection: Zoning and Boundaries	n/a	n/a	n/a	**n/a**	**n/a**	n/a
9.2: Implement mooring buoy program within the Park.	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
9.3: Require the use of mooring buoys, through park regulations.	Resource Management & Protection: Patrolling and Enforcement	7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park within one year.	Seagrass Beds Coral Reefs	-Inappropriate Boat Operations	**Benefits:** High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.25 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 6,000 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 30,000	Ranger

2.5.10 Objective 10: Increase reef fish biomass by 20 percent in the next four years.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
10.1: Identify baseline through surveys and existing data and continue monitoring of overall health of reef.	Resource Management & Protection: Scientific Monitoring and Research	n/a	Coral Reef Reef Fish Offshore Islands Reef Fish	n/a	**Benefits:** Medium **Threat Abatement Benefit:** - **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # people/Year**: 0.09 **Avg Cost /Person/Yr:** 36,000 **Annual Labor Cost:** 3,240 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 16,200	Fisheries
10.2: Develop a 4 year strategy in a participatory manner while establishing Park to meet the objective.	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Coral Reefs Seagrass Beds Reef Fish Mangroves	-Over fishing -Inappropriate Fishing Practices -Illegal Fishing	**Benefits:** Very High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # People/Year:** 0.1 **Avg Cost/Person/Yr:** 36,000 **Annual Labor Cost:** 3,600 **Annual Other Costs:** 0 **Years**: 4 **Cost in EC$:** 14,400	Fisheries
10.3:	Management and	1. Prevent further loss of	n/a	n/a	**Benefits:** Low	n/a	Manager

Implement adaptive management techniques.	Administration: General Management and Administration	vegetation by human activity by 80 percent within two years. 2. Develop a re-vegetation program & implement w/in 6 mo of damage. 3. Eliminate the human destruction of mangroves within three years. 4. Replace 20 percent of the lost mangrove population within 5 years. 5. Eliminate sewage disposal in the MPA within the next five years. 6. Eliminate disposal of solid waste within the Park by January 2009. 7. Eliminate anchoring in sea grass beds, mangroves & reefs w/in 1 year. 8. Establish a Park free from abandoned boats by January 2011. 9. Regulate the number of vessels visiting Sandy Island at one time, based on carrying capacity in 1 year. 11. Eliminate fishery regulation violations within one year. 12. Eliminate harvesting turtles w/in the Park after 1 year of operation 13. Develop a MPA based turtle conservation program in two years.			**Threat Abatement Benefit: -** **Conservation Resource Enhancement: -**		

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
10.4: Collaborate w / Fisheries Dept to enhance existing fishing regs prohibiting inappropriate fishing practices. Action step 10.4.1: Support legislation that would regulate larger mesh size of fishing gear. Action step 10.4.2: Amend Park regulation to eliminate spear fishing within Park boundaries.	Management & Administration: Policy Planning, & Emergency Preparedness	n/a	Coral Reefs Sea Turtles Reef Fish	-Over fishing -Inappropriate Fishing Practices -Illegal Fishing	**Benefits:** Very High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.03 **Average Cost per Person per Year:** 45,000 **Annual Labor Cost:** 1,350 **Annual Other Costs:** 0 **Years:** 1 **Cost in EC$:** 1,350	Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
10.5: Develop a public engagement strategy with fishermen	Research, Education & Awareness: Awareness Raising and Communications	11. Eliminate fishery regulation violations within the Park within one year. 12. Eliminate harvesting turtles within the Park after 12 months of operation	Coral Reefs Seagrass Beds Sea Turtles Reef Fish	-Over fishing -Inappropriate Fishing Practices -Illegal Fishing	**Benefits:** Medium **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Avg # People per Year:** 0.05 **Average Cost per Person per Year:** 45,000 **Annual Labor Cost:** 2,250 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 11,250	Manager
10.6: Develop and implement a public awareness campaign for the general public and targeted groups (fishermen, schools, beach vendors, boaters, etc).	Community Development & Outreach: Public Outreach and Information	6. Eliminate disposal of solid waste in the Park by Jan 2009. 7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park in 1 year. 8. Establish a Park free from abandoned boats by Jan 2011. 11. Eliminate fishery regulation violations within the Park within one year. 13. Develop a MPA based turtle conservation program in 2 yrs. 16. Stabilize the shoreline to reduce erosion within the next five years.	Coral Reefs Reef Fish Mangroves Seagrass Beds Sea Turtles Sandy Beaches	-Over fishing -Inappropriate Development -Clearing -Pollution -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Avg # People/Year:** 0.09 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 3,240 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 16,200	Assistant Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
10.7: Investigate sustainable livelihoods approach.	Community Development & Outreach: Sustainable Livelihoods & Training	12. Eliminate harvesting turtles within the Park after 12 months of operation of the Park.	n/a	-Over fishing -Inappropriate Fishing Practices -Illegal Fishing	**Benefits:** Low **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** -	**One-time Direct Cost:** 6000 **Average # of People per Year:** 0.04 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 1 **Cost in EC$:** 7,440	Fisheries/ Contractor
10.8: Develop zoning plan for the Park that includes "no take" areas and other areas that permit non-destructive fishing practices, with public consultation (See Zoning Plan, Section 2.6).	Resource Management & Protection: Zoning and Boundaries	3. Eliminate the human destruction of mangroves w/in three years. 5. Eliminate sewage disposal in the MPA within the next 3 yrs. 7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park w/in 1 yr. 9. Regulate the number of vessels visiting Sandy Island at one time, based on carrying capacity within one year. 15. Prevent the alteration of coastal dynamics and process by the construction of coastal man-made structures.	Coral Reefs Mangroves Seagrass Beds Reef Fish	-Over fishing -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Over visitation	**Benefits:** Very High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 6,000 **Average # of People per Year:** 0 **Average Cost per Person per Year:** 0 **Annual Labor Cost:** 0 **Annual Other Costs:** 0 **Years:** 0 **Cost in EC$:** 6,000	TNC-CREP

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
10.9: Develop Memorandum of Understanding between the Park and the Coast Guard and Police Force, to support joint enforcement of existing rules and regulations.	Management and Administration: Partnership Relations	1. Prevent further loss of vegetation by human activity by 80 percent within two years. 3. Eliminate the human destruction of mangrvs in 3 yrs. 5. Eliminate sewage disposal in the MPA within the next 5 yrs. 6. Eliminate disposal of solid waste within the Park by January 2009. 7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park in 1 year. 9. Regulate the number of vessels visiting Sandy Island at one time, based on carrying capacity within one year. 11. Eliminate fishery regulation violations within the Park within one year. 12. Eliminate harvesting turtles within the Park after 12 months of operation of the Park.	Coral Reefs Mangroves Seagrass Beds Reef Fish Sea Turtles Reef Fish	-Over fishing -Clearing -Pollution -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Sewage Discharge -Removal of Mangroves	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	n/a	Manager

2.5.11 Objective 11: Eliminate fishery regulation violations within the Park boundaries within one year.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
11.1: Develop and implement a public awareness campaign for the general public and targeted groups (fishermen, schools, beach vendors, boaters, etc).	Research, Education & Awareness: Awareness Raising and Communications	6. Eliminate disposal of solid waste within the Park by January 2009. 7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park within one year. 8. Establish a Park free from abandoned boats by January 2011. 10. Increase reef fish biomass by 20 percent in the next four years. 13. Develop a MPA based turtle conservation program in two years. 16. Stabilize the shoreline to reduce erosion within the next five years.	Reef Fish Coral Reefs Mangroves Seagrass Beds Sea Turtles Sandy Beaches	-Over fishing -Inappropriate Development -Clearing -Pollution -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.09 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 3,240 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 16,200	Assistant Manager
11.2: Develop Memorandum of Understanding between the Park and the Coast Guard and Police Force, to support joint enforcement of existing rules and regulations.	Management and Administration: Partnership Relations	n/a	n/a	n/a	n/a	n/a	n/a

Objective 12: Eliminate harvesting turtles within the Park after one year of operation of the Park.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
12.1: Amend park regulation to eliminate turtle harvesting within the park.	Management & Administration: Policy Planning, & Emergency Preparedness	n/a	Sea Turtles	-Over fishing -Inappropriate Fishing Practices -Illegal Fishing	**Benefits:** Very High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** High	n/a	Fisheries
12.2: Setup monitoring (patrol) regime.	Resource Management & Protection: Scientific Monitoring And Research	n/a	Sea Turtles	-Over fishing -Clearing -Pollution -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Sewage Discharge -Removal of Mangroves	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** High	n/a	Ranger

2.5.13 Objective 13: Develop a MPA based turtle conservation program in two years.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
13.1: Collaborate with regional and national strategies and efforts as soon as possible, i.e.: Sea Turtle Recovery Action Plan (STRAP), KIDO, RARE, Ocean Spirits.	Capacity Building : Alliance Development	n/a	Sea Turtles	-Over fishing -Inappropriate Fishing Practices -Illegal Fishing	**Benefits:** High **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.04 **Average Cost per Person per Year:** 45,000 **Annual Labor Cost:** 1,800 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 9,000	Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
13.2: Develop and implement a public awareness campaign for the general public and targeted groups (fishermen, schools, beach vendors, boaters, etc).	Management and Administration: Partnership relations	6. Eliminate disposal of solid waste within the Park by January 2009. 7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park within one year. 8. Establish a Park free from abandoned boats by January 2011. 10. Increase reef fish biomass by 20 percent in the next four years. 11. Eliminate fishery regulation violations within the Park within one year. 16. Stabilize the shoreline to reduce erosion within the next five years.	Coral Reefs Reef Fish Mangroves Seagrass Beds Sea Turtles Sandy Beaches	-Over fishing -Inappropriate Development -Clearing -Pollution -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.09 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 3,240 **Annual Other (or override) Costs:** 0 **Years:** 5 **Cost in EC$:** 16,200	Assistant Manager

2.5.14 Objective 14: Prevent any new inappropriate land use practice in the next three years.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
14.1: The park authorities must approve any development that will impact park area.	Management & Administration: Policy Planning, & Emergency Preparedness	n/a	Coral Reefs Mangroves Seagrass Beds	-Inappropriate Development -Inappropriate Land Use	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Medium	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.01 **Average Cost per Person per Year:** 45,000 **Annual Labor Cost:** 450 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 2,250	Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
14.2: A MPA representative will sit on the EIA review committee to set-up a physical planning unit.	Management & Administration: Policy Planning, & Emergency Preparedness	n/a	Coral Reefs Seagrass Beds Mangroves Sea Turtles Coral Reefs	-Inappropriate Development -Inappropriate Land Use	**Benefits:** Very High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.01 **Average Cost per Person per Year:** 45,000 **Annual Labor Cost:** 450 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 2,250	Manager
14.3: Encourage implementation and enforcement of the present Land Use Plan.	Management & Administration: Policy Planning, & Emergency Preparedness	n/a	Coral Reefs Seagrass Beds Mangroves Offshore Islands	-Inappropriate Development -Clearing -Inappropriate Land Use	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** High	**n/a**	Manager

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
14.4: Promote environmentally sound development practices within the park and in Carriacou as a whole, guided by St. George's Declaration. **Action step 14.4.1:** Develop standards for development and disseminate them throughout community. **Action step 14.4.2:** Raise awareness of economic diversification and alternative development practices. **Action step 14.4.3:** Foster the development of an eco-tourism market. **Action step 14.4.4:** Address Coastal Erosion issues.	Community Development & Outreach: Public Outreach and Information	14. Prevent any new inappropriate land use practice in the next three years.	Coral Reefs Mangroves Seagrass Beds Sea Turtles	-Inappropriate Development -Clearing -Dredging -Inappropriate Land Use	**Benefits:** High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.09 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 2,160 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 10,800	Ranger

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
14.5: Ensure that the park authority exercises oversight over all development within the park within two years. **Action step 14.5.1:** Build capacity to enable inter-agency collaboration and policy cohesion to provide the authority with the necessary tools to exercise oversight.	Management & Administration: Policy Planning, & Emergency Preparedness	n/a	Coral Reefs Mangroves Seagrass Beds Sandy Beaches	-Inappropriate Development -Clearing -Dredging -Pollution -Erosion -Sewage Discharge -Inappropriate Land Use	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0 **Average Cost per Person per Year:** 0 **Annual Labor Cost:** 0 **Annual Other Costs:** 0 **Years:** 0 **Cost in EC$:** 0	Manager

2.5.15 Objective 15: Prevent the alteration of coastal dynamics and process by the construction of coastal man-made structures.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
15.1: Implement national legislation	Management & Administration: Policy Planning, & Emergency Preparedness	n/a	n/a	n/a	**n/a**	**n/a**	n/a
15.2: Source appropriate personnel and resources	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Sandy Beaches	-Inappropriate Development -Dredging -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Medium	**n/a**	Manager
15.3: Correct existing coastal structures	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Sandy Beaches Offshore Islands	-Inappropriate Development -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** High	**n/a**	Manager

2.5.16 Objective 16: Stabilize the shoreline to reduce erosion within the next five years.

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
16.1: Plant appropriate vegetation	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Sandy Beaches Offshore Islands	-Clearing -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.04 **Average Cost per Person per Year:** 36,000 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 7,200	Forestry

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
16.2: Prevent illegal sand mining.	Resource Management & Protection: Patrolling and Enforcement	n/a	Sandy Beaches	-Clearing -Erosion	**Benefits:** Medium **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Medium	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.13 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 3,120 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 15,600	Ranger
16.3: Prevent the removal of corals from sandy beaches.	Resource Management & Protection: Patrolling and Enforcement	n/a	Sandy Beaches	-Erosion	**Benefits:** Low **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Medium	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.06 **Average Cost per Person per Year:** 2,400 **Annual Labor Cost:** 1,440 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 7,200	Ranger

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
16.4: Eliminate anchoring on coral reefs.	Resource Management & Protection: Patrolling and Enforcement	7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park within one year.	Coral Reefs	-Inappropriate Boat Operations -Erosion	**Benefits:** Medium **Threat Abatement Benefit:** Medium **Conservation Resource Enhancement:** Low	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.13 **Average Cost per Person per Year:** 24,000 **Annual Labor Cost:** 3,120 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 15,600	Ranger

Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	
16.5: Develop and implement a public awareness campaign for the general public and targeted groups (fishermen, schools, beach vendors, boaters, etc).	Research, Education & Awareness: Awareness Raising and Communications	6. Eliminate disposal of solid waste within the Park by January 2009. 7. Eliminate anchoring in sea grass beds, mangroves and coral reefs in the Park within one year. 8. Establish a Park free from abandoned boats by January 2011. 10. Increase reef fish biomass by 20 percent in the next four years. 11. Eliminate fishery regulation violations within the Park within one year. 13. Develop a MPA based turtle conservation program in two years.	Coral Reefs Reef Fish Mangroves Seagrass Beds Sea Turtles Sandy Beaches	-Over fishing -Inappropriate Development -Clearing -Pollution -Inappropriate Boat Operations -Inappropriate Fishing Practices -Illegal Fishing -Erosion	**Benefits:** Very High **Threat Abatement Benefit:** Very High **Conservation Resource Enhancement:** Very High	**One-time Direct Cost:** 0 **Average # of People per Year:** 0.0 **Average Cost per Person per Year:** 3,600 **Annual Labor Cost:** 3,240 **Annual Other Costs:** 0 **Years:** 5 **Cost in EC$:** 16,200	Assistant Manager

2.5.17 Objective 17: Increase capacity to ensure environmentally sound dredging in Carriacou by 2008.

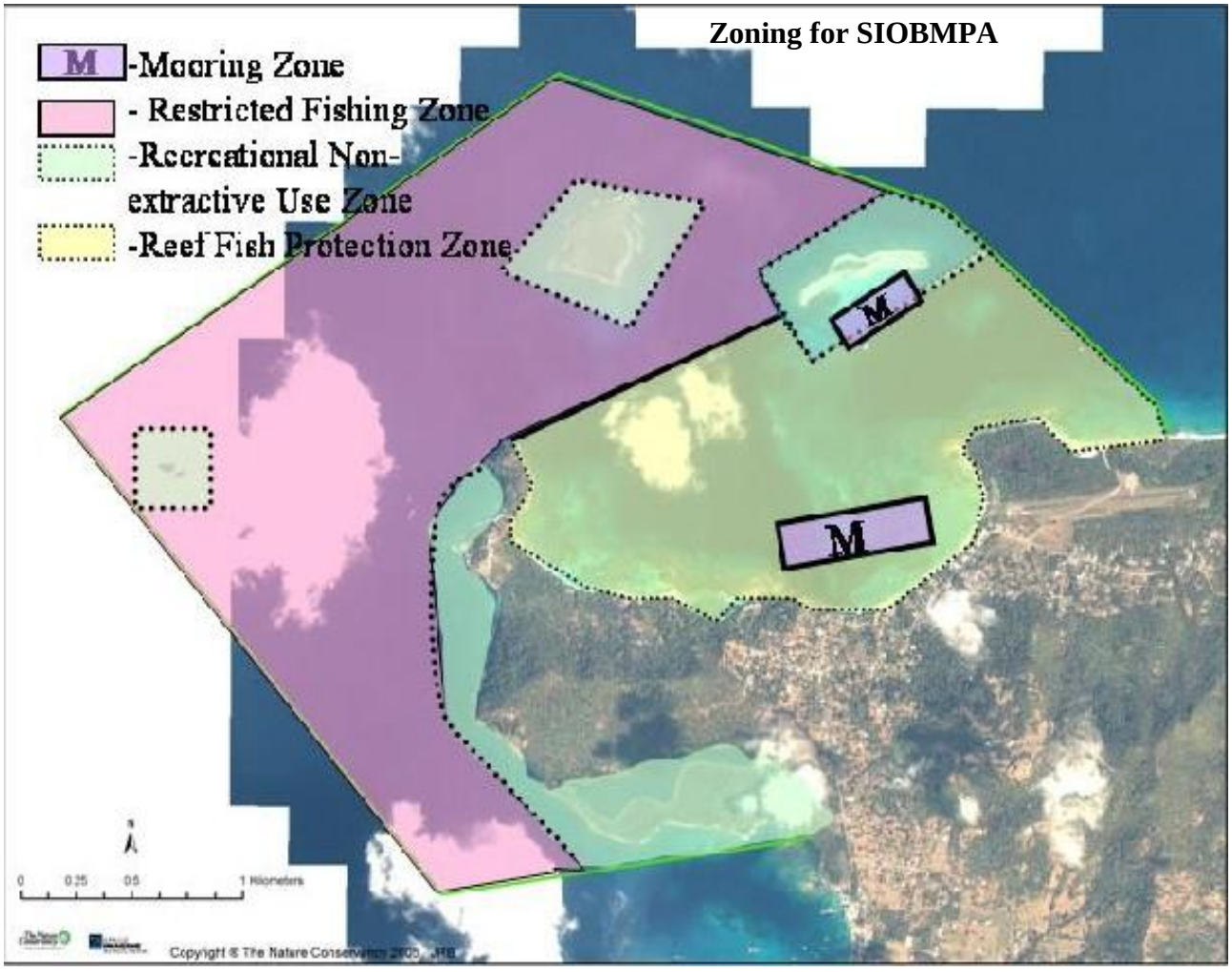
Strategic Actions	Financial Functional Area and Program	Other Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
17.1: Identify existing dredging areas.	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Coral Reefs Mangroves Sandy Beaches	-Dredging -Erosion	**Benefits:** Medium **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** High	**n/a**	Manager
17.2: Conduct a study and develop an action plan for dredging.	Resource Management & Protection: Wildlife Management and Habitat Restoration	n/a	Coral Reefs Mangroves	-Dredging	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Medium	**n/a**	Manager
17.3: Identify funding to promote environmentally sound dredging options.	Management & Administration: Financial Management and Administration	n/a	Coral Reefs Mangroves	-Dredging	**Benefits:** High **Threat Abatement Benefit:** High **Conservation Resource Enhancement:** Medium	**n/a**	Manager

2.5.18 Objective 18: Implement an adequate system of drain maintenance within five years.

Strategic Actions	Financial Functional Area and Program	Objectives supported by these Strategic Actions	Conservation resources affected	Threats Addressed	Benefits	Costs	Responsible Party
18.1: Develop a Cleaning and Maintenance Program (for?).	Facility Operations & Maintenance: Buildings, Grounds, and Utilities	n/a	Seagrass Beds	-Inadequate Drain Maintenance	**Benefits:** Medium **Threat Abatement Benefit:** Low **Conservation Resource Enhancement:** Low	**n/a**	Manager
Strategic action 18.2: Implement the program. **Action step 18.2.1:** Conduct regular cleaning and removal of debris.	Facility Operations & Maintenance: Buildings, Grounds, and Utilities	n/a	Seagrass Beds	-Inadequate Drain Maintenance	**Benefits:** Medium **Threat Abatement Benefit:** Low **Conservation Resource Enhancement:** Low	**Cost:** - **Use Action Costs or Sum of Steps?:** Action Costs **Cost Rank Override:** -	Manager

2.6 Zoning Plan

The zoning plan for the SIOBMPA was a direct result of the stakeholder workshop held in April 2006. The zoning of the SIOBMPA supports the implementation of the conservation actions that were identified in the previous steps and contributes to achieving the overall objectives of the SIOBMPA. During the zoning process, stakeholders took into account these objectives, the resources to be protected, the current uses and the users of the resources to create an effective plan. In determining the zones, importance was placed on the feasibility of implementing the zoning and the ease of enforcement and compliance. Three zones were identified and the restrictions for each zone were agreed upon by all participating stakeholders. The general location of mooring sites was also identified. Mooring buoys are to be located at the sandy area to the southeast of Sandy Island and the sandy area in L'Esterre Bay off of Paradise Beach.



Restricted Fishing Zone:

Description:
Only three types of fishing will be permitted: Hand lining, trolling and net fishing. SIOBMPA fishing regulations apply on line test, mesh size and techniques for net usage.

Location:
The seaward extent of the SIOBMPA, seaward of land and of L'Esterre Bay.

Recreational Non-extractive Zone:

Description:
Only recreational activities will be allowed. Extraction of any resource, living or dead is prohibited. All vessels must operate at a no-wake speed within the zone and follow designated route into and away from shore.

Location:
Surrounding, and including all of the offshore islands out to the edge of the reefs. This zone also includes the west shore of Pt. Cistern around through the Mangroves in Tyrell Bay.

Reef Fish Protection Zone:

Description:
Extraction of reef fish is prohibited. The only fishing allowed is seine fishing for pelagic species, following Sandy Island/Oyster Bed MPA fishing regulations.

Location:
The area inland of a line drawn from Pt. Cistern to Sandy Island, encompassing L'Esterre Bay.

2.7 Rules and Regulations

During the workshop on the development of strategies and zoning, the following rules and regulations were suggested by stakeholders. This list includes those ideas that were a result of these workshops, and is not a comprehensive list of the rules and regulations which need to be developed.

- **Spear fishing and Pot Fishing:** Not allowed anywhere within the Sandy Island/Oyster Bed MPA.
- **Anchoring:** Not allowed anywhere within the Sandy Island/Oyster Bed MPA, except in emergency situations.

- **Motorized Personal Watercraft (i.e.: jet skis):** Not allowed anywhere within the Sandy Island/Oyster Bed MPA.

- **Recreational Non-extractive Activities:** Allowed in all zones.

- **Seine Fishing:** Allowed in Reef Fish Protection Zone and Restricted Fishing Zone only. Seines must be deployed and retrieved from a vessel, must not be pulled into or from the shore, must be tucked in the water as not to drag on the bottom, and will be restricted by mesh size.

- **Dive Moorings:** May only be used by vessels less than 50 feet in length. Priority is given to commercial recreational dive boats, and there is a two hour maximum time limit for a vessel to remain on the mooring.

- **Turtle Harvesting:** Harvesting of turtles or turtle eggs is prohibited within the boundaries of the Sandy Island/Oyster Bed MPA.

- **Coral and Sand:** Extraction of coral, shells or sand, living or dead, is prohibited.

- **Vehicles on the Beach:** Operation of any vehicles on the beaches within the park is prohibited.

Collaborating during various Stakeholder Meetings

2.8 Monitoring Plan

An integral part of the management of a marine protected area is the evaluation of the effectiveness of its management actions. The SIOBMPA monitoring plan details the types and frequency of monitoring activities to be conducted. The indicators selected for the monitoring activities were chosen specifically to determine the overall condition of the resources and the responsiveness to management actions. The monitoring activities are organized by the frequency of the activity. It also includes information regarding how the indicators are measured and how the threats are being monitored. Finally, the table shows the objectives related to the indicator and the attributes of the conservation resources being monitored.

Oyster Bay Mangroves

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
1	Visitation Numbers To Sandy Island At Any Given Time	n/a	Coral Reefs -Threat: Inappropriate Boat Operations Mangroves -Threat: Inappropriate Boat Operations Seagrass Beds -Threat: Inappropriate Boat Operations Sea Turtles -Threat: Inappropriate Boat Operations Offshore Islands -Threat: Over visitation Reef Fish -Threat: Inappropriate Boat Operations	7. Eliminate boat anchoring in sea grass beds, mangroves and coral reefs in the Park within one year. 9. Regulate the number of vessels visiting Sandy Island at one time, based on carrying capacity within one year.	Visual patrol to ensure adherence to visitation and mooring regulations	Very High	Daily (part of Rangers' daily duties)	All moorings in the Park	Rangers

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
2	Number Of Fisheries Violations Cited	n/a	Coral Reefs -Threat: Inappropriate Fishing Practices -Threat: Over fishing Seagrass Beds -Threat: Inappropriate Fishing Practices -Threat: Over fishing Sea Turtles -Threat: Illegal Fishing -Threat: Inappropriate Fishing Practices -Threat: Over fishing Reef Fish -Threat: Illegal Fishing -Threat: Inappropriate Fishing Practices -Threat: Over fishing	10. Increase reef fish biomass by 20 percent in the next four years. 11. Eliminate fishery regulation violations within the Park boundaries within one year. 12. Eliminate harvesting turtles within the Park after one year of operation of the Park 13. Develop a MPA based turtle conservation program in two years.	Monthly sum of all violations cited	High	Monthly	Enforcement records	Rangers

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
3	Algal Index	Coral Reefs	Coral Reefs -Threat: Over fishing -Threat: Pollution -Threat: Sewage Discharge Reef Fish -Threat: Over fishing	5. Eliminate sewage disposal in the MPA within the next five years.	Atlantic and Gulf Rapid Reef Assessment (AGRRA) Reef Fish protocol	High	Quarterly	Sandy Island Shallow, Sandy Island Deep, Lighthouse, Mabouya North and South, Sister Rocks, Cistern Point	Government of Grenada Fisheries Division and Volunteers
4	Average Reef Fish Biomass (G/100m2)	Mangroves -Size: Size / extent of characteristic communities / ecosystems Reef Fish -Size: Size / extent of characteristic communities / ecosystems (4303)	Coral Reefs -Threat: Inappropriate Fishing Practices -Threat: Over fishing Reef Fish -Threat: Illegal Fishing -Threat: Inappropriate Fishing Practices -Threat: Over fishing	10. Increase reef fish biomass by 20 percent in the next four years.	Atlantic and Gulf Rapid Reef Assessment (AGRRA) Reef Fish protocol	High	Quarterly	Sandy Island Shallow, Sandy Island Deep, Lighthouse, Mabouya North and South, Sister Rocks, Cistern Point	Government of Grenada Fisheries Division and Volunteers

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
5	Average Biomass Of Herbivorous Fish On Reefs (G/100m2)	Coral Reefs Seagrass Beds Reef Fish	Coral Reefs -Threat: Inappropriate Fishing Practices -Threat: Over fishing Seagrass Beds -Threat: Inappropriate Fishing Practices -Threat: Over fishing Reef Fish -Threat: Illegal Fishing -Threat: Inappropriate Fishing Practices -Threat: Over fishing	10. Increase reef fish biomass by 20 percent in the next four years.	Atlantic and Gulf Rapid Reef Assessment (AGRRA) Reef Fish protocol	High	Quarterly	Sandy Island Shallow, Sandy Island Deep, Lighthouse, Mabouya North and South, Sister Rocks, Cistern Point	Government of Grenada Fisheries Division and Volunteers

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
6	Average Biomass Of Piscivorous Fish On Reefs (G/100m2)	Coral Reefs Seagrass Beds Reef Fish	Coral Reefs -Threat: Inappropriate Fishing Practices -Threat: Over fishing Seagrass Beds -Threat: Inappropriate Fishing Practices -Threat: Over fishing Reef Fish -Threat: Illegal Fishing -Threat: Inappropriate Fishing Practices -Threat: Over fishing	10. Increase reef fish biomass by 20 percent in the next four years.	Atlantic and Gulf Rapid Reef Assessment (AGRRA) Reef Fish protocol	High	Quarterly	Sandy Island Shallow, Sandy Island Deep, Lighthouse, Mabouya North and South, Sister Rocks, Cistern Point	Government of Grenada Fisheries Division and Volunteers

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
7	Density of Commercially Significant Species (#/100m2)	Reef Fish	Coral Reefs -Threat: Inappropriate Fishing Practices -Threat: Over fishing Seagrass Beds -Threat: Inappropriate Fishing Practices -Threat: Over fishing Reef Fish -Threat: Illegal Fishing -Threat: Inappropriate Fishing Practices -Threat: Over fishing	10. Increase reef fish biomass by 20 percent in the next four years.	Atlantic and Gulf Rapid Reef Assessment (AGRRA) Reef Fish protocol	High	Quarterly	Sandy Island Shallow, Sandy Island Deep, Lighthouse, Mabouya North and South, Sister Rocks, Cistern Point	Government of Grenada Fisheries Division and Volunteers

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
8	Coral Cover	Coral Reefs	Coral Reefs -Threat: Inappropriate Boat Operations -Threat: Weather (Hurricanes, etc)	7. Eliminate boat anchoring in sea grass beds, mangroves and coral reefs in the Park within one year.	Atlantic and Gulf Rapid Reef Assessment (AGRRA) Reef Fish protocol	High	Quarterly	Sandy Island Shallow, Sandy Island Deep, Lighthouse, Mabouya North and South, Sister Rocks, Cistern Point	Government of Grenada Fisheries Division and Volunteers
9	Fish Size Frequency	Reef Fish	Coral Reefs -Threat: Inappropriate Fishing Practices -Threat: Over fishing Seagrass Beds -Threat: Inappropriate Fishing Practices -Threat: Over fishing Reef Fish -Threat: Illegal Fishing -Threat: Inappropriate Fishing Practices -Threat: Over fishing	10. Increase reef fish biomass by 20 percent in the next four years. 11. Eliminate fishery regulation violations within the Park boundaries within one year.	Atlantic and Gulf Rapid Reef Assessment (AGRRA) Reef Fish protocol	High	Quarterly	Sandy Island Shallow, Sandy Island Deep, Lighthouse, Mabouya North and South, Sister Rocks, Cistern Point	Government of Grenada Fisheries Division and Volunteers

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
10	Ratio-Dead To Live, Species Level	Coral Reefs	Coral Reefs -Threat: Inappropriate Boat Operations -Threat: Weather (Hurricanes, etc)	7. Eliminate boat anchoring in sea grass beds, mangroves and coral reefs in the Park within one year.	Atlantic and Gulf Rapid Reef Assessment (AGRRA) Reef Fish protocol	High	Quarterly	Sandy Island Shallow, Sandy Island Deep, Lighthouse, Mabouya North and South, Sister Rocks, Cistern Point	Government of Grenada Fisheries Division and Volunteers
11	Sechii Depth	Seagrass Beds	Seagrass Beds -Threat: Erosion -Threat: Inadequate Drain Maintenance -Threat: Inappropriate Land Use -Threat: Pollution Sea Turtles -Threat: Inappropriate Development	14. Prevent any new inappropriate land use practice in the next three years. 15. Prevent the alteration of coastal dynamics and process by the construction of coastal man-made structures. 17. Increase capacity to ensure environmentally sound dredging in Carriacou by 2008. 18. Implement an adequate system of drain maintenance within five years.	Obtain Secchi Depth Measurements	Medium	Quarterly	All seagrass Beds	Fisheries

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
12	Sedimentation Rate	Coral Reefs	Coral Reefs -Threat: Destruction of Mangroves -Threat: Dredging -Threat: Inappropriate Land Use -Threat: Weather (Hurricanes, etc)	3. Eliminate the human destruction of mangroves within 3 years. 14. Prevent any new inappropriate land use practice in the next three years. 15. Prevent the alteration of coastal dynamics and process by the construction of coastal man-made structures. 16. Stabilize the shoreline to reduce erosion within the next five years. 17. Increase capacity to ensure environmentally sound dredging in Carriacou by 2008.	Measurement of sedimentation in the water	High	Quarterly	All reef sites	Fisheries

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
13	Water Quality Standards	Seagrass Beds Sea Turtles	Seagrass Beds -Threat: Inappropriate Boat Operations -Threat: Pollution Sea Turtles -Threat: Inappropriate Boat Operations -Threat: Pollution	5. Eliminate sewage disposal in the MPA within the next five years. 6. Eliminate inappropriate disposal of solid waste within the Park by January 2009 14. Prevent any new inappropriate land use practice in the next three years. 18. Implement an adequate system of drain maintenance within five years.	Water Quality Measurements	High	Quarterly	All seagrass beds	Fisheries

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
14	Presence Of Appropriate Species	Offshore Islands	Offshore Islands -Threat: Clearing	1. Prevent further loss of vegetation resulting from human activity by 80 percent within two years. 2. Develop a re-vegetation program and implement it within 6 months of damage. 16. Stabilize the shoreline to reduce erosion within the next five years.	Visual census survey	High	Biannual	All offshore islands	Forestry
15	Population Density (Nest Density)	Sea Turtles	Sea Turtles -Threat: Illegal Fishing -Threat: Inappropriate Development -Threat: Over fishing	12. Eliminate harvesting turtles within the Park after one year of operation of the Park 13. Develop a MPA based turtle conservation program in two years.	Standard Turtle Monitoring Protocol	High	During Nesting Season	All nesting beaches	KIDO

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
16	Aerial Coverage Of Mangroves (Ha)	Mangroves	Mangroves -Threat: Dredging -Threat: Inappropriate Boat Operations -Threat: Inappropriate Development -Threat: Inappropriate Land Use	3. Eliminate the human destruction of mangroves within three years. 4. Replace 20 percent of the lost mangrove population within five years.	Delineation of mangrove extent from imagery, and visual surveys	High	Annual, Quarterly	All Mangrove locations	Forestry
17	Aerial Coverage Of Seagrass Beds (Ha)	Seagrass Beds Sea Turtles	Seagrass Beds -Threat: Inappropriate Boat Operations Sea Turtles -Threat: Inappropriate Boat Operations	7. Eliminate boat anchoring in sea grass beds, mangroves and coral reefs in the Park within one year.	Aerial delineation from imagery	High	Annual	All Seagrass beds in Sandy Island/Oyster Bed	Fisheries

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
18	Aerial Extent Of Beach	Sandy Beaches Offshore Islands	Sandy Beaches -Threat: Clearing -Threat: Weather (Hurricanes, etc) Offshore Islands -Threat: Clearing -Threat: Weather (Hurricanes, etc)	15. Prevent the alteration of coastal dynamics and process by the construction of coastal man-made structures. 16. Stabilize the shoreline to reduce erosion within the next five years.	Measurements of the linear extent of the beach from dune to high water	Medium	Annual	All Beaches	Forestry
19	CDT Measurements	Mangroves	Mangroves -Threat: Dredging -Threat: Inappropriate Land Use	14. Prevent any new inappropriate land use practice in the next three years. 17. Increase capacity to ensure environmentally sound dredging in Carriacou by 2008.	Deployment of CDT sensor	High	Annual	All mangroves	Fisheries

#	Indicator	Key Attribute References by Target	Threat References by Target	Objectives	Methods	Priority	Frequency and Timing	Location	Responsible Party
20	Number Of Abandoned Boats Within The Park		Mangroves -Threat: Inappropriate Boat Operations	8. Establish a Park free from abandoned boats by January 2011.	Visual Survey	High	Annual	Throughout the Park	Rangers
21	Vegetation Presence And Coverage	Sandy Beaches Offshore Islands	Sandy Beaches -Threat: Clearing Offshore Islands -Threat: Clearing	1. Prevent further loss of vegetation resulting from human activity by 80 within 2 years.	Visual census survey	High	Annual	All Beaches and Offshore Islands	Forestry

3. Sustainable Financial Plan

3.1 Methodology

The financial plan methodology used for the SIOBMPA was adapted from the *Center for Park Management's Business Planning Methodology*. This is a participatory process that begins by interviewing staff, community, and stakeholders to identify the necessary resources needed to meet the Park's mission and goals. These needs are activity based and are organized by functional area and program. The costs of those activities are assessed at both the mission critical and mission optimal levels. **Mission critical** is defined as the level of operations and the amount of resources that are necessary *to meet the most important of the park's goals and objectives*. **Mission optimal** is defined as the level of operations and the amount of resources that are necessary *to fully meet the goals and objectives of the park's program areas*. The state of current financing is evaluated against both missions to determine the gap in funding. Once this financial gap analysis is completed, the process moves into identifying potential financing mechanisms to raise revenue and prioritizes them by complexity of implementation, impact on natural resources, and revenue generation. The financial gap analysis lists the first steps to implement the financing mechanisms and also outlines a marketing plan, highlights the benefits and services offered by the protected area, and analyzes their economic impact on the park.

Since the SIOBMPA is not yet an operational park, the potential activities and needs of the park had to be projected and their costs estimated. This was achieved by conducting interviews with various community members, private business owners, fishermen, the Carriacou Environmental Committee (CEC), the project manager of the Caribbean Regional Environmental Programme (CREP), the Ministry of Agriculture, and the Grenada Board of Tourism. The majority of interviewees are members of the SIOBMPA stakeholders' board.

The potential economic impact of the Park on the community of Carriacou was roughly estimated, since no actual park visitation data or spending data relative to the park exists. Visitation data is based on general tourism data of Carriacou provided by the Board of Tourism as well as a small survey conducted in 2004 by RARE. Spending data is based on information provided by the Board of Tourism statistics, private business owners, and people involved in the tourism industry in Carriacou. A literature review was conducted to provide further valuation data for this section.

3.2 Market Analysis

Stakeholders:

Accommodations sector
Carriacou and Petite Martinique Tourism Association
Carriacou Environmental Committee
Dive shops

Eateries and restaurants
Fisheries Division
Fishermen – subsistence, commercial
Forestry Division
Grenada Board of Tourism
Local residents
Marina
Ministry of Carriacou and Petite Martinique
Ministry of Tourism
Police, Coast Guard
Port Authority, Customs and Excise
Private businesses located on the border of SIOBMPA
Vendors
Water taxi operators

Users:

Charter boats
Cruise ships
Divers
Foreign commercial fishermen
Local fishermen (subsistence & commercial)
Residents
Snorkelers
Sport fishermen
Tourists
Yachters

Competitors:

Bonaire Marine Protected Area, Bonaire
Grenada (mainland)
Molinere/Beausejour Marine Protected Area, Grenada
Similar local activities outside of Park
Soufreire Marine Park, St. Lucia
Tobago Cays Marine Park, St Vincent and the Grenadines
Woburn Creek/Clark's Court Bay Marine Protected Area, Grenada

3.3 SWOT Analysis

Table 4 – SWOT Analysis

Strengths:	W**eaknesses:**
Located on Western side of island where water is calm, and bays are protected User friendly Natural hurricane shelter Unique natural landscape Natural beauty Residents treasure the area, especially SI Well known and used beaches, dive sites Infrastructure exists: bars, dive shops, Carriacou Tourism Association Natural resources: coral reefs, fish, turtles, seagrass beds, mangroves etc. Local community support for management Carriacou Regatta starts from Paradise Beach Critical site for yacht racing, local boat use Interest from foreign tourists in Carriacou is primarily marine related Accessible Return visitors, divers	High use rates and associated littering and pollution Stress on resources Inappropriate and Harmful development practices Increasing development Unpredictable weather and Hurricanes Lack of financing Carriacou marketed by GBoT as day trip Capacity: business planning, management, tourism skills and guide training, marketing No coast guard station on Carriacou No law enforcement Police, Carriacou Fisheries Dept do not have boat access Low number of visitors to levy fees Lack of waste management Lack of public awareness Lack of current protection and management structure Lack of institutional and civic responsibility No park facilities and no amenities
Opportunities:	**Threats:**
Increased tourism Eco-tourism development Increased revenue Research and education Lobster and oyster farming Alternative livelihoods through nature guide positions and park staff positions Volunteering opportunities Natural resource protection	Overuse by both locals and tourists Local opposition from fishermen and residents Marina (currently under construction) Increased sewage and other discharge Increased run-off Lack of management capacity Lack of inter-agency cooperation Enforcement problems Lack of buy-in regarding user fees Lack of funding Over fishing Destruction of natural resources from weather and anthropogenic factors

3.4 Visitation Data

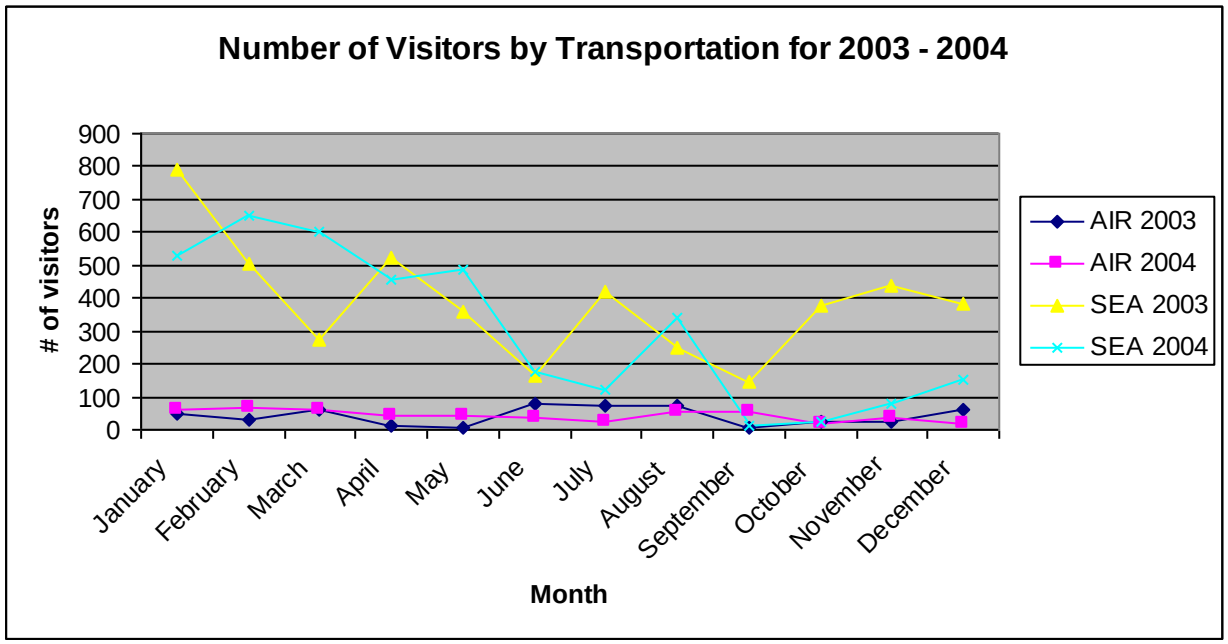
Visitors to Carriacou consist of both foreigners and mainland Grenadians who go to enjoy the beautiful marine resources. Tourists take pleasure in diving, snorkeling, hiking, sunbathing, and walking the miles of deserted white-sand beaches.

The Grenada Board of Tourism collects tourism data for Grenada as a whole, but the data specific to Carriacou is limited. In the years 2003 and 2004, the total number of visitors to Carriacou has been between 4,000 and 5,000 people. However, the data for visitors to Carriacou by boat does not include Osprey shuttle passengers, which is the cheapest and most common mode of transportation from Grenada to Carriacou. A representative from the Grenada Board of Tourism in Carriacou stated that the annual number of visitors to Carriacou could be estimated at 16,000 visitors. Despite the lower figures, the following information can be useful to determine trends. Numbers highlighted in red show the great volatility in visitors throughout the year as well as between years. Similar to regional tourist trends, September seems to be a low month for visitors traveling to Carriacou while January through April appear to be high visitor months.

Table 5 – Carriacou Visitor Statistics

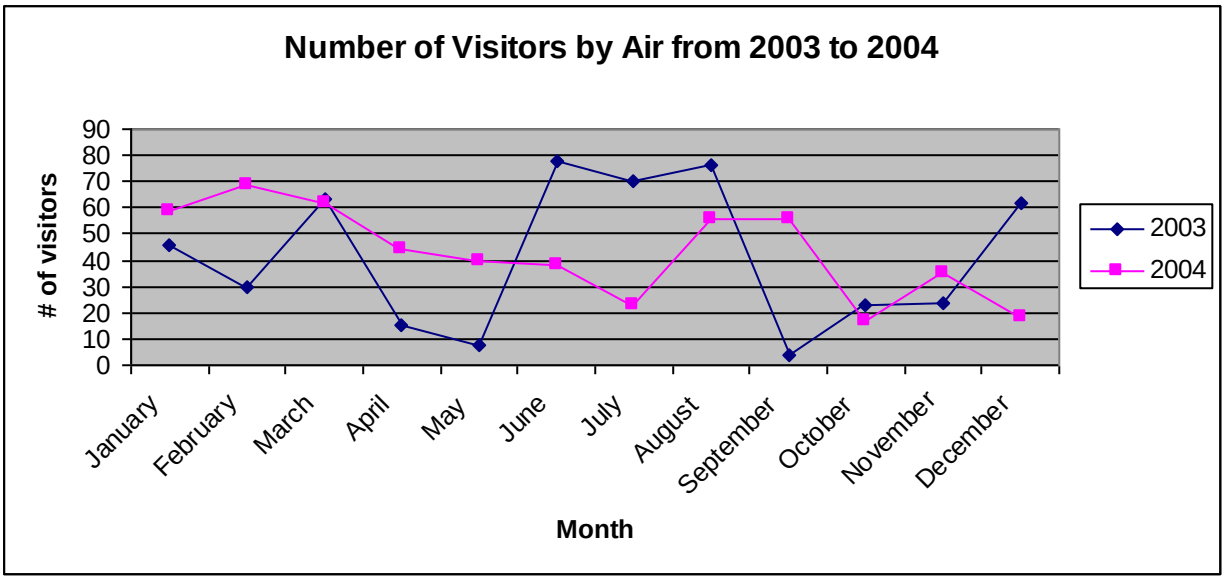
	AIR			SEA			TOTAL		
MONTHS	2003	2004	% CHANGE	2003	2004	% CHANGE	2003	2004	% CHANGE
January	46	59	28%	789	532	-33%	835	591	-29%
February	30	69	130%	506	649	28%	536	718	34%
March	63	62	-2%	272	602	121%	335	664	98%
April	15	44	193%	526	458	-13%	541	502	-7%
May	8	40	400%	360	485	35%	368	525	43%
June	78	38	-51%	164	176	7%	242	214	-12%
July	70	23	-67%	418	119	-72%	488	142	-71%
August	76	56	-26%	250	343	37%	326	399	22%
September	4	56	1300%	147	15	-90%	151	71	-53%
October	23	17	-26%	377	25	-93%	400	42	-90%
November	24	35	46%	440	79	-82%	464	114	-75%
December	62	18	-71%	384	153	-60%	446	171	-62%
TOTAL	499	517	4%	4633	3636	-22%	5132	4153	-19%

Table 6 – Visitor Arrivals by Month



Although air travel appears to be fairly static in the chart above, once it is separated from sea travel, volatility becomes apparent. As with sea travel, air travel tourist use peaks in the period from January to March and drops substantially in the period from September to October.

Table 7 – Visitors by Air



The following table shows historical data of visitors to Grenada and Carriacou over a ten year period. Unfortunately, this information does not differentiate those tourists who are specifically traveling to Carriacou and those who simply heard about the island after arriving to Grenada. Moreover, there is no information on where these tourists are going or what they are doing once in Carriacou. Without this information it is hard to estimate the number of people who might visit the Park.

Table 8 – Visitors from 1995-2004

Visitor Arrival Methods	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Air	94,552	95,372	98,217	104,151	114,540	118,426	111,876	121,074	133,724	127,904
Sea	13,455	12,859	12,531	11,643	10,749	10,438	11,475	11,342	8,631	5,961
Cruise Ship	249,879	266,982	246,612	265,875	245,461	180,305	147,381	135,061	146,925	229,800
Same Day Visitors	11,450	10,800	11,057	10,011	8,202	7,359	6,825	3,917	4,931	6,145
TOTAL	369,336	386,013	368,417	391,680	378,952	316,528	277,557	271,394	294,211	369,810
USA	30,033	30,380	29,320	31,640	34,694	32,541	32,219	36,508	35,191	30,127
Canada	3,920	4,205	4,977	5,343	6,136	4,849	5,442	4,684	5,599	5,309
UK	18,480	19,583	21,350	23,338	26,234	32,236	28,488	29,760	33,286	28,232
Germany	6,342	7,004	5,004	4,019	4,319	4,586	3,665	2,981	3,533	2,701
Other Europe	11,660	11,002	11,442	10,778	10,078	9,547	8,029	6,227	6,324	5,244
Caribbean	14,615	14,357	16,407	18,725	21,998	23,774	27,160	32,303	38,396	40,064
G'dians Residing Abroad	18,145	17,030	16,922	18,743	18,339	18,068	14,956	14,836	16,715	19,076
All Others	4,812	4,670	5,326	3,208	3,491	3,263	3,392	5,117	3,311	3,112
TOTAL	108,007	108,231	110,748	115,794	125,289	128,864	123,351	132,416	142,355	133,865
Cruiseship Calls	446	393	323	328	369	360	288	259	267	249
Yacht Calls	5,314	5,355	5,292	4,583	5,354	5,361	5,610	3,966	4,157	3,177
Visitors to Carriacou	7,310	7,266	7,203	6,743	6,718	5,464	6,887	5,408	5,132	4,153
Hotel Occupancy	67.17%	61.11%	62.10%	62.31%	64.77%	71.00%	67.00%	71.00%	NA	NA
Visitors Rooms Available	1,652	1,669	1,775	1,802	1,800	1,822	1,734	1,734	1,758	
Average Length of Stay	7.40	7.54	7.43	7.36	7.32	7.20	7.23	7.32	7.65	7.53

A RARE/TNC report entitled "Assessing the potential for small scale tourism development in Grenada and Carriacou" gives a more detailed look at tourists visiting Carriacou. Despite a small sample size and the lack of historical data, the information does show promising results. The survey found that Carriacou's main attractions are its beaches, landscapes, and snorkeling with 57 percent of the visitors visiting Sandy Island

for these activities. The survey also found that 43 percent of visitors to Carriacou first heard about the island through word of mouth and often after arriving on Grenada. Finally, Carriacou is primarily viewed as a day trip with only 46 percent of visitors staying one day.

3.5 Functional Analysis

This plan organizes the programs and activities of the park into six functional areas:

- Resource Management & Protection,
- Tourism & Recreation,
- Commercial & Commodity Uses,
- Management & Administration,
- Community Development & Outreach,
- Facility Operations & Maintenance.

These areas require separate management oversight and have different goals and objectives. The functional areas are divided into program areas that include all of the respective activities to be implemented in the Park. The functional areas are designed to be applied to any and all protected areas, enabling cross referencing at the national level. This is an activities-based organizational structure that allows managers to analyze staff and non-staff costs by activity and program rather than by budgets, which show general salary information and recurrent costs by type.

3.6 Financial Analysis

In conducting the financial analysis, a needs assessment was completed to identify the programs and activities of the Park. Most of the activities were determined during the community workshop that identified strategies for protection of natural resources. Other activities included in the analysis are operational activities necessary for managing and running the Park. Using the functional areas as the structural base, the costs of all the programs were estimated at the Mission Critical and Mission Optimum levels.

The first step in identifying the needs of the SIOBMPA is to determine the costs of all the activities and the necessary staff time associated with each activity. The staff time is calculated in full-time equivalent (FTE) units, which measure the standard number of hours worked during the year by a full-time employee for each program. In this analysis, it was assumed that staff work eight hours a day, five days a week, forty-seven weeks a year and FTE was calculated using the number of hours, days or weeks, whichever was most appropriate. The second step of the financial analysis is to look at the investments required to meet the infrastructural and informational needs of the new Park. These are considered one-time costs and so are capital expenditures or investments.

The costs are then compared against available funding by funding source and the difference is the financial gap. For the most part, the only currently available funding is projected in-kind funding of staff salary by the Fisheries and Forestry Departments.

3.7 Financial Strategies

Financial strategies for this project are designed to utilize staff, capital, and assets while raising funds. A systematic analysis of expenditures must be integrated into the financial management to allow for identification of better resource allocation. For example, by identifying peak visitor times and conducting a user analysis, the best use of resources and methods for revenue collection can be identified. Other Strategies include partnering with organizations that have experience in their respective fields and share similar goals. Partnering can include sharing costs or simply exchanging services.

Potential strategies for generating revenue are determined by evaluating the goods and services offered by the Park. These are then matched with potential financing mechanisms that result in users paying for the benefits provided by the Park. These financial mechanisms are screened to ensure that they do not violate the mission of the Park. After screening, these strategies are ranked according to their complexity of implementation and their potential impact on revenue generation to determine the most appropriate strategies.

Table 9 – Goods and Services

GOODS AND SERVICES PROVIDED BY SIOBMPA AND FINANCIAL MECHANISMS			
Type	Benefit	Financial Mechanism Specific to Benefit	General Financial Mechanism
Coral Reef	Storm protection	Insurance fee for mooring in shelter	Governmentt support
	Creation of sand	Tax or fine on sandmining	Environmental Trust Fund, Int'l Foundation and Organizations
	Fish Habitat		Funding
	Fish Food		
	Diving and snorkeling tourism	Entrance Fee, Diveshops, Charter Boats Fee	
Mangroves	Fish Nursery		
	Filtration		
	Storm protection	Insurance fee for mooring in shelter, Marina fees	
Seagrass Beds	Turtle Food	Fines for harvesting turtles	
	Fish Nursery		
Beaches, Sand	Tourism	Entrance Fee	
	Recreational Use	User fees, Local Donations, Friends of the Park	
Fish	Fishermen's Livelihood	Permit and Fines	
	Food		
	Sportfishing Tourism	License	
Oysters	Harvesting Revenue	Permit	
Eco-tourism	Niche market, add'l tourism	Entrance fee, premium operating price to operate in Park	
	Alternative Livelihoods as Tour Guides		

3.7.1. Funding Sources

Special Purpose Fees

Research, photography, filming, and special events are types of commercial fees that could fall under the category of special purpose fees. Currently, anyone wishing to research in a MPA must apply for a permit from the Fisheries Department. A fee could easily be attached to this permitting process in order to raise revenue. The same permitting process could also occur for photography, filming, or special events in the Park. The annual regatta starts from Paradise Beach and occurs within Park boundaries. Negotiations would have to occur to determine fair and equitable fees for such special events.

Concerts, a special recreational day or special tours are events that can attract many people to the Park for one day and raise a fair amount of money while minimizing long-term impact on Park resources. These events are also an excellent opportunity to raise public awareness and educate the local community as well as tourists. Special events also offer opportunities to solicit private sponsorship from companies who want to advertise and increase their corporate social responsibility towards the environment.

Mooring system donations

There are a number of organizations that provide mooring buoy equipment and money for installation. Some of these are: Reef Relief, Project AWARE, and Oceanwatch's "Adopt a Mooring" Program. This is a high impact activity in terms of decreasing harm to corals from irresponsible anchoring as well as in terms of revenue generation and should be pursued as soon as possible.

International Foundations

Various private foundations donate large sums of money for protected area management in various forms, including: seed money, capacity building for staff, or for monitoring and research. A list of donors and the types of projects they have been funding should be identified. These foundations should then be targeted for funds or in-kind contributions.

Souvenirs

The Park may sell souvenirs such as hats, t-shirts, postcards, DVD's, etc. It would be necessary to conduct a quick market analysis of cost and pricing on the island. The Park may also want to negotiate contracts with vendors of crafts, whereby vendors pay for a permit to sell their goods at entry and exit points to the Park. This is based on the assumption that these locations would have higher numbers of tourists. Again, it would be imperative that costs associated with contracts, permits and enforcement do not exceed the revenue generated by the permits.

GEF Funding

The Global Environment Facility (GEF) is a United Nations financing mechanism for environmental projects. Its funding is targeted towards four project areas: Water, Biodiversity, Climate Change and Desertification. To qualify for GEF funding countries must:

- Address at least one of the GEF focal areas
- Produce global benefits
- Be an eligible country or region
- Have the support from the host government
- Be within established funding limitations

The SIOBMPA best falls under the Biodiversity category. It produces global benefits by sustaining natural resources and thus preserving the diversity of species. Grenada is an eligible country since it has ratified the Convention on Biological Diversity and the Park has the support from the government of Grenada.

The GEF funding is entering a new four year cycle. Grenada is eligible for US$3 to 3.6 million, 40 percent of which can be applied to protected areas. SIOBMPA will apply for a small grant of US$50,000 for implementation of priority investments and activities, and for hiring and training of staff. This funding would be targeted for developing programs that generate revenue, such as the user fee system, in order to establish the foundation for sustainability. Presently, the Sustainable Development Committee is forming a group of people to review small grants proposals before submitting them to the UN. It remains to be seen exactly how this might change the small grants proposal system.

As the Millennium Development Goals (MDG) are a focus of the United Nations, grants must clearly show how the SIOBMPA would help meet the MDG environment goals and reduce poverty, as well as meet biodiversity targets.

International Organizations

International non-profit organizations should be targeted for joint-project collaboration and funding related to MPA management, implementation, wildlife protection and habitat restoration. International organizations have the technical expertise and funding for such projects.

Sponsorship

Corporate social responsibility has become an important part of doing business today. Companies wish to be seen as responsible members of society and many have begun giving substantial contributions to various organizations and projects that promote social responsibility. Different levels of contributions could receive different levels of publicity such as displaying the company logo on moorings or on signage. The Park should research national and international companies that have donated or might be interested in contributing to protected areas. These companies may include: Oil and Gas companies, utility companies, cell phone companies and other large Grenadian companies. The companies which best fit the profile will be targeted for both one time and recurring donations. High profile events are an especially opportune time to solicit

sponsorship revenue, as more people would be gathered in the Park to see sponsors' publicity.

Donations

Private donations could be solicited from wealthy citizens and residents, whether they are living abroad or residing in Grenada. These potential donors would be identified and targeted in a way that would demonstrate specific benefits of their donations, how their money will be spent, and accountability. This could then develop into a more formal "Friends of the Park" organization with 501c3 status, which would enable tax deductible donations. The granting of 501c3 status is a complex process but it may be worthwhile in the long run as there are many Grenadians living in the United States who send remittances to their families.

Government Contribution

The Ministry of Agriculture and the Ministry of Tourism both cover staff costs for terrestrial protected areas. The Fisheries Department is working on a MPA revitalization project. As the SIOBMPA falls under the jurisdiction of the Ministry of Carriacou and Petite Martinique Affairs, this agency potentially could provide some government subvention to fund certain aspects of the Park, such as staff costs.

User Fees

The first step in developing a user fee system is to determine what customers are willing to pay to enjoy the service provided. In this case, the service is amenities within the park such as mooring buoys, guided tours, use of the facilities and other recreational or educational opportunities within the Park. One of the most important things to consider when developing user fees is that the system must generate more revenue than it costs to operate. The collection of user fees is estimated at EC$19,800 at mission critical level. This number is a bit inflated as the time spent collecting fees by the assistant manager and by the rangers will also encompass other activities such as financial management or visitor interpretation and patrolling. Fee collection, as it is estimated, must generate at least the same amount that it costs to operate and preferably much more. With this in mind, the fee structure should be as simple as possible while maximizing fee revenue.

Another consideration in developing a fee system is that legislation and regulations must be in place to allow the collection of fees to begin when the Park officially opens. This reduces the chance of resistance to fees compared to introducing fees after the Park has been opened. In the case of marine protected areas, regulations are in place for the collection of fees, but the fees that are listed are too low. The current fee structure must be changed through a submission to Cabinet. This submission should rely on "Willingness to Pay" data as well as the cost of operating the Park.

User fees generate revenue but they are also a control mechanism to ensure that carrying capacity is not exceeded. Ideally, the Park should establish the carrying capacity at an ecological level along with a tourism satisfaction level and consider these levels in the pricing system of user fees.

Considering all of the above, the user fee system for SIOBMPA will best be divided by type of user. There should be mooring fees for day and overnight visitors. There should also be diving and snorkeling fees as well as sport fishing fees. Depending on the establishment of entrance points into the park and the development of guided tours, there may be an entrance fee. There should also be fees to use amenities provided at popular beach locations. There is a project underway for a building that could include bathroom and shower facilities to be constructed at Paradise Beach.

Another suggestion for collecting user fees is to create a flag, pin, or bracelet that visitors buy to moor, dive in, or enter the Park. This provides a tangible token that can be kept as a souvenir, in exchange for user fees. However, this will increase the cost of the user fee system. There must also be receipt booklets that allow for one receipt to be given to the visitor and one to remain in the office records.

In order to price the different user fees, a willingness to pay survey should be conducted as well as a detailed review of regional user fee systems. Fisheries officers are planning to visit Soufriere Marine Protected Area in St. Lucia to evaluate their management system.

Comparative user fees for visiting eco-tourism sites in the Caribbean are highlighted in the following Table 10.

Table 10 – Example of User Fees Across the Caribbean

Location	Attraction	Entrance Fee US$
Grenadines	Tobago Cays Marine Park	
Trinidad & Tobago	Buccoo Reef	
Belize	Port Honduras Marine Reserve	
St Lucia	Soufriere Marine Management Area Diving Fee	5 daily, 15 annually
	Soufriere Marine Management Area Snorkeling Fee	EC$3.00 daily
	Soufriere Marine Management Mooring Fee	15 for 2 days, 20 for 3 days to 1 week, <40 ft
	Soufriere Marine Management Mooring Fee	20 for 2 days, 25 for 3 days to 1 week, bt 40-70 ft
	Soufriere Marine Management Mooring Fee	40/day, >70 ft
	Pigeon Island	5
	Guided rainforest walk	17.5
Barbados	Farley Hill National Park	4
	Andromeda Gardens	13.5
	Welchman Hall Gully	13.5
	Wildlife Reserve	10
Bonaire	Bonaire Marine Park	
Saba		
Dominica	Protected Areas WtP study	10
Bahamas	Exuma Cays National Trust	

3.7.2. Prioritization

Table 12 shows the process of ranking the potential financial strategies by complexity of implementation and relative impact. Complexity of implementation is measured by: staff time required, financial investment, available resources & expertise, political impact, bureaucracy, external stakeholders, and the legal/policy framework in place. Impact of implementation is measured by: resources protected, revenue generated, money & staff time saved, value added, external stakeholders, visitor education & satisfaction, park image, staff morale.

Financial strategies with low complexity and high impact are listed in the upper left quadrant. These strategies should be pursued first. The lower left quadrant consists of strategies with low complexity and low impact and should also be pursued. The lower right quadrant shows strategies with high complexity to implement and a low impact and should be pursued only if the opportunity presents itself. The upper right quadrant includes strategies which have a high complexity and high impact and should be pursued cautiously, perhaps when the Park is more established and staff time can be devoted to pursuing these strategies.

The positioning of each strategy reflects its relative complexity and impact within the Low and High rankings. For example, GEF funding and International Foundations are both in the High Impact, Low Complexity quadrant but International Foundations have slightly less impact and a higher complexity and therefore they are ranked lower than GEF funding. The following table shows the ranking of each of the strategies mapped in the chart above.

Table 11 – Funding Strategies

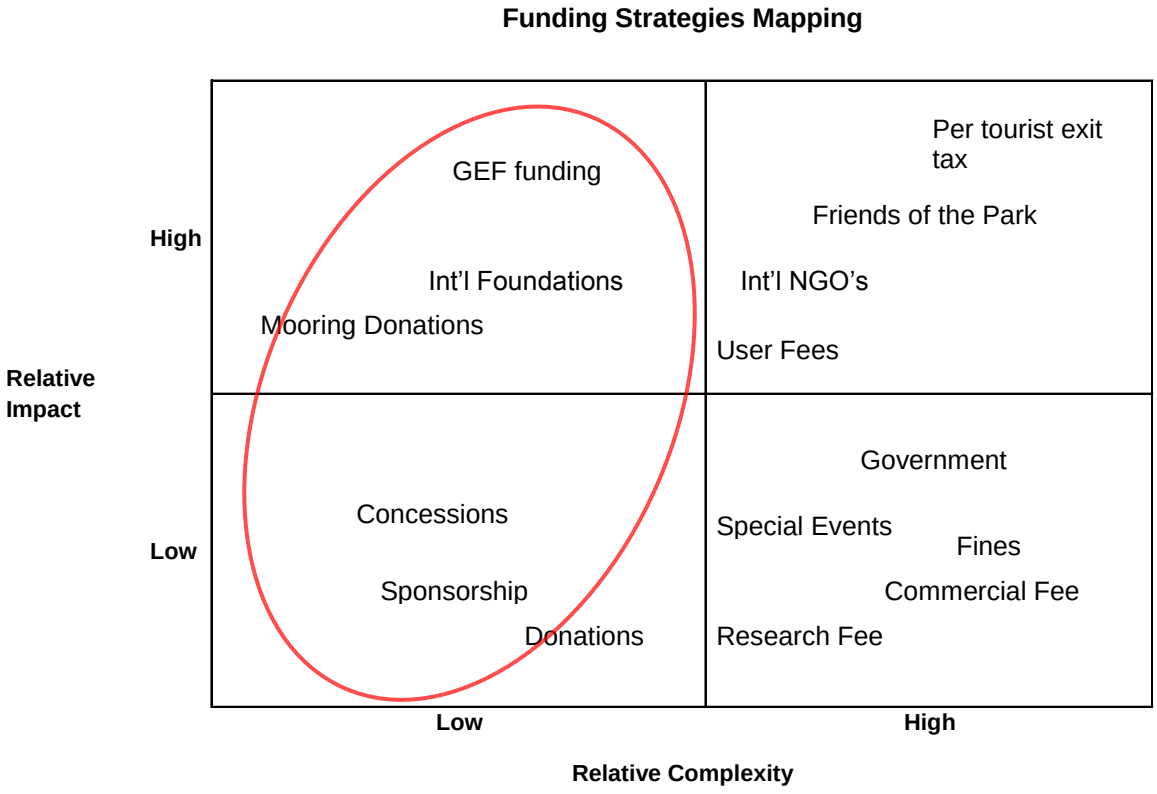


Table 12 – Ranking of Funding Strategies

	Ranking of Funding Strategies
1	Research Fees
2	Mooring Donations
3	Special Events
4	International Foundations
5	Concessions
6	GEF
7	International Organizations
8	Private Sponsorship
9	Donations
10	Government Contribution
11	Friends of the Park Organization
12	Commercial User Fees
13	User Fees
14	Fines
15	Per Tourist Exit Tax

3.7.3. Financial Projections

The following is a possible scenario of revenue generation for the Park, assuming that all the necessary infrastructure and management systems are in place. The fees charged and revenue generated are estimates of what could be possible.

Without "willingness to pay" data, average regional data on fees can be used as a proxy for what could be charged. The average fee charged in the Caribbean to enter a protected area is US$10. Assuming that 3,000 people dive in the Park and another 3,000 general visitors enter the park, and a flat rate of US$10 is charged, then US$60,000 could be raised, leaving an annual financial gap of US$30,000.

Research fees also have potential to generate funding. Partnering with St. George's University, the University of the West Indies, and other regional universities as well as schools with strong Marine Resources Departments could help in attracting research projects. Estimating two research projects a year, charged US$1,000 each, would generate US$2,000. This leaves an annual financial gap of $28,000.

Negotiating contracts with individuals to sell souvenirs could generate additional revenue. Assuming there are four vendors that are each charged US$250 per year generates another US$1,000. This leaves an annual financial gap of US$27,000.

Specific project funding from international foundations and organizations for wildlife protection and habitat restoration, scientific monitoring and research, eco-tourism and sustainable development activities and/or infrastructural needs could

likely generate between US$10,000 and US$25,000 per year. These funds would be appropriated for specific activities, so other sources of revenue such as user fees and donations would have to be allocated to cover the day to day operational and management activities as well as recurrent costs.

Assuming grants totaled only $10,000 per year, there would still be a $17,000 deficit. The government of Grenada, through either the Ministry of Agriculture's Forestry Department or the Ministry of Tourism, pays the salaries of staff at various terrestrial forest reserves. Perhaps the Ministry of Carriacou, Petite Martinique Affairs could contribute funds to pay part of the staff needs for the Park. Assuming the Ministry could pay just one of the ranger's salaries, US$9,000, then that would leave a gap of US$8,000.

Private donations, sponsorship and special events would have to cover this funding gap.

3.7.4. Investment Priorities

A list of investments in infrastructure, studies, equipment, and training was developed through the interview process. Investments were determined for both mission critical and mission optimal levels. The overall mission critical investment needs totaled EC$229,200 or US$85,800. At mission optimal, this figure increases to EC$378,300 or US$141,170.

From this list, the top five investment priorities were identified.

1. Inter-Agency Coordination
    a. Perform one workshop to determine a process of decision making and communication among the different management actors
    b. Define roles and responsibilities of each actor.
2. Purchase boat with an outboard engine
3. Public Information Materials
    a. Create brochures (2500 at mission critical/5000 at mission optimal), posters (2500/5000), kiosks (2/4) and signage (5/10) to educate and inform the public about the Park.
4. Boundary Markers and Mooring Buoys
    a. Complete studies to determine location and number of markers and buoys.
    b. Purchase necessary equipment buoys (25/50) and markers (10/20)
    c. Install buoys at determined locations.
5. Staff Training and Equipment
    a. Train staff in protected area management, financial management, enforcement, and visitor safety.
    b. Provide equipment for staff such as radios, GPS unit, uniforms, and visitor safety devices.

The total cost at mission critical for these five investments totals US$50,200 and at mission optimal the total is US$74,000. These items represent slightly less than half the total investments needed.

3.8 Timeline – Year 1 of Operation

1) Permanent Staff - $172,619
2) Implementation of User Fee System - $3,000
3) Fundraising –
    a. Target private donors and private sponsorship opportunities, such as advertising on buoys or buildings - $3,000
    b. Set up donation boxes in strategic locations - $500
4) Public Information and Outreach -
    a. Develop and implement a public awareness campaign informing the public about the SIOBMPA and the benefits of MPA's, the zoning areas and the mooring buoy system and harms of anchoring. - $10,500
5) Stakeholder Engagement –
    a. Design and implement a participatory management and stakeholder engagement strategy – Staff time
    b. Conduct a conflict management workshop - $5,000
6) Visitor Interpretation
    a. Develop a visitor interpretation center at Paradise Beach - $10,000
    b. Develop a mangrove trail and underwater snorkeling trail - $1,236
7) Policy, Planning, and Emergency Preparedness –
    a. Develop an MOU between the Park, Police, Fisheries, and Coast Guard to support joint enforcement of existing laws and Park regulations – Staff time
    b. Develop an emergency preparedness plan – Staff time
8) Environmental Education –
    a. Work with teachers to create and implement an annual environmental education curriculum that specifically focuses on the local ecosystem, natural resources and conservation measures such as marine protected areas - $1,500 + staff time
9) Maintenance –
    a. General - $20,900
    b. Mooring Buoys - $1,200 + staff time
    c. Trails – $500 + Staff time

Total for Year 1 = $228,755

3.9 Marketing Plan

3.9.1. Market

The first step towards developing a marketing plan for the SIOBMPA is to understand both the product and the audience. Carriacou has been marketing itself as the authentic Caribbean experience. To continue that, eco-tourism will have to play a larger role to safeguard that genuine encounter.

Current and potential users of the Park are well known. What is less known, are tourist characteristics and preferences. A more detailed study of Carriacou visitors must be conducted to determine more accurately the types of tourists who come and what types of amenities and activities they would like. This would aid in targeting specific groups of tourists, concentrating efforts in development of the Park, and maximizing the return on advertising.

3.9.2. Disseminating Information

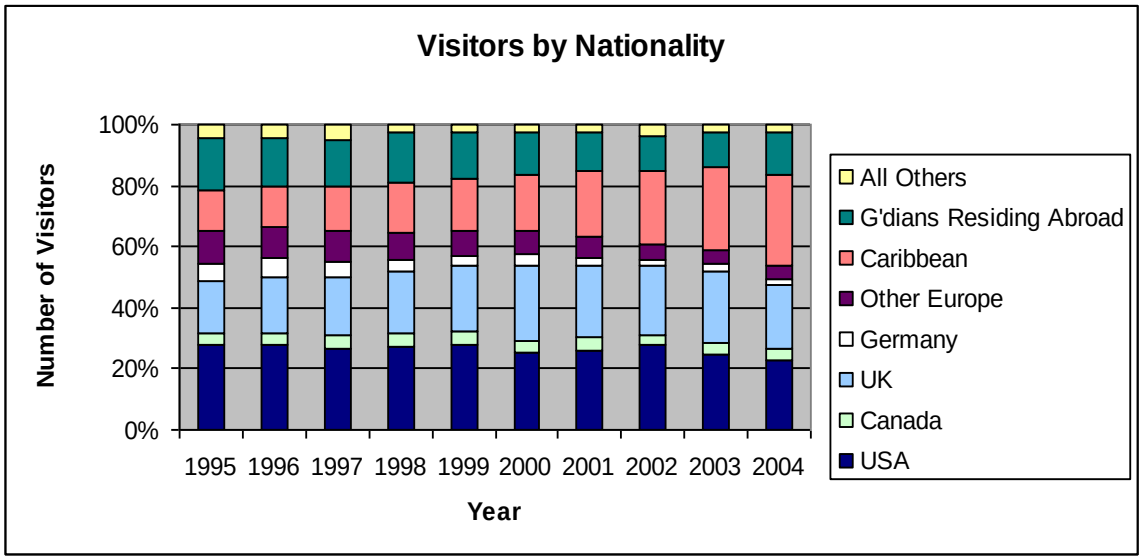
The Park should produce a few large kiosks in select locations to inform Park visitors about the natural resources, and why supporting the Park, through visitor or amenity fees, is important. These kiosks could be placed in the Grenada Board of Tourism office located directly opposite the jetty in Hillsborough, on Paradise Beach, and in front of the CEC office next to the market hall. Brochures and other informational tools could also be distributed to raise awareness in the community.

3.9.3. Advertising

Taking into consideration the different audiences, the Park must develop brochures and posters explaining the mission of the Park, what the Park protects, Park activities, information about the value of the Park and its socio-economic benefits, and contact information. These should be placed in hotels, travel agencies, car rental agencies, restaurants, dive shops, airports, and the Osprey Shuttle in Carriacou.

The RARE survey conducted in 2004, mentioned in the Visitation Data Section, provides evidence that about half of the foreign visitors are English speaking, so it would be reasonable to produce materials in English.

Table 13 – Visitors by Nationality



There must be a systematic coordination with the Grenada Board of Tourism and the Carriacou and Petite Martinique Tourism Association. In the past, Carriacou has been advertised as a day trip, but a new tourism strategy should be implemented to attract visitors for longer stays.

The local tourism association based in Carriacou has a newsletter and a website. It would be efficient to partner with them and have them develop and host the Park's website along with their own and have a section in the newsletter devoted to the Park.

Other avenues for advertising include international travel magazines, the travel sections of major international newspapers, travel websites, and travel agencies. This effort will have to be coordinated with the Grenada Board of Tourism's international advertising campaigns. About 20 percent of visitors come from the Caribbean region, so advertising should be regional as well as international. The Sailor's Guide to the Windward Islands, which most yachters and sailors buy, would provide a good opportunity to reach potential users of mooring buoys and entries into the Park. Advertising space has been donated to the Carriacou and Petite Martinique Tourism Association and could likely be available for the SIOBMPA. In addition, the various magazines, newspapers, and journals printed throughout the Grenadines could be an effective avenue. Many Grenadians listen to the radio and this has been identified as an effective means of transmitting information locally.

There must also be some outreach towards more specialized users such as universities, researchers, scientists, film production companies, and photographers.

At the national level, negotiations must take place with the cruise ships and their respective tour operators, so as to enable cruise ship visitors to come to the SIOBMPA. The negotiations should specify that organized groups use designated access points and areas, so that they do not overwhelm a specific area or resource. The contracts should also ensure that part of the revenue from cruise ships entering Carriacou waters goes to the Park. As of now, an environmental levy is placed per passenger; however, this money is used to fund the Solid Waste Management Authority in Grenada as well as the Consolidated Fund.

3.10 Impact Analysis

There are several ways to calculate the economic impact that the Park might have on the community of Carriacou. One method attempts to calculate the actual benefit provided by the natural resources that are being protected. Another method calculates the direct and indirect revenue generated by tourists to the Park. A third method is called contingent valuation and looks at visitor's willingness to pay to enjoy the resources of the Park. The first step in conducting any valuation of natural resources is to understand what those resources are and what benefit exists in protecting them.

3.11 Valuation of Natural Resources

A recent study conducted by the International Coral Reef Action Network (ICRAN), the International Union of Concerned Scientists (IUCN) and the United Nations Environment Programme (UNEP) suggests that the value of coral reefs in the Caribbean is estimated between US$2,000 per sq km per year in remote areas, to US$1million per sq km per year near tourist resorts. Worldwide, the estimate for intact coral reefs is between US$100,000 – 600,000 per sq km per year. Mangroves are valued between US$200,000 and US$900,000 per sq km per year. The average cost of coral reef protection is US$775 per sq km.

The coral reefs surrounding Sandy Island, Mabouya Island, and Sister Rocks are the main dives sites for all three dive shops on the island, and are all located within a twenty minute boat ride from the shops. Thus their value would be in the upper range of the study mentioned above.

3.12 Direct and Indirect Revenue

<u>Fishing</u>

Fishing is a multi-million dollar industry in Grenada, providing thousands of jobs to fishermen, boat builders, boat suppliers, fish market workers, import/export workers etc. In a more direct way, annual catch reports for Grenada show the tremendous value that fish provide to this culturally and economically important sector of the economy. In 2004, the last year of data, EC$21,600,000 was generated by pelagic species alone in Grenada. Using the current exchange rate of 2.67, this equals US$8,090,000. The three top sellers in fish were Yellowfin tuna (EC$5,600,000), Blackfin tuna (EC$2,800,000), and Red hind (EC$2,000,000). Revenue in the non-fish category included Conch (EC$290,000), Lobster (EC$340,000) and Turtle (EC$70,000) totaling EC$700,000 or US$262,000.

Although there are no specific catch reports for Carriacou, fishing is an important part of the community and economy. Fishermen here export to international markets as well as supply the local markets and many people are also sustenance fishers. Assuming that Carriacou makes up ten percent of the national catch reports for Grenada, fishing in Carriacou generates US$800,000. This figure is probably low since Carriacou supplies international markets where prices are higher than in Grenada. This

also doesn't include the indirect revenue from fishing related jobs that contribute to the economy.

It has been shown that if critical areas, such as mangroves and seagrass beds, are protected, fish stocks can increase in just a few years. The value of the SIOBMPA therefore could be directly related to the increase in fish stock in the short-term, plus the essential value in conserving fish habitats and fish stocks for future generations.

Diving

One dive shop's owner estimated that scuba divers spend EC$1,000 on an average three day stay. This total spending was divided into one third spent on accommodation, one third on diving and one third on food and souvenirs. They estimated that their shop had approximately 500 divers visiting per year. So if each of the 500 divers spends and average of EC$1,000 then it is estimated that dive-related revenue generates EC$500,000 per year from one dive shop operation. Assuming all dive operations generate the same amount, we can determine that the coral reef ecosystem in the Park could generates EC$1.5 million per year. At an EC$2.67 exchange rate, the direct and indirect revenue generated per year from diving is US$561,798.

Tourism

A valuation model was developed using the Grenada Board of Tourism data and the RARE study on small scale tourism that was mentioned in the visitor information section. The Grenada Board of Tourism data is not ideal because it does not include same day visitors to the island, specify whether the numbers are based on foreign or local visitors to the island or include Osprey Shuttle passengers in visitor counts. The RARE study has its limitations as well, due to a small and non-random sample size, but it is the only information specific to Carriacou available. Together this data does provide an idea of the revenue generated by tourists. Since most of the tourists come to Carriacou to enjoy the beaches, marine resources, and natural landscapes it can be assumed that many visitors would visit the Park.

As the data is not exact, the model uses a range of numbers. The low estimate for number of tourists is 6,228 and the high estimate is 11,114. Using these numbers and assuming each tourist spends EC$1000, we find that direct and indirect revenue generated is between US$2,300,000 and US$4,100,000 per year.

3.13 Cost – Benefit Analysis

The total needs assessment of operating the Park at a mission critical level was estimated at about EC$240,000 or US$90,000. The value of coral reefs and mangroves alone was calculated at US$318,000 per year. Even if we add all mission critical investments to the recurring costs, the total is about EC$528,000 or US$198,000. These expenses represent only a tenth of the direct and indirect economic value.

Economic values are useful to consider the costs versus the benefits; however it is difficult to put a moral and cultural value on natural resources. It is equally difficult to imagine a place like Carriacou without its reefs. The continued existence and healthy

state of the coral reef ecosystems is important not only for its economic value but also for that value which cannot be calculated.

Table 14 Five Year Operational Budget

Item or Activity	Actor	Cost
Pre-Operational Budget		
Securing financing for mooring buoys and boundary markers	Contract services	
GEF Funding small project development	Contract services	
International Foundations/NGO project development	Contract services	
Lobby for government subvention of staff costs		
Hire park staff - manager, office manager, 2 full time rangers, 1 part-time ranger - ads, labor	Advisory council and local NGO	3,000
Train staff - consultant to train plus venue, food and equipment for five people for five days	Training	8,500
Inter-agency coordination workshop to determine roles and responsibilities		6,000
Develop visitor and boating safety program	Manager	
Negotiate contracts for concessionaires	Office Manager	1,300
Market the park within the local community, nationally and internationally thru coordination with the GBoT	Manager	
Boat, engine and equipment	Manager	58,500
Zoning and Boundary Participatory Process - workshop	TNC and local NGO	6,000
Capacity study for moorings (9.1.1)	Consultant	5,000
Study for # and location of moorings	Consultant	5,000
Install 10 boundary markers and 25 mooring buoys	Fisheries, Staff	43,400
Develop signs, brochures, posters and place them in strategic locations	Manager	9,875
Website	Office Manager, Contract Service	1,335
Prepare a high level event for the opening of the Park	Local NGO	10,000
TOTAL		157,910
Year 1 of Operation		
Permanent Staff		176,130
Fundraising: Target private donors and private sponsorship opportunities, communications, setting up donation system online		3,000
Set up donation boxes in strategic locations	Equipment	500
Implementation of User Fee System		3,000
Develop and implement a public awareness campaign informing the public about the SIOBMPA and the benefits of MPA's, the zoning areas and the mooring buoy system and harms of anchoring.		8,285
Design and implement a participatory management and stakeholder engagement strategy		6,000
Conduct a sustainable livelihoods study		6,000
Nature guide training for 3 people		6,000
Run sustainable livelihoods program		8,000
Develop a visitor interpretation center at Paradise Beach		10,000

Develop a mangrove trail and underwater snorkeling trail using volunteer divers - gas, tanks, signs		1,200
Develop an MOU between the Park, Police, Fisheries and Coast Guard to support joint enforcement of existing laws and Park regulations	Staff time	
Develop an emergency preparedness plan	Staff time	
Work with teachers to create and implement an annual environmental education curriculum that specifically focuses on the local ecosystem, natural resources and conservation measures such as MPAs.	Equipment	1,500
Maintenance: general - gas, utilities, cleaning		19,200
Mooring buoys	Equipment	1,200
Trails		500
Operations		10,345
Staff Training - 2 days: includes travel or hiring a consultant, materials, venue if necessary		5,000
Truck		60,000
TOTAL		325,860

Year 2 of Operation

Staff		176,130
Implementation of User Fee System		3,000
Fundraising: Target private donors and private sponsorship opportunities, communications, setting up donation system online		3,000
Develop and implement a public awareness campaign informing the public and targeted groups on littering, pollution and disposal of solid waste (5.4, 6.1) and another campaign on reef ecosystems, and fishing practices (10.6, 11.1)		8,285
Collaborate w/ Fisheries Dept to enhance existing fishing regulations against inappropriate fishing practices (10.4) - hold a workshop with relevant stakeholders		6,000
Support legislaton which would regulate larger mesh size of fishing gear (10.4.1) - hold a workshop with fisherman, fisheries, and other relevant stakeholders to develop strategy		6,000
Establish and implement a mangrove replanting program		6,000
Participatory management and stakeholder engagement workshop		6,000
Sustainable livelihoods program		8,000
Implement environmental education curriculum that specifically focuses on the local ecosystem, natural resources and conservation measures such as MPAs.	Equipment	1,500
Maintenance: general - gas, utilities, cleaning		19,200
Mooring buoys	Equipment	1,200
Trails		500
Operations		10,345
Staff Training - 2 days		5,000

TOTAL		260,160

Year 3 of Operation

Staff		176,130
Implementation of User Fee System		3,000
Fundraising: Target private donors and private sponsorship opportunities, communications, setting up donation system online		3,000
Raise awareness of economic diversification and alternative development (14.4.2) - workshop		6,000
Promote sustainabel harvesting practices - workshop		6,000
Participatory management and stakeholder engagement workshop		6,000
Sustainable livelihoods program		8,000
Implement environmental education curriculum that specifically focuses on the local ecosystem, natural resources and conservation measures such as MPAs.	Equipment	1,500
Maintenance: general - gas, utilities, cleaning		19,200
Mooring buoys	Equipment	1,200
Trails		500
Operations		10,345
Staff Training - 2 days		5,000
TOTAL		245,875

Year 4 of Operation

Staff		176,130
Implementation of User Fee System		3,000
Fundraising: Target private donors and private sponsorship opportunities, communications, setting up donation system online		3,000
Promote environmentally sound development practices w/in Park and Carriacou as a whole (14.4)		6,000
Develop and implement a public awareness campaign for general public and targeted groups on turtle conservation		4,500
Participatory management and stakeholder engagement workshop		6,000
Sustainable livelihoods program		8,000
Implement environmental education curriculum that specifically focuses on the local ecosystem, natural resources and conservation measures such as MPAs.	Equipment	1,500
Maintenance: general - gas, utilities, cleaning		19,200
Mooring buoys	Equipment	1,200
Trails		500
Operations		10,345
Staff Training - 2 days		5,000
TOTAL		244,375

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