The Soufriere Scotts Head Marine Managed Area
Dominica

Management Plan
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For the Soufriere Scotts Head Marine Managed Area

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LIST OF ACRONYMS

CATS	Caribbean Aqua Terrestrial Solution
DFO	Department of Fisheries
DSC	Dominica State College
DWA	Dominica Water Sport Association
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
FMA	Fisheries Management Authority
FPA	Fisheries Protected Area
FNZ	Fisheries Nursery Zone
GIZ	German International Cooperation
LAMA	Local Area Management Authority
LAMP	Local Area Management Plan
MMA	Marine Management Area
MPA	Marine Protected Area
MOE	Ministry of Environment
MOT	Ministry of Tourism
PPD	Physical Planning Division
SRO	Statutory Rules and Orders
SSFMA	Soufriere Scotts Head Fisheries Managed Area
SSMMA	Soufriere Scotts Head Marine Management Area
SSMR	Soufriere Scotts Head Marine Reserve
UNCLOS	United Nations Convention on Law of the Sea

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SUMMARY
The Soufriere Scotts Head Marine Managed Area (SSMMA) was established in 1987 to achieve the long term conservation, economic and cultural values of the area. The main objectives and rationale was to diffuse user conflicts, address the pollution challenges and protect the traditional fisheries. Since then, there has been focus towards resource enhancement and sustainable financing and the need to standardize MMA practice in line with regional standards.

The SSMMA is a historic embayment and shoreline. The bay is submerged extinct volcano crater plummeting to great depths which is characterized by an array of geological features making it one of the best dive spot on earth. The entire area is about 3 to 4 miles long from Champagne in the north to 'Dey Foo' in the south, near the village of Grand Bay. It extends seaward to about 0.5 mile in all directions. The biological diversity of this managed area is unique with many different species of corals including the Yellow Tube Corals, Sponge Corals, Boulder Brain Corals, Finger Corals and the Pillar Corals. The unique Wire Coral is also common to the area. Various sea grass meadows are found throughout the SSMMA. Reef Butterfly, dolphinfish, Jacks, and the Knobbed Porgy are common species of fish especially at the Scotts Head Point. The area is also regularly visited by migratory birds such as the pelicans, brown boobies, frigates and other endemic species namely the seagulls. The SSMMA has attained international reputation for best snorkel and dive destination in the world.

Since the establishment of the SSMMA, the area has been managed by a Local Area Management Authority (LAMA) which comprises different stakeholders including Dominica Water Sports Association, fisher folks, local authorities of the SSMMA communities, Ministry of Agriculture and Fisheries, as well as other interest groups. The day to day operation of the SSMMA is under the supervision of a part time manager and chief warden.

The SSMMA is managed predominately for biodiversity conservation, the promotion of sustainable use and for the protection and enhancement of cultural and historical values to provide a greater array of goods and services. This is the first management plan for the SSMMA. Rapid changes in the development of the managed area in recent years highlighted the need for greater strategic intervention to improve the management and decision making processes in the governance of the SSMMA. The management plan therefore provides the tools and mechanisms whereby sustainable management goals can be achieved. The plan specifies management goals and strategies for the SSMMA, the natural, cultural and historical resources within the area, allowing their sustainable use for the benefit of current and future generations. It is designed to meet the needs of MMA managers, stakeholder interest groups and government department involved in the administration of MMAs.

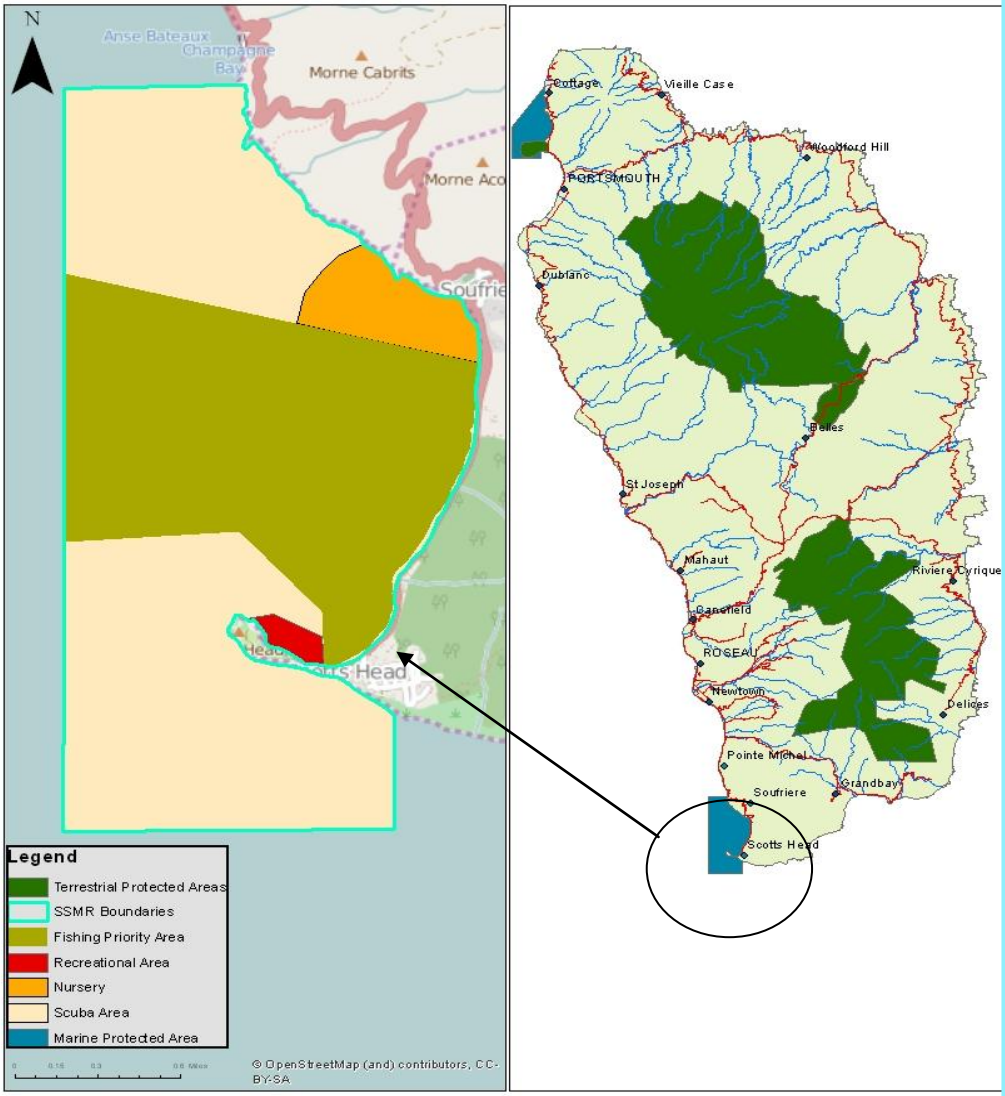
This management plan will be implemented following an adaptive approach given the dynamic nature of MMAs. As a result, the approach to preparing and implementing the management plan involved building on existing knowledge and filling the knowledge gaps that impede understanding of MMA processes. The management options proposed are based on practical understanding and knowledge of SSMMA. The overarching goal of the plan is achieve sustainable financing of the SSMMA while preserving and enhancing the biological and non living resources of the area.

1.0 PURPOSE AND BACKGROUND

1.1 The Soufriere Scotts Head Marine Managed Area (SSMMA)

In 1987 the Soufriere Scotts Head Marine Reserve was established to address a number of critical issues affecting the area.The SSMMR is a defined geographical space located in Soufriere, Scotts Head and up to Anse Bateau, near the village of Point Michel, encompassing the immediate offshore waters and sub-strata, as well as the adjacent coasts, which is intended to be managed in such a way so as to achieve the long term conservation, economic and cultural values of the area (See figure 1). The bay is submerged extinct volcano crater plummeting to great depths and is characterized by an array of geological features making it one of the best dive spot on earth. The SSMR was legally established under the Fisheries Act, Chapter 61: 60 Act 11 of 1987 and the Statutory Rules and Order No. 17 of 1998. There has been a shift in management approach from marine reserve protectionist mindsets, to marine managed areas, (Soufriere Scotts Head Marine Managed Area, SSMMA) which allows for greater exploitative uses of resources.

Figure 1. The Soufriere Scotts Head Maine Managed Area



Under the Fisheries Act No 11 of 1987, several designations exist for the area:

- ✓ The establishment of the Scotts Head Fishereis Management Area (SSFMA) (SRO18 of 1998)
- ✓ The declaration of the Soufriere/Scotts Head Marine Reserve (SSMR) and its boundaries (SRO19 of 1981)
- ✓ The declaration of the Fishing Priority Area (FPA) and boundaries (SRO 20 of 1998)

The purpose of these designations was to:

- help resolve and or eliminate conflicts, assist in making decisions relating to trade-offs, clarify roles and responsibilities of different stakeholders, and facilitate diverse stakeholder involvement
- maintain a fishing priority in the area to keep the traditional integrity of fishing
- conserve and promote the recovery of over exploited species, maintain biodiversity and sustainable resource uses
- Effectively manage land base activities that have negative effects on the marine environment
- Preserve activities for the people of Soufriere, Scotts Head and Pointe Michel

Since the establishment of the SSMR, the Local Area Management Authority, LAMA, is acting as its managing entity with the support of Fisheries Division as the lead governmental institution. Although several legal instruments have been adopted (SRO 16 and 17 of 1998 and SRO No.7 of 2001) to facilitate the ability of LAMA to manage the area, major legal inconsistencies exist that continue to undermine the authority and effectiveness of LAMA. An enabling legal and organisational framework has not been developed to allow for inter agency coordination and comprehensive policy plans to be formulated. There are present efforts to develop a framework for management of the MMA but this has not been completed. For the time being, the LAMA consists of a broad range of stakeholder including:

- ❖ Local Fisher Folks
- ❖ Representatives of the Dominica Water Sport Association
- ❖ Fisheries Division
- ❖ Coast and Marine Unit
- ❖ Local Government (Village Councils)
- ❖ Ministry of Tourism

In the past, there has been strong emphasis mainly on the marine resource components with little regards to the terrestrial environment. As the evidence suggest, marine managed areas, MMAs, resources cannot be adequately protected without management of land-based activities. As such, any protected area system plan or framework, must incorporate terrestrial concerns, as well as address the issues of land management and development activities/pressures.

The use of protected areas in the marine environment has been growing around the world as governments have increasingly come to appreciate their value as precautionary and proactive means of conserving important ecosystems. The SSMMA Regulations provide for the direct management and legal protection of the reserve's unique, diverse, and sensitive deep benthic ecosystem. Although there were some conservation efforts in the area prior to the MMA designation, environmental quality and habitat concerns were not being addressed in a comprehensive manner. . The designation has provided an opportunity to harmonize efforts across different groups and allowed habitat and other environmental quality concerns to be addressed across the board.

It is clear that a number of problems still persist that undermined efforts to manage the SSMMA effectively. This must be addressed in broad way engaging all relevant stakeholders and civil society institutions with the goal of maximizing the economic opportunities of the managed area while at the same time preserving the biological and non living resources within it so that future generation can benefit adequately.

The SSMMA is a contribution towards Dominica's commitment to protecting its marine resources in line with national strategies and sustainable management development goals. As well, the SSMMA supports regional marine planning efforts and is linked closely with the development of an integrated ocean management plan.

The goal of SSMMA Management Plan (the Plan) is to provide a road map for the development and enhancement of the existing resources to achieve economic sustainability while addressing public concerns and maintain the quality of the marine environment. The Plan provides a multi-year framework that includes an overall vision, objectives, and priorities for conservation and use of the resources. It also includes a description of the regulations, boundaries and zones, and specific actions to protect the SSMMA. As the health of the SSMMA is closely tied to the surrounding environment, the plan helps to guide decision-making for activities in and around the area.

The Fisheries Division is the lead umbrella Government Department overseeing the activiteies of the Local Area Management Authority for the protection of the SSMMA.

1.2 Management Framework

The management of marine living resources in SSMMA is a national responsibility. This Plan will serve as the long-term strategy for the governance of the SSMMA. It will be a use tool to guide decision making and a major platform on which more detailed management activities and operational plans for the area can be developed to address specific issues, particularly in the context of fast changing priorities within protected area spaces. It is a living document and must be reviewed and updated periodically to ensure that goals and objectives are achieved. It is supported by the wider involvement of key stakeholder and legislation which govern MPA management in Dominica.

1.3 Structure of the Plan

This Management Plan is divided into nine sections.

1. **Purpose and Background**: Outlines the rationale for the establishment of the marine reserve, its history, boundaries and zoning arrangements and the rules and regulations that govern it.
2. **Vision, Objectives, and Guiding Management Aprroaches:** Describes the vision, and management objectives and the broad principles guiding management actions.
3. **Description of area resources**: This section of the plan provides a description of resources within the SSMMA, its economic, cultural, and historical values as well as the major issues confronting management .
4. **Administration of SSMMA**: Provides a summary of the roles and responsibility of key stakeholders involved in management of the SSMMA.
5. **Management Strategies, structures and operational set up**. This section provides an overview of the staffing arrangements and capacity needs to fulfill the goals and objectives outlined in the plan
6. **Awareness and Communication**-. This section of the plan provide a summary of the communication and awareness strategy needed to promote the stakeholder interest in the SSMMA
7. **Management of infrastructure and equipment**. This outlines the strategy for managing and maintaining all equipment needed and owned by the management authority of the SSMMA
8. **Revenue generation and sustainable financial management plan**. This section details the means of generating revenue for the SSMMA and a financial plan needed to sustain its operation
9. **Future issues facing the SSMMA**.- Provides a brief summary of the key issues likely to affect the SSMMA in the future and how these can be addressed

This management plan is intended to act as a tool for the management of the Soufriere Scotts Head Marine Managed Area (SSMMA) for the next 5 to 10 years. It also provides guidance on governance, as well as management actions such as monitoring, compliance, education and awareness-raising, all of which will be critical to the success of the MMA. The target audiences include those responsible for managing SSMMA such as the Local Area Management Authority, Department of Fisheries, stakeholders, external supporters, potential donors and other interested parties who wish to support the SSMMA. The SSMMA Management plan has been designed to be a

dynamic document, recognizing the fact that Marine Managed Areas (MMAs) are dynamic environments. Inherently, the concept of adaptive management is adopted as the approach for governance of the resource. Changes to the plan should be listed in a simple format and agreed by the management board in consultation with stakeholder interest groups.

Box 1. Definition of and characterization of MMAs.

A marine protected area strictly speaking *is an area of the sea where no disturbance is allowed (Ballantine,1991). It is a proactive rather than reactive approach to marine management where operation and decision making is not dependent on detailed information. It is a more restrictive management approach. On the other hand, Marine Managed Area is a broader concept, allowing multiple use of a resources where conservation concerns drive the scope of permissive actions. It is generally defined as a site which has meets the following criteria:*
i) Area — Must have legally defined boundaries,
ii) Marine — An area of ocean or coastal waters,
iii) Reserved — Established by or currently subject to law or regulation,
iv) Lasting — Provide year-to-year protection for a defined area, and
v) Protection — Have existing regulations that afford increased protection specifically to natural and/or cultural resources and qualities within the site (http://d32ogoqmya1dw8.cloudfront.net/files/eslabs/fisheries/marine_managed_areas.pdf).

MMAs generally address one or more of three different conservation goals. Natural heritage goals- to conserve natural heritage values, such as biodiversity, ecosystems or protected species. Sustainable production goals aim to support healthy and sustainable fisheries, which might include restoring overfished stocks, and protecting spawning grounds or other key habitats. Lastly, cultural heritage goals focus on conserving areas of maritime history and traditional cultural connections to the sea, such as shipwrecks, submerged cultural artifacts, and areas important to specific cultures.

In specific regards to our own situation, the Fisheries Act of 1987 give the Minister power to declare any area of the fisheries waters and, as appropriate, any adjacent or surrounding land, to be a marine reserve where he considers that special measures are necessary: The declaration of the SSMR was :

a. *To afford special protection to the flora and fauna and to protect and preserve the natural breeding grounds and habitats for aquatic life, with particular regards to flora/fauna in danger of extinction*
b. To allow for natural regeneration of aquatic life in areas where life has been depleted
c. To promote scientific study and research in the respect of such areas; or,
d. To preserve and enhance the natural beauty of such areas

1.4 Legislative basis for the marine managed area

The legal support for the SSMMA and its management plan is contained in the Fisheries Act and various Statutory Rules and Regulations. Several sections under Fisheries Act of 1987 and other binding and non-binding regional and international conventions support ocean management strategies and the declaration of marine protected and managed area spaces to manage biological diversity and promote sustainable ocean exploitation. The international, regional, and national drivers for the establishment of marine managed spaces are detailed in the sections that follows.

1.4.1 The international framework context

Globally, there is growing support for adoption of MMAs as an overall strategy to conserve marine biodiversity and cultural heritage values of the marine environment. This support has been the result of increasing number of protected area designations, the increased demand on protected area resources, growing involvement of state and private institutions directly involved in the monitoring and management of MMA resources, and the recognition that many threats originate outside the protected area space. This has served as a catalyst for the increased awareness

and the realization that systematic institutional arrangements and the necessary legal support are key to achieving effective protected area management goals.

As such, many countries have become signatories to international marine agreements or conventions. These provide legal and institutional frameworks to establish mechanisms for governing and managing marine areas under their national jurisdictions, or more simply, within their national waters. The UN Convention on the Law of the Sea (UNCLOS) is widely regarded as the overarching framework for marine governance. In force since 1994, it provides nations with the legal capacity to delineate national maritime boundaries (such as the EEZ), to regulate extractive activities such as fishing within those boundaries, and to establish protected areas within both the 200 nautical mile EEZ and the 12 nautical mile territorial sea of a national coastline consistent with the rights of international shipping. Other international conventions such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora[1], and the Convention on the Conservation of Migratory Species of Wild Animals[2] also indirectly facilitate the establishment of MMAs and MPAs alike—for example, by facilitating the establishment of whale sanctuaries as protection areas for individual endangered.

1.4.2 Regional context

Regional conventions, such as the St. Georges Declaration and the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region have been established to improve marine management and information sharing. Of those adopted, guidelines have been drawn to provide a foundation for management programs. These agreements have been translated into local management plans and will continue to shape management and policy for managed areas of the sea within Caribbean jurisdictions.

1.4.3 National and local context

At the national level, MMAs are governed by laws and regulatory mechanisms established by central government and local authorities. In Dominica, the marine environment is not governed under a single law but is addressed through a fragmented set of laws and mechanisms established to manage different aspects of the marine environment such as conservation, tourism, pollution or fisheries. Consequently, no holistic legislative pact exists for protected areas management. Jurisdictional overlap, gaps and lack of integration between multiple organizations create a daunting challenge for MMA governance. The need therefore exist for a functional, holistic and cross-jurisdictional governance system for MMAs in Dominica.

In Dominica, the Fisheries Act, No 11 of 1987 was enacted[3], followed by a series of Statutory Rules and Orders (SRO) to establish the Soufriere/Scottshead Marine Reserve. This proclamation was in accordance with section 22 of the Fisheries Act through the SRO No.19 of 1998.

The avoidance of conflict between the fishermen (the traditional users), the need for accommodating new and emerging livelihoods, as well as conservation objectives were among the major reasons for the establishment of the marine reserve. The various SROs adopted to support governance of the SSMMA include

- The appointment of wardens as designated Fisheries Authorized Officers (SRO 16 of 1998)
- The designation of the Local Area Management Authority (LAMA) as the Fisheries Management Authority (FMA) of the SSMR (SRO 17 of 1998)

[1] Signed at Washington D.C. in 1973, amended n Bonn 1979, amended at Gaborone 1983

[2] Adopted in 1979 and entered into force in 1983. Intergovernmental treaty concluded under the aegis of the UNEP concerned with wildlife and habitat at global scale

[3] Fisheries Development Plan, 1990

- The establishment of the Soufriere /Scotts Head Fisheries Management Area (SSFMA) – (SRO 18 of 1998)
- The declaration of the Soufriere/Scotts Head Marine Reserve (SSMR) and its boundaries (SRO 19 of 1998)
- The declaration of the Fishing Priority Area (FPA) and boundaries (SRO 20 of 1998)

Figure 2: Traditional fisheries within the SSMMA

The supportive structures to enable enforcement of these various rules have not been fully implemented and continue to constrain management efforts. Subsequent to the above mentioned, the SRO 7 of 2001 was introduced to give effect to the collection of fees for certain activities executed within the SSMMA as well as to prohibit and govern certain operations.

In addition to the SROs, a number of strategic approaches will be necessary to reduce the potential for conflicts and enhance the governance capability of the local authority. These are outlined in the sections that follow:

Strategy1: Appropriate regulations to galvanize support for managed area.

The laws that impact the marine reserve will require updating and upgrading as the need arise. The process must be initiated by LAMA in close collaboration with its stakeholders to expand and enhance the array of goods and services that can be produced from the available resources. One way this can be achieved is to address some of the legal issues that currently constraint exploitation and management of marine resources. Building strategic partnerships could also be helpful in this respect. For instance, the Physical Planning Division's National Land Use Policy and Plans are in their review stages. It would be useful to take on board some of the issues that are relevant to the management and designation of marine reserve

1.5 Other regulatory agencies' jurisdiction and operational scope

The roles of agencies such as the Physical Planning Division (PPD) and the Environmental Health Department (EHD), Discover Dominica Authority (DDA), and such like, have become increasingly important in the management of the SSMMA. Given the nature of the issues and governance challenges, there is need for shared management responsibilities and collaborative approaches to devise a sustainable management framework for

the area.The main laws in Dominica that are directly or indirectly related to the designation and management of MMAs are as follows

- Fisheries Act No 11 of 1987
- National Parks and Protected Areas No 16 of 1975
- Beach Control Act No 21 of 1966
- Physical Planning Act No 5 of 2002
- Forests Act No 25 of 1958
- Forestry and Wildlife Act No 12 of 1976
- Litter Act No 4 of 1990
- Environmental Health Services Act No 8 of 1997
- International Maritime Act No 9 of 2000
- State Land Act No 27 of 1958
- Land Acquisition Act 1946

The SSMMA is also affected by various issues which are external to it. These include:

- Land-based sources of pollution
- Liquid waste management and sewage treatment
- Solid waste management
- Land use planning and uncontrolled developments along the coast
- Climate change elements

The extent of the landward boundary of the SSMMA must also be given due consideration. This legally defines the jurisdiction of the Local Area Management Authority. Important activities may occur at the peripheral areas which can adversely affect the health of the ecosystems within the protected are space.

In this regard, government departments such as the Lands and Survey Department (LSD), Forestry Division, EHD and the Ministry of Communications and Works (MC&W) are to be sensitized and kept abreast of issues relevant to the management and development of the MMA. The extent to which these agencies have incorporated these considerations into their action plans remains unknown.

Strategy 2: Provisions to ensure obligatory consultation/deliberation with other agencies/entities prior to any undertaking that will impact on the MMA.

This can be achieved by amendments to the Fisheries Act or by memorandum of understanding between LAMA and various agencies.

Strategy 3: Clear zones needs to be established to reduce conflicts within the SSMMA.

Competition for use of resources in the SSMMA continues to grow for many reasons

- the inclusion and activities of new stakeholder in the marine space,
- the growing importance of commercial fishing in the area
- Increase in local consumption of fish,
- wider utilization of the resource by tourism stakeholders,
- dynamic socio-economic issues across the island.

The above factors were the major push for the establishment of the marine reserve. Particular consideration was due to concerns of local fishers and the sustainable economic livelihoods derived from fishing activities within the reserve. For this reasons the greater part of the marine reserve was set aside exclusively for the fishing activity. The Fishing Priority Area (FPA) was consequently demarcated according to provision of SRO No. 20 in 1998. Since,

fishing continues to play a major role to the economic development of the local communities. Figure 3 highlights the fishing priority area within the SSMMA

Figure 3 Fishing Priority Area within the SSMMA

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Subsequent to the establishment of the marine reserve, zones has been adopted to further compartmentalize activities within the managed area space. This arrangement should continue to be observed pending the establishment of legally set boundaries. The engagement of all stakeholders is therefore key to maintaining these designations.

Strategy 4: Coordinates establishing management zones are to be set and physically demarcated.

Obtain new coordinates using GPS techniques to develop accurate maps of demarcated areas to enhance planning and management

MMA processes are dynamic and therefore, management approaches must always remain in a state of dynamic equilibrium with emerging concerns and issues. Proper measures to mitigate and to increase resilience must always be kept under review. Other than marine oriented activities, land base processes may also impact the integrity of the resources in the MMA.

The utilization of the living resources of the sea is governed by the provisions of the Fisheries Act No. 11 of 1987 and the various SROs. Other major regional and international Conventions influencing management approaches include:

- Oil Spills Protocol
- Convention on Biological Diversity
- Convention on Wetlands
- UNESCO Convention on the Protection of the World Cultural and Natural Heritage
- UNCLOS lll

- UN Framework Convention on Climate Change
- UN Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC)
- St. George's Declaration of Principles for Environmental Sustainability in the OECS.

To better conserve and manage the use of fisheries resources within the MMA, specific guidelines must be developed in respect to species, size, mesh sizes, seasons of harvest as well as opens and closed fishery rules. The overall success of such plans will depend on the awareness levels and the extent to which fishers understand the importance of such actions. The overall responsibility must be undertaken by LAMA and the Fisheries Division.

The same in implied for activities that are land based with the potential to adversely impact the MMA. Current laws that provides for a holistic management approach is lacking. The adoption of any new regulation will require cross linkage with other regulatory entities.

Also lacking as a management tool are provisions to handle or govern the activities of designated stakeholders distinct from fishers. The provisions that govern non-fisher activities are contained in the SRO No. 7 of 2001. There is need to clarify responsibility as well as jurisdiction in the following specific areas:

(1) the resources on the peripheral regions of the MMA such as the warm water vents on the coastline
(2) the adjacent lands that form part of the expansion plans of the SSMMA such as the isthmus leading to Scotts-Head Point, access route to the champagne snorkeling site and the beach at either sides of Point Cacharcou,
(3) the erection of any structures on the foreshore in the future,
(4) the declaration of buffer zones around the MMA, and
(5) revision of the fee structure for use of the SSMMA

The authority must be prepared to act and control all activities that may impact the marine manage space such as land based activities. Adequate representation and continued dialogue with the respective agencies are required.

Strategy 6: Review of SRO.7 of 2001 with view to streamline the fee structure in keeping with set policies.

In keeping with increasing administration costs and that of maintaining the facilities within the SSMMA, there is need to review and amend the fee structure to reflect inflation and increased management costs over the last 20 years. Also a new system of collecting user fees need to be developed based on issues that affected the old system.

2.0 VISION, OBJECTIVES, AND GUIDING MANAGEMENT PRINCIPLES

2.1 Purpose

The purpose of this plan is to outline the vision for the SSMMA. The broad goal is to develop a model management structure with the scope to engage all interested stakeholder under a shared management approach to maximize output from the areas' resources but at the same time promote responsible resource management. The document also outlines the goals, objectives and the appropriate strategies for achieving success. Among other things it aims

- to continue to secure an area of the marine space for the traditional users (fishermen) to cater for perpetuation of their livelihoods.
- to continue to cater for community base recreational and social activities with a view to conserving cultural practices.
- to cater for other new and potential users of that marine space
- to secure the resources contained in this space for future generations
- to consistently inform and educate
- to create an awareness of broad based knowledge and benefits of the resources of the MMA

It is a living, public document and as such is subject to periodic review.

2.2. Conservation objectives for the SSMMA

The conservation objectives for the SSMMA are aimed at protecting the ecological integrity of the resource, which includes the natural biodiversity, productivity, and ecosystem components, functions and properties and provide for economic opportunities for the peoples of the area.

2.3 Management and stewardship objectives

Management and stewardship objectives are aimed at establishing good management of the SSMMA by promoting and facilitating collaboration among agencies, users, and others with an interest in the resource and through promoting compliance with the MMA regulations and management planning. Promoting a greater understanding of the SSMMA among users and the general public is an important part of managing the MMA. Specifically, the guiding objectives include:

- Promote collaboration among all users, regulators, and other interests.
- Involve stakeholders and the general public in the management of the MMA.
- Establish co-operative agreements with responsible regulatory authorities to meet objectives for the MMA.
- Ensure that human activities within the MMA are consistent with regulations and the conservation objectives.
- Monitor and evaluate the design, management, and effectiveness of the MMA on a regular basis to ensure that it is meeting defined objectives.
- Promote stewardship activities:
- Increase understanding of the SSMMA ecosystem among regulators, user groups and the public.
- Promote active participation and engagement in management and research.

2.4 Research and monitoring objectives

The research objectives aim to develop a better understanding of the SSMMA ecosystem through research and monitoring of natural processes and the effects of human activities:

- Increase our understanding of the SSMMA and the potential for human impacts on this ecosystem.
- Foster collaboration and communication among managers and natural and social scientists.
- Provide managers with accurate and timely information on the state of the SSMMA ecosystem and potential threats to conservation and management objectives.

2.5 Economic objectives

The economic objectives of the SSMA include:

- Provision of goods and services to the all users and peoples of the area
- Provision of viable economic opportunities

LAMA vision of the area is to develop a model management structure for sustainable financing of the SSMMA. The goals set out to achieve this are based on the major thematic objectives outline above.

2.6 Biophysical goals

There are three major goals in this category

1. To manage the marine resources and ecosystems of the area so as to enhance biodiversity and ecological functioning of the managed area;
2. To protect and restore depleted, endangered and endemic species and populations which are important for the functioning of the ecosystem to maximize good and services produced;
3. To contribute towards the long-term viability of marine fisheries

2.7 Socio-economic goals

a) To promote and maximize non-consumptive, ecotourism opportunities;
b) To provide opportunities for marine ecological research and monitoring of environmental effects of human activities on marine ecosystems;

2.8 Governance goals

1. To reduce conflicts between competing users in the MMA and surrounding areas;
2. To ensure that appropriate and effective legal structures are developed for protecting the biodiversity of the MMA and the activities that benefit from it;
3. To fulfill Dominica's international commitment to marine protection in terms of international protocols and conventions;

2.9 Guiding principles and management approaches

The SSMMA Management Plan and management actions will be guided by the internationally accepted standards that promote sustainable management of MMAs. The two major guiding principles include

i. **Ecosystem-based Management:** The management of human activities so that ecosystem components, functions, and properties are restored and/or maintained at appropriate temporal and spatial scales. Ecosystem objectives are used to identify and set desired ecosystem conditions, measurable indicators for monitoring and evaluation, and operational measures and actions to ensure that conditions are met and maintained.

ii. Collaboration and Stewardship*:* While DFO has the lead jurisdictional responsibility, the vision and objectives for the SSMMA can only be achieved through the co-ordination, co-operation, and partnership among all organizations and interests. Management planning must be both inclusive and transparent, and supported, to the greatest extent possible, by all affected organizations and individuals. Stewardship refers to the wide range of actions and activities that can be taken by individuals, groups, and communities to raise awareness of SSMMA and to monitor, and conserve the MMA ecosystem. LAMA encourages and will actively pursue collaborative activities and stewardship opportunities for the SSMMA.

iii. Precautionary Approach: The precautionary approach is an evaluation and decision-making processes that errs on the side of caution and is used in the case of significant scientific uncertainty. Not all human activities will be excluded from the SSMMA, but a precautionary approach will be applied in evaluating proposed activities. This will put the burden of proof on any individual, organization, or government

agency conducting activities within or affecting the MMA to demonstrate that proposed activities will not damage the marine ecosystem.

iv. Sustainability: Human activities in the SSMMA will be limited to those whose sustainability has been demonstrated. Emphasis will be placed on maintaining healthy populations of all species and on the conservation of ecosystem functions and processes. A precautionary approach and the most current scientific knowledge will provide the basis for management decisions.

V. Integrated Management*:* The SSMMA is located in an area of immense biological diversity and unique geological features. The LAMA will take a comprehensive and coordinated approach to planning and decision making for sustainability, based on the balanced consideration of the full range of interests and environmental, social, cultural, economic and institutional objectives for the whole management area.

VI. Knowledge-based Decision-making*:* Management actions will be based on the best scientific information and traditional ecological knowledge available. Scientific studies of particular aspects of the ecosystem will be encouraged to improve information.

VII. Adaptive Planning and Management: As the SSMA is one of the first MMAs in Dominica, the management plans will take a "learning by doing" approach. As well, some of the pressures on the SSMMA ecosystem will change over time. Planning and ongoing management actions will be adaptive and responsive to better knowledge of the MMA ecosystem and changing social, environmental and economic conditions. The design, management and effectiveness of the SSMMA will be monitored and evaluated regularly to see if it is meeting the objectives for the MMA.

3.0 DESCRIPTION OF THE AREA RESOURCES

The area has a number of important sites and features which makes it a prime eco-tourist on island. Tourists and recreational enthusiasts total around 4000-5000 in the SMMA annually. There is potential to double or triple that number in the near future with development of the appropriate infrastructure and management planning. The majority of visitors and locals alike take part in diving and snorkeling activities near champagne and at other sites within the SSMMA. Diving and related activities are the mainstay of local SSMMA economy. The area has been rated as one of the best dive destination for shore diving in the world but this can change if resource quality is not enhanced. There is scope to develop a number of other initiative to generate more economic activity and resource enhancement. These activities are sustained because of a rich and diverse nature of the SSMMA marine ecosystem.

3.1 Geography and habitat

The geographic extent (See figure1) of the SSMMA spans from a northerly point in Anse Bateau just south of the edge of the village of Pointe Michel to Point Cacharcou on the southern tip of the island and extends to a south easterly point just east of Scotts-Head village near grand Bay, the further point south.

The SSMMA is one of the largest and deepest near shore submarine volcanic crater in the Caribbean. The SSMMA consists of unique land forms and a complex network of benthic ecosystems nestled on the outer perimeters of a huge sunken volcanic crater. The substrata consists of areas of fine quartzite sand bottom, and occasional deposits of very fine, low-density silt which is easily disturbed and returned to suspension. Larger coble materials are also dispersed across the seafloor. There are small pockets of shell, gravel and mud scattered throughout the SSMMA. The steep topography of the SSMMA influences the currents flowing through allowing low residence time. Because of its location, shape, size, and physical oceanography characteristics, the SSMMA contains many diverse habitats and is highly productive for a variety of species.

3.2 MMA zonation

Zoning is a strategy adopted to promoting multiple use of SSMMA resources and is intended to diffuse conflicts. The zoning scheme classifies different areas within the MMA according to their ecosystem characteristics and protection requirements. The management zoning scheme presented here reflects the perceived sensitivities of the ecosystem and the broad objectives of management approach. These objectives and priorities are described in detail in the objectives and goals section of the document.

There is one established and three conveniently demarcated zones in the SSMMA. These include

1. **Fishing Priority Area (FPA**). This zone was set up in an area where fishing was widely practiced. The area is also well known for frequent aggregation of coastal migrating pelagic fishes. The FPA is the largest of the zones and encompass both shallow waters and some of the deepest portions of the SSMMA. Fisheries data indicate that approximately 75-90 registered fishers including part time fishers utilize the area for fishing. There are still lingering conflicts between fishers and Dominica Waters Sports interest as some of the prime dives are within the FPA. The FPA was delineated in 1998 by S.R.O 20. The FPA is the only demarcated zone substantiated by an SRO. Its Boundaries are as follows:

2. Fish Nursery Zone (FNZ)

The fish nursery area is the tucked away to the northern end of the SSMMA and was established to promote stock regeneration. This area has widely been recognized as the traditional nursing ground for most of the dominant species within the SSMMA. This is a strict no take areas of the SSMMA and limited activities occur in this region. The area is characterized by very shallow waters and coral beds. The area is dominated by a strong prevailing near-shore current and a continuous pulse of warm water from the vents in the rocks near the shore. This creates ideal condition or a range of biological activities including spawning

3. Recreational Zone (Scuba and Swimming) - This is the area specifically set aside for recreational Scuba diving, snorkel and swimming**.** The set up was based on the traditional use, the resource condition and, the potential for development into a prime recreational space. There are multiple areas designated for swimming in the SSMMA (Figure 4a). The largest expanse for swimming and scuba are in the northern region of the SSMMA. The world renowned Champagne Scuba and Snorkel site is located in the far north region of the SSMMA along with several other underwater features including warm vents from the sea floor creating bubble-like effects, pinnacles, sheer drops/walls with a kaleidoscope of flora and fauna making the area one of the prime dive sites in the world (figure 4b).

Unfortunately, there is very little signage in the area and illegal and unsupervised dive and snorkel continue to occur even though the practice is strictly forbidden. Appropriate signage and mooring facilities are to be erected and maintained both on land and sea to improve the quality of service being offered

Figure 4a. Zone areas of the SSMMA

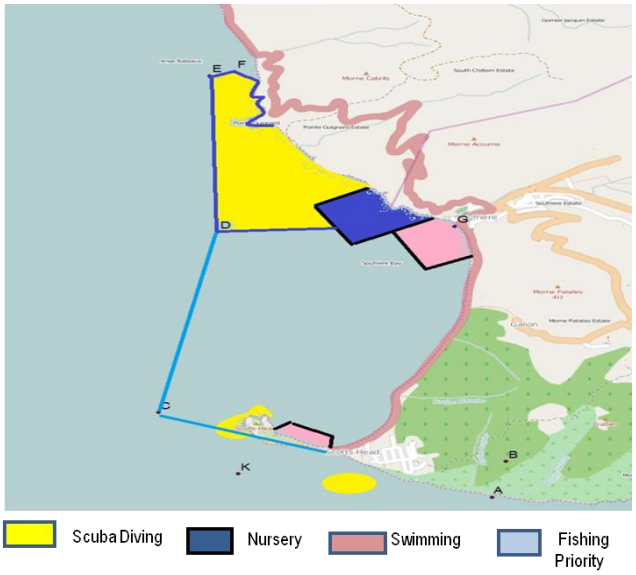


Figure 4b. Champagne Reef in the SSMMA

Champagne Dive Site

The main habitats and resources that can be found in the SSMA are:

a) Sandy and pebble beach

The SSMMA sand and pebble beach consist of an array of coarse grained quartz which has a characteristic brownish appearance. There is a huge sulphur presence due to infiltration of heavy mineral water which flows sub surface throughout the area. There are also entrapments of hot mineral water along the surf zones which supports a thriving tourism business. Sandy and pebble beaches are characteristically dynamic habitats dominated by wave action. Erosion can change the nature of these habitats from time to time making these habitats suitable only for hardy sessile species. Human activities are also having effects. Some of the major anthropogenic pressures include

- The construction of sea defense walls which alter the characteristics of the coastline and induce erosion in various areas
- Poorly regulated infrastructural development
- Solid and liquid waste disposal
- Storm induce erosion and deposition
- Climate change

b) Rocky shores and cliff drop-offs

Rocky shores form the transition between terrestrial and marine environments, and are thus exposed to very different physical conditions. In the course of a day, rocky shores may be covered with seawater at high tide and exposed directly to the air at low tide. In the SSMMA, rocky shores are found in close vicinity to the northern areas of the village of Soufriere and in and around the headland in Scotts Head. Rocky shore also dominates the southern region of the village and is important nesting sites for migratory and resident species of shore birds. Northwards of Soufriere towards the village of Pointe Michel, the coastline is characterized by shear drops and rocky terrains. The rocky shores on SSMMA are attributed to the volcanic geology of the area (Figure 5).

Figure 5. Rocky coastline of the SSMMA form nesting sites for migratory species of shore birds

c) The Alum Stream River mouth

Historically, the Alum Stream was a small, temporarily open system with the mouth predominantly determined by river flows and storm action. Under these conditions sea water intrusions created estuarine conditions supporting an array of species and communities. This remained one of the few marine–fresh water interfaces in the area for a long time. Estuary conditions began to deteriorate in recent years due primarily to water effluent discharges from development upstream and increased turbidity due to poor land use practices. Stream flow remains intermittent with higher flows occurring during rainstorms activity. Increased flows can result in widening and shift of the mouth but migration has been reduced due to channelization. Storm action can also change position of the mouth from time to time.

(d) Diverse habitats and biodiversity

With varied depths and sediment types, the SSMMA sustains a diversity of habitats and species. Some of the dominant species include the Yellow Tube Corals, Sponge Corals, Boulder Brain Corals, Finger Corals and the Pillar Corals (Figure 6a). The unique Wire Coral is also common to the area. Various sea grass meadows are found throughout the SSMMA. Reef Butterfly, dolphin fish, Jacks, and the Knobbed Porgy are common species especially at the Scotts Head Point area (Figure 6b). The diversity of surficial sediments in the MMA results in conditions appropriate for many different bottom-dwelling animals such as the filter feeders, , echinoderms, crustaceans such as crabs, amphipods, and shrimps, mollusks such as snails and octopods, and a variety of worms such as polychaetes and nematodes. The area is highly frequented by other marine mammals as well. There are confirmed sightings of different species of whales and dolphins paving the way for the area to become a major whale watching site.

In addition to supporting a wealth of marine organisms, the coral reefs are the basic reason for the designation of a dive site and dive tourism development. The structure of the reef protects coastal developments from waves and storm surges and is important to supporting the local fisheries.

Figure 6a. Abundance of life forms within the SSMMA

Figure 6b. Diversity and abundance of fish in SSMMA

e. Human Settlements

The villages of Soufriere and Scotts Head are nested along the shores of MMA due to the unavailability of flat land in the interior. Its main attraction is the unique landscape and architecture, with number of historic sites scattered throughout the twin communities. The main road runs along the coastline for several kilometers, allowing easy access to the shore at a number of places. The road side is lined with restaurants, small shops and makeshift souvenir stands

f. Sulphur vents

The seafloor of the SSMMA has an abundance of sulphur vents which create a continuous stream of bubbles within the water column. This is most evident at the Champagne site. Along bubble beach, and within inland areas are numerous sulphur pools where people patronize presumably for the therapeutic and healing properties of the heavy mineral laden waters. This has tremendous potential to become a major revenue generator in the area.

g. History and Archaeological sites

Combined with its unique topography and towering hills, gorgeous valleys and hot springs, the area is known to be a site of archaeological findings and remnants of lime processing plants and plantation houses. The cultivation of limes and processing of lime juice became the mainstay of the local economy and a key cultivator to foreign exchange earnings of Dominica. Evidence of an old watermill and machinery can be seen at various points cross the Soufriere estate (Figure 7a). Figure 7b shows the wreckage of a ship just off the coast of Champagne. The area is a prime dive site and an area of historic value.

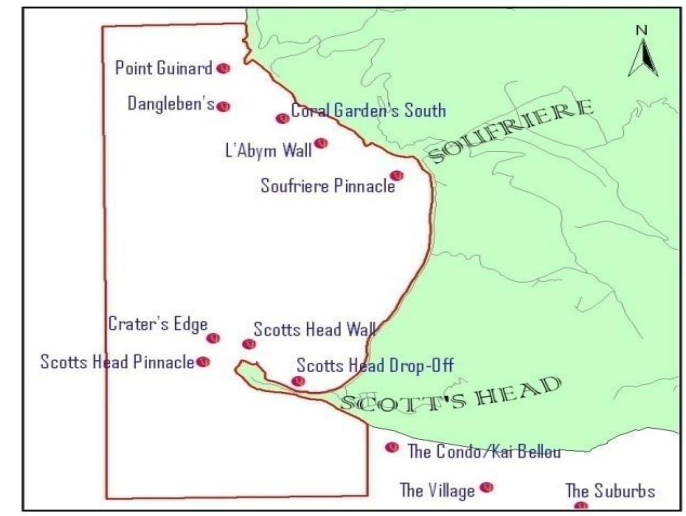
The Bois Cotlette plantation (Figure 7c) is one of the oldest surviving estates on the island dating from the early years of French settlement in the 1720s. It is the best preserved example of plantation architecture in Dominica, combining buildings for the processing of coffee, sugar and limes as well as its French colonial "Maison de Maitre". It has the only existing windmill tower on the island. This was turned by wind blowing along the valley from the south east coast. This rich history compliments the dive and snorkeling experience in the area. A viable community tourism based initiative can capitalize on this.

Figure 7a. Evidence of an old watermill and machinery in the Soufriere Estate. Figure 7b. Wreckage of sunken vessel just outside champagne area. Figure 7c A fine example of a Dominican Plantation of French origin, Located in the Soufriere (www.lennoxhonychurch.com/article.cfm?id=386)

h. Dive sites

There are 12 dive and 10 snorkeling sites within the SSMA with Champagne being the most popular snorkel site. These dive sites are generally located in the vicinity of coral beds, historic sites or in areas where geologic features are prominent. Figure 8 shows the spread of some of the more popular sites

Figure 8: Major Dive Sites within the SSMMA



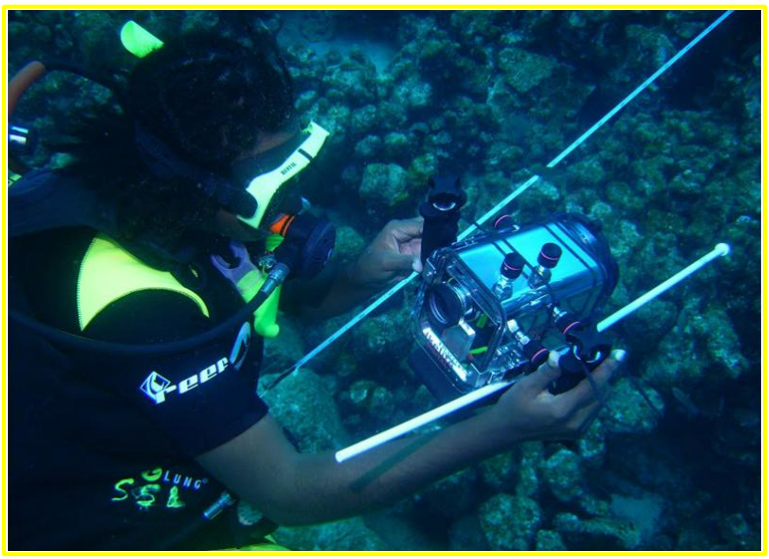
i. Uniqueness of the seafloor

The peculiar features of seafloor in the SSMMA are one of the main reasons for designating it as an MMA. The sheer drop and steep, the underwater pinnacles, the relatively flat plains along with the cone-shape volcanic crater that forms the Soufriere Bay as well as the immense biodiversity in such a relatively small geographic space, are compelling reasons for protecting this resource.

j. Research value of the SSMMA

Scientists have learned much about the SSMMA in recent years. Scientists regularly make summer visits to conduct research projects. Other important surveys have been conducted to determine the feasibility of community yacht mooring project. Additionally, periodic surveys are conducted to determine the health of the major benthic communities particularly after major disturbance such as the passage of tropical storms. The species richness and distribution along the volcanic vents are important sites to study potential impacts of climate change on near shore ecosystems.

Figure 3: Monitoring reef health in the activities in the SSMMA



k Conservation value of the SSMMA

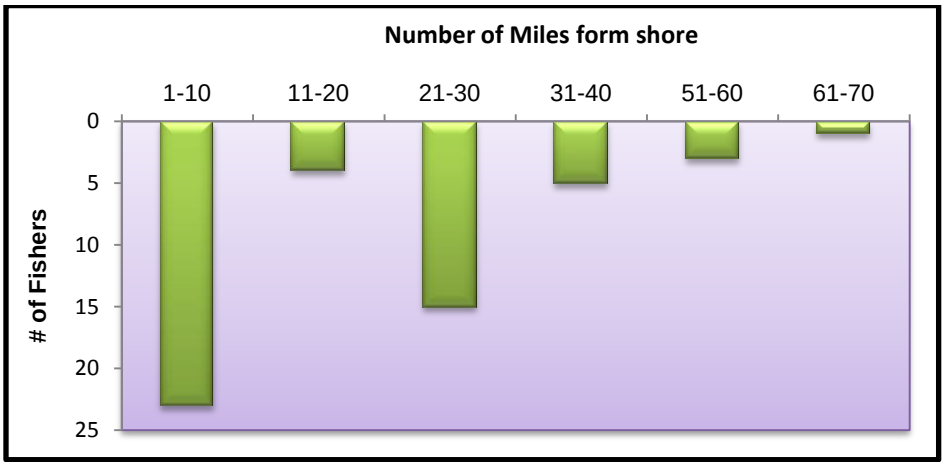
The conservation of marine resources and environments is of increasing importance to many Dominicans. The SSMMA and the marine life found there, particularly the corals and migratory whales species are valuable to many people for non-consumptive reasons. The government of Dominica and the general public has identified the area as a unique site that merits special protection.

l. Fisheries

Soufriere and Scotts Head are two major fishing communities in Dominica with a unique history of artisanal fisheries. There are about 75- 90 registered fishers in the two major communities of Soufriere and Scotts Head according to the last fisheries census. Here fishers employ a variety of fishing technique ranging from use of open keel boats and traditional fish ports to seines and net fishing (Figure 10). Most of the fishing is done one to 1-10 miles off shore (Figure 11) but in recent times, fish aggregating devices (FADS) have been encouraged and deployed to relieve pressures on coastal fisheries much further offshore..

Figure 10. Artesian fisheries in the SSMMA

Figure 11 Distance fished offshore within in the Soufriere Scotts Head Bay



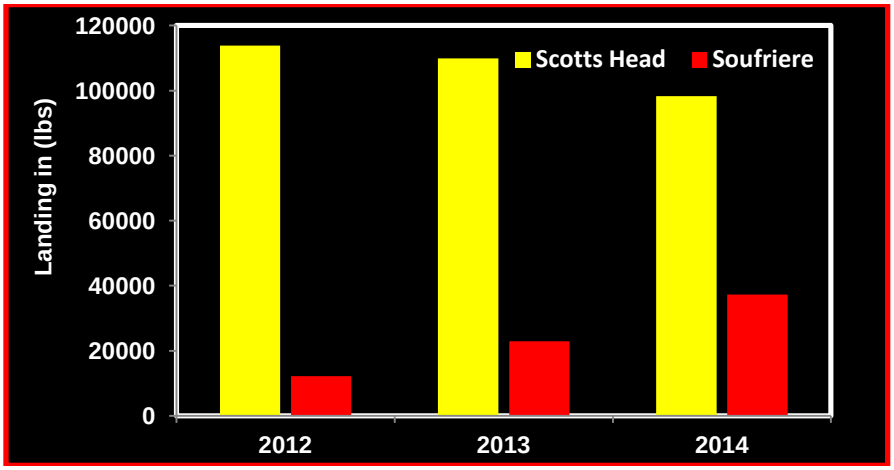
The dominant species caught in the Soufriere Scotts Head Fishing Priority Area and areas beyond it based on Fisheries Division datasets are summarized in Box 2

Box 2. Most common species caught within the SSMMA for period 2012-2014

Yellow Fin Tuna
Squirrel Fish
King Fish
Jack
Blue Main
Parrot Fish
Coney
Snapper
Dolphin Fish

Fishing has been one of the most dominant economic activity in the area for a very long time. Total annual landing for 2012-2014 are shown in Figure 12. On average, 107 328 ponds of fish is landed Scotts Head annually and 24124 pounds in Soufriere. The average dollar value is EC$ 751 296 and `EC$168 870 respectively for each community.

Figure 12. Total annual landings estimated for the Soufriere Scotts Head Area



3.3 Critical issues impacting the SSMMA

The topography and type of mineral that make up the surrounding hills (Figure 13a) predispose the area to mudslide and rock falls (Figure12b.). Physical weathering and prolonged dry periods followed by heavy rains can exacerbate the conditions (Figure 13b). Mudslides and rock falls can negatively impact the marine environment and impair habitat health. This is particularly common in the area leading up to the famous Champagne Snorkelling Site (Figure 13 c) where mudslides and rock fall can damage the board walk infrastructure. This can put considerably strain on limited financial resources of the local management authority. The likelihood for increase in intensity and frequency of heavy rain storm events due to climate change will increase the cost of repair and maintenance of critical infrastructure within the marine reserve.

Figure 13a. Steep and unstable slope in areas of SSMMA

Figure 13b. Rock falls and slides near boardwalk

13c. Impact of rock falls on board walk infrastructure

3.3.1 Strategy to mitigate impact:

The location of the boardwalk renders it susceptible to continued slides. The most practical short term approach is to maintain and replant tree on the lopes to retain soil and reduce runoff. Overtime, cliff stabilization will have to be considered as well as more resistant infrastructural designs.

3.4 Solid waste disposal

The uncontrolled disposal of garbage within the SSMMA is a serious concern that needs to be addressed. The practice of disposing garbage over the cliffs edge is one of the major contributors of solid waste and plastic debris in the near shore waters (Figure14). This can impair ecosystem health and reduce the aesthetic appeal of benthic ecosystems. Addressing this issue will require, the cooperation and collaboration of other agencies such as the Physical Planning, Forestry, Solid Waste Management and the other Local Authorities

Figure 14a and 14b. Site of waste dumping on slopes leading to the MMA.Construction waste and other household matter are elements that find their way into the marine space along the coastline of the MMA. These materials are deposited in areas that are usually out of the sight of the patrol wardens.

3.4.1 Strategy for action:

Wardens need to increase surveillance and patrol and work with the local community to set up a watch program. Similarly, an awareness program should commence both at the school level and at the level of the household. There must be broad base consultation between LAMA and the aforementioned Government agencies on a regular basis.

3.5 The Alum Stream

The Alum Stream (Figure 15) is one of the only surface flow streams entering the reserve in the Soufriere Scott Head area. The source originates from the warm sulphur vents in within the rock crevices of the mountains about 1 mile inland from the coast. The heavy mineral laden waters enter the SSMMA in northern edge of the community of Soufriere. Traditionally, this stream has been the waste outlet of many households and in recent times with the expansion of the village upstream, the problems of waste discharge has exacerbated. The volume of water has also decreased considerably due to vegetation clearing. Standing water and increase residence time promotes bacterial decomposition and nutrient retention in ponds. This is often characterized by unpleasant smell which permeates throughout the community. At certain times, tidal forces and sand deposition control the interaction of the stream with the ocean. The environmental health department began water quality monitoring in the past and has been working with the local authorities to address this problem.

Figure 15. Sections of the Alum Stream in Soufriere

3.6 Ship and User generated threats

Unregulated activities can impact the marine environment in a number of ways especially the water sport activities, ship traffic, fishing and recreational users. Ships may release ballast and waste water which can introduce contaminant and alien species to the local area. Mooring and anchoring can also damage reef systems if dive moorings are not in place at required sites. In the case of the fisherman, net casting and retrieval can adversely impact benthic floral and flora. Strict standards are needed to safeguard the marine ecosystems within the SSMMA.

To minimize the likely impacts that some water-sports operations (Figure 16) may cause particularly in the scuba diving and snorkelling areas, moorings are erected at strategic locations. These have to be reviewed periodically and informed by data

Figure 16. A water-sports vessel operating within the SSMMA

3.7 Storm impact

The SSMMA is susceptible to many natural phenomena such as storm surge, hurricanes and sea level rise. During high seas, wave action cause extensive erosion to the isthmus. During Hurricane Hugo in 1988, the area was completely cut off. The isthmus connects the mainland with the outermost headland. This is one of the most scenic sites within the SSMMA (Figure 17)

Figure 17: The causeway that leads to Scotts-head Point is frequently disrupted during storms

3.8 Coral bleaching

Coral bleaching is the loss of intracellular endosymbionts (Symbiodinium, also known as zooxanthellae) through either expulsion or loss of algal pigmentation. Bleaching events are often induced by warmer water intrusion or sudden cold water pulses within tropical environments. When water is too warm, corals will expel the algae (zooxanthellae) living in their tissues causing the coral to turn completely white (Figure 18). When a coral bleaches, it is not dead but it is under more stress and is subject to mortality. Evidence of coral bleaching has been observed within the SSMMA in the past.

Figure 18. Coral bleaching are a major cause of loss in the Caribbean

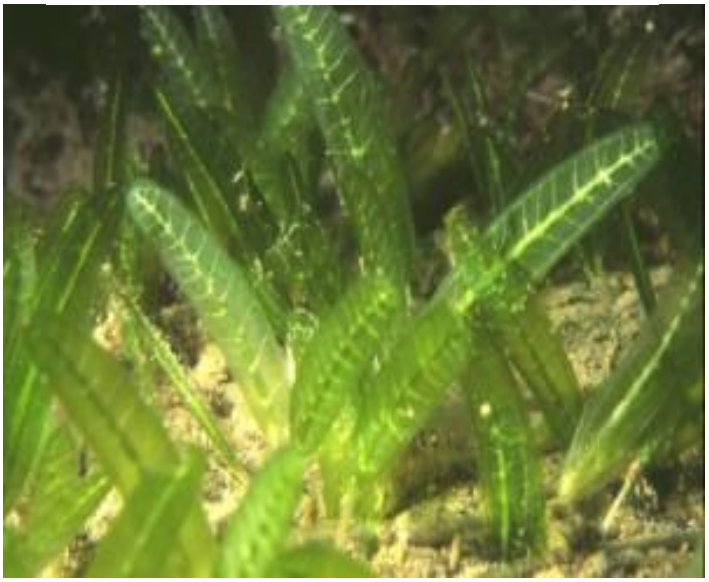
A number of strategies can be adopted to reduce occurrence and impact. These may include

i). *Continuous regular monitoring is required of such impacted areas.*
ii). Impacted and susceptible areas must be demarcated and studied
iii). Carrying capacity for human interaction to be closely monitored with a view to alleviating any undue stress to the resource.

3.9 Invasive Species

Invasive species can pose a major threat to the stability of any ecosystem. The *Halophilia stipulaceae, an invasive species originating from the* Red Sea, have been detected along the waters off the west coast of Dominica and near areas of the SSMMA (Figure 19). It is most often dispersed by commercial maritime traffic inclusive of yachts and big commercial vessels. *Halophila stipulacea* is capable of out-competing native sea grasses while inducing changes in the composition of sub littoral communities. The diversity of sea grass species are very important to the SSMMA in terms of habitats benthic species and turtles, a major source of food and nutrient exchanges in the water column. Management of the SSMMA must be cognizant of the threat of these alien species and regular monitoring must be put in place to control distribution.

Figure 19: Photo of invasive sea grass H. *stipulaceae*



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Another threat to the SSMMA is the Lion Fish (Figure 20). The Lion Fish was introduced from the Pacific into the Atlantic in the early 90s, and due to lack of natural predators, their populations have increased sharply in recent years, threatening biodiversity, dive operations, and local fisheries, throughout the Caribbean including Dominica. Efforts are on the way to support and promote the control of Lion Fish through human consumption and authorized spear fishing within the SSMMA.

Figure 20. Photo of the invasive Lion Fish species

The nature of an MMA is such that continuous assessment and monitoring is essential to inform management action. Inherently, MMAs are dynamic systems with both internal and external factors exerting considerable pressures on ecosystem processes. Therefore data collection, analysis and interpretation are an import aspect of the overall management approach. At present, surveys are conducted infrequently or usually after major impact storms to assess health of habitats in the SSMMA (Figure 21). The most recent was after the passage of tropical storm Erika

The Fisheries Division assist LAMA with data collection but more need to be done to ensure that the process is continuous and non fisheries data sets are collected to better understand change and trends in ecosystem monitoring. For the time, mostly fish landings and species are documented. The Environmental Health Unit is also involved in water quality monitoring but this was discontinued. A water quality monitoring programme needs to be set up to closely monitor water quality and health of the coastal ecosystems. In the short term, LAMA needs to recruit and train at least one staff in sampling techniques, data collection, analysis and interpretation to strengthen its management capabilities

Figure 4: Wardens and Fisheries personnel engage in resource monitoring in the SSMMA

4.0 ADMINISTRATION OF THE SSMMA

This section provides an overview of the activities related to the administration of the SSMMA and identifies the roles and responsibilities of DFO, various government departments, and the LAMA. The management of the SSMMA is an ongoing commitment and it requires the collective participation of all stakeholders. Government and non-government organizations must play a role in managing the SSMMA to ensure that it can continue to provide the services that sustain economic livelihoods. However, others with an interest in the SSMMA can play their role by providing advice on management, carrying out research, undertaking outreach, or participating in stewardship activities in the MMA. The following summarizes the key roles of all stakeholders in the MMA.

4.1 Roles of Major Government Ministry in MMA management

4.1.1 Ministry of Agriculture and Fisheries

The Ministry of Agriculture and Fisheries has the lead responsibility for ocean management in Dominica and coordinates all programs, policies, and management strategies related to the marine environment. As the lead authority, it has the primary responsibility for its protection, enhancement of maritime resources, and the overall management. The department of fisheries (DFO) needs to collaborate with other governmental agencies and stakeholder institutions to develop programs and strategies that promote sustainable use. Core responsibilities for DFO in MMA management include:

- implement and coordinate activities related to the management plan;
- promote compliance with regulations among all user groups and other government regulators;
- Assist LAMA monitor permitted activities within the MMA;
- provide outreach opportunities and materials where possible;
- Support and conduct research in the MMA; and
- Evaluate and monitor management of the MMA to ensure objectives are met.

4.1.2 Ministry of Education (MOE)

The MOE can contribute to the management of MMA by providing training in a number of skills relevant to natural resource and protected area site development. The MOE should also provide training to enhance the management/entrepreneurial skills that may be needed by organizations that will wish to provide services to the protected areas or make use of business opportunities provided by the system. Its support should also be solicited in curriculum development to improve the awareness of students and the general public about environmental protection and management of MMAs.

The Dominica State College (DSC) provides tertiary level and workforce training, and can contribute to the development and management of the system of manage areas by providing training opportunities for protected area personnel. Additionally, DSC can collaborate through conducting or participating in social, economic, and environmental research relevant to MMAs. Other major areas of input by DSC could be in areas of data gathering and analysis of data for informed decision making.

4.1.3 Ministry of Tourism (MOT)

The MOT has a crucial role to play in MMA management. When MMAs are managed properly, tourism has the advantage to preserve and strengthen indigenous cultural identity, while at the same time make a positive contribution to economic development of local communities. Sustainable tourism can also help raise awareness on conservation issues. On the other hand, tourism may pose an implicit threat to the MMA, particularly if such ecosystems are very fragile. Recognizing that the existing operational framework is challenged with balancing two competing goals – protection of natural and cultural resources and provision of opportunities for public use or visitor experiences, there is recognition that forward planning must build strong alliances with the MOT in a number of critical areas.

A first step in the process is for the Ministry to develop a policy statement with clear goals and objectives. This can subsequently be translated into a series of actions and opportunities for partnership building. This effort will contribute to development and establishment of an ecologically comprehensive, resilient, and representative management plan that better addresses biological diversity, health and sustainable tourism issues. The management plan should be integrated into the wider institutional framework for increased collaborative support. The focus and responsibility of this Ministry in MMA management include:

- Marketing and promotion of the SSMMA to increase visitor arrivals
- Provide active support for the management of MMAs by providing the technical and capacity building expertise for more coordinated planning of MMA
- Provide access to financing where possible to support MMA programs at local and national levels
- Facilitate training opportunities in MMA management and sustainable tourism initiatives
- Local capacity is essential to a successful MMA-based nature tourism enterprise but it is difficult to build sufficient management capacity at the local level. It is more efficient to consider system-wide capacity development to bolster collective capacity across participating stakeholder institutions. The MOT can play an important role in building institutional networks for collective action and support for the SSMMA
- Foster opportunities for stakeholder engagement and information exchange on MMA issues.
- Ensure that the natural and cultural heritage of the site is managed appropriately and effectively over the long term

4.1.4 The Ministry of Justice, Immigration and National Security

The Ministry of Justice, Immigration and National Security in Dominica, is the major arm of government that is responsible for legal matters. It plays important roles in legislative drafting and the provision of legal advice to the government on several issues including protected area management legislation. Support for MMA can generally occur on two levels namely, (a) institutional support and (b) development of new legislation or amendment to existing legislation. At both levels, governance of MMA can be most effective when clear provisions are made and the necessary enforcement mechanisms are put in place. Therefore, the ministry can support the SSMMA through:

- Continuous update of the marine managed area legislation of the Commonwealth of Dominica to ensure that it is up to date and in sync with regional and international legislation governing MMAs.
- Drafting and preparation of government legislation specifically relating to protected area management.
- Increase levels of awareness on the need for protection of marines and terrestrial ecosystems
- Provide strong leadership in areas of enforcement support to ensure compliance with all legislation pertaining to MMAs
- Build strong collaborative support with other government ministries to institutionalize MMA policy and legislation

4.1.5 Physical Planning Division

The Division of Physical Planning is the executive institution for planning control in Dominica. Its role in the support of an MMA is therefore critical since terrestrial developmental activities can adversely impact the MMA environment. Within the coastal marine interface, planning activities can be quite complex since these systems can be very dynamic. Its responsibility and involvement in MMA management should focus mainly on the following:

- Development of policies, monitoring and project evaluation guidelines for MMA management
- Assessments of environmental impacts and facilitation of baseline studies for all proposed development to advise on the cumulative effects and examination of alternatives, especially those in or adjacent to the MMA.
- Provide mechanisms to foster inter-sectoral linkages for coordinated planning
- Coordinate and conduct of risk assessments by an interdisciplinary panel of experts;

4.1.6 Marine Coast Guard

The Marine and Coast Guard Unit can support MMA monitoring through its emergency response, vessel traffic management, and pollution surveillance programs. This includes receiving and acting on accident reports and coordinate government responses as required. The Coast Guard can also assist in enforcement and training of wardens and can take central coordination responsibility in the event of an environmental emergency. The Coast Guard can also provide information on MMA conservation measures and specific guidance for transit of vessels in the area.

4.2 Nongovernmental organization in MMA management

4.2.1 LAMA

LAMA is the management authority most directly involved in management and decision making for the SSMMA.. Legally, LAMA has the authority to adopt by laws to regulate only fishing operations in SSMR as it was and still is the designated Local Fisheries Management Authority. Sustainable management of the SSMMA will require greater legislative authority beyond fisheries management in order for LAMA to build sustained partnerships with key institutions, implement and enforce strategies outlined in its management plan, and oversee control of SSMMA resources.

Within the context of MMA management, LAMA's primary responsibilities must be developed out of the need to promote sustainable consumption of resources and conservation of biological diversity, as well as the need to build robust partnership with stakeholder institutions and the local community for shared responsibility. As such its major role must include:

- Implementation of the management plan
- Regular monitoring of marine ecosystem health
- Public information and sensitisation
- Provision of facilities for users of the SMMA, e.g. moorings
- Coordination of economic activities related to the SMMA and its resources to benefit community
- Promotion of technologies that are appropriate and linked with local environmental, social and cultural aspects of the SMMA
- Surveillance and enforcement of rules and regulations
- Conflict resolution among the various user groups whenever necessary

A Local Area Management Plan is the tool that will be used to strengthen institutional partnership in management of SSMMA. Accordingly; the local area management plan (LAMP) must respond to and address the needs of local SSMMA communities, as identified through public participation processes.

4.2.2 Management responsibility of Dominica Watersports Association (DWA)

The DWA is an integral partner in MMA management in Dominica. Their roles and responsibilities need to be institutionalized within any management plan. Provisions should be made in bylaws to allow joint management planning with LAMA, membership representation on Boards, development of conflict resolution strategies, and joint training programs developed to certify waters sports operator within the SSMMA. Closer collaboration is also needed between the DWA and the MOT. Their responsibility in MMA management should be expanded to include:

- Promotion of sustainable water sport development within the MPA
- Training to marine warden to develop capacity to monitoring benthic ecosystems
- Leadership in sustainable development of marine parks/reserves
- Promoting public awareness and education in marine affairs.

4.3 Management plan review and reporting format

This management plan is intended to guide management of the SSMMA for the period 2015 to 2025. Each year, an annual report will set out accomplishments for the previous year as related to the objectives, priorities, and activities identified in the Plan.

A complete review of the Plan and its implementation will take place in 2019. The review will assess progress against the objectives for the SSMMA, track the implementation of activities identified in the management plan and subsequent annual reports, review priorities in light of events of the preceding years (e.g., results from new research, and new activities), and identify priorities for the next version of the management plan. The annual reports, which provide a form of ongoing review, will contribute to the complete review of the Plan. All stakeholders of the SSMMA is expected to provide ongoing feedback on the management plan and measures to implement the strategies identified in the plan. If issues require immediate adaptation of the plan before the term of review is due, those changes will be made in consultation with the LAMA and appended to the Plan.

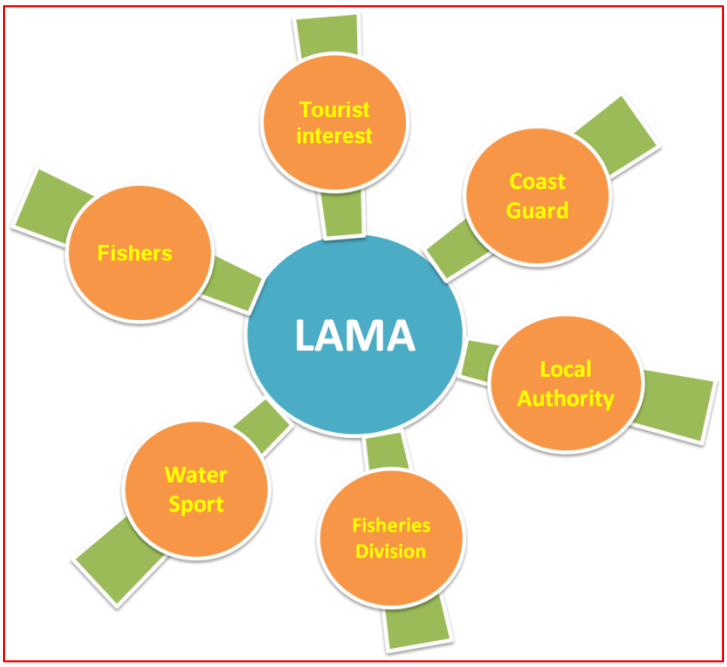
The review of the management plan will draw from the established framework for managing MMA in Dominica. The review process will require that indicators be identified for each objective in the management plan in order to track progress towards meeting those objectives. Once identified, these indicators will be reported on in the annual reports as well as in the overall review. The overall evaluation of the plan and its implementation will look at “outputs” (e.g., were the identified activities carried out?) and will also evaluate “outcomes” (e.g., as a result of carrying out the activities, were the objectives identified in the management plan met?). To assist the management plan review, those involved with establishing and managing the SSMMA will report on lessons learned during the establishment and ongoing management of the MMA. This will assist in future management efforts.

5.0 MANAGEMENT STRATEGIES, STRUCTURE AND OPERATIONAL SET-UP

The success of a management plan depends on how widely accepted it is. Inherently, several stakeholder efforts have to be coordinated in such away so as to minimize conflicts and promote resource enhancement and economic opportunities. For this reason, it is important that the plan is developed on the premise of shared vision and values. Inter-agencies coordinating mechanisms must be developed and promoted to ensure that user interest and decision making are broad and inclusive. To date, more that 20 stakeholders have been identified, some of which are actively involved in the management of the SSMMA.

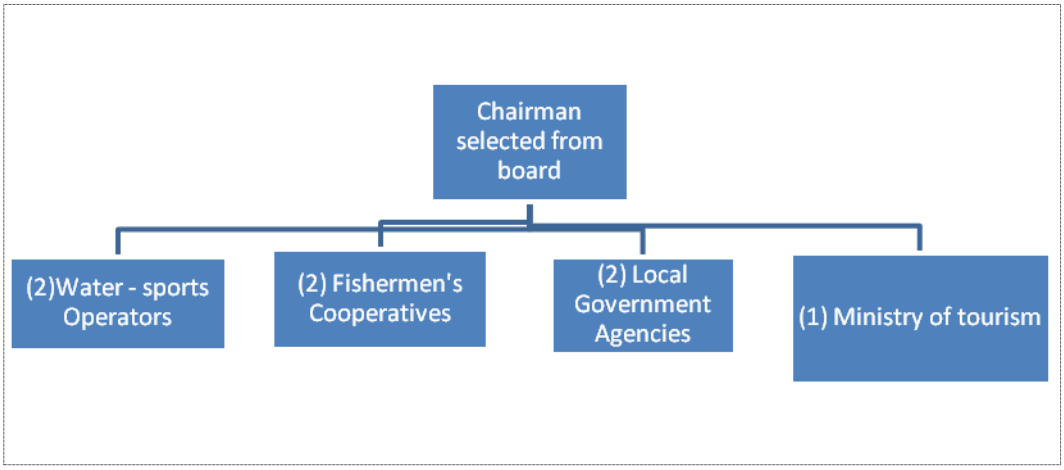
The LAMA is the local management authority for the SSMMA with responsibility for implementing the management plan activities. It is composed of representatives from major stakeholder groups. This set up was adopted (Figure 22) to ensure adequate representation at the highest decision making level. Each group has a stake in the resources of the SSMMA.

Figure 22. Major stakeholder group represented in LAMA



The management structure of the LAMA comprises a 7-man team which includes 2 members from the local government authorities, 2 members from the fishermen's organization, 2 members from the water-sports operators and one the Ministry of Tourism (Figure 23). The chairman is selected from the management board to reign for a period of two consecutive years. Among the members, a President, Secretary, Assistant Secretary and Treasurer is selected to reign for a period of not more than two years.

Figure 23. Composition of LAMA board



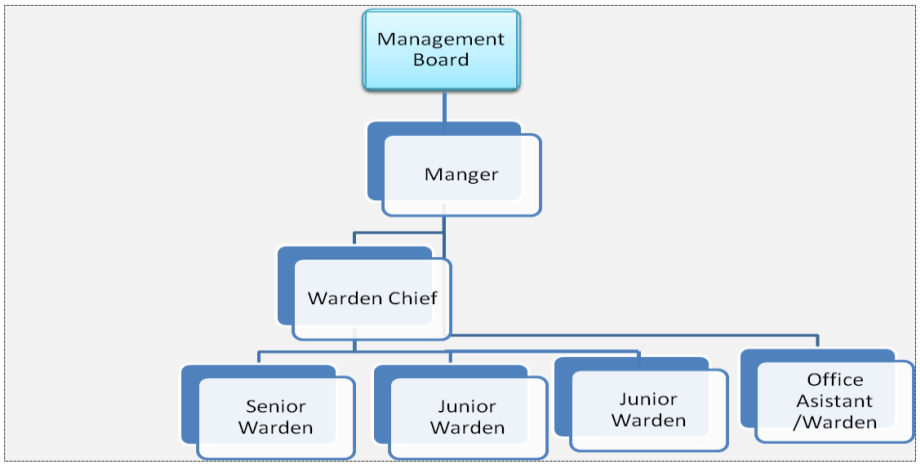
5.1 The SSMMA Manager

The day to day management of the SSMMA will be under the responsibility of a manager. The board shall decide on the selection of manager after a notice in the public media is advertised for two weeks. A suitably qualified manager shalled be selected on a full time a or contractual basis as the board may see fit. To avoid confict of interest, any member of the board who has or had a working relationship, business patrnership or otherwise share a common interest, or is related to any applicant for the position of manager of the SSMR, is disagualified in the decision making process of electing a manager. Each memeber shall have one vote in the selcttion process. The deciding criteria shall be based on but not restricted to the followig:

- An MMA Manager must have at least a first degree in Natural Resource Conservation, Oceanography or closely related field. Additional qualifications in MPA management would be an asset.
- Broad knownelegde of MMA management processes
- Significant experience in MMA management
- Ability to write project, source funding and maintain accurate records
- Ability to supersive staff and report to the board in a timely and accurate manner
- Team oriented with ability to build dynamic patrenship with key government and private stakeholder organisations

The manager shall have responsibility for chief warden, junior and senior wardens and office staff. He or she is to report monthly, quarterly and annually to the Board of Governor and advise based on progess and challeges of the current period. Figure 24 highlights the hiercharchial management structure. The manager will become the custodian and will oversee the implementation of activities and programs decided by the board.

Figure 24 The management hiercharchy structure



5.2 Staffing

There shall be 4 wardens to carry out the surveillieance and monitoring responsibilities and an office assistant to help the manager with the day to day activities of executing his duties. This set up is highlighted in Figure 22.

5.2.1 The Chief Warden

The chief warden will be answerable to the manager of the SSMR. His role shall include day to day management and supervision of the junior staff, monitoring and implemtation of work programs, writing reports, maintenance of infrastructure and other other duties that the manager may asign. He shall possess the requisite training and should be a certified diver and first aid responder to hold the position of cheif warden.

5.2.2 The Senior warden and Junior wardens

The senior and junior wardens will be under the direct supervision of the chief warden. Like the cheif warden, they should become certified first aid responder and trained as dive masters. They are to also share the day to day burden of upkeeping the SSMMA to ensure that users are safe, illegal activities donot occur and biolgical and non living resources are protected and enhanced where possible. Stations of work are at the discretion of the chief warden and manager.

All wardens will be responsible for data collection and maintenance of accurate records as well as perform public awareness to increase local knowledge of the SSMMA. Wardens are to aslo develop training and skills in areas of law enforcement, vessel boarding procedures, search and rescue, and must also be able to undertake and lead reserach expeditions. To be effective, wardens will be uniformed and equipped with the basic tools for the execution of their dutes. see the section on tool and equipment maintainence for more detail information

5.2.3 The Office Assistant

The office assistant will assist the manager with clerical activity and record keeping in a standard and approved formart. He or she will also act as warden when and wherever necessay or as directed by the manager. As a result, any person filling the position of office assistant must also possess the ability and requirement outlined as for wardens and cheif warden.

5.3 Staff evalution

All staff will be appraised annually by the manager . The manager's performce will be assessed by the board. The key performance criteria include poor, fair, good, excellent. Staff in the poor to fair category shall be cuationed and manager will issue specific recommendations and opportunites for improving performance within a reasonable time

frame. Failure to perform will result in warning letter being issued. Where three warning letters have been issued for non performance, the staff employment may be terminated inaccordance with the laws of the Commonwealth of Dominica. Where a member of staff meets or exceeds performance, he or she will be subjected to raise based on the financial standing of LAMA. Performnce will be judged in the following areas outined below but this listing is non exhaustive:

- ✓ **Quantity:** The number of units produced/service delivered per unit time/completeness of tasks
- ✓ **Quality:** The overall quality of work performed
- ✓ **Timeliness:** How fast work is performed/ ability to meet deadlines
- ✓ **Creativity/ innovativeness:** cost reduction measures or strategies to increase efficiency
- ✓ **Punctuality**. Arrival and departure times at work stations
- ✓ **Reliability/Dependability**-willingness to work/ responds to call or changes in shift on short notice
- ✓ **Adherence to Policy:** Deviations from policy indicate an employee whose performance goals are not well aligned with those of the LAMA
- ✓ **Personal Appearance/Grooming:** Consistency in wearing uniforms/ neatness/ wearing of badge

5.4 Capacity

Capcity develoment is an important component to ensure that the requiste skills are obtained to implement and monitor ongoing activities within the SSMMA. A variety of approaches can be adopted to provide trianing such as on-line courses, workshops, short courses abroad or offered locally. Whatever the mode, the goal is to allow skill enhancement and opportunities where such talent can routinely be used in deliverance of services.

5.4.1 Skill Requirements

It is highly advised that all staff must be qualified in further specialist courses such as personnel management courses (pending budget allocations and prioritisation through management). The following are some criticl areas:

- Marine & MMA Legislation
- Boat license and maintenance
- Visitor control and compliance
- Marine Education
- Investigating Crime Scenes
- Court Procedures

Staff must attend various workshops and short courses as required by manager. Staff, both permanent and voluntary, must be suitably trained to execute their functions in terms of awareness-raising and education. They are required to have a complete knowledge of the SSMMA environment and management issues.

The manager must keep a record system for all courses attended and completed and must provide the opportunity for every employee to practice new skills acquired in the performance of his duties. In addition, trained emloyees are to be monitored to evaluate whether imroved effeciency is attained.

An annual budget for capacity building should be developed every year with amounts depending on trianing needs. Table 1 below provides a summary of the skills and qualifications of all employee of the SSMMA and the required skills that is needed to achieve the goals set out in the management plan.

.

		Manager	Chief warden	Senior warden	warden	Junior warden	Office attendant
Staff Details		Camille David	Vivin Titre	Linton Etienne	Tara James	Gibson Lockhart	Soon to be employed
	Full time/part time	PT	FT	FT	FT	PT	Not yet employed
	Yrs. of Experience	0yrs/6mthns	20 years	16 years	5 years	O years/1 mth	--
	Academic Qualifications	PhD	certificates	certificate	High school	High school	---
	Evaluation						
Additional qualification	Dive qualification		✓	✓	x	x	---
	VHF operator		✓	✓	x	x	---
	Boat Maintenance		✓	✓	x	x	---
	First Aid		✓	✓	x	x	---
	Conflict resoultion		✓	x	x	x	---
	Captain lisence		x	x	x	x	---
	Monitoring/patrol		✓	✓	✓	x	---
	Custmer service		✓	x	x	x	---
	Record Keeping		x	x	x	x	---
	Court procedures		✓	x	x	x	---

Table 1. Skill requirement matrix

6.0 AWARENESS AND COMMUNICATION

6.1. Background

The success of MMA managemt depends on the ability of the management plan to inspire public support and participation through awareness. The focus of this awareness plan is to promote an understanding of the importance of healthy ocean ecosystems, the importance of MMAs and the role that the community can play in their care in order to provide the goods and services that can sustain economic livelihoods.

Marine managed area management is emerging as a regional and national priority due to undesirable impacts on marine ecosystems from developmental activities. An important management tool to protect marine resources will be to implement an awareness programme that improves understanding of the SSMMA within its surrounding communities and at the national level.

6.2 Objectives of the communication strategy

The communication strategy has the following objectives:

- To dessimination information on protection and enhancement of the marine biodiversity and non living resources to spur an array of economic activities.
- To generate stakeholder support and improve understanding of MMAs

6.3 Awareness methodologies.

To achieve the objective set out above, the plan will engage a number of processes. These include

- Appropriate signage at key predetermined sites that are highly visible and relevant to the user group in question
- Engagement of stakeholder to undertake a yearly activity promoting or positively impact MMA interests
- Implementation of school programmes
- Radio broadcasting, newspaper and local magazine articles, presentation at events when requested
- Participation in and driving of local and national events such as Marine Week activities, beach clean ups, diving events to promote the area, fish watch activities etc
- Interpretation and dissemination of SSMMA research outputs for use by the non research community
- Compilation of appropriate “Codes of Conduct” for the different user groups as required

6.4 Programme Activities

All staff will be utilised for formal awareness programmes

a) School Programmes:

To be carried in schools in SSMMA communitiies and other parts of the island:

- Poster competitions; beach clean-ups; poem or song
- Children 10 years and older: snorkelling in tidal pools (include safety module)

b) General visitors:

- Interpretive boards for tourists (e.g. whale information boards, pamphlets, booklets, flyers
- Promote marine conservation through local, national and international media (internet, newspapers, magazines, TV)
- Interpret and disseminate SSMMA research to local community

c) Volunteers

- Develop/enhance the SSMMA volunteer training programme
- Develop formal and informal education-based volunteer programmes
- Develop recognition and benefits for volunteers (letter of reference, community recognition through media, clothing)

6.5. Addressing conflict between user groups within the MPA.

Appropriate signage and information on resources must be developed in partnership with the different user groups, in order to reduce user conflicts and ensure protection of the marine environment (e.g. demarcate areas for certain activities).

Overall strateggy to promote for communication and outreach of the SSMMA ummarized in table below

			METHOD/APPROCH					
GROUP	DETAILS	OBJECTIVE	Website	Print meida	E-news	Signage	Press releases	Brochure / leaflets
Government deprtments	Ministry of Health, Fisheries Division, PPD	Develop strategy to promote sustainable use and management of SSMMA resources	X	X	X			X
Ministry of Tourism	Trade shows, airline advertisements, cruise ships, travel gents	Etablish SSMMA as prme dive and snorkel site on island	X	X		X		X
DWA	Dive, snrkel , and whae watching activities	Promote sustainable use of SSMMA; emphsise conservation to protect biodiversity and resources	X	X		X		X
Minitry of Education	Kids and students	Educate about marine environment and need for conservation		X	X		X	
Local Authority	All village and councils events	Mobile ommunity to do beach clean ups	X	X		X		X
Fishers	All full and part time fishers	Stimulte interest in SSMMA, educte on conservation values			X	X	X	
Tourist/ recreational users	Visitrs and non-residents	Promote imortance of education and conservation	X		X	X		X

Table 2. Overall strateggy to promote for communication and outreach of the SSMMA

7.0 MANAGEMENT OF INFRASTRUCTURE AND EQUIPMENT

Tools and euipment are necessary to develop an effective monitoring program. Wardens should be adequately eqipped to allow them to perfom their duties. Therefore, a maintenance program must be developed and maintained to ensure that resources are available and are in good condition. This section of the management plan sets the broad guidelines for maintenance of tools and equipment. Currently, LAMA has the following peices of equipment under its watch (Table 3). A list of essential tools outline in Table 4 is needed in the short run to facilitate the implementation of actiities outlined in the management plan.

Current Equipment				
Item	**Unit**	**Priority**	**Partnership**	**status**
Nissan pick up	1	high	LAMA/Fisheries	good
Building housing office	1	high	LAMA	Fair
20 feet patrol Boat	1	high	LAMA	Needs Repair
Lap top	2	high	LAMA	good
Desk top	1	high	LAMA	good
Printer/scanner	1	high	LAMA	good
Binocular	1	high	LAMA	poor
Life vest	9	high	LAMA	fair
Snorkel gear	29	high	LAMA	Fair
stationary	assorted	high	LAMA	fair
Generator	1	high	LAMA	new

Table 3. List of current tools

Required Equipment				
Item	**Unit**	**Priority**	**Partnership**	**status**
Underwater Temperature Recorder	2	high	LAMA	----
Fish tag kit	4	high	LAMA	----
Fishing equipment	Assorted	high	LAMA	----
Cell Phone	3	high	LAMA	----
Trailer	1	high	LAMA	-----
Sign boards	3	high	LAMA	-----
Camera (under water)	1	high	LAMA	-----
regulators	6	high	LAMA	-----
weights	20	high	LAMA	-----
wetsuits	5	high	LAMA	-----
Ph Meter	1	High	LAMA	-----
Water quality test kit	7	High	LAMA	-----
Secchi disc	7	High	LAMA	-----
GPS	2	high	LAMA	-----
Fire extinguishers	2	high	LAMA	-----
VHF	2	high	LAMA	-----

Table 4: Required equipment to perform critical task

Machinery safety and marking requirements

- Fire extinguishers must be serviced annually by an approved fire appliance servicing agent
- The LAMA patrol Boat should be clearly marked in a conspicusous position on the vessel bearing with LAMA logo
- All equipment belonging to a vessel must be permanently marked with the vessel's name orapproved marking

7.1 Use of Equipment

All equipment must be used in accodance with manufacturers' requirement

7.2 Capacity Requirements

- ✓ All staff to be handling sensitive equipment must obtain the correct training and experience necessary
- ✓ A boat licence must be obtained from the approprite authority
- ✓ Boat operator should undertake the necessary health and safety training for launching and marine vessel use. All staff must undergo a first aid course, including CPR, and must be proficient in the use of the first aid kit.

7.3 Equipment register

- ✓ A register must be available for each piece of equipment so that when required for use, the staff member utilising the equipment can sign it out and back in. The register should include a table with the item in question, a column for the name of the staff member utilising the equipment, date and time it was taken for use, date and time it was returned and a column for comments where the staff member must state the condition of the piece of equipment upon its return. This should preferably be done in the presence of another staff member such as a supervisor to ensure that the comments are correct. In the case of motorised transport (the vehicle or boat), the register must include kilometres travelled, estimated fuel used and odometer reading (in the case of the vehicle). The supervisor should check the motorised transport register frequently to determine service requirements of the equipment as per the manufacturer's servicing requirements (e.g. new diesel vehicle requires a service between every 10 000-20 000 kms).

7.4 Equipment maintenance and insurance

- ✓ All equipment must be maintained in accordance with its manufacturer's servicing requirements
- ✓ A budget must be made available for costs associated with maintenance of equipment (amount determined by costs of servicing etc)
- ✓ Maintenance to the outboard engine must take place regularly as precribed by manafuacturer

8.0 REVENUE GENERATION AND SUSTAINABLE FINANCIAL STRATEGY

Traditionally, protected areas have been managed by government agencies and have thus tended to rely almost exclusively on government coffers. In some places, however, these arrangements are changing. New models which promote sustainable financing are preferred options for managing MMAs because it removes reliance on government funding and at the same time develop capacity to utilize resources to generate income. Several potential sources of income and funding are available for SSMMA but they often vary in terms of their characteristics. Some are more reliable than others, some sources are easier to raise than others, and some can be used freely according to management priorities while others come with strings attached. A good financial plan identifies these characteristics, and builds a revenue stream which matches both the short and long-term requirements of the managed area. Ensuring effective management and securing sufficient financial resources are vital if managed areas are to continue to provide benefits and fulfill their role in biodiversity conservation.

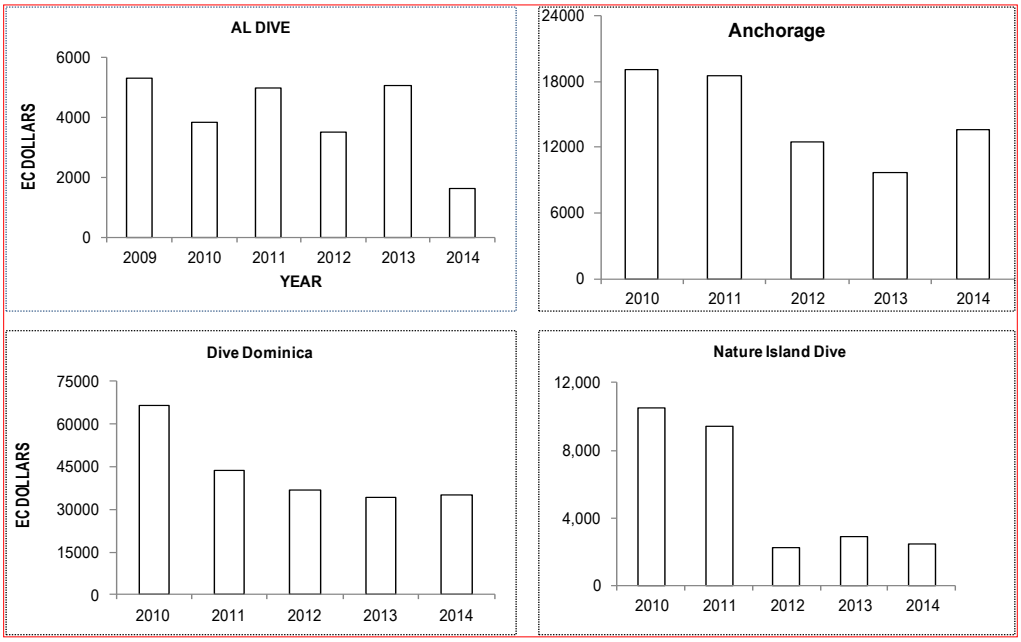
The SSMMA management plan is aimed at achieving sustainable financial management. This is one of the main reasons for the set up of MMAs in the first place. The goal is that sustainable income and employment opportunities can be derived from a properly managed MMA. The user fee charge to individuals who enter the marine reserve are meant to be re-injected into the reserve to enhance service quality and to contribute towards sustainable livelihoods.

S.R.O 7 of 2001 outline the fee structure for use of the SSMMR. Typically, a user is charged US $ 2 for snorkel or dive, a monthly fee of US$ 20 for repeated use, a membership fee of US $25 per annum for being a member of the DWA and EC$ 300 per year for registration and operation in the SSMMA.

The major current revenue generating streams for the SSMMA include:

a. **User fee collection** from watersports operators from clients who snorkel and dive in the SSMMA. These fee are to be collected at every entry point where a warden is authorized to collect the fee on behalf of LAMA. Fgure 25 provides records of user fee for seleced dive operators for the years 2009 to 2014

Figure 25: Annual user fees collected from major dive operators



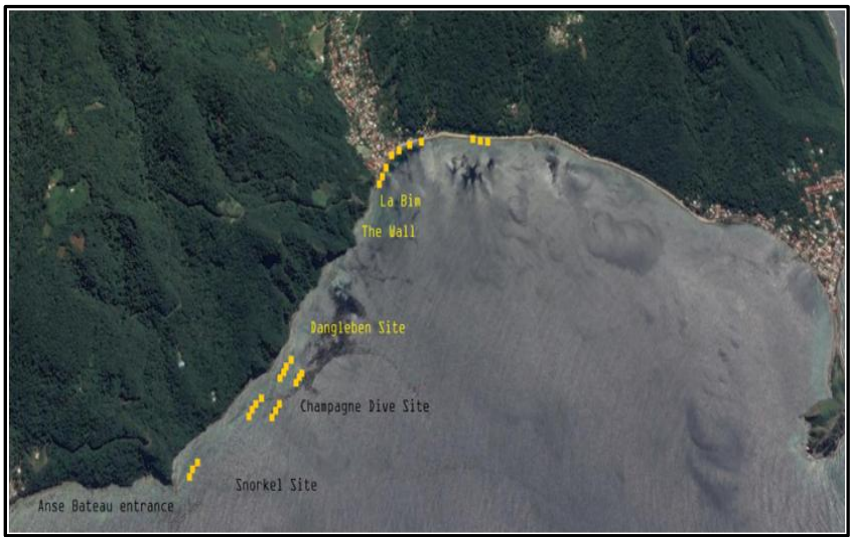
b. **An fee for research** is charged for any worked carried out in the SSMA. Research in this context imply access to the SSMR for the purposes of collecting data, experimental setup, use of SSMA gears and facilities, authorized removeal of special, imagery or acoustics.

c. **Grants and sponsors-** This involves writing proposal for specific projects and sourcing funds from donors to undertake specific developmental objectives or enhancement of resource or service.

8.1 Potential Revenue generation streams

Both terrestrial and marine areas of the SSMMA have untapped features that can increase revenue generation streams for LAMA. Example, the numerous suplfur vents that are found in and near the shore throughout the SSMMA (Figure 26). They are particularly common in northern section of the Soufriere Bay through to Anse Bateau. From the sea floor these vents exude a hot mineral water and gases creating a bubble effect. This allows local diverse communities of orgaisms to thrive and also serves as a major tourist attraction.

Figure 26: Location of hot water and sulphur vents near the shore



Closer to the Soufriere community and within the reach of the shore, these feature become more common. Entrapment of these hot water sources is a relatively new concept in diversifying and adding value to the range of services offered in the SSMMA (Figure 27). It is now opportune time for the LAMA to take control of these resources and provide the requisite facilities and aesthetics to make these natural features revenue machine.

Figure 27. Hot water enrappment along the shore are popular for their therapuetic values

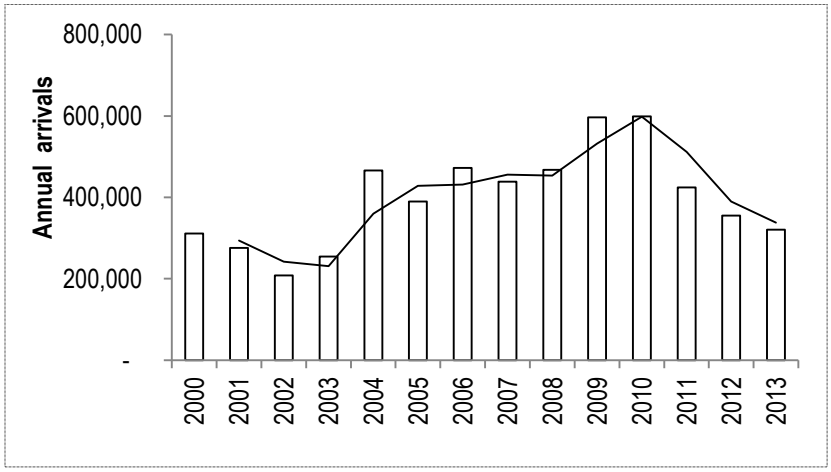
8.1.1 Other revenue geratinion options

a. Intellectual property right and ownership
b. Sale of gift items including post cards and souvenirs
c. Fee charged for use of an information centre
d. Organized fund raising activities through major events such as dive fest
e. Adertisement and marketing with major local and regional hotels
f. Development of private car parking facilities at strategic locations. A fee can be charged for supervised parking
g. Charge fee for change and rest room facilities at strategic locations
h. Organized bird watching tours
i. Organized packaged tours comprising both marine and terrestrial components of the SSMMA
j. Develop hot water pools as to maximize therapeutic values
k. Trust funds

8.2 Financial projections

The international acclamation the dive sector in Dominica receives is mainly attributed to the quality of the underwater flora, fauna and features that are found in the SSMMA. This is the reason that location is rated by leading international travel media organizations and scuba diving publications as one of the best dive sites in the world. This rating continue to increse wareness levels both at the national nd internation level. Therefore, it is likely that numbers of divers and snorkelers will likely increase in the future. Figure 28 shows the number of arrivals in Dominica over a 14 year period. The averaged annual arrival for the period is 398 615, although there are declines in recent years.

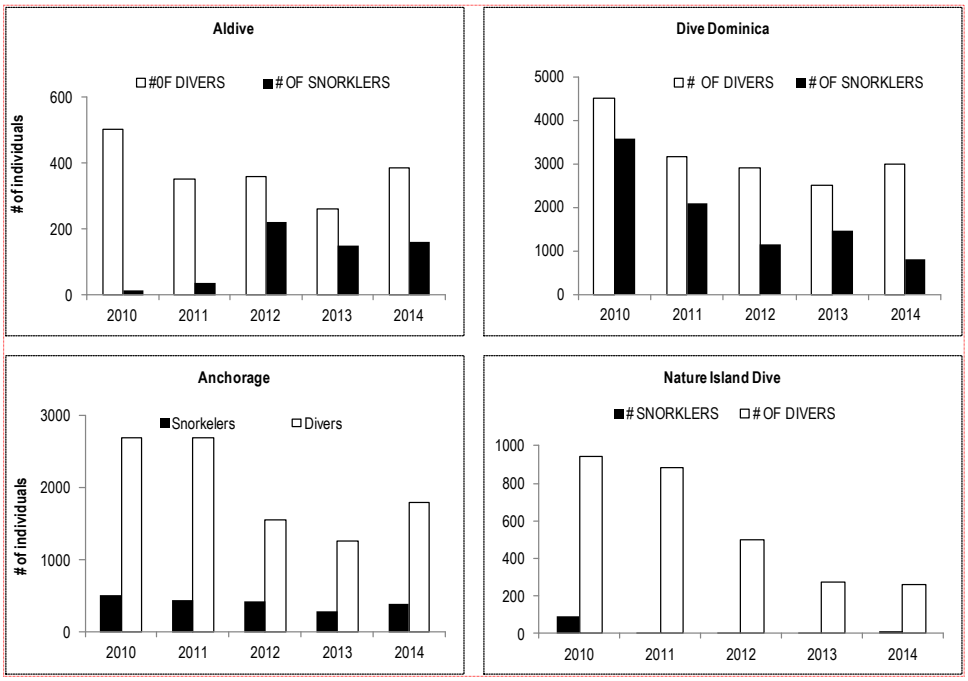
Figure 28. Total tourist arrival by year in Dominica



Data Source: Tourist Boards, Central Statistics Offices, ECCU and ECCB

From the figures presented in Figure 29, the averge number of divers and snorkelers visiting the SSMMA yearly is 4562 and 3951 individuals respectively. Financial projections are based on these estimates.

Figure 29. Total number of divers and snorkelers in SSMMA annually



8.3 Summary of projection for 2015-2017

Table 5 summarizes the projected revenues for LAMA based on a 5% increase in 2016/2017 over 2015/2016 and an average 10% increase 2017 /2018 over 2016/2017. Projections are also based on the assumption that various infrastrctures will be put in place by year end 2016. As can be seen in table 5, the prjected income range from an estimated EC$128117- EC$175 283.

REVENUE SOURCE	EC $		
	2015/2016	2016/2017	2017/2018
User fees (Dive shops)	73017	76667	84333
User Fees (Chamagne)	40000	42000	46200
Registration Fees	1500	1800	2000
Research Fees	3000	6000	6000
Intellectual property right	2000	5000	5500
dive fest activities	5000	6500	7150
Gear rentals	1000	1000	2500
Advertisement /use of SSMR Branding	500	2500	3500
private car parking facilities			1500
Charge fee for change and rest room facilities			4000
Bird watching tours or platforms	600	1500	2500
Use of trail in SSMMA		500	1500
Health and wellness	500	1000	2600
Use of an information centre	1000		3000
Sale of gift items			3000
TOTAL	**128 117**	**144 467**	**175 283**

Table 5: Projected revenue for LAMA

Table 6 presents a statement of projected revenue and expenditure from 2015-2020. As can be seen, profit margin continue to increase indicating that self sufficiency can be attained. Significant increase in profit marginswill be realized n 2017/2018.

Activity	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	Indicators and justification
REVENUE (EC$)	128 117	144 467	175 283	192 811	212 092	Increase in visitor to the SSMMA
EXPENDITURES						
Maintenance of Sites & infrastructure:	5000	7000	7700	8000	8500	Number of Complaints from user
Mooring maintenance	6000	6800	7500	7900	8300	Increase in expenditures
signage maintenance	500	750	560	560	560	
Engine maintenance	1000	1660	2000	2500	2700	
Gas and oil for boat	5500	6000	6400	6700	7000	
Gas and oil vehicle	4000	5500	5800	6000	6400	IN
Stationary	500	660	700	700	7300	
Electricity	200	400	450	500	550	
Water	200	400	450	500	550	
Internet	1000	1200	1260	1300	1400	
tickets	2000	2500	2500	3000	3500	
Salary						Well executed functional unit. MMA develops according to plan Cost met by SSMR operation and Donors
Manager	42000	42800	43400	43800	44200	
-Staff	45 000	46000	46400	46900	47400	
Projects.						Available functional support services Partnership w/ agencies
-Car park		3000			1000	
warden check point	1500					
-Rest room facility		1500			500	
Total projected costs	**114,400**	**126170**	**125 120**	**128 360**	**139 860**	
Project financial ending balances	**13,717**	**18 297**	**50 163**	**64 451**	**72 232**	A fully operational stakeholder driven entity Management Plan – Donor

Table 6 Projected financial expenditure on key infrastructure within the SSMMA

8.4 Mechanism for fee collection

A warden stationed at the two major land access sites, Champagne and scottts Head, will serve as the collection agents for LAMA. Upon payment of fee, a ticket is issued to verified that each person who access the SSMMA site has paid and is permitted. Wardens on marine patrol will also verify with boat captains total number of person acessing and performing in water sport activity and research. User fee are subsequently paid to LAMA at an mutually agreed time during the calender month. There is need however to enter into formal agreement with each dive shop to standardize fee payment times and methods.

Outstanding user fee collection is a major issue for LAMA. In the past due to poor collection strategies and lack of management enforcement, payment of users fee was very infrequent. To date, a number of dive opartors still owe significant sums of money to LAMA. The three step approach for recovering these outstanding monies should be:

a. Engagement of the dive operator to determine issues relating to payment of fee to LAMA
b. Develop a payent plan based on information receied from consulation with each operator
c. Formalize agreement with some degree of flexibility. A lawyer may be retained for this purpose.

8.5 Penalties for non compliance

LAMA shall develop new measures to safeguard its own interest and to ensure that payment of user fees are made on time. Its prefered startegy is dipolamcy but where circumstance warrant outside intervtervention, the services of a qualified attorney shall be retained to help recover outstading fees. All outstandng user fee greater than 3 months should be passed out to services a collection agency or lawyer for recovery.This policy will take effect on February 01, 2016.

Any outstanding fee which falls into the above category are subjected to a monthly interest of 5 % until final amounts are paid. An operator may also be suspended from the SSMMA or denied access based on the discertion of LAMA for non compliance or payent of fees and his or her operators name published in local print media.

8.6 Maintianing the supporting infrastructure

The overall quality of the visitor experience to the SSMMA can be enhanced if propoer facilities and measures are put in place. As such, LAMA must seek in the short run to erect and maintain the necessary infrastructure to support revenue collection. Some of the measures that are deemed essential and their priorization levels are included in table 7.

Activity	high	medium	low
Boardwalk repair	✓		
Warden station at Scotts Head	✓		
Improvement ot sulphur pool		✓	
Additional mooring/refurbishment	✓		
Swimming markers	✓		
signage	✓		
Interpretation center			✓
Rest roon (scotts Head & Champagne)		✓	
Car park			✓
Adaptation measure for climate change			✓
Beach clean up	✓		
Receptacles at strategic locations	✓		

Table 7: Measure that need to be put in place to support revenue generation

8.7 Annual Budgets

The management auithority must ensure that the activities prescribed in the ections dealing with management of the MMA and revenue generation are carried out and that competent individuals are contracted to undertake the tasks where appropriate or that the staff component is adequately increased and capacitated. The management plan will determine if the management activities are being carried out adequately, and if adjustments are necessay to endure that financial sustainability is attained

A budget to fund the implementation of the SSMMA Management Plan must be compiled and approved before the start of each financial year, in collaboration with the delegated authority, manager and his staff. Such budget must be approved by the board.

9.0 AUDITING REQUIEMENTS

9.1 Auditing of management activities to support sustainable fiancial management goals

a) Objectives:

Auditing of the Management Plan should not be confused with monitoring of the MMA. The purpose of implementing an audit is to ascertain the relevance and effectiveness of the activities recommended within the framework of this Management Plan, in order to ensure that the environment is being maintained in a satisfactory condition. This is done by:

- ensuring that the accepted Management Plan is adhered to
- ensuring that utilization of resources is within acceptable and determined limits and that conflict resolutions are facilitated
- determining if the condition of the environment is deteriorating or improving under current management regimes by measuring certain parameters and monitoring the changes over time

b) Implementation:

A programme for annual environmental auditing must be designed and agreed upon. There are a number of current MPA audit tools designed to determine the health and effectiveness of MMAs and develop management strategies accordingly. However, the effectiveness and/or relevance of this document to meeting the principles and objectives of the SSMMA need to be fined tuned as required to meet specific objecives.

- It is recommended that audit sheets be drawn up to accurately evaluate the effectiveness.
- It is recommended that an independent organisation/agency/individual carry out the audit.
- The audit must be undertaken in intervals as agreed upon by board, particulary by a contracted management agency to avoid predujice.

9.2 Some guideline/example parameters to consider in the audit can include:

9.2.1 Marine and flora and fauna

i) Changes in species diversity, composition and abundance
ii) Degree and rates of change in invasion of alien species
iiv) Rate of success of restored areas previously disturbed

9.2.2 Marine resources

i) Size and abundance of key species
ii) Fecundity of large predatory fish as an indicator of a healthy functioningecosystem

9.2.3 Alum stream flow and water quality

i) Changes in flow rate
ii) Changes in chemical composition
iii) Pollution and pollutants

9.4.3 General parameters

i) Condition of vehicles, equipment and signage
ii) Levels of awareness and public perception of the LAMA and the SSMMA
iii) Number of fines issued and whether or not these are lessening over time
iv) Number and rate of successful convictions
v) Rate and reduction of conflicts between users

10.0 MONITORING STRATEGY

Monitoring and evaluation is an important component in MMA management and implementation. It is an effective tool in tracking the progress of activities outlined in the plan. The process helps in identifying factors that hinder the achievement of desired goals and objectives. In a way, through monitoring and evaluation, implementation can be made more effective by assessing the appropriateness of selected and utilized strategies vis-a vis the outputs and impacts. Consequently, adjustments can thus be undertaken to ensure that the general purpose for which the plan is implemented is realized.

To support monitoring programs both the tools and human resource capability needs to be enhanced to perform tasks. These have been addressed in previous sections of the document.

Objectives of monitoring programs:

- Determine if planned activities are effective and implemented
- Identify more effective measures/strategies
- Ensure positive impact and sustainability

Table 8 provides a summary of monitoring activities intended for the SSMMA and responsibility, frequency and areas that will be monitored.

What to monitor	How to monitor	When to monitor	Who will monitor
Coral cover	Coral reef assessment	Annual	LAMA/DWA/Coast Guard
Fish stocks	Underwater assessment	Annual	Fisheries
Fish catch in the FPA of the SSMMA	Survey and landing records	Annual	Fisheries
Decrease incidence of illegal activity	Survey/discussion with all stakeholders	Semi-annual	LAMA/ Coast guard
Quality visitor experience	Return of visitor survey	Monthly	MOT/LAMA/DWA
Economic contribution to locals	Surveys	annual	Council/ LAMA

Table 8. Monitoring design

11.0 FUTURE OF ISSUES FACING SSMMA AND CONCLUION

Marine managed areas are open systems and remain vulnerable to internal and external factors. The nature of these systems warrants planning processes must take into account a number of factors. All factors likely to affect the future of SSMMA must be identified and evaluated. Whilst such predictions are at best uncertain, the identification of future trends in ecological change, visitor use, conflicts, economics and related pressures should be attempted. An understanding of the socioeconomic environment is of particular importance. Predictions are not just about future issues – they also help to identify opportunities for planning, beneficial change, remediation or restoration.

11.1 Future ecological change

These can several forms

- ✓ Decrease in coral cover (assuming development continues unchecked and effects of climate change intensifies**)**
- ✓ Loss of sea grass beds due to damage from human activity
- ✓ Decrease in fish stocks from over exploitation and habitat loss.
- ✓ Loss of ecological value of the area

11.2 Future visitor use

- ✓ Carrying capacity limits may be exceeded in some areas of use.
- ✓ The number of divers visiting the area is expected to increase
- ✓ Increase in number of stakeholders operating in the managed area space
- ✓ Socioeconomic in cultural change that increase pressures on the reasource

11.3 Future conflicts

- ✓ Coastal development and environmental protection are expected to continually be mismatched,
- ✓ Less conflict between fisher folk and other users is expected through the establishment and better monitoring of zones
- ✓ Improved communication can improve public participation in MMA management

Future economic issues

- ✓ Loss of tourism revenue
- ✓ Continued increases in energy prices

11.4 Conclusions

The SSMMA Management Plan must be seen as a dynamic working document and should be revised every 5 years. The effectiveness of the management actions in meeting the conservation and economic objectives will be measured using a variety of tools. LAMA will adapt management actions on a continuous basis should amendments be required, to keep the plan and its objective in dynamic equilibrium with current developments and issues confronting the MMA.

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