DEVELOPING A FRAMEWORK FOR A COMPREHENSIVE MARINE MULTI-USE ZONING PLAN FOR THE GRENADINE ISLANDS

MAY 2012

SUBMITTED BY
KIMBERLY BALDWIN
UNIVERSITY OF THE WEST INDIES
BARBADOS

THIS PROJECT WAS FACILITATED BY

Sustainable Grenadines, Inc.
Clifton, Union Island
St. Vincent and the Grenadines
(784) 485-8779

FUNDING AND SUPPORT FOR THIS PROJECT WAS KINDLY PROVIDED BY

The Global Environment Fund (GEF) – Small Grants Programme

ACKNOWLEDGEMENTS

Special thanks to the Grenadine Stakeholder Planning Project Committee and island communities for taking the time to attend workshops and give insight and input to this project. Thanks is extended to Ruth Blyther, John Knowles, Shawn Margles, Steve Schill, and Vera Agostini (of The Nature Conservancy) and Alison DeGraff (Compton Mentor Fellow) for providing technical assistance with the Marxan with Zones analyses and the facilitation of workshops as well as the staff and interns of Sustainable Grenadines, Inc. for providing assistance with various aspects involved to implement this project.

Picture 1. The Grenadine Stakeholder Planning Project Committee Members at Workshop 2 held in Ashton, Union Island.

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Marine spatial planning and multi-use zoning

In the Caribbean and around the world, human use of coastal and marine resources including tourism, fishing, recreation and other activities, is placing increasing and often conflicting demands on natural resources. As a result, important coastal areas are under increasing pressure that is threatening the health of coral reefs, wetlands, mangroves and seagrass beds, and the environmental services they provide, such as coastal protection from storms, food security and tourism-based economies.

As place-based activities continue to increase, the "space" of the ocean is becoming more limited and conflicts among users are increasing. It is clear that there is an urgent need for a process to guide sustainable uses of the marine environment; one that provides for a diversity of uses while maintaining and protecting biodiversity, resilience and adaptation to climate change, and the services people depend on. Using an ecosystem approach to help identify the right balance between social and economic demands for development, and protecting the health and resilience of ecosystems is a difficult task, particularly in the marine environment (McLeod and Leslie 2009). Marine spatial planning (MSP) and the development of a multi-use zoning design has recently emerged as a tool that can help people better manage multiple activities taking place in the ocean and achieve the goals of sustainable development.

Analogous to land-use planning in the terrestrial environment, MSP is a comprehensive multidisciplinary planning process which lays out a spatially focused, multi-objective, integrated vision to be developed for an area in which ecological, economic and social objectives can be simultaneously accommodated (Crowder and Norse 2008, Douvere and Ehler 2009). A further tenet of MSP is that stakeholder engagement is central to the process. Providing a transparent framework that can accommodate a wide diversity of multi-disciplinary information in an accessible format can serve to improve stakeholder understanding and involvement in decision-making and governance (Pomeroy and Douvere 2008, Carocci et al. 2009, Mackinson et al. 2011).

1.2 Objectives of project

Sustainable Grenadines Inc. (SusGren) was awarded funding to carry out a project to develop a transboundary marine zoning design (will subsequently be referred to as MZP) for the Grenada Bank, entitled "Developing a Framework for a Comprehensive Marine Multi-use Zoning Plan for the Grenadine Islands", which is funded by the National Oceanic and Atmospheric Administration (NOAA). In tandem, funding has been received through the Global Environment Facility Small Grants Programme (GEF SGP) to ensure the participation of Grenadine marine resource users (MRUs) in this

marine spatial planning process through a complimentary grant entitled "Incorporating the Knowledge and Resource Values of Stakeholders in Marine Resources Management in the Grenadines". In addition, The Nature Conservancy (TNC) has provided technical support, namely in terms of assistance with GIS decision support analyses for the project.

This project builds on pre-existing initiatives in the Grenadine islands of St. Vincent and the Grenadines and Grenada, namely: the Grenadines Marine Resource and Space-use Information System (MarSIS) geodatabase (www.grenadinesmarsis.com) and the Protected Area Systems Plans developed by both countries of St. Vincent and the Grenadines and Grenada to increase the effectiveness of marine protected areas (MPAs). Moreover, the project aims to ensure broad public buy-in, self-enforcement, and long-term sustainability of the plan through the engagement of Grenadine MRUs (e.g. fishers, divers, ferry companies, day tour operators, yacht operators, water taxi operators and the wider Grenadine island communities) from the project inception.

As such, SusGren has retained the services of Kimberly Baldwin as both the GIS consultant and the community facilitation consultant to achieve the project objectives.

This project was administered through the following objectives:

Objective 1

To develop a draft multi-use zoning design for the Grenadines using new and existing information, and incorporating local knowledge from marine resource users, in order to increase the capacity to protect, manage and sustainably use the resources of the Grenadines by March 2012.

- Examine existing criteria used in the development of the Protected Area Systems Plans for both countries; along with research conducted through the MarSIS research and IUCN protected areas management categories, through a collaborative process in order to establish locally-appropriate objectives and criteria for the zoning scheme
- Develop an integrated geospatial database for multiple marine uses and a draft spatial marine zoning design for the Grenadine Islands, with zones for specific uses that are accompanied by regulations
- Produce zoning maps in a format that can be easily integrated into the associated outreach and awareness activities to convey the results of the spatial planning process to the wider public

- Attend and participate in three workshops as a means of presenting and reviewing progress made on developing the multi-use zoning plan:

  Workshop 1 – Vision (27-28 Jan 2011)
  Workshop 2 – Define objectives, goals & use priorities (18-19 Aug 2011)
  Workshop 3 – Finalise draft marine multi-use zoning plan (16-17 Feb 2012)

- Consult with technical marine-focused individuals in Grenada and St. Vincent and the Grenadines

Objective 2

Create an enabling environment for participatory marine and coastal resource management and capacity building of Grenadine MRUs by March 2012 .

- Involve MRUs and Grenadine communities in a series of informal meetings on each inhabited island (e.g. Bequia, Mustique, Canouan, Mayreau, Union, Petite Martinique, and Carriacou) to develop resource and use maps, ensure that MRUs understand the value of the multi-use zoning plan, how it is being developed, and obtain local feedback of the multi-use zoning plan. Two meetings will be held on each island of Bequia, Mustique, Canouan, Union, and Carriacou (one for fisher folk and one for the general community) after the first and last formal stakeholder planning workshop. In islands with smaller population densities (e.g. Mayreau and Petit Martinique), only one meeting will be held. The meetings on Bequia, Union, and Carriacou (i.e. islands with high concentrations of yachts) will include yacht owners, marinas, and yacht clubs as stakeholders of the general community.
- Hire a local note-taker/meeting assistant (making every effort to engage a female in this role) on each island to assist with the series of community meetings (7 islands).
- Evaluate the performance of each local note-taker/meeting assistant and document the development of their skills (e.g. advertising meeting, taking minutes, recording participant attendance, etc.) throughout the project lifetime
- After Workshop 2, a MRU stakeholder steering sub-committee (made up of 12-15 Grenadine island MRU community members spread across each of the islands) will be held (November 2011). This meeting will aim to increase local understanding of marine spatial planning, the process of decision-making, and the Marxan with Zones decision-support tool. The sub-committee will review various developed scenarios and give feedback to identify a socially-acceptable

scenario to assist stakeholders with the drafting of a multi-use zoning plan for the Grenada Bank. The results of this meeting will be shared with the larger stakeholder group during Workshop 3 as well as shared with the wider public via the Grenadines MarSIS and Susgren egroups.

Objective 3

Create opportunities for building resource management partnerships in the Grenadines amongst MRUs, businesses, legal authorities, and governments through co-management and associated livelihoods arrangements by March 2012

- Attend the three stakeholder planning workshops, along with one MRU representative from each inhabited island to act as an advocate to ensure that the values of MRUs are adequately represented in the planning and zoning development process

2 THE GRENADINE ISLANDS

2.1 Geography

The Grenadine Islands provide an example of a complex transboundary marine management environment. The Grenadine Islands lie atop the Grenada Bank, an area of approximately 2,000 km^2, and are shared between the small island developing states of St. Vincent and the Grenadines in the north, and Grenada in the south (Figure 2-1). Seven of the inhabited Grenadine Islands (Bequia, Mustique, Canouan, Mayreau, Union, Palm and Petite St. Vincent) belong to St. Vincent and the Grenadines, and the remaining two (Carriacou and Petite Martinique) are a part of the tri-island state of Grenada. The project area includes the Grenadine Islands seascape and extends to the 60 metre depth contour of the Grenada Bank but does not include the mainland of St. Vincent or Grenada.

2.2 Ecology

The Grenadine Island seascape is recognised for its beautiful natural scenery consisting of rolling hills, spectacular beaches, clear blue waters and diverse marine habitats (ECNAMP 1980, CCA 1991a). Three quarters of the Grenada Bank is less than 50 m deep and supports the most extensive coral reef and related habitat in the south-eastern Caribbean (CCA 1991a, CCA 1991b). All reef-related habitats are represented including: seagrass and lagoon, areas of mangrove, and a variety of patch, fringing and bank barrier reefs (ECNAMP 1980, ECLAC 2004). These habitats provide many commercially important marine resources such as conch, lobster and reef fish as well as several ecosystem goods and services for the coastal communities of the Grenadine Islands.

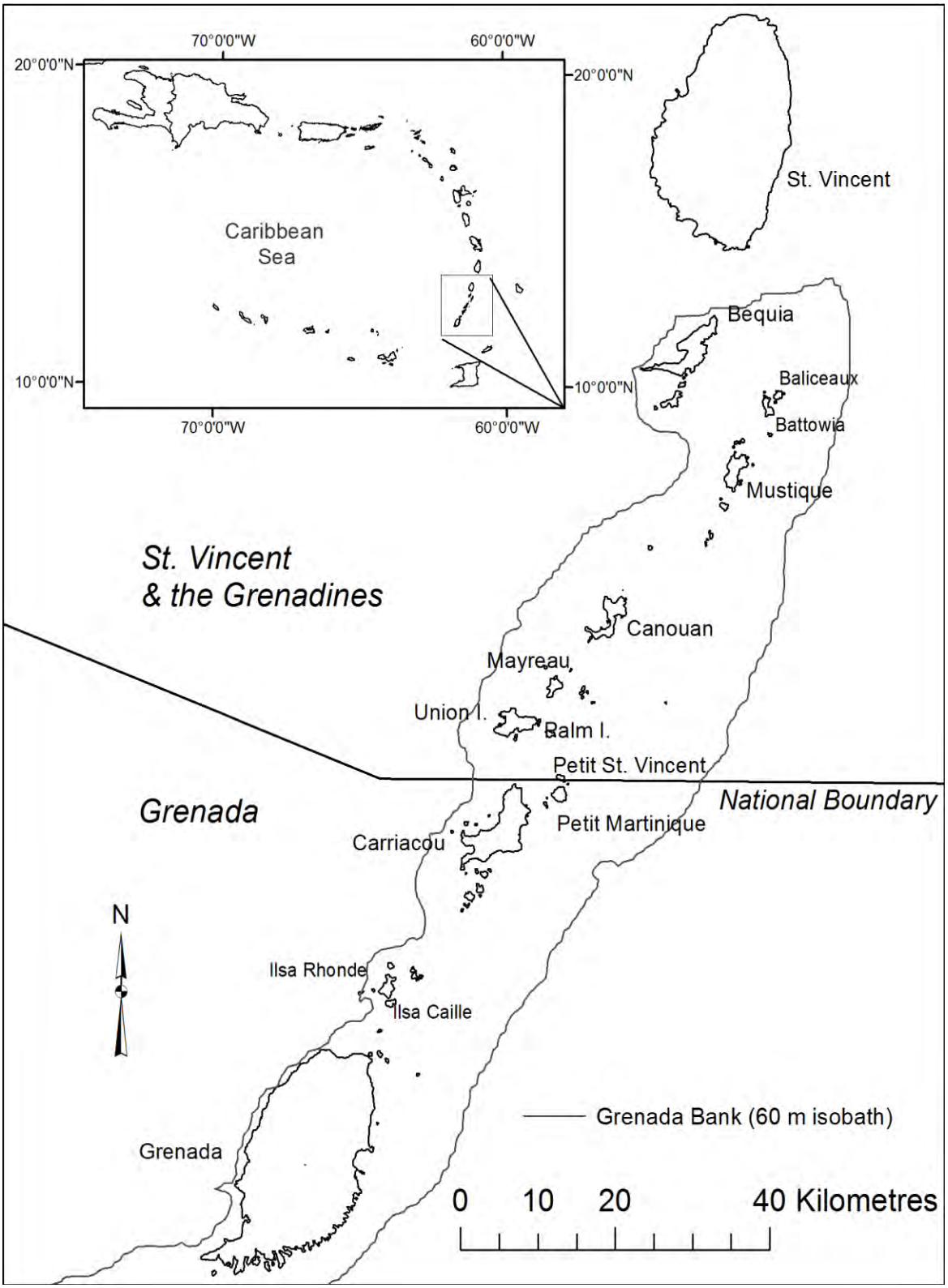


Figure 2-1 Geographic location of the countries of St. Vincent and the Grenadines and the tri-island state of Grenada and detail of the Grenadine Islands of the transboundary Grenada Bank (60 m isobath).

2.3 Human uses

As the Grenadine Islands are an archipelago with a strong maritime culture, marine transportation historically has been and remains today an indispensable livelihood. Ships, ferries and water-taxis are fundamental to the movement of cargo and passengers, and comprise a substantial portion of the total transportation sector (Clive 1976, Adams 1996, Cooke et al. 2007, Baldwin et al. 2008). Marine-based tourism is a key sector for employment and revenue and tourism development is proceeding apace with the number of visitors to the Grenadines increasing steadily in recent years (ECLAC 2004, CTO 2010). The marine-based tourism sector includes onshore accommodation and restaurants (resorts, hotels, guesthouses, rental villas), ferries, cruise-ships and yachts (including bareboat, charter and live-aboard cruisers), and recreation/entertainment (water-sports including SCUBA and snorkel trips, sport-fishing, day boat charters). Fishing is the other main source of employment and livelihood (CCA 1991a, CCA 1991b). Fisheries resources consist of shallow-shelf reef fishes and deep-water (slope and bank) demersal fishes, lobsters, conchs, coastal pelagics, offshore pelagics and sea turtles (Mahon 1990, Gill et al. 2007). Fisheries in the Grenadines are small-scale, with fishers typically operating independently without formal organisations, such as cooperatives or associations (Chakalall et al. 1994, Staskiewicz and Mahon 2007). The picturesque and biodiverse marine ecosystem, entwined with a rich maritime culture, has cultivated the belief that the entire Grenadine archipelago should be declared a World Heritage Conservation Site (Mahon et al. 2004, SusGren 2005).

2.4 Governance

Ownership of the Grenadine Island chain is by two nations which share a similar population size and structure; St. Vincent and the Grenadines has a total estimated population of 103,869 and Grenada has a total estimated population of 108,419 (CIA 2011). Likewise, each country's Grenadine Island citizens make up less than 10% of the national populace (Table 2-1). Although the international boundary between Grenada and St. Vincent and the Grenadines runs east to west across the Grenada Bank between Petite Martinique and Petite St. Vincent (Figure 2-1), linkages among all of the Grenadine Islands are historically strong and continue to be active in the areas of fishing, informal trading, tourism and social life, with little attention to the jurisdictional boundary. Many people consider these connections among the people of the Grenadines to be stronger than connections with their respective mainland (Susgren 2005).

Although there is legislation relevant to various aspects involved in the management of the coastal marine resources of Grenada and St. Vincent and the Grenadines, marine

and coastal zone management thus far is limited both within and between the two countries; each having largely administered management in an ad-hoc top-down sectoral fashion that has failed to adequately protect and conserve the transboundary marine resources and biodiversity of the Grenada Bank (FAO 2002, Culzac-Wilson 2003, Mahon et al. 2004, SusGren 2005, Gardner 2007, Lee 2009).

Table 2-1 The approximate land area and estimated population for each of the inhabited Grenadine Islands listed by mainland country.

Mainland country	Island	Area (km^2)	Population	Data source
St. Vincent & the Grenadines	Bequia	16.1	4,420	Susgren (2005)
	Mustique	5.6	1,290	
	Canouan	7.5	1,830	
	Mayreau	1.8	170	
	Union I.	8.6	1,900	
	Palm I.	0.4	Resort I.	
	Petit St. Vincent	0.4	Resort I.	
Grenada	Petit Martinique*	2.1	800	OECS (2005)
	Carriacou*	32.0	6,081	
Total		**74.5**	**17,371**	

3 GENERATING A DRAFT MULTI-USE ZONING DESIGN

3.1 Engaging stakeholders

With a heavy reliance on marine resources and increasing numbers of marine resource users in the Grenadine Islands, there is a clear need for integrated marine resource management. In order to augment management effectiveness, it is well recognised that the resource users themselves must be a part of the data gathering and planning process and that their resource space-use profiles must be clearly understood (Walters et al. 1998; Bunce and Pomeroy 2003; Rambaldi et al. 2005; Corbett et al. 2006, Baldwin and Mahon 2011c). This information can provide more appropriate information for marine spatial planning and management initiatives. Furthermore, multi-sectoral collaboration and meaningful community participation involving a range of stakeholders in the information gathering, research and evaluation processes can maximise management efforts by allowing for equity in decision-making. By meaningfully including and considering both sectoral and community interests, mutual respect and understanding for management initiatives can allow for a participatory framework for co-management (McConney et al. 1998; Renard and Krishnarayan 2000; Chuenpagdee et al. 2004; Sayer and Campbell 2004; Wiber et al. 2004). In addition, stakeholder engagement in management can provide for better compliance with rules, increased stakeholder capacity in problem solving and decision-making, local empowerment and community cohesion and ultimately build a more sustainable future (IIRR 1998; Cumberbatch

2001; Sayer and Campbell 2004; Wiber et al. 2004).

A range of participatory and communication techniques were used to engage stakeholders in the development of the Grenadines MarSIS geodatabase (Baldwin et al. 2007). Several of these techniques were maintained in the implementation of this project. The project objectives, the role of stakeholder involvement, and the progress of the project, including issues encountered and possible solutions, were communicated to stakeholders through both one-way and two-way channels. One-way channels included the distribution of regular newsletters, emails, flyers and technical reports. Two-way channels included the development of an internet-based Yahoo e-group and a website (www.GrenadinesMarSIS.yahoogroups.com; www.grenadinesmarsis.com). All stakeholders with internet access are encouraged to join this e-group and there are currently more than 400 members. Other two-way channels included three workshops and a series of two MRU and community stakeholder meetings in each inhabited Grenadine island. Workshops and meetings were used to introduce the project, review and refine the objectives, share and validate information collected by stakeholders, as well as to allow for feedback of the project and information produced. Moreover, all stakeholder meetings and field research activities was documented in a series of summary reports and informational brochures that were shared through both the e-group/website as well as distributed in hard copy format.

An initial 'Visioning Workshop 1' was held January 27 - 28, 2011 in Hillsborough, Carriacou. A total of 35 persons from 20 organisations attended this workshop. The objectives of this multi-stakeholder workshop were to: introduce and provide context for the project; introduce the concept of marine spatial planning and zoning; provide a background on efforts related to marine spatial planning and zoning that have been undertaken in the region to date; kick-off discussions amongst stakeholders on marine spatial planning in the Grenadine Islands; and devise an action plan to develop a multi-use marine zoning design for the Grenadines, build awareness strategies, and discuss legal and policy issues. A presentation on the importance of sustainable development and role MSP can play as well as a review of the Grenadines MarSIS research and the existing information contained in the MarSIS geodatabase was given (Appendix I).

3.2 Data review

In February 2012, MarSIS GIS data and the Protected Areas Systems Plans for the two countries were reviewed to identify information and data gaps.

Several data gaps were identified including information on:

- Areas of beauty or scenic value (identified for no development)
- Kite-boarding/windsurfing areas
- Potential mariculture sites (seamoss/fish farming)
- Areas of conflict or multiple uses
- Validation of priority fishing banks by MRUs

Marine spatial planning, zoning, and decision-support GIS tools literature was also reviewed. From 28th February – 2nd March 2011 a trip was undertaken to St. Croix to meet with TNC's marine planning and GIS experts to review the Grenadines MarSIS geodatabase, other MSP and zoning projects (and methodologies applied) to help determine an appropriate and feasible workplan for the Grenadines MSP initiative. As a result, a workplan was developed for this project and approved by Susgren (Appendix II).

3.3 Defining objectives and appropriate multi-use zones

The Visioning Workshop 1 notes were reviewed to: (a) develop a clearly defined overall vision (Figure 3-1); (b) identify the objectives for the Grenadines MSP initiative (Table 3-1); (c) extract the stakeholder's identified existing and future uses in order to propose appropriate zones (Table 3-2); and (d) draft clear objectives for each of the identified zones (Table 3-2).

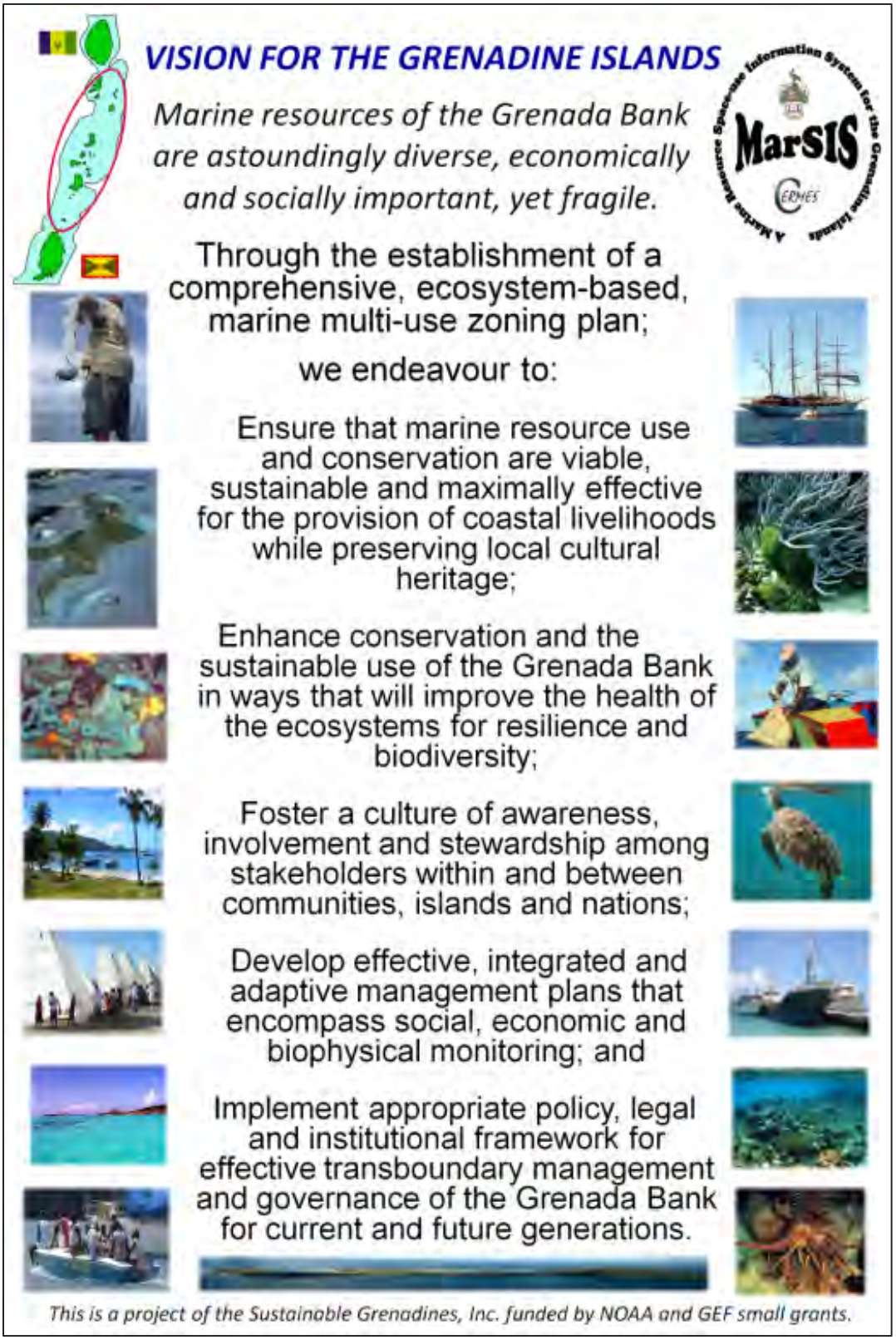


Figure 3-1 Vision for the Grenadine Islands marine zoning plan.

Table 3-1 Proposed overall objectives of the Grenadine Islands MSP.

Proposed Objectives
• Fishery production
• Environmental conservation
• Sustainable marine livelihoods
• Cultural and historical preservation
• Tourism income
• Transportation access

Table 3-2 Proposed zones and objectives developed for each zone.

Zone	Objective
Fishing	- Manage Grenada Bank as one area (and harmonized regulations across the entire bank) - Maintain access to landing facilities for fishers - Managed access to baitfish & coastal pelagic fish - Ensure undersized fish are not caught & nursery areas protected - Multi-use zoning areas to include closed areas, open access and other areas where selected gear or access restrictions apply
Tourism/Recreation	- Healthy coastal and submerged ecosystems, clean water & beaches for swimming, sailing, diving, picnicking, etc. - Adequate areas for swimming and other activities (snorkelling/diving, sailing, wind-surfing/kite-boarding) - Areas designated for future sustainable tourism infrastructure - Areas where development is not allowed - Ample facilities for recreational boating (beach and pier access, moorings) - Free access for all beaches for locals/tourists
Transportation / Industrial	- Distinct identification and demarcation of ferry and shipping lanes - Marina development plan—identify locations where seaports & marinas may be developed in the future (for both commercial, local & tourism purposes)
Conservation	- Identify and protect submerged marine resources (critical habitats and species, nursery areas & breeding grounds) - Identify and protect coastal resources (beaches, mangroves, salt-ponds, whelks, oysters, seabird & turtle nesting) - Identify and protect culturally important marine areas - Provide healthy natural resources for everyone - Integrated land and sea management - Build resilience to natural and man-made disasters
Mariculture	- Identify areas of current and potential for mariculture activities - Well managed environmentally sound mariculture industry livelihoods

A series of community meetings were held from June 5-20, 2011 in each of the seven inhabited islands to share project objectives, gather information on the identified data gaps and obtain feedback on the 'Developing a Framework for a Comprehensive Marine Multi-use Zoning Plan for the Grenadine Islands' project from the Grenadine MRUs and island communities (see Progress Report 1 – Baldwin 2011 for review). To advertise the meetings, flyers were posted, the SusGren and Grenadines MarSIS egroups were used, and press releases were sent to Grenada and St. Vincent and the Grenadines media houses (i.e. newspaper, radio and television). Furthermore, seven female notetakers were hired and trained to assist with publicising, organizing and general note-taking responsibilities for each of the island community meetings. As such, a brief training session and an initial evaluation of each of the note-takers was undertaken (see Progress Report 1 for review).

A total of 212 persons attended the 11 meetings. All additional data collected was spatially translated into GIS and incorporated into the MarSIS database. Meetings generally lasted approximately two hours and comprised of a presentation on the project, followed by time for group discussion to allow community feedback on the project, objectives and draft zones. In conclusion, time was provided for participatory mapping exercises to collect information on the identified data gaps (see Progress Report 1 for review).

All new data collected during MRU meetings were digitised and incorporated into the MarSIS geodatabase. Next all GIS data was prepared for input in the 'Marxan with Zones' software application. Progress Report 1 and new mapping products were produced and shared with stakeholders via MarSIS and Susgren egroups and posted on MarSIS website in July 2011.

3.4 Decision-support tools

The International Marine Conservation Congress (IMCC2) conference in Victoria, Canada was attended May 13-18th 2011 to: present the Grenadines MSP project; further explore the GIS decision-support tools; and discuss planning strategies and lessons learned with other technical experts. Additionally, a meeting was held with TNC's Global Marine Team to discuss lessons learned from their experiences with MSP globally and in St. Kitts and Nevis as well as further refine the developed workplan and methodologies to be applied for the Grenadines MSP initiative. The possibility of obtaining technical assistance from TNC with the Marxan decision-support tool for the Grenadine MSP project was discussed and agreed upon. As a result, a two day 'Introduction to Marxan' training session was undertaken May 19-20th at University of Victoria to better understand the Marxan decision-support tool and aid the preparation of existing Grenadines MarSIS GIS data for input to the Marxan with Zones decision-support tool.

3.4.1 Marxan with Zones

'Marxan with Zones' is an extension of one of the most popular conservation planning decision-support tools - 'Marxan' developed by the University of Queensland (www.uq.edu.au/marxan provides a detailed review of the decision-support tool). This free software application allows users to incorporate multiple social and ecological objectives or priorities when designing a portfolio of management areas. Below is a description of how Marxan with Zones was implemented for the Grenada Bank. The following section provides an explanation of the software and various input parameters applied for the Grenadine Islands and are adapted based on Agostini et al. 2010.

3.4.2 Prioritising stakeholders resource and use values

A second stakeholder project committee workshop entitled 'Workshop 2 Update and Follow-up' was held August 17-18, 2011 in Ashton, Union Island in which 46 participants from 24 organisations attended. The agenda for the Workshop 2 is given in Appendix III. At this workshop, participants were updated on the status of the project, discussed and revised the project vision and objectives, discussed gaps in policy, and were briefed on the multi-use zoning process and benefits of marine management. Several exercises were conducted to enable the group to review and validate new information collected and objectives for each of the developed marine zones. Exercises were conducted to prioritise stakeholder's marine resource and use values and to determine compatible uses between each of the designated zones. Participants also selected a Grenadine MRU sub-committee working group who will work together to evaluate the developed 'Marxan with Zones' scenarios and other synthesized multi-use mapping data (a detailed review is provided in Progress Report 2 – Baldwin 2011b).

The workshop began with a series of presentations to: review project activities and marine zoning; share and amend the vision, zones and goals developed during the first workshop in January 2011; give an update on the review of the existing policies and legislations for each country; share case studies on marine use and zoning, specifically decision-making and tools used in the MSP process from St. Kitts and Nevis (Appendix IV). Next, a series of group exercises was conducted.

Each exercise is explained in detail in the following section.

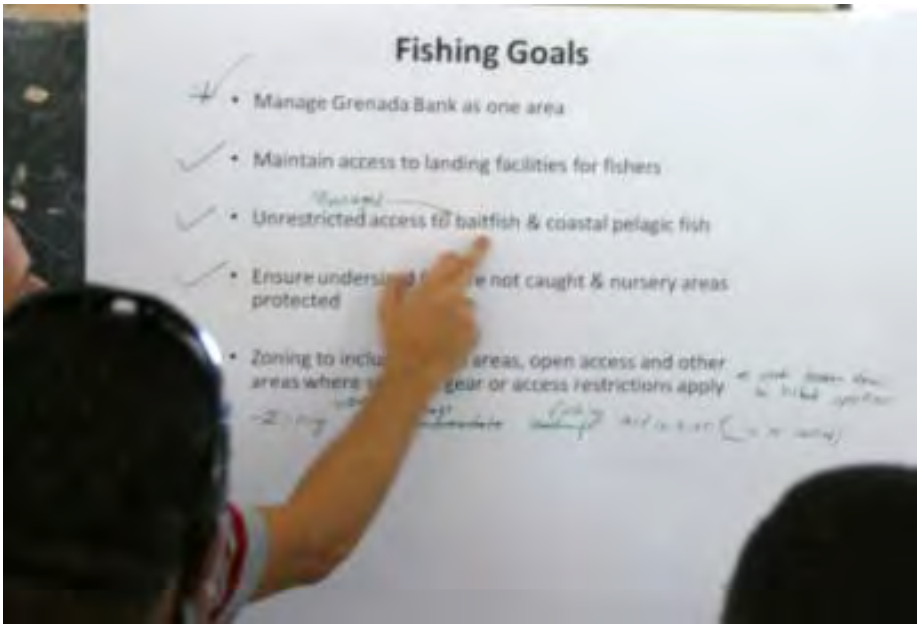
Exercise 1: The Grenadines marine use maps – How are we using our marine space? Review new and existing information and discussion

In June 2011, a series of community meetings were held on each of the inhabited Grenadine islands in which additional marine resource use information was collected to fill in the previously identified data gaps (i.e. priority fishing banks, kite-

surfing/windsurfing areas, potential mariculture sites). This information was entered into the MarSIS GIS database to supplement existing information and portray the spatial components of the coastal and marine environment, as well as the livelihoods which interact with and rely upon these resources. During this workshop, participants divided into break-out groups to review the Grenadines marine use maps for accuracy and contribute any additional information which was not captured in existing datasets.

Exercise 2: Finalise goals for each zone

At Workshop 1 and community meetings, five marine zones and associated goals (e.g. Tourism, Conservation, Fishing, Industrial/Transportation and Mariculture) were proposed by stakeholders. Participants were asked to review and amend specific management goals for each zone (Picture 1). To do this, participants were divided into four break-out groups in which every individual visited a station for each zone and were asked to review and amend the listed goals. These clearly defined goals were used to guide the marine zoning decision-making process as well as to assist the consultants with decisions involved to run the Marxan decision-support software appropriately.



Picture 1. Example of a 'Zoning Goal' station showing the amendments made by the participants

Exercise 3: Prioritisation of features - What are the most important features and resources? Identifying marine resource use priorities and how we can make decisions about trade-offs.

The next exercise was used to determine the priority features (or determine stakeholder values) within each of the proposed zones. To do this, each participant was required to

visit each of the five 'zoning stations'. At each station, a list of features that participate in the zone were listed (Picture 2). While at the zoning station, each participant was given an amount of dot stickers that was approximately 2/3 less than the total amount of features, and asked to place their stickers adjacent to features that they valued the highest. In doing this, participant's values were ranked on the relative priority status of features for each zone. This information was used in turn used to determine a proportion for each of the variable goals (or targets) for each feature included in the Marxan analyses (Table 3-3).

Picture 2. An example of a zoning station and its' associated features; dots represent a ranking of priorities as expressed by participants.

Table 3-3 Results of participant prioritisation of features identified by zone (N.B. Numbers indicate the amount of stickers placed adjacent to a feature).

Proposed Zone	Priority Feature
Fishing	Fish (line, net, towing, pot) – 38 Lobster (diving/traps) – 27 Conch – 17 Bait and coastal pelagic – 17
Tourism/Recreation	Traditional boat building – 31 Mooring areas – 28 Birding/turtle watching/nature tourism – 25 Diving/snorkelling – 23 Anchoring – 22 Swimming/bathing – 19 Vending – 15 Kite-boarding/windsurfing – 1
Transportation/Industrial	Landing site (fishers, water taxis, dive shops, day tours, etc.) – 35 Seaport/marina – 23 Shipping lane/ferry route – 14
Conservation	Nursery area (fish/conch/lobster) – 34 Turtle nesting site – 32 Important bird areas – 18 Oyster beds – 20 Wetlands (mangrove/salt pond) – 33 Coral reefs – 43 Mixed-live (algal) bottom – 2 Hard bottom – 0 Sea grass – 19 Sand – 16
Mariculture	Conch/lobster/shellfish – 13 Fish farming – 12 Seamoss – 10

N.B. Many people did not understand the mixed-live (algal) bottom category. When it was explained to the group, participants felt that it should have been placed a higher priority status.

Exercise 4: Compatibility of marine resource use by zones

Marine resource use may operate in varying degrees of conflict or compatibility. Specifically, certain types of marine resource uses can be conducted in conjunction with, or within the same geography as other uses, while some may be entirely incompatible. Participants took part in a group exercise to determine the relative compatibility of marine resource uses in an overlapping spatial context. The participants were divided into four groups and each discussed and determined the compatibility of the five zones in relation to the each other.

The larger group convened and each break-out group shared their results and come to a consensus. Where there was some disparity, group discussions continued until the

group could come to an overall consensus. Table 3-4 lists the results of the final incompatibility matrix. Information obtained from this exercise was used to determine appropriate input variables for the incompatibility matrix or the 'cost' layer of the Marxan with Zones analyses. Discussion topics included: that mariculture and conservation zones were determined to be compatible, but only if it was strictly limited to seamoss and conch mariculture. However, it was agreed that large-scale fish farming could potentially threaten compatibility with conservation, as it has potential to adversely affect ecosystems. Therefore, it was determined to be compatible in the current context, but with caution for future management. Although there was some debate regarding the compatibility of mariculture and fishing, it was agreed that if the two were operating in an overlapping geography, they would be essentially incompatible. Reasons were based on the fact that mariculture is usually a private endeavor in a set area, and that fishing activity in the same area could cause potential conflict. Participants felt that industry and tourism were somewhat compatible, based mainly on the fact that certain amounts and types of industrial infrastructure and accommodation are required for tourism. Industry and fishing on the other hand were determined to be somewhat incompatible. It was felt that ideally, they would be kept separate, but that they currently are, and may have to continue operating in an overlapping geography.

Table 3-4. Results of the relative compatibility of marine resource use activities.

Zones	Tourism	Fishing	Conservation	Industrial	Mariculture
Tourism					
Fishing					
Conservation					
Industrial					
Mariculture					

(N.B. Green = compatible, Yellow = somewhat compatible, orange = somewhat incompatible, red = entirely incompatible)

Exercise 5: Stakeholder sub-committee

Participants at the workshop were briefed on the role of a Grenadine MRU sub-committee to work together at a one-day meeting in November 2011 to learn more about marine planning and zoning as well as review and give feedback on the Marxan multiple-use zoning scenarios to be developed based on stakeholder values from the 1st two workshops and community meetings. The role of the sub-committee would be to determine the most feasible option (or scenario) for the Grenadines marine multi-use zoning plan. Workshop participants agreed that this sub-committee should equitably represent each of the Grenadine Islands and each the marine resource user groups. A 12 member sub-committee was appointed.

3.4.3 Marxan with Zones model inputs and parameters

Marxan with Zones was run several times to develop a number of possible zoning scenarios over a three month period (August to October 2011) with technical assistance from TNC's GIS experts and Compton Mentor Fellow Allison DeGraff. As a result, a number of mapping products were created based on four developed Marxan scenarios. An overview of Marxan with Zones, including model inputs and parameters as well as the corresponding mapping products are provided in the following section.

- Analysis boundary

To define the maximum analysis extent (or boundary) for this project, several factors were considered. These included the jurisdictional boundary of each countries' exclusive economic zone (EEZ), the location of marine activities throughout the seascape, existing spatial data on marine resources and activities. Although the need for a zoning plan that extends to the limits of the countries EEZ is recognized, the analysis extent was set to the limits of the majority of the existing data, namely the Grenadines MarSIS database. Thus the geographical scope of the analysis boundary is delimited by the island coastlines and the 60 m isobath, such that it spanned the entire 'shallow-water' portion of the Grenada Bank between the island of Bequia in the north and Il'de Caile in the south, covering approximately 2000 km^2 (Figure 3-2).

- Potential zone type

During Workshop 2 and the community meetings, stakeholders identified the overall vision (Figure 3-1) and objectives for each feature participating in each of the zones (Table 3-1) as well as the predominate types of marine activities that presently occur or may occur in the future on the Grenada Bank to be zoned for. Stakeholders also identified objectives for each zone as summarized in Table 3-2. The five main zones that were determined by stakeholders are: Conservation, Fishing, Industrial/Transportation, Tourism/Recreation and Mariculture.

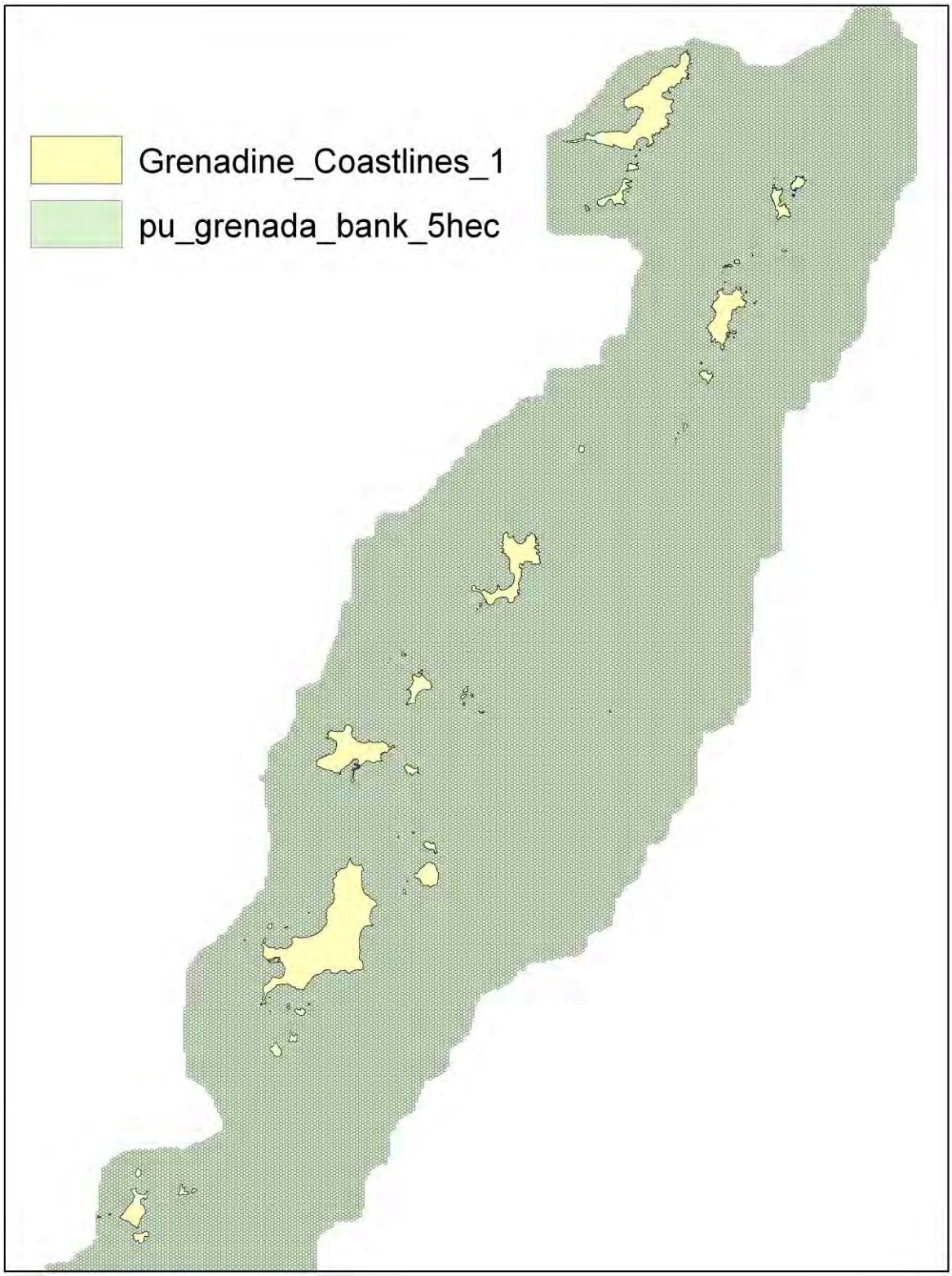


Figure 3-2 Map of the Grenada Bank project area representing the 5 heactare planning units.

- Spatial unit for analysis

Marxan with Zones requires that each resource and activity (e.g. spatial features) in the project area be summarized into planning units. Planning units are a pre-defined grid, typically hexagons, that is overlain on each feature. This allows the program to run comparison and selection spatial analyses between features and candidate zoning areas. It is important that planning units capture all of the area that is to be selected as part of the zoning design and their size should be at a scale appropriate to the existing data. Therefore planning units should be no finer than the scale existing data was collected at and no coarser that is realistic for management decisions. For this project, it was decided that hexagons five hectares in size were suitable based on the scale and complexity of the Grenadines MarSIS. A total of 41,177 (5 ha) planning units were created, covering the study area extent to the 60 metre depth isobath (Figure 3-2).

- Specification of the quantitative goals and spatial information on where they can potentially be achieved

The specific information on the spatial extent of the resources and space-use activities (features) that occur within the project area need to be selected as model inputs within a Marxan with Zones platform. Decisions on the features (and their respective goals) taking place within each zone must also be made. Table 3-5 lists the spatial features that were selected to participate in each zone for the Grenada Bank project area. Appendix V presents the location of each of the features (e.g. spatial extent) that was input in the Marxan with Zones platform. The choice of goals implemented in the analysis was guided by discussions with stakeholders, both at the workshops and community meetings as previously outlined (see Progress Report 2 for review).

Table 3-5. The spatial features included in each zone for the Grenada Bank project area.

Zone	Feature
CONSERVATION	Coral Reef
	Sand
	Seagrass
	Mixed Live Bottom
	Hard Bottom
	Wetlands (Mangroves and Salt Pond)
	Sea turtle nesting beaches
	Seabird nesting areas
	Marine protected areas (Designated)
	Marine conservation areas
	Proposed marine protected areas
	Nursery areas
	Oyster beds
FISHING	Baitfish bays
	Conch Grounds
	Lobster Grounds
	Fish Grounds
INDUSTRIAL / TRANSPORTATION	Seaports
	Shipping lanes
	Fish landing sites
	Day-tour operators
	Water-taxi operators
	Ferry operators
	Dive shops
	Fishers
	Yacht companies
MARICULTURE	Mariculture (Seamoss)
	Potential Seamoss Areas
	Whelks
TOURISM / RECREATION	Anchorages
	Dive sites
	Historical sites
	Recreational areas
	Shipbuilding sites
	Shipwrecks
	Vending sites

- A metric that captures factors to avoid

Different activities occurring in the marine environment may affect each other, in addition to affecting the coastal and marine ecosystem. Marxan with Zones models these interactions using an input variable called a 'cost matrix'. Marxan with Zones identifies and allocates an optimal selection of planning units to each zone, while achieving each zone's goals at a minimum 'cost'. Thus the 'cost' values used in this matrix will ultimately influence where (i.e. planning unit) goals could most reasonably be achieved. The statically optimal solution is referred to as the most efficient solution.

Another way to consider the 'cost' surface is a measure of potential conflict between marine features, activities or interests. A cost matrix, or the compatibility of features within each zone compared to other zones, in the Grenada Bank project area was generated at Workshop 2 (Table 3-4). For example, the conservation zone features were found by stakeholder to be compatible with the mariculture zone features and incompatible with the industrial zone features. Values were assigned to the cost matrix (Table 3-6) and were used to create a series of GIS-based compatibility mapping surfaces (Appendix VI) that were modelled for each proposed zone. Marxan with Zones assigns compatibility scores to each planning unit by taking the average value within the boundaries of the planning unit for each of the modeled compatibility surfaces. When attempting to meet the goals for each zone, Marxan with Zones uses the cost value of each planning unit as a constraint for selecting the most optimal zoning configuration. In other words, the final zoning solution represents an attempt to minimize conflict by selecting the planning units with the lowest total unit cost while meeting the goals of each zone. These zone compatibility maps can also help stakeholders visualize the compatibility between each zone and can be useful to aid decision-making and the evaluation of trade-offs in a zoning plan.

Table 3-6 Zone boundary costs used in all scenarios for the Grenada Bank project area.

Zones	Tourism	Fishing	Conservation	Industrial	Mariculture
Tourism	0	0	0	0	0
Fishing	0.25	0	0	0	0
Conservation	0.25	0.75	0	0	0
Industrial	0.75	0.75	1	0	0
Mariculture	0.75	1	0.50	1	0

- Spatial objectives that guide the appropriate location of zones (zone boundary cost)

How fragmented a specific zone is has an impact on management feasibility and effectiveness (i.e. how costly implementing a zone will be). Exploring the impact of varying levels of fragmentation is achieved in Marxan with Zones with a parameter representing compactness (i.e. zone boundary cost). Optimal parameters for spatial compactness and buffering of zones were derived through a calibration process as described in the Marxan with Zones Users Guide (Watts et al. 2010).

3.4.4 Developed scenarios

After calibration, in order to assess the impact of different decisions on the potential configuration of zones, some of the parameters described above were modified to generate different scenarios. Four zoning scenarios were initially developed in this analysis as well as one subsequent scenario (based on stakeholder feedback from the examination of the initial four scenarios) each with different zone-specific requirements. For each of the scenarios, Marxan with Zones was run using 100 repetitions, with each repetition having 1 million iterations. Although many various scenarios were developed, the following scenarios were selected to represent a variety of potential planning perspectives, so as to best assist stakeholders in considering the trade-offs and variations in the zoning design and to determine usefulness to the local context within the Grenadine Islands.

Scenario #1 – Reduced variable goals with industrial, MPAs, and sea moss areas locked-in

- This scenario used variable goals (based on stakeholder values) for each of the Marxan targets reduced by 20% from the original variable goals determined at the workshop (Table 3-7). This scenario locked in the features or activities in the industrial zone, sea moss mariculture areas and the MPAs (Figure 3-3).

- During workshop 2 attendees ranked the activities or features within each zone. This scenario began by attempting to reach the variable goals as ranked by the attendants of the workshop. However, a solution with these original goals was not mathematically possible. For this reason, the goal of each Marxan target in the conservation, fishing and recreational zone and potential sea moss mariculture areas was reduced by 0.2, except for hard bottom habitat, and kite boarding and wind surfing areas since their targets were already set at 0.1. Marxan targets in the industrial zone and sea moss mariculture areas were not reduced by 0.2 since these features or activities were locked into the solution.

- All of the targets were met with the exception of shipbuilding, vending and mooring areas. These targets could not be met because portions of them were already locked up in the industrial or mariculture zones due to multiple overlap of activities. In terms of absolute area, shipbuilding sites was off from meeting the goal by the most (30%). In terms of proportion, mooring areas were off by 31%.

- The industrial zone and sea moss mariculture areas were locked into the solution for practical reason. These activities or features have small footprints and are likely to be included in their entirety within their respective zones (e.g. sea moss mariculture area). The practicality also comes into play for shipping lanes as well. Complete shipping lanes are more practical. The MPAs were locked into the solution for practical reasons as they are already present; it was seen as logical to include them in the conservation selection.

- The final solution concentrated fishing and conservation zones into blocky areas on the bank reflecting the resolution at which these features were collected at. Closer to land the conservation and fishing zones are more 'spotted'. In general, the fishing and conservation areas have difficult goals to meet given their large extent and high goals. This played out between the fishing grounds and coral reef areas specifically. Shipwreck areas are likely similar to the features whose goals were not met because of multiple activity overlap.

Table 3-7 Variable goals for features based on stakeholder values derived at Workshop 2.

Zone	Feature	Goal	Reduced Goal
CONSERVATION	Coral reef	0.90	0.70
	Sand	0.40	0.20
	Seagrass	0.45	0.25
	Mixed live bottom	0.42	0.22
	Hard bottom	0.10	0.10
	Wetlands (mangroves & salt pond)	0.72	0.52
	Sea turtle nesting beaches	0.70	0.50
	Seabird nesting areas	0.55	0.35
	Nursery areas	0.74	0.54
	Oyster beds	0.47	0.27
FISHING			
	Baitfish bays	0.40	0.20
	Whelks	0.60	0.40
	High quality conch Grounds	0.40	0.20
	High quality lobster grounds	0.64	0.44
	High quality fish grounds	0.90	0.70
INDUSTRIAL			
	Seaports	0.60	0.40
	Shipping lanes/ferry route	0.36	0.16
	Landing sites	0.90	0.70
MARICULTURE			
	Mariculture (seamoss)	0.65	0.45
	Potential seamoss areas	0.50	0.30
TOURISM / RECREATION			
	Anchorages	0.63	0.43
	Mooring areas	0.81	0.61
	Dive sites	0.66	0.46
	Vending sites	0.43	0.23
	Recreational areas (swimming/bathing)	0.55	0.35
	Kite-boarding/wind-surfing	0.10	0.10
	Shipbuilding sites	0.90	0.70
	Shipwrecks	0.66	0.46

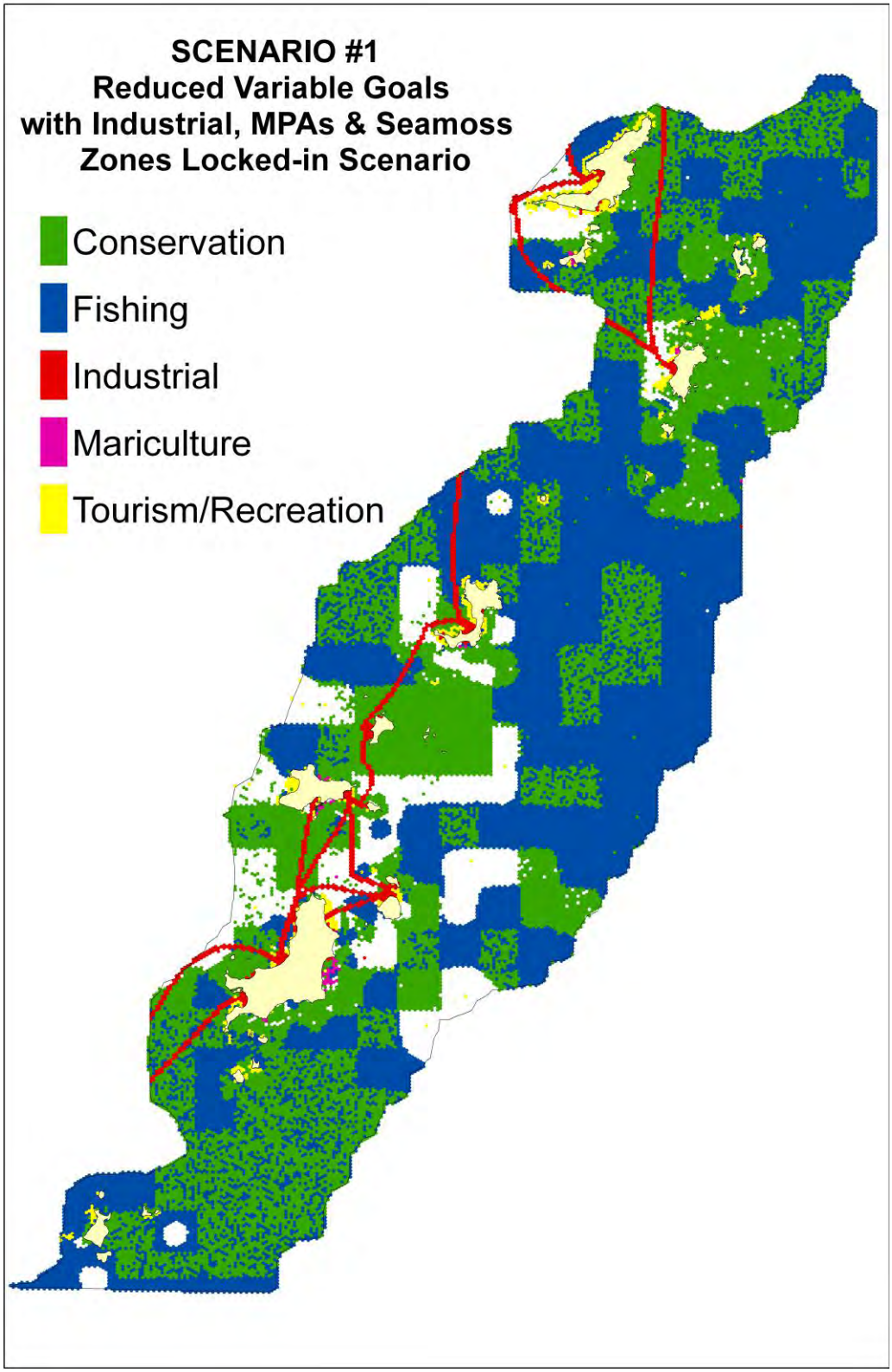


Figure 3-3 Marxan with Zones Scenario 1: Reduced variable goals with industrial, MPAs and seamoss areas locked-in.

Scenario #2 – Reduced variable goals with MPAs locked-in

- Similar to Scenario #1, this scenario used variable goals for each of the Marxan targets reduced by 20% from the original variable goals determined by the workshop (Table 3-7). This scenario only locked in existing MPAs into the conservation zone (Figure 3-4).

- This scenario, run after the scenario with "reduced variable goals with industry features, MPAs, and sea moss areas locked-in," attempted to determine if the reduced goals could be met without having industry features and the sea moss areas locked in. The result was all reduced goals were met.

- The MPAs were locked in for practical reasons as they exist presently as a conservation zone and did not contribute to why shipbuilding, vending and mooring areas were not meeting their goals in Scenario #1 "reduced variable goals with industry features, MPAs, and sea moss areas locked-in." Although it is practical to lock in the extents of some features such as the smaller areas of sea moss mariculture and shipping lanes, this solution allows one to look at the most important areas of each of these features. This could be important when determining tradeoffs (e.g. shipping lanes could be rerouted to lessen the impact on another activity or when zoning for sea moss mariculture areas).

- The final solution looks very similar to the scenario with "reduced variable goals with industry features, MPAs, and sea moss areas locked-in."

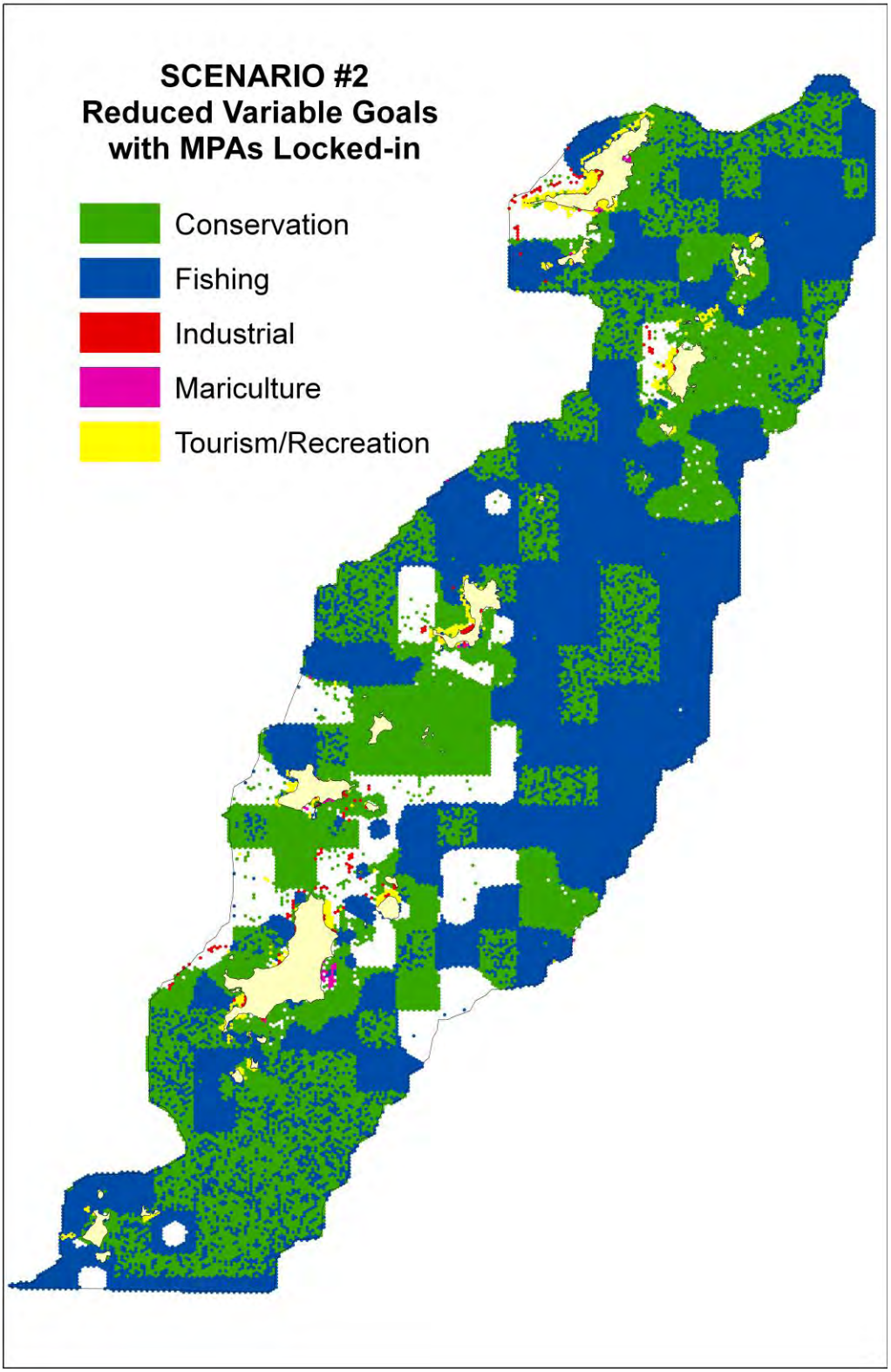


Figure 3-4 Marxan with Zones Scenario 2 – Reduced variable goals with MPAs locked-in.

Scenario #3 – 50% goals with MPAs locked-in

- This scenario used (0.5) or a 50% goal for each of the Marxan targets with MPAs locked into the solution. Two scenarios were run before this "50% goals with MPAs locked-in" scenario. One used 0.3 set as the goal for each Marxan target and the other scenario used 0.4 set as the goal for each Marxan target. One scenario was run after this scenario which used 0.6 as the goal for each Marxan target. When 0.6 was set as the goal for each Marxan target, the goals were not met. However, they were met when 0.3, 0.4 and 0.5 was set as the goal. This scenario represents the point before an increase in all goals cannot be met (Figure 3-5).

- Assigning the same goal for each target places everything on the same playing field, no one target is ranking higher than another. As these goals are ratcheted up, one can observe some of core zone areas.

- The "spotty" appearance of these zones would be impractical from an enforcement standpoint. However, this scenario might indicate where multi-purpose zones could exist between complimentary fishing and conservation practices.

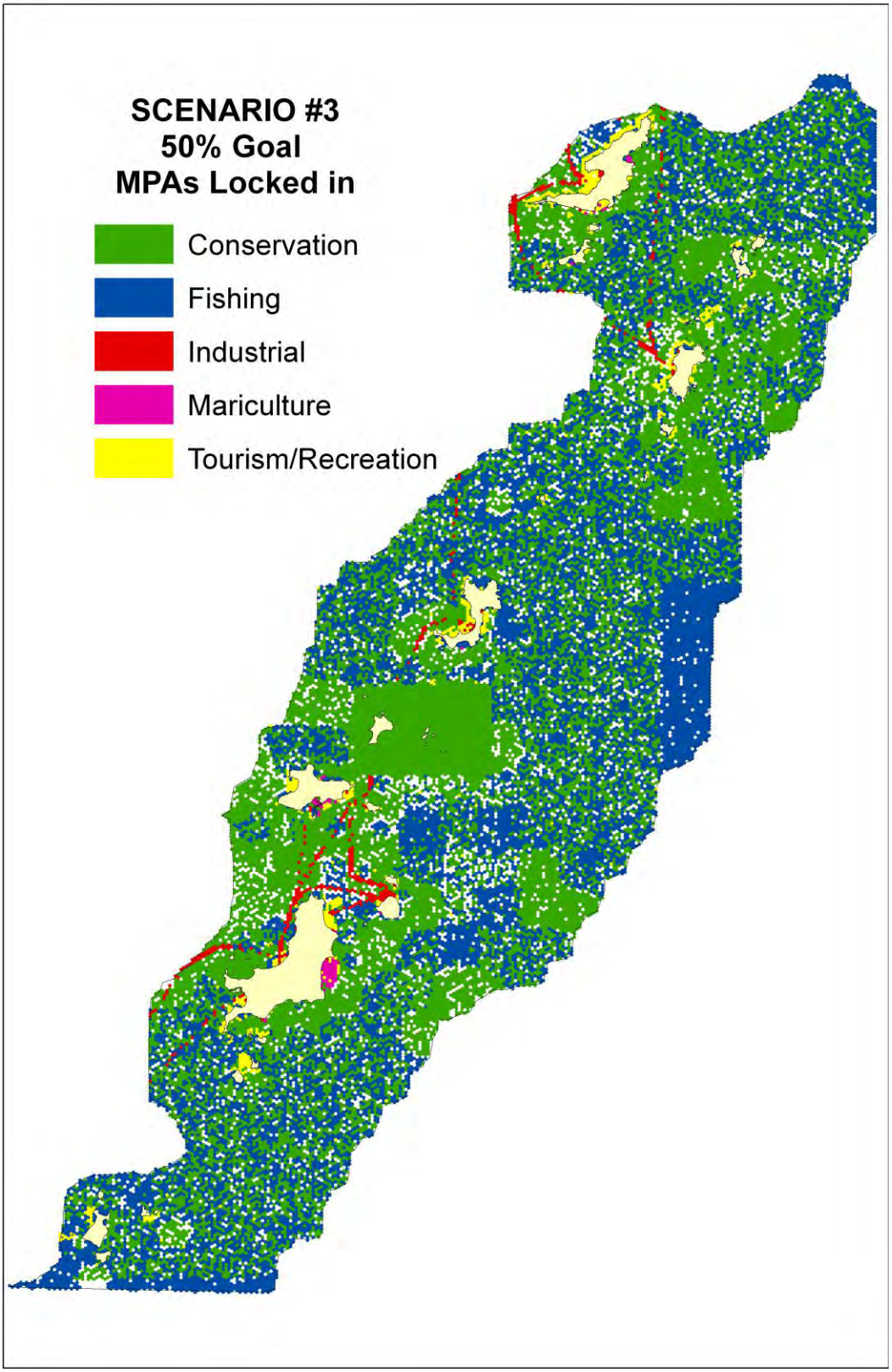


Figure 3-5 Marxan with Zones Scenario 3: 50% goals with MPAs locked-in.

Scenario #4 – 55% goals with no costs

- This scenario used (0.55) or a 50% goal for each of the Marxan targets (Figure 3-6). No features were locked in and a constant cost surface was used instead of a variable cost surface. This scenario furthers the notion of placing everything on an even playing field. It assumes that all targets are equal and there are no costs in the placement of zones. Although this is unrealistic, the solution can reveal areas that might be designated as one zone that might not normally be designated as such under the other modelled constraints. Also, without the MPAs locked in, it provides the opportunity to visualize where conservation areas might be placed if given a clean slate.

- The goals were nudged up to 0.55 from 0.5 in this scenario to place more pressure on the model to find the optimal solution. This was the highest percent in which all goals were met.

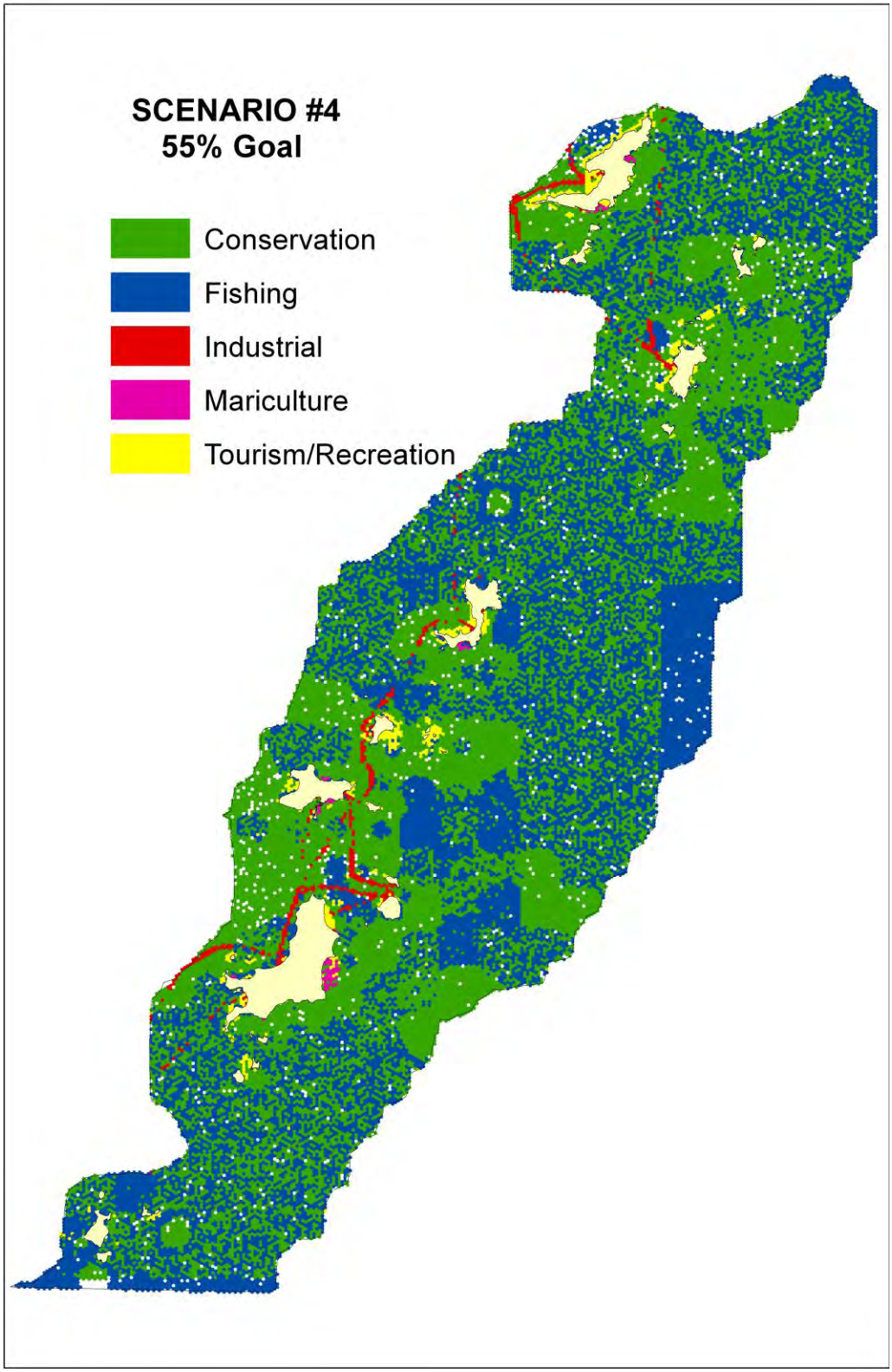


Figure 3-6 Marxan with Zones Scenario 4: 55% goal for all features with no costs

3.4.5 Grenadine MRU sub-committee feedback

A one day MRU stakeholder sub-committee meeting was held in Mayreau the 17th of November 2011. A total of 15 MRUs attended this meeting. The objective of the meeting was to increase the understanding of marine spatial planning, decision-making and the Marxan with Zones decision-support software and to collaboratively work through the four developed Marxan scenarios, incompatibility surfaces and other GIS overlay analyses highlighting important areas for conservation, human use (livelihood) and threat. The meeting sought to obtain stakeholder's feedback to identify the most feasible marine zoning scenario for use to plan the way forward in the multi-use marine zoning of the Grenada Bank. The selected scenario and results of this workshop were presented to the larger stakeholder group during Workshop 3 to aid the drafting of a marine multi-use zoning plan for the Grenada Bank.

The agenda for the one day sub-committee meeting is listed in Appendix VII. The sub-committee meeting began with a presentation to review the steps involved in planning for the coastal and marine environment (Appendix VIII). These include: gathering marine resource and space use data and information; setting objectives of marine zoning plan; defining uses for each zone; evaluating uses, areas of high space use and trade-offs of each zone to identify an acceptable and feasible plan; and lastly developing legislation to support management. Next participants were briefed on the process of decision-making. Decision-making steps include: Identify the area and the problem; design a goal to achieve; define management priorities; collection information on resources and uses; look at areas of high use and potential conflicts; think about trade – offs; think about the feasibility of decisions; and develop a plan of action. Then a review of the project activities thus far was given. This included: the definition of the planning area – The Grenadine Islands and the Grenada Bank; developing a vision and set of objectives (Worksop 1); determine zones (e.g. conservation, fishing, tourism, mariculture, and industrial); setting goals for each zone (Workshops 1 and 2); collecting information and mapping resource and use features (i.e. Grenadines MarSIS); mapping the features (Appendix V); identifying priority areas for each zone (e.g. Marxan scenarios, compatibility surfaces and hotspot analyses); and determining the compatibility of marine resource use (Table 3-6; Appendix VI).

The primary goal of the meeting was to allow the sub-committee to gain an increased understanding of the process of marine spatial planning and decision-making and how the Marxan decision-support software can be of use for marine planning. Thus, a number of exercises were developed to guide the stakeholders through the process of marine spatial planning decision-making and the relevant input variables required to run the Marxan software. These exercises are briefly described in the following section (see Progress Report 2 for review).

Exercise 1: Zone Identification

Participants were split into three groups and charged with the identification of places of conservation, fishing, tourism/recreation, transportation/industrial, and mariculture for their respective island and places of overlap using existing mapping information and personal knowledge of the area. Stakeholders were reminded to keep in mind the vision, objectives and priorities for each zone as determined in previous workshops. The outcome of this exercise was that participants were able to identify critical areas, the location of different activities as well as identify areas of overlap within a single island. Through this exercise it became apparent that this would be difficult to accomplish across the entire Grenada Bank, as human uses are not mutually exclusive, and that multi-use zoning was in fact necessary.

Exercise 2: Evaluating Maps

Following this exercise, the groups were asked to discuss and evaluate the maps they had created, specifically keeping in mind the following questions: is the zoning map representative? (are the activities balanced?); is the zone distribution equitable for all users? (is it fair?); are the uses compatible with each other?; and is the zoning plan manageable?

This exercise resulted in lively discussion and the concept of compatibility, which was developed in the previous workshop, was revisited. During the discussion questions about equitability and how this is determined arose. When discussing manageability, sub-committee members realised it would be possible once supporting legislation was developed and passed. As a result of this exercise, the groups came to the conclusion that multi-use zoning and integrated management is needed on land as well as the sea to allow for successful implementation.

Exercise 3: Review and Discussion of Marxan Scenarios

The final group exercise was used to examine and discuss two of the developed Marxan scenarios. These included: Scenario 1 - Reduced variable goals with industrial, MPA's and seamoss zones locked in and Scenario 2 - Reduced variable goals with MPA's locked in. Each group was asked to evaluate the advantages and disadvantages of each scenario and determine if the Marxan decision-support tool would be useful for the Grenadine Island context. If so, participants were asked to choose a scenario or alter the parameters as they thought appropriate based on the information collected from previous workshop and their knowledge of the Grenadine Islands.

Overall stakeholders felt the Marxan decision-support tool and developed scenarios would be useful for integrating and prioritizing information for planning the coastal and marine area of the Grenada Bank. Scenario 2 was the preferred choice of the MRU sub-committee as it was seen to be more representative of the larger stakeholder planning

group's developed objectives. Participants also felt the definition of the zone boundaries in this scenario would be more practical and easier to implement. Scenario one (1), although it provided equal opportunities across the board, was seen as a disadvantage as it was 'clumpy' and the lack of defined zones would be hard to implement and manage. As a result, stakeholders suggested that Marxan should be re-run with reduced variable feature goals with the MPAs and shipping lanes locked in and that only this one scenario would be presented to the larger stakeholder planning group.

3.4.6 Final scenario

Marxan with Zones was re-run in January 2012 based on feedback from the Grenadine MRU sub-committee. Thus this scenario used variable goals (based on stakeholder values) for each of the Marxan targets reduced by 20% from the original variable goals determined at Workshop 2 (Table 3-7). This scenario locked in the features of shipping lanes and the MPAs (Figure 3-7).

At Workshop 2 participants ranked the activities or features within each zone. This scenario began by attempting to reach the variable goals as ranked by the workshop participants. However, a solution with these original goals was not mathematically possible. For this reason, the goal of each Marxan target in the conservation, fishing and recreational zone and potential sea moss mariculture areas was reduced by 0.2, except for hard bottom habitat, and kite boarding and wind surfing areas since their targets were already set at 0.1 (Table 3-7). Marxan targets for shipping lanes and MPAs were not reduced by 0.2 since these features or activities were locked into the solution. All of the targets were met.

The final solution concentrated fishing and conservation zones into blocky areas on the Grenada Bank reflecting the resolution at which these features were collected at. Closer to land the conservation and fishing zones are more 'spotted'. In general, the fishing and conservation areas have difficult goals to meet given their large extent and high goals. This played out between the fishing grounds and coral reef areas specifically. Shipwreck areas are likely similar to the features whose goals were not met because of multiple activity overlap.

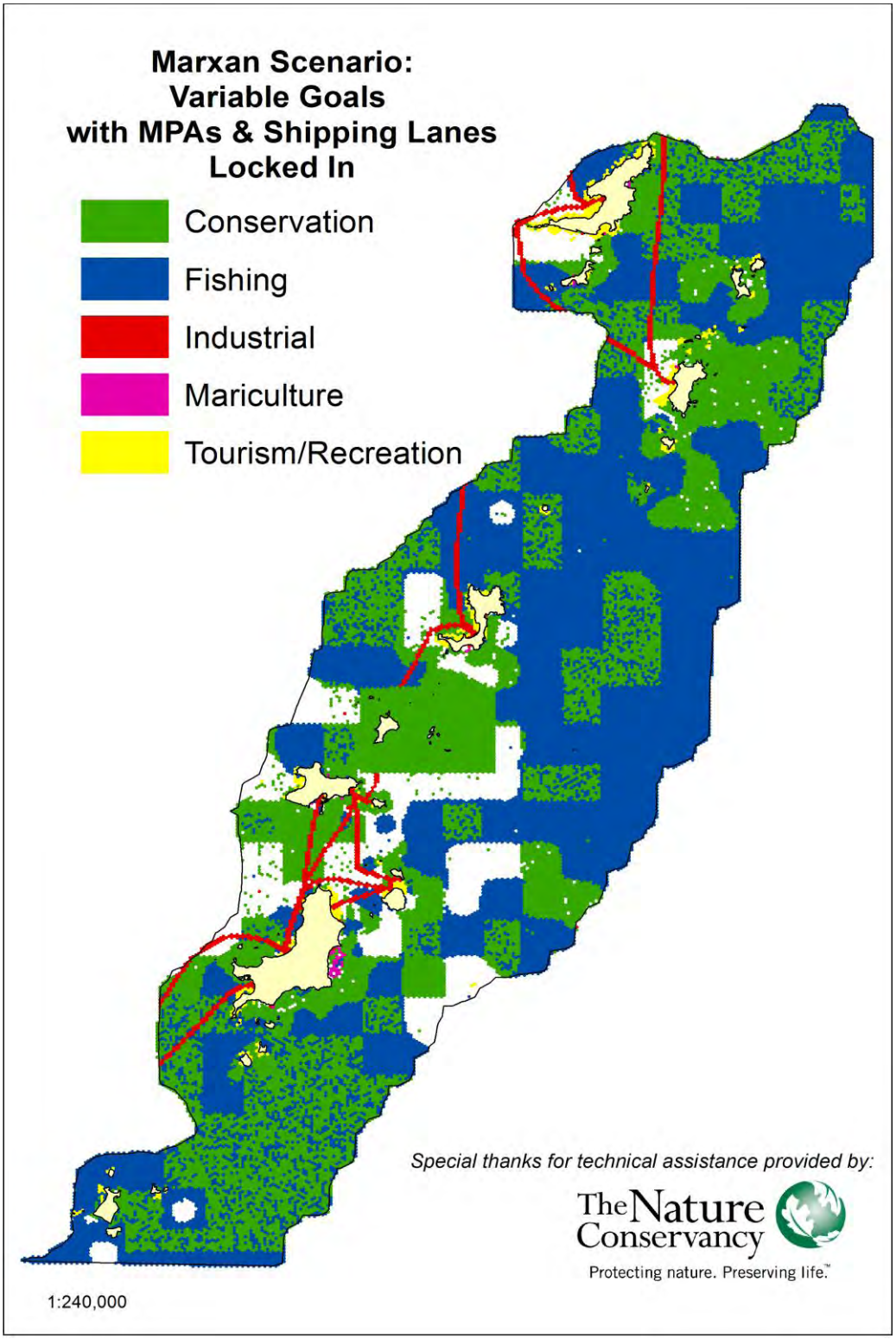


Figure 3-7 Final Marxan scenario run using reduced variable goals with MPAs and shipping lanes locked in.

4 DRAFTING A MARINE MULTI-USE ZONING DESIGN

4.1 Planning for the sustainable development of the coastal and marine resources of the Grenadine Islands

A third workshop entitled 'Planning for the sustainable development of the coastal and marine resources of the Grenadines' was held in Carriacou February 16-17, 2012. There were a total of 38 participants from 28 organisations in attendance. The primary goal of this workshop was to collaboratively develop a draft marine multi-use zoning design for the Grenada Bank. Appendix IX provides the agenda for the workshop and Appendix X provides the presentations that were given. Presentations reviewed the project activities thus far, including the Marxan decision-support tool application, and the MRU stakeholder steering sub-committee provided a summary of meeting to the larger stakeholder planning group. The following section reviews exercises and key discussion points that emerged during Workshop 3. See Progress Report 3 (Baldwin 2012) for a detailed review of the workshop.

Exercise 1: Review and discussion of the developed Marxan zoning scenario
The final Marxan with Zones scenario was presented to allow for stakeholder evaluation (Figure 3-7). This scenario included zones for conservation, tourism, industrial use, fishing and mariculture. Group members were given large maps to review, discuss and provide feedback on the boundaries of proposed zones. The first 45-60 minutes was spent in group discussion. After this groups began making revisions to the maps using coloured markers

Exercise 2: Zone definitions
To gain a better, shared understanding of what is envisioned for each of the proposed zones group discussion on the definition of each zone was solicited. This included the activities that should be permitted or restricted, the types of management measures that might take place, and the goals/objectives of each zone. Breakout groups discussed and shared key points with the larger group. Group consensus was reached that more information was required in relation to specific examples of multi-use zoning designs and activities allowed/prohibited from other countries in which marine zoning was implemented.

Exercise 3: Zone definition case studies
A review of zoning schemes applied to existing marine reserves and zoning designs including: Columbia's Seaflower Reserve; Australia's Great Barrier Reef; and Belize's South Water Caye Marine Reserve was presented (Appendix X). Information included the types of multi-use zones and what activities are permitted or restricted in each of these zones.

Exercise 4: Refining the definition of each zone

Break-out groups reviewed the five proposed zones for the Grenadine Islands. Consensus was reached to have a total of seven multi-use zones for the Grenada Bank project area. These include: Conservation; General Use; Low Impact/Ecotourism; Transportation/Industrial; Mariculture; Nearshore Fishing; and Offshore Fishing Zones. The group decided that the Conservation Zone already exists in the form of MPAs with either no-take or limited extraction (e.g. Tobago Cays Marine Park, Sandy Island Oyster Bed MPA). The General Use Zone is an area of planned development with limited restrictions (e.g. Clifton, Hillsborough, Port Elizabeth). The Low Impact / Ecotourism Zone is an area in which there would be very limited land development, yet recreational uses and local fishing would be allowed (e.g. Balliceaux, Petit Canouan, Sail Rock, Diamond Rock). These areas also coincide with existing terrestrial national park and/or wildlife reserve designations. The Mariculture Zone would be designated for the production of seamoss farming only. This zone could occur within the boundary of another zone as it is not seen to have many negative environmental impacts. Alhtough the group was not against the concept of fish farming, it was felt that this activity should occur within one of the fishing zones and would require a special permitting process. The Transportation Zone is an area that consists of shipping lanes, landing sites, seaports and marinas. The Offshore Fishing Zone is an area that would be set aside for use by local Grenadine fishers only. Small-scale fishing would occur in this area, although there would be restrictions to prohibit commercial fishing, dredging and oil drilling in this zone. The Nearshore Fishing Zone would compromise a fisheries management area in which some gear restrictions, seasonal closures, catch limits or a combination of management measure would be implemented to improve the health of the nearshore fishery resources. It was suggested and agreed that fishers would be critical in assisting in the determination of feasible management measures and their involvement would be required for the successful implementation of management measures in this zone.

Exercise 5: Review of the zoning scenario

Breakout groups reformed and used the refined zoning definitions developed in Exercise 4 to re-examine the zoning design and make further revisions to the proposed zone boundaries. The 1st draft marine multi-use zoning design for the Grenada Bank GIS files and map was developed based on the feedback provided by the project planning stakeholder group and the hardcopy maps that the breakout groups had created (Figure 4-1).

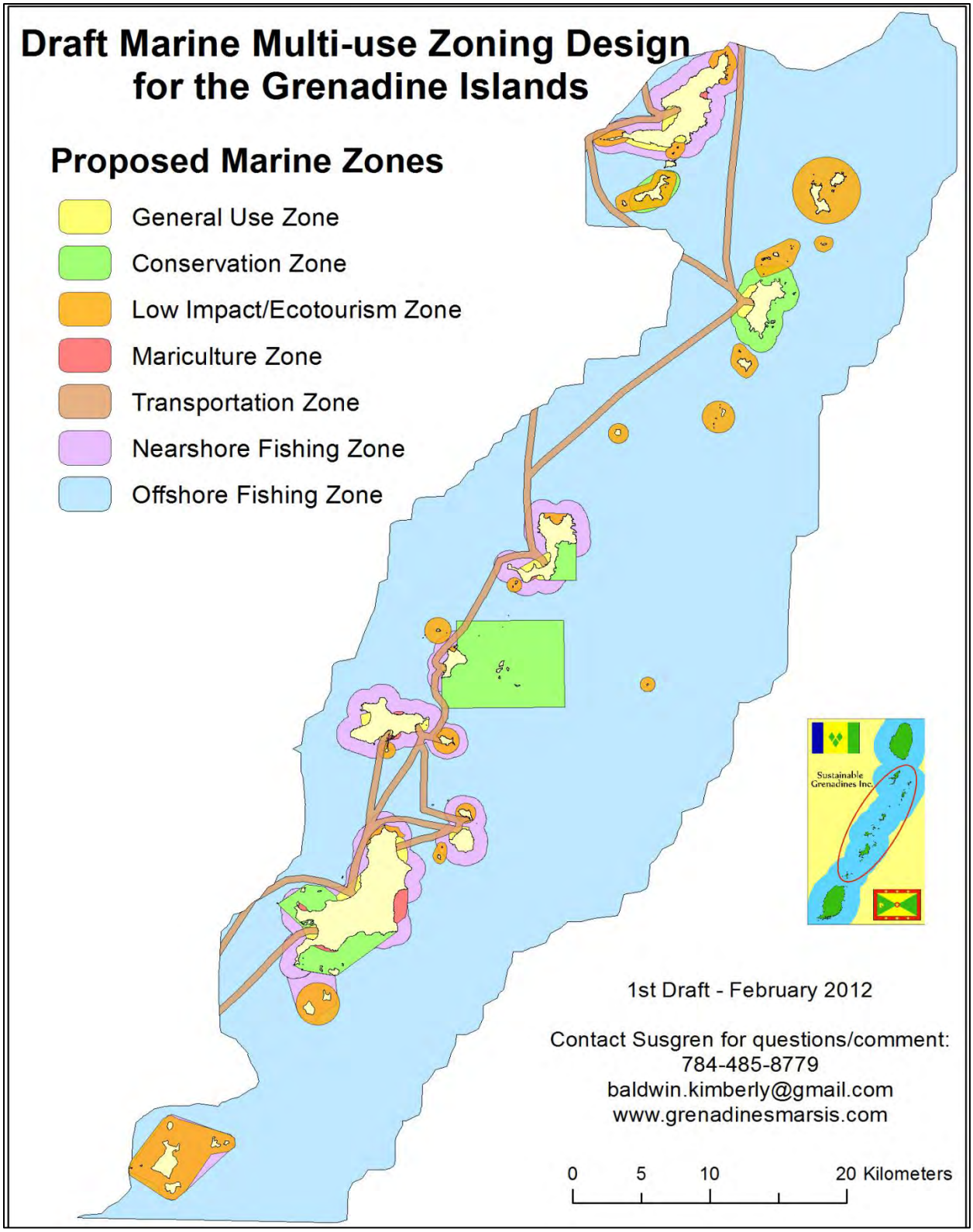


Figure 4-1. First draft of the Grenadines marine multi-use zoning design resulting from Workshop 3.

4.2 Marine resource user and island community feedback meetings

As a follow-up to the regional project committee planning workshop held in Carriacou, a second series of community meetings was conducted to review the drafted marine multi-use zoning plan with Grenadine MRUs (e.g. fishers, cruisers, dive shop operators, day tour operators, water taxi operators, ferries etc.) and community members. A presentation (Appendix X), a flyer of the draft marine multi-use zoning design project with a map (Appendix XI) and a media press release (Appendix XII) were prepared for the MRU community stakeholder meetings. The Grenada Bank marine multi-use zoning design was presented at these meetings to increase the level of understanding and support for MSP, the need for a zoning design and to obtain local island feedback to create a further iteration of the zoning design (2nd draft). Thus, the objective of these meetings was to create a zoning design that will be equitable and representative of the interests and values of the wider Grenadine communities.

A total of 311 participants attended 11 MRU community meetings held from the 20th February – 5th March 2012 (see Progress Report 3 for detailed review and notes from each of the meetings). Overall the need for a marine multi-use zoning plan was well received by Grenadine MRUs and the communities. The communities agreed that planning for the future of marine resources is essential to ensure sustainable development of the Grenadine Islands and the marine resources. Furthermore a sense of urgency, in regards to moving forward with this project, was resonated in many of the islands. A need to manage coastal inshore fisheries was voiced in every island and fishers expressed a desire to be involved in the determination of possible management solutions for the nearshore fishery resources. Communities realise that enforcement in the Grenadine Islands is minimal and that self-enforcement will be an essential component for the successful management of the draft zoning design. This being said, empowering fishers to be involved in governance and help determine appropriate and feasible management measures are recommended. Many of the island communities, as compared to the project steering committee, expressed an interest to increase in the number and amount of conservation areas as compared to the 1st draft of the multi-use zoning design. There was also great support for the limited development (low-impact/ecotourism) zones and communities agreed with the project steering committee that aligning these areas with existing terrestrial national park and wildlife reserve designations can provide for an integrated and supporting land and sea management approach. Based community recommendations the marine multi-use zoning design was updated, and the 2nd draft of the marine multi-use zoning design was created in March 2012 (Figure 4-2).

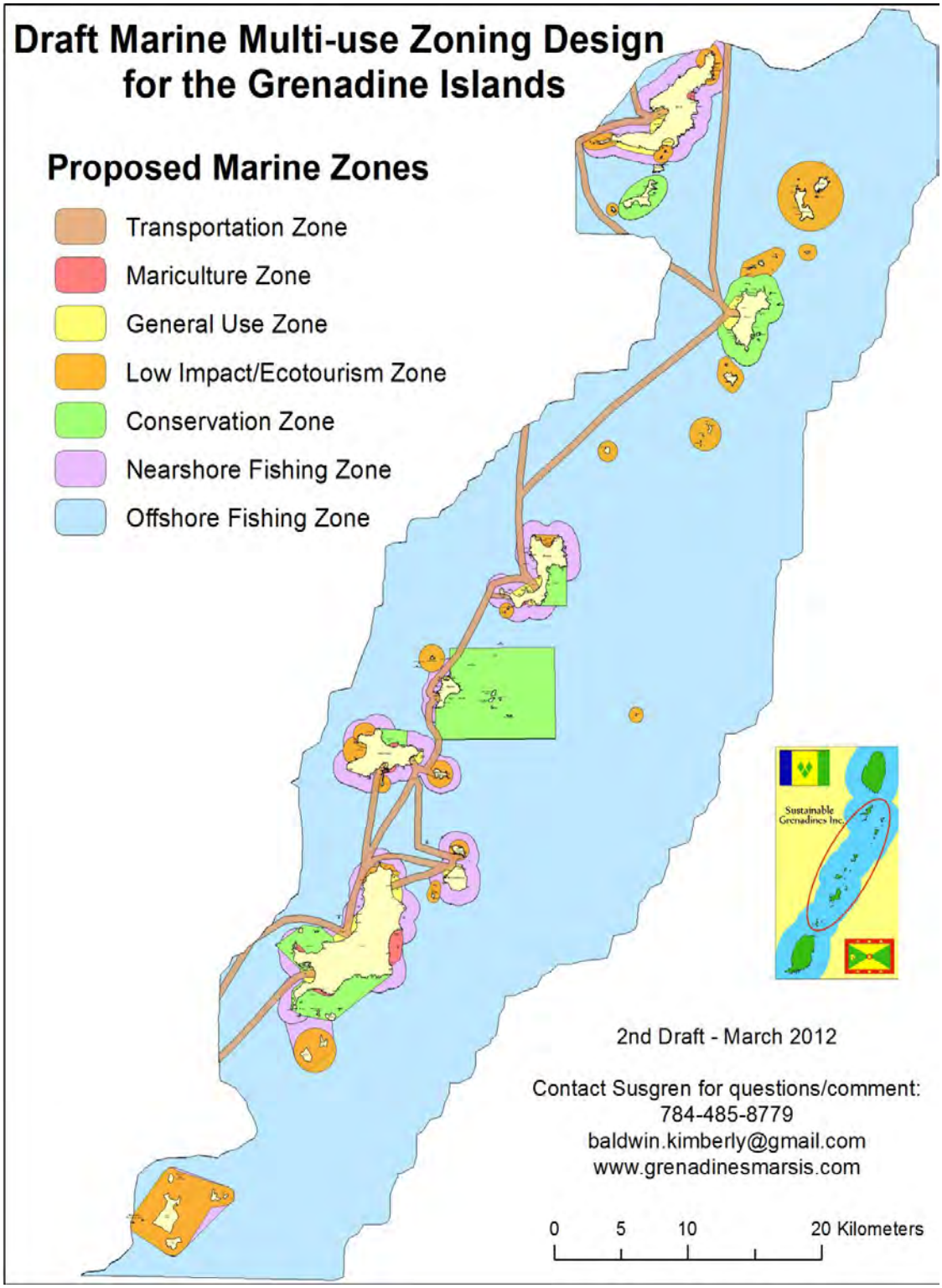


Figure 4-2 The 2nd draft of the proposed marine multi-use zoning design.

4.3 Final products and accessibility of information

The Grenadines MarSIS geospatial database was expanded with the developed MSP GIS files for each of the proposed zones as well as the Marxan with Zones GIS datasets and mapping products. A further requirement for MSP, particularly for a transboundary area, is that information must not only be accepted by marine resource users but be accessible and shared openly amongst all of the involved stakeholders and between the two countries. Thus, all of the project reports are available on the open-access Grenadines MarSIS website. Additionally, the MarSIS geodatabase was converted to Google Earth (.kml) files and uploaded to the Grenadines MarSIS website to allow for widespread public access to the produced information and data across geographic and jurisdictional scales of nations, islands and communities of the Grenadines.

5 RECOMMENDATIONS

5.1 Promoting the development and implementation of a transboundary marine zoning framework for the Grenadine Islands

The goal of a MSP framework is to deliver an ecosystem-approach to managing human activities occurring in the marine environment. This may also improve decision-making as it has the potential to support an integrated multi-level management approach that ranges from the Grenadine communities, islands, nations, to the region that comprises the Grenada Bank's marine resources. The goals of MSP and the implementation of a marine multi-use zoning design are consistent with the stated policies of the Commonwealth, the CRFM, the OECS and the governments of Grenada and St. Vincent and the Grenadines. By allocating space-use for the various sectors, including conservation, in an equitable and harmonised manner MSP can reduce the potential for conflicts. Successful MSP therefore can promote the conservation of biological diversity, the sustainability of marine-based livelihoods, the mitigation of adverse effects of climate change and the maintenance of ecosystem goods and services on which the Grenadine coastal communities rely.

The development of a transboundary MSP framework would also help to clarify and rationalise the roles and responsibilities of the involved regional and national marine and environmental agencies as well as maximise efficiency and accountability of transboundary management of marine resources. A framework to allow for the effective implementation of the drafted zoning design is needed. The framework's principle output, the marine zoning design prescribes zones including no/limited-take conservation areas to multi-use areas providing for a range of recreational, commercial, development and other activities. The successful implementation of a MSP framework will require all relevant sectoral agencies to work together to comply with the drafted

zoning design. While existing laws permit the governments to regulate some of the coastal and marine activities that presently occur, it is insufficient to implement a comprehensive, integrated transboundary framework for ecosystem-based marine planning and zoning. Therefore a close examination of the legislations as well as both regional and national governance (i.e. institutional) arrangements to support MSP must be apriority.

A further tenet of MSP is that stakeholder engagement is central to the process. Providing a transparent framework that can accommodate a wide diversity of multi-disciplinary information in an accessible format can serve to improve stakeholder understanding and involvement in decision-making and support interactive governance (Pomeroy and Douvere 2008, Carocci et al. 2009, Mackinson et al. 2011). This MSP project, as well as the development of the Grenadines MarSIS, has carefully aimed to engage a wide range of stakeholders from the onset. Information exchange and access has been provided for to strengthen capacity for informed collaborative decision-making. Mechanisms to ensure the continued access to information across such a wide-range of stakeholders will be required for the successful implementation of MSP and the multi-use zoning design, particularly in a complex coastal and marine environment such as the Grenadine Islands.

5.2 Next Steps

At this stage of the project, there are several recommended next steps. The first is to obtain the political will and commitment to implement the transboundary MSP and the multi-use zoning design. A meeting should be arranged with the relevant marine-related Ministers (i.e. Fisheries, Environment, Tourism, Planning) of Grenada and St. Vincent and the Grenadines to explain the role of MSP, how it can assist the countries in the achievement of international commitments (i.e. CBD and the Caribbean Challenge), regional commitments (i.e. St. George's Declaration) and the attainment of sustainable development. Furthermore, the implementation of such a plan would bring the Grenadines, including the two involved countries of Grenada and St. Vincent and the Grenadines, to the forefront of environmental planning and sustainability. The implementation of the MSP will also support the designation of the Grenadines as a transboundary World Heritage Site, in which both countries are signatory to the convention and have expressed interest (Susgren 2005). In tandem, a strong coordinated public outreach and education programme to highlight the importance and role of MSP should be undertaken to increase wide-spread knowledge and build on stakeholder engagement activities of these initiatives and the implementation of a zoning plan. To this end the use of media, including internet, television and radio advertisements, is recommended.

If political will and a commitment to the implementation of MSP is attained, additional funding will need to be secured to successfully implement the drafted multi-use zoning design. Specifically, the development of management plans will needed to define and regulate human activities to occur in each of the different zones. Although general objectives for each zone have been developed, the specific management measures for each of the zones will need to be collaboratively developed. For example, a plan for each of the inshore fisheries management zones will need to be developed to regulate fishing and other activities. Considering the diversity of the Grenadine Islands and its' communities, it is anticipated that these management plans will need to be developed on an island-specific level to appropriately determine feasibility and to obtain community-level understanding and acceptance of the plan.

As throughout the world, MSP and integrated resource management is still in its early stages. Unfortunately, many zoning efforts stop at the planning stage and never move to the implementation stage (Agardy 2010, Agostini et al. 2010) Continued effort and inputs will be required for successful implementation. Moving the transboundary marine zoning design to a fully implemented marine multi-use zoning plan will take a concerted effort on the part of governments, marine resource user groups, NGOs and the international community. Currently the capacities of the two countries' marine management agencies are limited. In other places in the world, co-management arrangements are one possible mechanism that has been shown to help supplement similar capacity limitations. To this end, the continued role of the regional multi-level stakeholder MSP Steering Committee will be central to achieving these actions and should be carefully evaluated and refined. A tremendous amount of work has been accomplished since 2006, ranging from the collaborative development of a transboundary marine resource and space-use information system (MarSIS) to the drafting a marine multi-use zoning design for the Grenadine Islands. As a result, the people of Grenada and St. Vincent and the Grenadines have laid a solid foundation for sustainable coastal and marine resource management that can incorporate multiple uses and user groups. Every effort should be made to continue to support the interactive governance frameworks and the MSP process that have been developed as a result of these projects.

6 REFERENCE LIST

Adams, E. 1996. *Golden anchor/ silver chain - A historical and socio-economic perspective on shipping in St. Vincent and the Grenadines*. St. Vincent and the Grenadines: n.p.

Agardy T. 2010. *Ocean zoning: Making marine management more effective*. Washington, D. C.: Earthscan.

Agostini V., S. M. Margles, S. R. Schill, J. E. Knowles, and R. J. Blyther. 2010. *Marine zoning in Saint Kitts and Nevis: A path towards sustainable management of marine resources*. St. Criox, USVI: The Nature Conservancy.

Baldwin K., R. Mahon, P. McConney and H. Oxenford. 2007. Stakeholder engagement in the development of a participatory GIS for the Grenadine Islands. In *Proceedings of the 58th Gulf and Caribbean Fisheries Institute*.

Baldwin K., R. Mahon, H. Oxenford, A. Cooke, D. Gill, T. Staskiewicz. 2008. A profile of marine resource users in the Grenadines. In *Proceedings of the 59th Gulf and Caribbean Fisheries Institute*.

Baldwin K. 2011a. Progress report 1: Developing a framework for a comprehensive marine multi-use zoning plan for the Grenadine Islands. Barbados: CERMES.

Baldwin K. 2011b. Progress report 2: Developing a framework for a comprehensive marine multi-use zoning plan for the Grenadine Islands. Barbados: CERMES.

Baldwin K., and R. Mahon. 2011c. A geospatial framework to support ecosystem based management and marine spatial planning for the transboundary Grenadine Islands. In *Proceedings of the 10th CoastGIS conference*.

Baldwin K. 2012. Progress report 3: Developing a framework for a comprehensive marine multi-use zoning plan for the Grenadine Islands. Barbados: CERMES.

Bunce L. and R. Pomeroy. 2003. *Socioeconomic monitoring guidelines for coastal managers in the Caribbean: SOCMON Caribbean*. Australia: Australian Institute of Marine Science.

Caribbean Conservation Association (CCA). 1991a. *Grenada country environmental profile*. Tortola, BVI: Island Resources Foundation.

Caribbean Conservation Association (CCA). 1991b. *St. Vincent and the Grenadines country environmental profile*. Tortola, BVI: Island Resources Foundation.

Caribbean Tourism Organisation (CTO). 2009. *Individual country statistics*. http://www.onecaribbean.org/statistics/countrystats/.

Carocci F., G. Bianchi, P. Eastwood and G. Meaden. 2009. *Geographic information systems to support the ecosystem approach to fisheries: status, opportunities and challenges*. FAO Fisheries and Aquaculture Technical Paper No. 532. Rome, Italy: FAO.

Central Intelligence Agency (CIA). 2011. *The world factbook 2011*. https://www.cia.gov/library/publications/the-world-factbook/.

Chakalall Y., R. Mahon, H. Oxenford and R. Ryan. 1994. Fish exporting in the Grenadine Islands: activities of trading vessels and supplying fishers. *CARICOM Fishery Research Document* 17.

Chuenpagdee R., J. Fraga, J. Euan-Avila. 2004. Progressing toward comanagement through participatory research. *Society and Natural Resources* 17:147-161.

Clive A.F. 1976. *The Grenadines from Columbus to today -The settlement of St. Vincent and the Grenadines*. Bridgetown, Barbados: Cole's Printing.

Cooke, A.L., R. Mahon and P. McConney. 2007. *A livelihoods analysis of the water taxi operators in the Grenadines*. CERMES Technical Report No. 9. Barbados: UWI.

Corbett J., G. Rambaldi, P. Kyem, D. Weiner, R. Olson, J. Muchemi, M. McCall and R. Chambers. 2006. Overview: Mapping for change – the emergence of a new practice. *Participatory Learning and Action* 54:13-19.

Culzac-Wilson L. 2003. *St. Vincent and the Grenadines Report to the Regional Consultation on SIDS Specific Issues*. St. Vincent: Government of St Vincent and the Grenadines.

Cumberbatch J. 2002. Case study of the Folkstone marine park and reserve, Barbados. St. Lucia: Caribbean Natural Resources Institute (CANARI) Technical Report No. 281. Trinidad: CANARI.

Crowder L. and E. Norse. 2008. Essential ecological insights for marine ecosystem-based management and marine spatial planning. *Marine Policy* 32 (5): 772-778.

Douvere F. and C. Ehler. 2009. Ecosystem-based marine spatial management: An evolving paradigm for the management of coastal and marine places. *Ocean Yearbook* 23:1-26

Eastern Caribbean Natural Area Management Program (ECNAMP). 1980. *St. Vincent Grenadines: Preliminary data atlas. Survey of conservation priorities in the Lesser Antilles*. St. Croix, V.I.: ENCAMP.

Economic Commission for Latin America and the Caribbean (ECLAC). 2004. Yachting in the Eastern Caribbean. N.I.: ECLAC Technical Report LC/CAR/R.75.

Food and Agriculture Organisation (FAO). 2002. *Fishery Country Profile: St. Vincent and the Grenadines*. Rome: FAO Fisheries and Aquaculture Department. Accessed December 2010. http://www.fao.org/fi/fcp/en/SVG/profile.htm.

Garner L. 2007. *Review of the policy, legal and institutional frameworks for protected areas management in St. Vincent and the Grenadines*. St. Lucia: Environment and Sustainable Development Unit, Organisation of Eastern Caribbean States.

Gill D., P. McConney and R. Mahon. 2007. Socio-economic profiles of fisheries in the Grenadine Islands. CERMES Technical Report No. 11. Barbados: University of the West Indies.

International Institute of Rural Reconstruction (IIRR). 1998. *Participatory methods in community-based coastal resource management*. 3 vols. Silang, Cavite, Philippines: IIRR.

Kirby-Straker, R. 2003. *Fisheries resources and regulations in St. Vincent and the Grenadines*. St. Vincent: Ministry of Agriculture, Fisheries and Forestry.

Lee, D. 2009. *St. Vincent and the Grenadines national parks and protected areas systems plan 2010-2014*. St. Vincent: National Parks, Rivers and Beaches Authority, Ministry of Tourism.

Mackinson, S., D. Wilson, P. Galiay and B. Deas. 2011. Engaging stakeholders in fisheries and marine research. *Marine Policy* 35:18-24.

Mahon R. 1990. Fisheries management options for the Lesser Antilles countries. Food and Agriculture Organisation (FAO) Fisheries Technical Paper 313. Rome: FAO.

Mahon R., S. Almerigi, P. McConney, C. Ryan and B. Whyte. 2004. Coastal resources and livelihoods in the Grenadine Islands: Facilitating change in self-organising systems. In *Proceedings of the 55th Gulf and Caribbean Fisheries Institute*.

McConney P., A. Atapattu and D. Leslie. 1998. Organising fisherfolk in Barbados. In *Proceedings of the 51st Gulf and Caribbean Fisheries Institute*.

McLeod K. and H. Leslie. 2009. *Ecosystem-based management for the oceans*. Washington, D.C.: Island Press.

Organisation of Eastern Caribbean States (OECS). 2005. *Macro-Socio-Economic Assessment of the Damage caused by Hurricane Emily, 2005*. Castries, St. Lucia: OECS.

Pomeroy R. and F. Douvere. 2008. The engagement of stakeholders in a marine spatial planning process. *Marine Policy* 32 (5): 816-822.

Rambaldi G., P. Kwaku Kyem, P. Mobile, M. McCall and D. Weiner. 2005. Participatory spatial information management and communication in developing countries. Paper presented at *Mapping for Change International Conference,* Nairobi, Kenya, September 7-10.

Renard Y and V. Krishnarayan. 2000. Participatory approaches to natural resource management and sustainable development: some implications for research and policy. Paper presented at Managing Space for Sustainable Living in Small Island Developing States Regional Conference. Port of Spain, Trinidad, October 16-17.

Sayer J. and B. Campbell. 2004. *The science of sustainable development: Local livelihoods and the global environment*. Cambridge, UK: Cambridge University.

Staskiewicz T. and R. Mahon. 2007. *A livelihoods analyses of fishers in the Grenadine Islands*. Barbados: CERMES Technical Report No. 12. Barbados: University of the West Indies.

Sustainable Grenadines Project (SusGren). 2005. *Sustainable Integrated Development and Biodiversity Conservation in the Grenadine Islands - Overview*. Union Island, St. Vincent and the Grenadines: SusGren.

Walters J., J. Maragos, S. Siar, and A. White. 1998. *Participatory coastal resource assessment: A handbook for community workers and coastal resource managers*. Coastal Resource Management Project (CRMP) Document No. 2. Silliman: Silliman University.

Watts M., R. Stewart, D. Segan, L. Kircher, and H. Possingham. 2010. *Using the Zonae Cogito decision support system: A manual*. www.uq.edu.au/marxan/docs/ZonaeCogitoManual_1April2009.pdf.

Wieber M., F. Berkes, A. Charles and J. Kearney. 2004. Participatory research supporting community-based fishery management. *Marine Policy* 28:459-468.

7 APPENDICES

Appendix I. Workshop 1 MSP presentation given by Kimberly Baldwin.

Sustainable Development

is development that meets the needs of the present without compromising the ability of future generations to meet their own needs

Our Common Future: Report of the World Commission on Environment and Development

International Commitments

St. George's Declaration

Cartagena Convention / SPAW Protocol

OECS Environmental Management Strategy

Convention on Biodiversity & The Caribbean Challenge

Grenada 25-25 Declaration – SVG?

Pledge to effectively conserve at least 25% of near shore marine resources and at least 25% of terrestrial resources across Grenada by 2020

Natural resources are basis for sustainable development

- Impacted by diverse human activities
- Effective management must involve planning
- Ideally this must be in a spatial context
- Requirement for ecosystem based management makes a spatial approach even more important

Spatial planning and management of natural resources

-Accepted for land use management

- Less common for sea use & marine resources

Marine management already has some spatial components

e.g.

- Ship Channels
- Military Zones
- Marine Protected Areas
- Disposal Areas /Outfalls
- Anchorages
- Dive Sites

But is fragmented & not integrated

Marine Spatial Planning (MSP)

An integrated approach to managing human activities in the marine environment

Modern MSP uses GIS as a tool to:

- Provide framework for scientific information
- Address complexity of marine ecosystems in a practical manner
- Make information accessible
- Engage all stakeholders
- Address conflicts among human uses
- Move from single sector to integrated management

In order to manage resources

Good information that is integrated between
- —Countries
- —Sectors (tourism, fisheries, planning, etc.)
- —Islands

Accessible to all stakeholders
- —Government
- —NGOs
- —Communities

Information System

Must integrate all types of information from all available sources

- Physical
- Social
- Biological
- Economic
- Local Knowledge

With integrated information we can answer questions like:

- Distribution & extent of marine resources
- Areas & patterns of resource use
- Linkages between resources & livelihoods
- Areas of multiple use & potential conflicts

MarSIS is ...

A Transboundary Marine Resource & Space-use Information System (MarSIS)

To facilitate sustainable development

– By integrating scientific information & local knowledge

In a transparent & participatory fashion involving a variety of stakeholders

MarSIS uses a Geographical Information System (GIS)

Spatial Database which organizes the 'Real-World' in a system of 'layers' of similar types of information

Each layer of information consists of:

- A spatial location
- A type of feature
- Its associated data (attributes)

MarSIS has information on...

Marine habitats*
- reefs, mangroves, seagrass beds, beaches, rocky shores

Infrastructure
- seaports, marinas, roads, hotels, desalination plants

Marine resource users*
- dive shops, tourism facilities, fish landing sites, communities, etc.

Marine space-use*
- anchorages, dive sites, fishing grounds, shipping lanes, recreation areas

Sensitive biological & heritage areas*
- sea turtle nesting beaches, seabird nesting sites, marine protected areas, nursery grounds, historical sites, shipwrecks

Areas of threat*
- sand mining, beach erosion, dumping, land-based sources of marine pollution, mangrove cutting

Stakeholder participation was essential

- Government Agencies
  - Fisheries, Planning, Forestry, Tourism, Environment, Coast Guard, Port Authority, Statistics, Maritime Administration
- Marine Resource Users
  - Fishers, Divers, Yachters, Water-taxis, Day Tour Operators, Ferries, Ships & Recreation
- NGOs
  - Local, Regional, International
- Community groups/schools

Validation, Feedback & Evaluation

Sharing, verification of information produced & feedback

For learning in methods

Increases understanding for information generated

Foster a transparent participatory management environment

Data Collection and Inventories

Institutions & Marine Resource Users

- Interview key informants *(87)*
- Inventory of marine resource users *(>984)*
- Collect existing information & management plans, policies, legislations *(>3 years)*
- Construct MarSIS database

Series of Mapping Exercises

- Local place names
- Marine space-use patterns
- Critical conservation & livelihood areas
- Issues/problems

Marine Resource Users
- Individual interviews
- Focus groups

Appendix II. Final MSP project workplan submitted by Kim Baldwin

Workplan for the marine spatial planning initiative for the Grenada Bank March 2011

1. Background

Sustainable Grenadines Inc. (SusGren) has recently been awarded funding to carry out a marine spatial planning project on the transboundary Grenada Bank, entitled "Developing a Framework for a Comprehensive Marine Multi-use Zoning Plan for the Grenadine Islands", which is funded by the National Ocean and Atmospheric Administration (NOAA). In tandem, funding has been received through the Global Environment Facility Small Grants Programme (GEF SGP) to ensure the involvement of Grenadines marine resource users in this marine spatial planning process through a complimentary grant entitled "Incorporating the Knowledge and Resource Values of Stakeholders in Marine Resources Management in the Grenadines". As such, SusGren has retained the services of a GIS Consultant (Kim Baldwin) in order to achieve the project objectives as outlined below.

The project will build on pre-existing initiatives in the Grenadine islands of St. Vincent and the Grenadines and Grenada by the Sustainable Grenadines Project: the Marine Resource and Space-use Information System (MarSIS) geodatabase and the Protected Area Systems Plans developed by both countries of St. Vincent and the Grenadines and Grenada to increase the effectiveness of marine protected areas (MPAs) through the development of a transboundary multi-use marine zoning plan for the Grenadines. In addition, the project aims to ensure broad public buy-in, self-enforcement, and long-term sustainability of the plan through engaging fishers, divers, ferry companies, day tour operators, yacht operators, water taxi operators, and other resource users from the project inception.

This will be accomplished through the following objectives:

Objective 1: Develop a draft multi-use zoning design for the Grenadines using new and existing information, and incorporating indigenous technical knowledge from marine resource users, in order to increase Grenada and St. Vincent and the Grenadines capacity to protect, manage and sustainably use the resources of the Grenadines by March 2012

- Examine existing criteria used in the development of system plans for both countries; along with research conducted through the MarSIS research and IUCN protected areas management categories, through a collaborative process in order to establish locally-appropriate objectives and criteria for the zoning scheme

- Develop an integrated geospatial database for multiple marine uses and a draft spatial marine zoning design for the Grenadine islands, with zones for specific uses that are accompanied by regulations

- Produce zoning maps in a format that can be easily integrated into the associated outreach and awareness activities to convey the results of the spatial planning process to the wider public

- Attend and participate in 3 workshops as a means of presenting and reviewing progress made on developing the multi-use zoning plan:
  - Workshop #1 – Vision (27-28 Jan 2011, Carriacou, Grenada)
  - Workshop #2 – Update (Aug 2011)
  - Workshop #3 – Final (Feb 2012)

- Consult with technical marine-focused individuals in Grenada and St. Vincent and the Grenadines

Objective 2: Create a more enabling environment for participatory marine and coastal resource management and capacity building of Grenadine MRUs by March 2012

- Involve MRUs and Grenadine communities in a series of informal meetings on each inhabited island (7 total: Bequia, Mustique, Canouan, Mayreau, Union, Petite Martinique, and Carriacou) to develop resource mapping, and ensure that MRUs understand the value of the multi-use zoning plan and how it is being developed. Two meetings will be held on each island of Bequia, Mustique, Canouan, Union, and Carriacou (one for fisher folk and one for the general community) after each of the three formal stakeholder planning workshops that are part of the NOAA project. In islands with smaller population densities (Mayreau and Petit Martinique), only one meeting will be held. The meetings on Bequia, Union, and Carriacou (harbours with high concentrations of yachts) will include yacht owners, marinas, and yacht clubs as stakeholders of the general community.

- Plan and host a series of 2 MRU and community meetings in each of the 7 islands as a means of presenting, reviewing and obtaining feedback on progress made on developing the multi-use zoning plan:
  - Workshop #1 – Vision, objectives of MSP and data gap collection (June 2011)
  - Workshop #3 – Review and feedback of the draft marine zoning design (February 2012)

- Hire a local note-taker/meeting assistant, making every effort to engage a female in this role, on each island to assist with the series of community meetings (7 total)

- Evaluate the performance of each local note-taker/meeting assistant and document the development of their skills (eg. taking minutes, recording participant attendance, etc.) throughout the project lifetime

- After Workshop #2, a MRU stakeholder steering sub-committee (comprising of 1-2 Grenadine island MRU community members from each island) will be held (during October 2011) in order to increase the understanding of Marxan decision-support software and work through the various developed Marxan scenarios. This meeting will be used to obtain Grenadine MRU stakeholder's feedback in order to identify a smaller number of the most appropriate and feasible Marxan scenarios for the Grenada Bank. These chosen scenarios will be presented to the larger stakeholder group during

Workshop 3 and will be used as decision-support tools to assist with guiding the drafting of a marine multi-use zoning plan for the Grenada Bank.

Objective 3: Create opportunities for building resource management partnerships in the Grenadines amongst MRUs, businesses, legal authorities, and governments through co-management and associated livelihoods arrangements by March 2012

- Attend the three stakeholder planning workshops, along with one MRU representative from each inhabited island and an additional resource person from UWI CERMES, and act as an advocate to ensure that the values of MRUs are adequately represented in the planning and zoning development process

2. Workplan and expected outcomes for the GIS consultant deliverables

This consultancy will be completed no later than 31 March 2012.

January 2011:

- Assist with setting up SusGren GIS workstation on project-procured laptop to include data, documents, and maps generated from the Grenadines MarSIS project.
  - MarSIS GIS information to be released pending UWI approval (October/November 2011)
- Attend and participate in Workshop 1: Attend and present to stakeholders information on the importance of sustainable development marine spatial planning (MSP) and provide a review of the Grenadines MarSIS research as well as existing data and information collected to date.

February 2011:

- Explore and review the MSP literature and various decision-support GIS tools currently available.
- Meet with The Nature Conservancy Caribbean Program GIS experts to review the Grenadines MarSIS geodatabase, other MSP and zoning projects (and methodologies applied) in order to determine an appropriate and feasible workplan for the Grenadines MSP initiative.

March 2011:

- Review of existing MarSIS GIS data and existing PA Systems Plans for the two countries. Review existing information and GIS data and identify information and data gaps.
- Review Workshop 1 'Visioning' notes to develop a clearly defined overall objective for the Grenadines MSP initiative; extract the stakeholder's identified existing and future uses in order to propose appropriate zones; and develop clear objectives for each of the zones.
- Develop the GIS consultant and MRU facilitator workplan for January 2011 – March 2012 based on the TOR listed in the MOU.

May 2011:

- Plan the first series of community meetings in each of the seven inhabited Grenadine islands to inform and obtain feedback from local Grenadines communities and MRUs on the 'Developing a Framework for a Comprehensive Marine Multi-use Zoning Plan for the Grenadine Islands' project. Print supplementary maps and materials required for MRU meetings and for additional data collection required to fill existing data gaps.

- Hire seven local note-takers (with an effort to engage females in the role) for each of the seven Grenadine islands. Develop short training program and evaluation assessment for note-takers.
- Attend International Marine Conservation Congress (IMCC2) conference in order to present this MSP project; further explore GIS decision-support tools; and discuss planning strategies and lessons learned with other technical experts. In addition, a meeting will be held with TNC technical MSP GIS experts (Shawn and Vera) to discuss and refine the methodology to be applied for the Grenadines MSP initiative. Attend a Marxan 2 day training session immediately after the workshop.

June 2011:

- Facilitate the first series of community meetings in each of the 7 inhabited islands to inform and obtain feedback from local Grenadines communities and MRUs on the 'Developing a Framework for a Comprehensive Marine Multi-use Zoning Plan for the Grenadine Islands' project. During this trip a brief training session and an initial evaluation of each of the 7 local note-takers will be undertaken.
- Collect (where possible) any of information from MRUs, local community members or government agency experts in order to fill the identified data gaps for upcoming MSP analyses.
- Prepare a summary/progress report on the project. This will include a review of information presented, feedback obtained from each of the Grenadine island communities and MRUs, participant lists/sign in sheets from each meeting, any information/data which was collected to fill existing MSP data gaps, list of hired note-takers and an evaluation of present capacity and skills for each note-taker.

August 2011:

- Prepare for Workshop 2: including presentations, workshop exercise methodologies, handouts and maps. Meet with TNC technical GIS experts to review and prepare GIS data, perform initial MSP analyses and finalize workshop exercises.
- Attend Workshop 2: Share and amend as needed the 'drafted' objectives derived from the Workshop 1 stakeholder vision statement; review existing GIS information and options for MSP decision-support tools in detail; review the existing and potential uses identified from Workshop 1 and develop 'zones' for the draft MSP; and complete a prioritization of marine uses exercise and a compatibility matrix exercise with stakeholders to determine the appropriate Marxan variables.
- Identify MRU stakeholder steering sub-committee members will from larger group.
- Run Marxan and develop several scenarios with TNC technical GIS experts for 2 additional days at the conclusion of Workshop 2.

October 2011:

- Print several large maps of the various Marxan scenarios and prepare presentations and activities for MRU stakeholder steering sub-committee meeting.
- Meet with a MRU stakeholder steering sub-committee (comprising of Grenadine island MRU community members) to increase the understanding of Marxan decision-support software and work through the various developed Marxan scenarios. This meeting will be used to obtain MRU stakeholder's feedback in order to identify a smaller number of the most feasible Marxan scenarios. These scenarios will be presented to the larger stakeholder group during Workshop 3 and will be used as a decision-support tool to assist with the drafting of a marine multi-use zoning plan for the Grenada Bank.

December 2011:

- Prepare a summary/progress report on the project . This will include a review of information and various Marxan scenarios presented, feedback obtained from MRU

stakeholder steering sub-committee (including the preferred Marxan scenarios), participant lists/sign in sheet and review of meeting notes.

January 2012:

- Expand the Grenadines MarSIS integrated geospatial database with the derived MSP GIS and Marxan-derived datasets.
- Prepare for Workshop 3: including presentations, handouts and maps of the selected Marxan scenarios used to assist with the drafting of a marine spatial zoning design for the Grenada Bank.

February 2012:

- Attend Workshop 3: Review Marxan decision-support tool application, present a summary of the MRU stakeholder steering sub-committee (including the preferred Marxan scenarios). Develop a draft marine multi-use zoning plan for the Grenada Bank.
- Based on the draft marine multi-use zoning plan for the Grenada Bank; create GIS shapefiles of the developed zones for specific uses.
- Print large and small maps of the draft marine multi-use zoning plan for the Grenada Bank to obtain feedback from the Grenadine MRU and community stakeholders.
- Conduct a final series of MRU and community stakeholder meetings in each inhabited island to inform and obtain feedback on the draft marine spatial zoning design developed for the Grenada Bank.
- Evaluate skill development and capacity of each of the seven local note-takers.
- Prepare a summary/progress report on the project. This will include a review of information presented, feedback obtained from each of the Grenadine island communities and MRUs, participant lists/sign in sheets from each meeting and an assessment of the capacity and skills development for each of the seven note-takers.

March 2012:

- Finalise the Grenadines MarSIS geospatial database with the derived Marxan datasets and digitize shapefiles of the zones for the specified uses of the draft marine spatial zoning design for the Grenada Bank.
- Update the MarSIS Google Earth geodatabase with all of the derived MSP shapefiles and upload these to the Grenadines MarSIS and Susgren websites to allow for public access and viewing.
- Produce a final report to include all components of the project, including recommendations for implementing the marine multi-use zoning design.

3. Reporting

All progress reports will be prepared in MS Word format and submitted by electronic mail. The final report of the consultancy (a compilation of all outputs under both projects) will be in five (5) hard copies and one copy submitted by electronic mail. All supplementary mapping products will be submitted on DVD as both ArcGIS and Google Earth files (to allow for greater public outreach and communication purposes) as well as will be available on the Grenadines MarSIS and Susgren websites for download to ensure for easy access and viewing without specialized software.

Appendix III. Agenda of Workshop 2 held in Ashton, Union Island.

	START OF WORKSHOP DAY 1	August 17th, 2011
8:30-8:35	Prayer and Welcome	Chair
8:35-8:50	Brief Remarks by Parliamentary Representative – Southern Grenadines Brief Remarks by Director of Grenadines Affairs	Hon. Mr. Terrence Ollivierre Senator Edwin Snagg
8:50-9:30	Housekeeping, Agenda - Project overview Introduction of Participants via Role Play – Cast Your Vote What is Marine Zoning and Why Should We Care? – Video	Martin Barriteau Director Sustainable Grenadines, Inc.
9:30-10	Review of project activities and marine zoning Share and amend the vision, zones and goals from the first workshop in January 2011	Kim Baldwin PhD Candidate University of West Indies
10:00-10:15	Update on the expert review of the existing policies and legislation for each country and if there will need to be any additions or amendments	Martin Barriteau for Sandra Nichols Environmental Law Institute
	10:15-10:30 COFFEE BREAK	
10:30-11:00	Marine use and zoning - How do we make decisions? Tools we can use and examples of the process from St. Kitts and Nevis	John Knowles Caribbean Program The Nature Conservancy
11:00-12:00	The Grenadines Marine Use Maps – How are we using our marine space? Review new and existing information and discussion	Kim Baldwin Group Exercise
	12-1:00 LUNCH BREAK	
1:00-1:30	Why do we want this Zone? Discussion and amendments of the goals for each zone determined in the first workshop	Fast Track Round-Robin group exercise
1:30-2:00	Share and finalise goals for each zone	Ruth Blyther
2:00-3:30	What are the most important features and resources? Can we have it all? Identifying marine resource use priorities and how we can make decisions about trade-offs.	Kim Baldwin, John Knowles Group exercise by Zone
3:30-3:45	Explanation of Steering Group Sub-Committee & activities	Kim Baldwin
3:45-4:00	Day 1 wrap-up	Martin Barriteau
	START OF WORKSHOP DAY 2	August 18th, 2011
8:30-8:45	Prayer, welcome and housekeeping	Martin Barriteau
8:45-9:15	Update on marine multi-use zoning – St. Kitts	Ruth Blyther The Nature Conservancy
9:15-10:00	Identify marine resource use compatibilities	Group exercise
	10:00-10:15 COFFEE BREAK	
10:15-11:15	Share and amend marine resource use compatibilities	Kim Baldwin
11:15-11:45	Finalise sub-committee members Review work plan of sub-committee meeting & next steps	Kim Baldwin
11:45-12:00	Workshop wrap-up Workshop evaluation	Martin Barriteau

Appendix IV. Workshop 2 presentation held in Union Island.

With integrated information we can answer questions like:

- Distribution & extent of marine resources
- Areas & patterns of resource use
- Linkages between resources & livelihoods
- Areas of multiple use & potential conflicts

= Plan sustainable development

Information System

Must integrate all types of information from all available sources

- Physical
- Social
- Biological
- Economic
- Local Knowledge

Geographical Information System (GIS)

Spatial Database which organizes the 'Real-World' in a system of 'layers' of similar types of information

Each layer of information consists of:

- A spatial location
- A type of feature
- Its associated data (attributes)

Modern MSP uses GIS as a tool to:

- Provide framework for information
- Map resources and uses
- Move from single sector to integrated management
- Make information accessible
- Engage all stakeholders
- Develop scenarios for decision-making

STEPS IN Marine Planning

1. Gather data and information
2. Set objectives and define uses
3. Then consider uses, areas of high space use & trade-offs of each to identify an acceptable plan
4. Propose a draft marine multi-use plan
5. Develop legislation to support management

Planning & management of Grenada Bank marine resources is complex

Transboundary island chain

Large diversity of users

Information not integrated between :

- Countries
- Government Agencies
- Knowledge Systems

Need for Marine Planning in Grenadines

- Increased demand for ocean/coastal space & resources
- Single sector management not meeting multiple demands
- Grenadines Islands are 'one ecosystem'
  - Need for integrated information & regional decision making
- Increasing development of tourism facilities
- Preservation of livelihoods, conservation & cultural areas

A Transboundary Marine Resource & Space-use Information System (MarSIS)

MarSIS — A Marine Resource Space-use Information System for the Grenadine Islands — CERMES

To facilitate sustainable development

- *By integrating scientific information & local knowledge*

In a transparent & participatory fashion involving a variety of stakeholders

Stakeholder participation was essential

- Government Agencies
  - Fisheries, Planning, Forestry, Tourism, Environment, Coast Guard, Port Authority, Statistics, Maritime Administration
- Marine Resource Users
  - Fishers, Divers, Yachters, Water-taxis, Day Tour Operators, Ferries, Ships & Recreation
- NGOs
  - Local, Regional, International
- Community groups/schools

Data Collection and Surveys

Institutions & Marine Resource Users

- Interview key informants *(87)*
- Collect existing information & management plans, policies, legislations
- Surveys of marine resource users *(>984)*
- Construct MarSIS database

Series of Mapping Exercises

- Local place names
- Marine space-use patterns

- Critical conservation & livelihood areas
- Issues/problems

Marine Field Surveys

Mapping of:
- Marine habitats
- Fishing information
- Bathymetry (seafloor)

MarSIS has information on...

Marine habitats*
- reefs, mangroves, seagrass beds, beaches, rocky shores

Infrastructure
- seaports, marinas, roads, hotels, desalination plants

Marine resource users*
- Dive shops, tourism facilities, fish landing sites, communities, etc.

Marine space-uses*
- anchorages, dive sites, fishing grounds, shipping lanes, recreation areas

Sensitive biological & heritage areas*
- sea turtle nesting beaches, seabird nesting sites, marine protected areas, nursery grounds, historical sites, shipwrecks

Areas of threat*
- sand-mining, beach erosion, dumping, land-based sources of marine pollution, mangrove cutting

Identify Priority Areas

Areas important for livelihoods
- *Fishing, tourism, transportation, communities*

Areas important for biodiversity
- *Reef ecosystems, turtle nesting, seabird nesting*

Areas of threat
- *Multiple uses, space-use conflicts/incompatible use*

TOURISM
Southern Grenadines

- Recreational Areas
- Historical Sites
- Ship Wrecks
- DiveSites
- Anchorages

The development of a marine multi-use zoning plan for the Grenadine Islands

Oct 2010 - March 2012

The project is being facilitated by SusGren, Inc. with funding/support provided by:

SGP The GEF Small Grants Programme

CORAL REEF

The Nature Conservancy

Project Workplan: 2010-2012

1st workshop: *January 2011*
- Developing a vision for the future

1st series of community meetings: *June 2011*
- Share visioning workshop results & get feedback

2nd workshop: *August 2011*
- Finalize objectives, zones and determine compatible uses

Stakeholder subcommittee meeting: *November 2011*
- Identify various marine zoning scenarios or options

3rd workshop: *February 2012*
- Draft a marine multi-use zoning plan for the Grenadines

2nd series of community meetings: *February 2012*
- Obtain feedback from communities on the draft plan

VISION FOR THE GRENADINES

The marine resources of the Grenada Bank are astoundingly diverse, economically and socially important, yet fragile.

Through the establishment of a comprehensive, ecosystem-based, marine multi-use zoning plan; we endeavour to:

1. *Ensure that marine resource use and conservation are viable, sustainable and maximally effective for the provision of coastal livelihoods while preserving local cultural heritage;*
2. *Enhance conservation and the sustainable use of the Grenada Bank in ways that will improve the health of the ecosystems for resilience and biodiversity;*
3. *Foster a culture of awareness, involvement and stewardship among stakeholders within and between communities, islands and nations;*
4. *Develop effective, integrated and adaptive management plans that encompass social, economic and biophysical monitoring; and*
5. *Implement appropriate policy, legal and institutional framework for effective transboundary management and governance of the Grenada Bank for current and future generations.*

Develop Objectives of Zoning Plan

- Fishery production
- Environmental conservation
- Cultural conservation
- Tourism income
- Transportation

Determine Uses (ZONES)

- Conservation
- Fishing
- Tourism / Recreation
- Industrial / Transportation / Development
- Mariculture

ANY OTHERS ????

Conservation Goals

- Protection of key submerged marine resources (critical habitats and species, nursery areas & breeding grounds)
- Protect key coastal resources (beaches, mangroves, salt-ponds, whelks, oysters, seabird & turtle nesting)
- Protect culturally important marine areas

Fishing Goals

- Manage Grenada Bank as one area
- Maintain access to landing facilities for fishers
- Unrestricted access to baitfish & coastal pelagic fish
- Ensure undersized fish are not caught & nursery areas protected
- Zoning to include closed areas, open access and other areas where selected gear or access restrictions apply

Tourism / Recreation Goals

- Healthy reefs, clean water & beaches for swimming, sailing, diving, picnicking, etc.
- Appropriate and adequate areas for swimming and other tourist activities (snorkeling/diving, sailing, wind-surfing/kite-boarding)
- Areas designated for future tourism infrastructure
- Areas where development is not allowed
- Ample facilities for recreational boating (beach and pier access, moorings)

Industrial / Transportation Goals

- Distinct identification and demarcation of ferry and shipping lanes
- Marina development plan - identify locations where seaports, marinas & landing sites may be developed in the future (for both commercial, local & tourism purposes)

Mariculture Goals

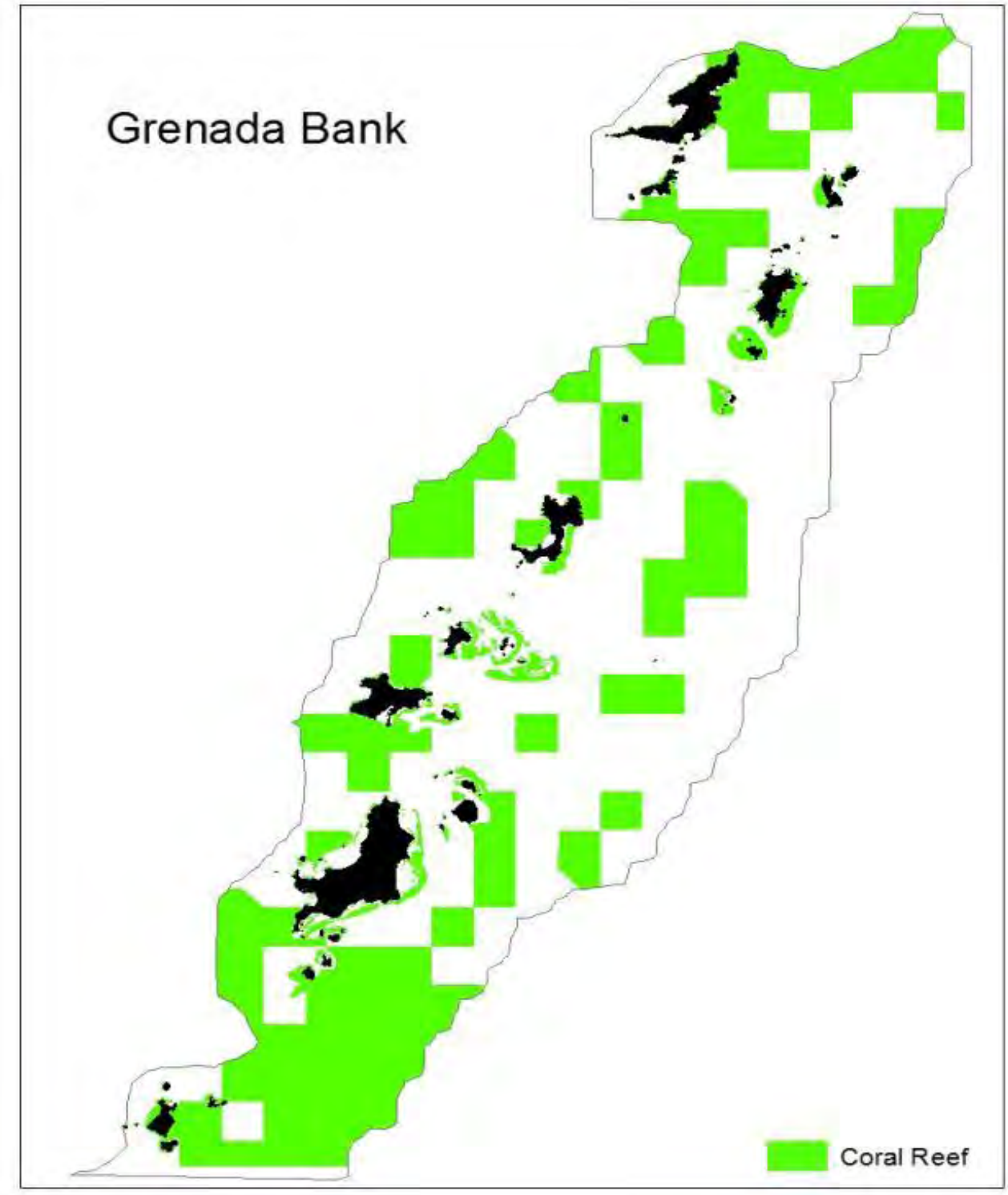
- Identify areas of potential for mariculture activities

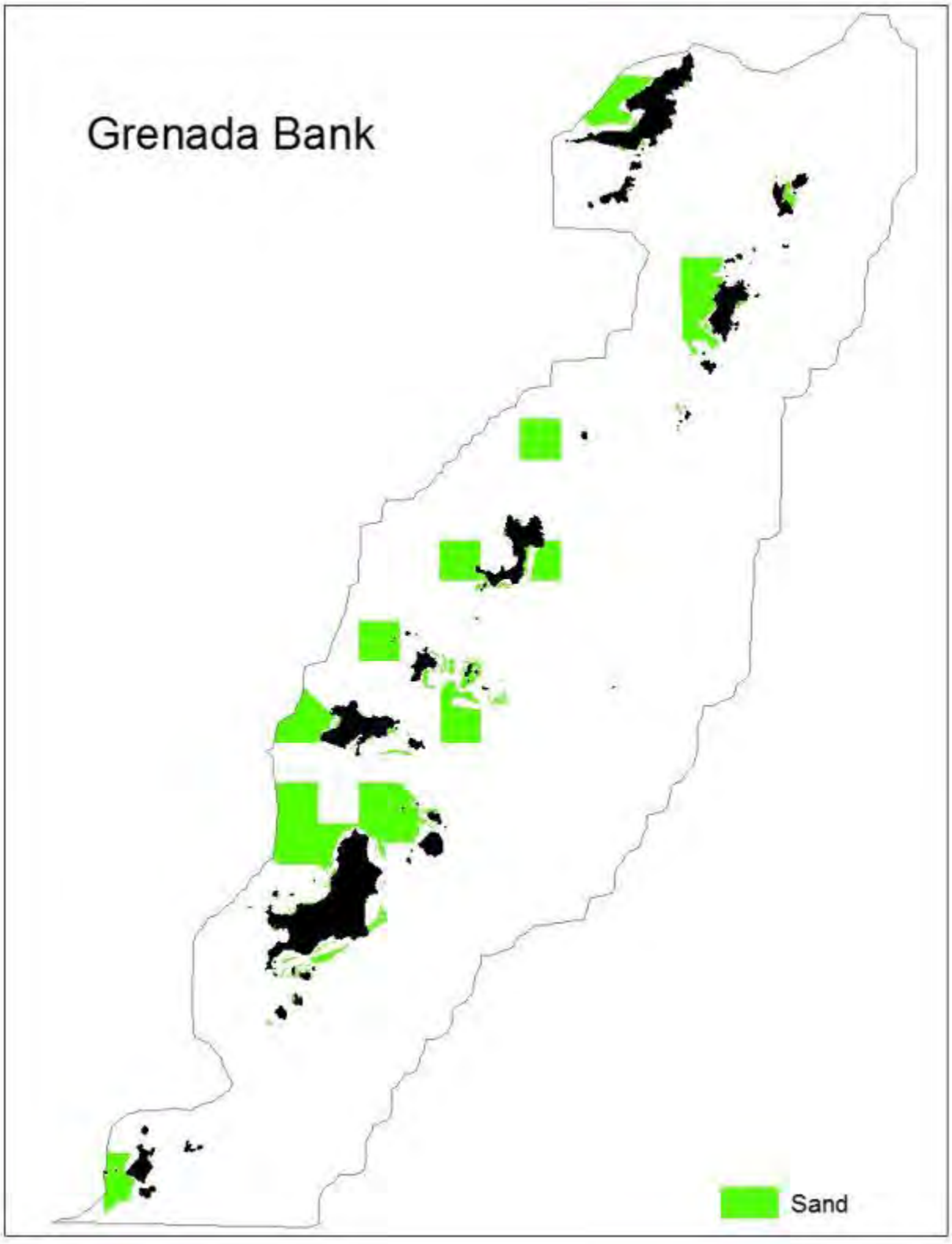
Workshop Activities

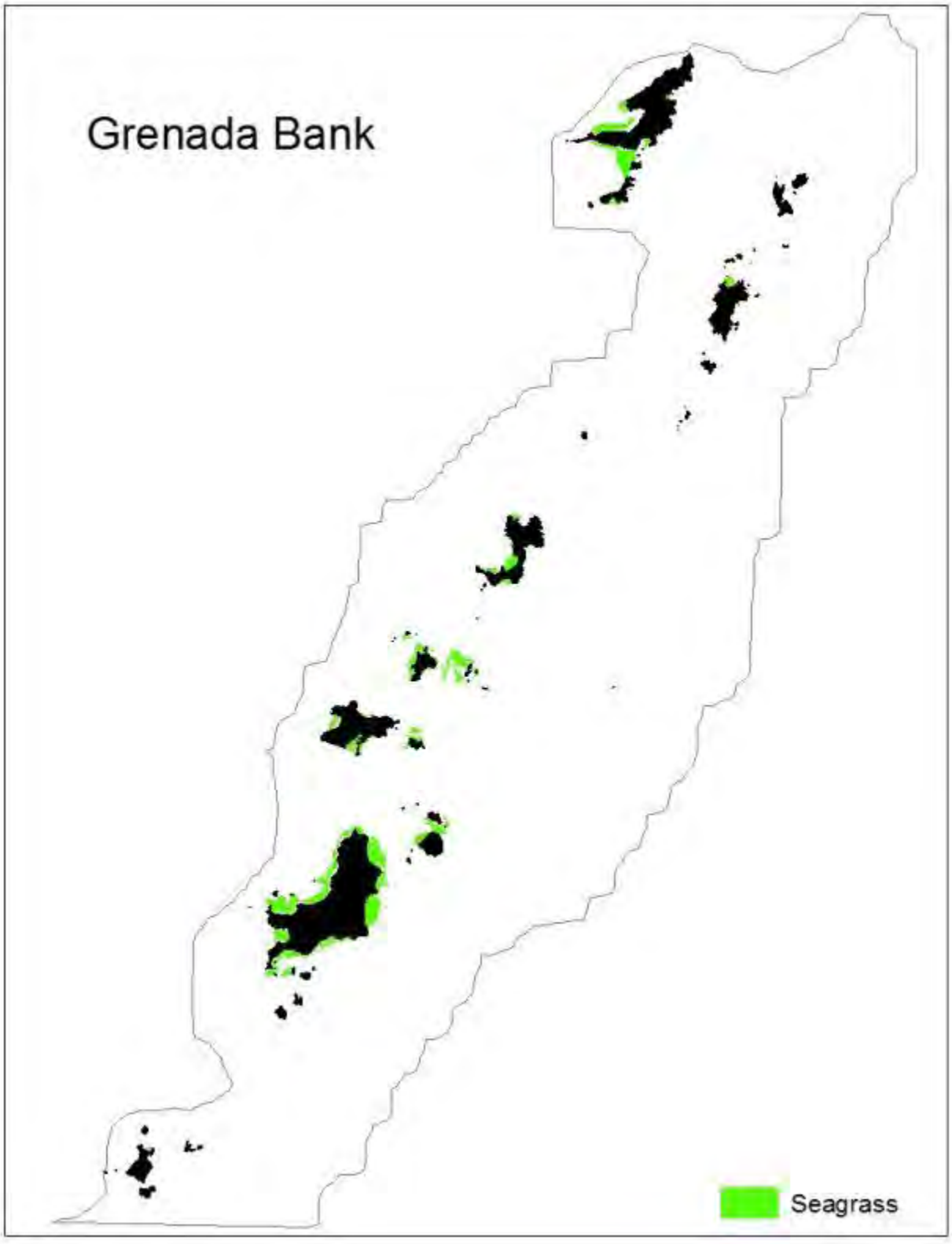
1. Explore decision support tools for marine planning
2. Define goals of each zone
3. Review the MarSIS data / Grenadine maps
4. Identify marine resource & use priorities
5. Identify use compatibilities & trade-offs

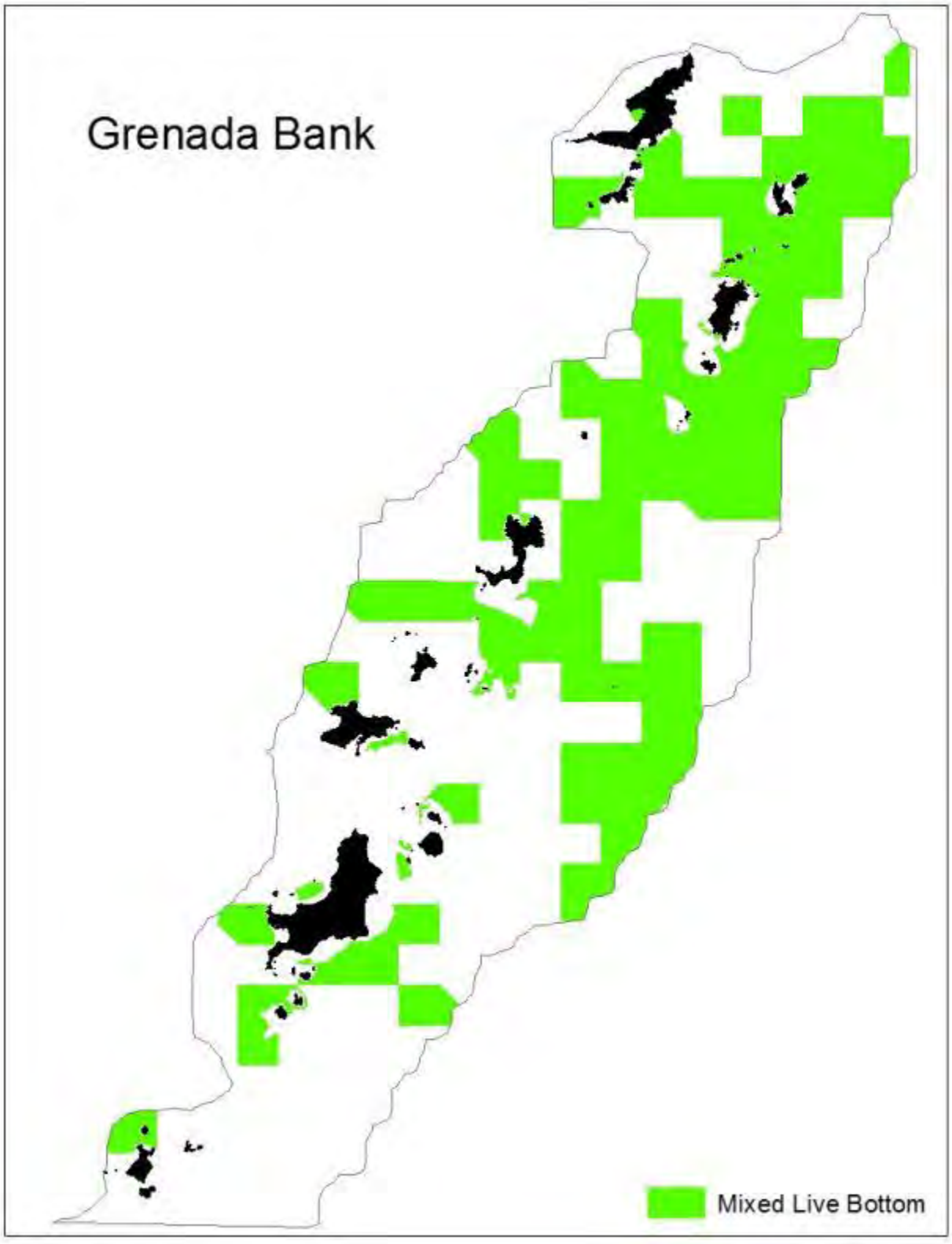
Appendix V. Input features for use by the Marxan with Zones platform.

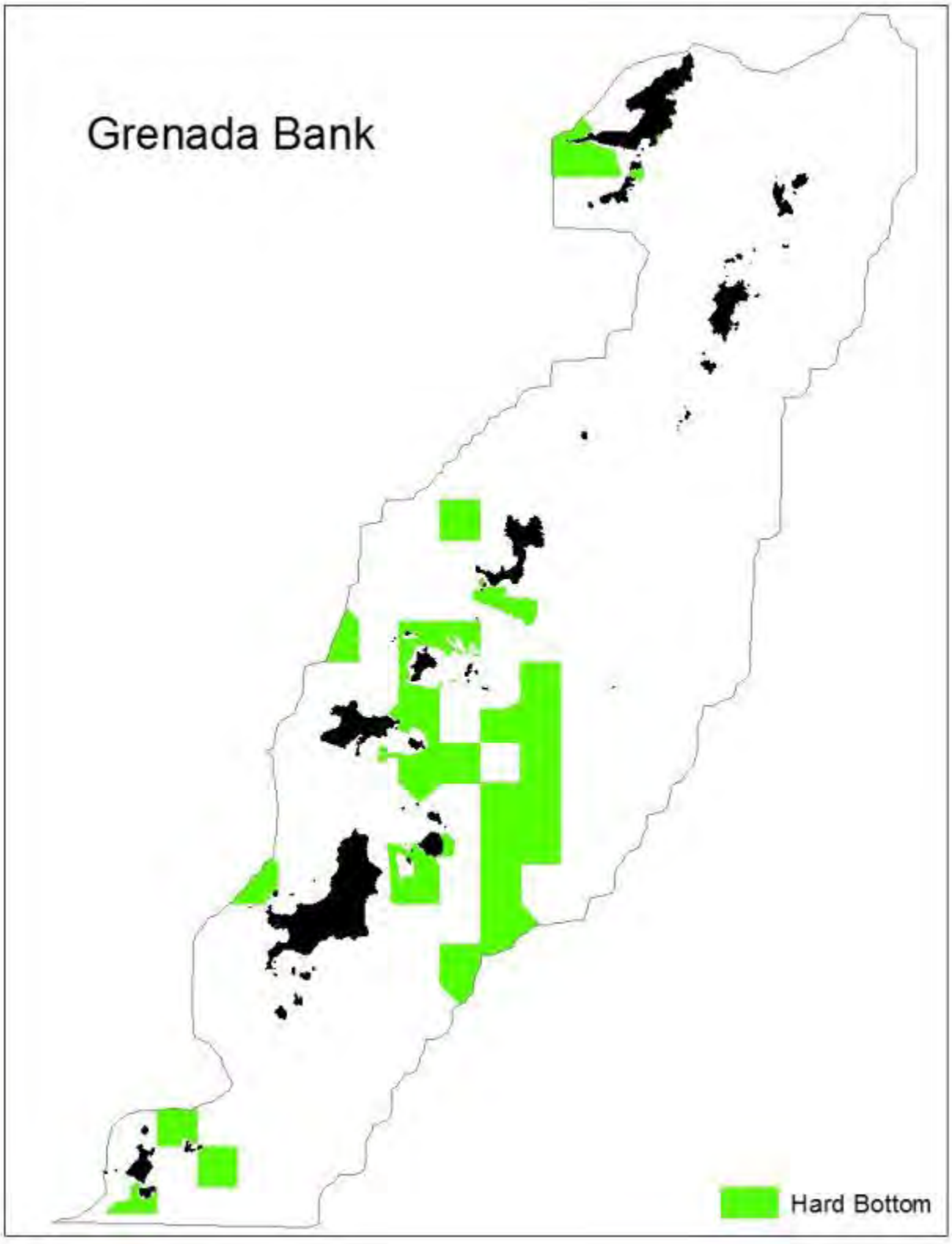
Conservation Features

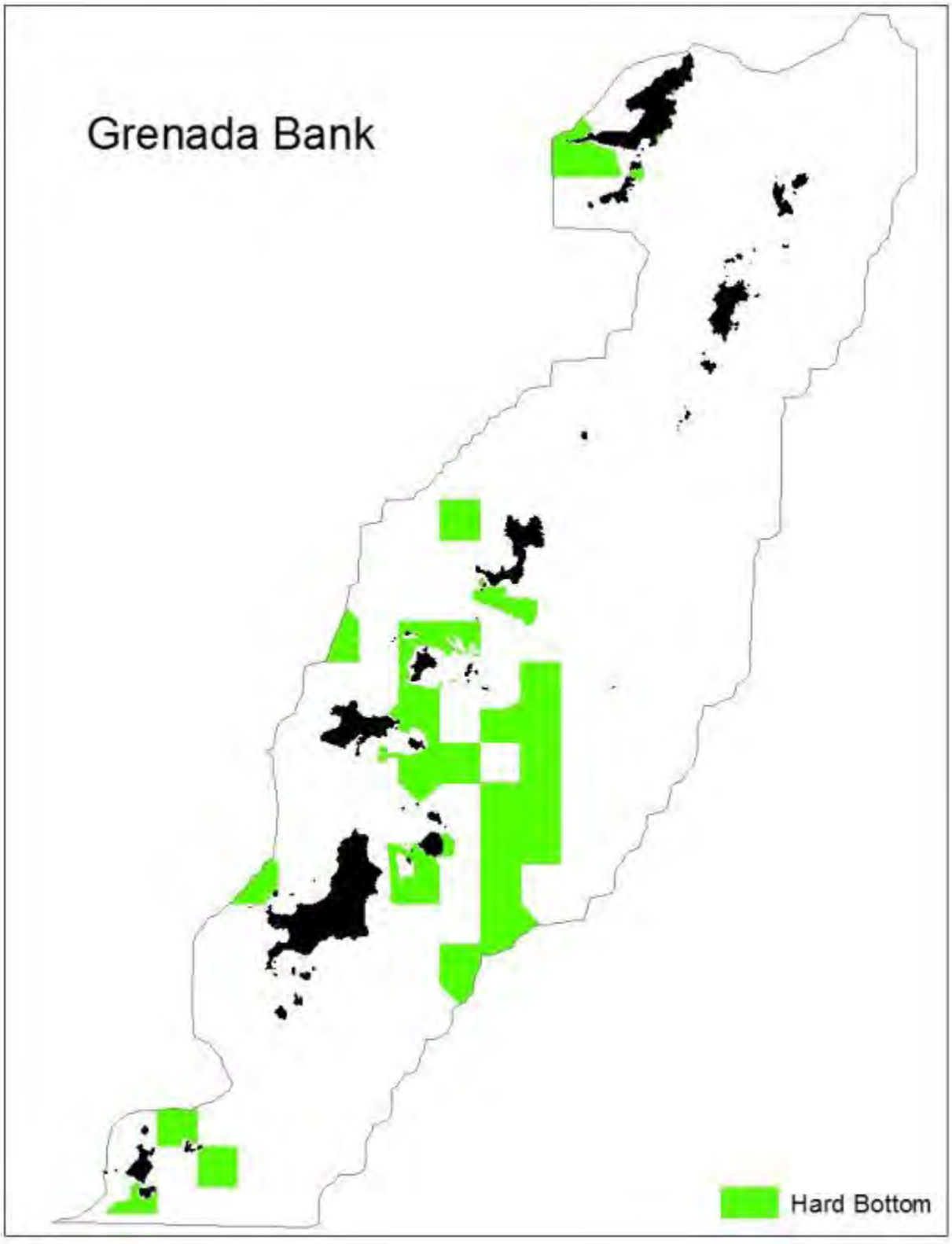


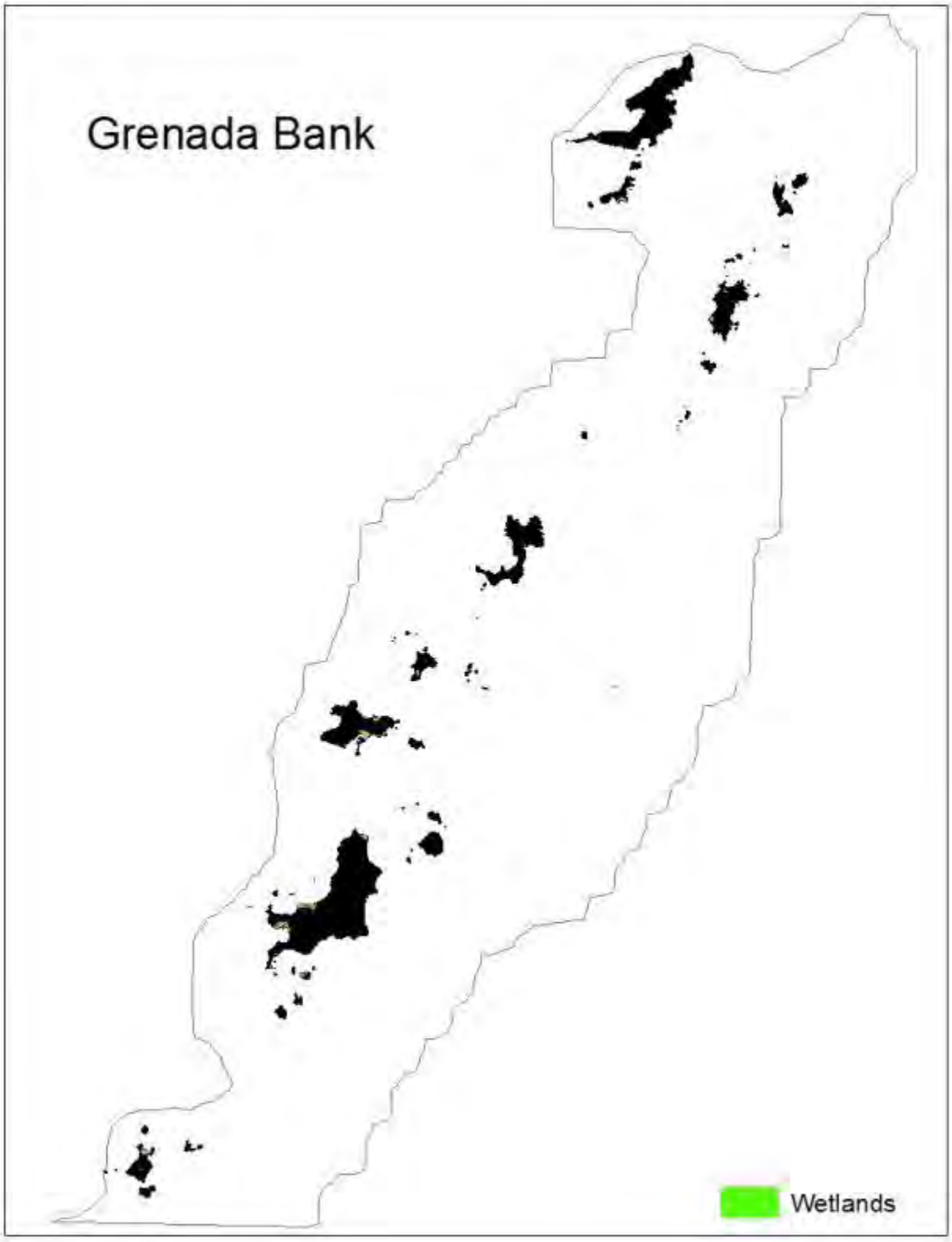

Grenada Bank
Sand

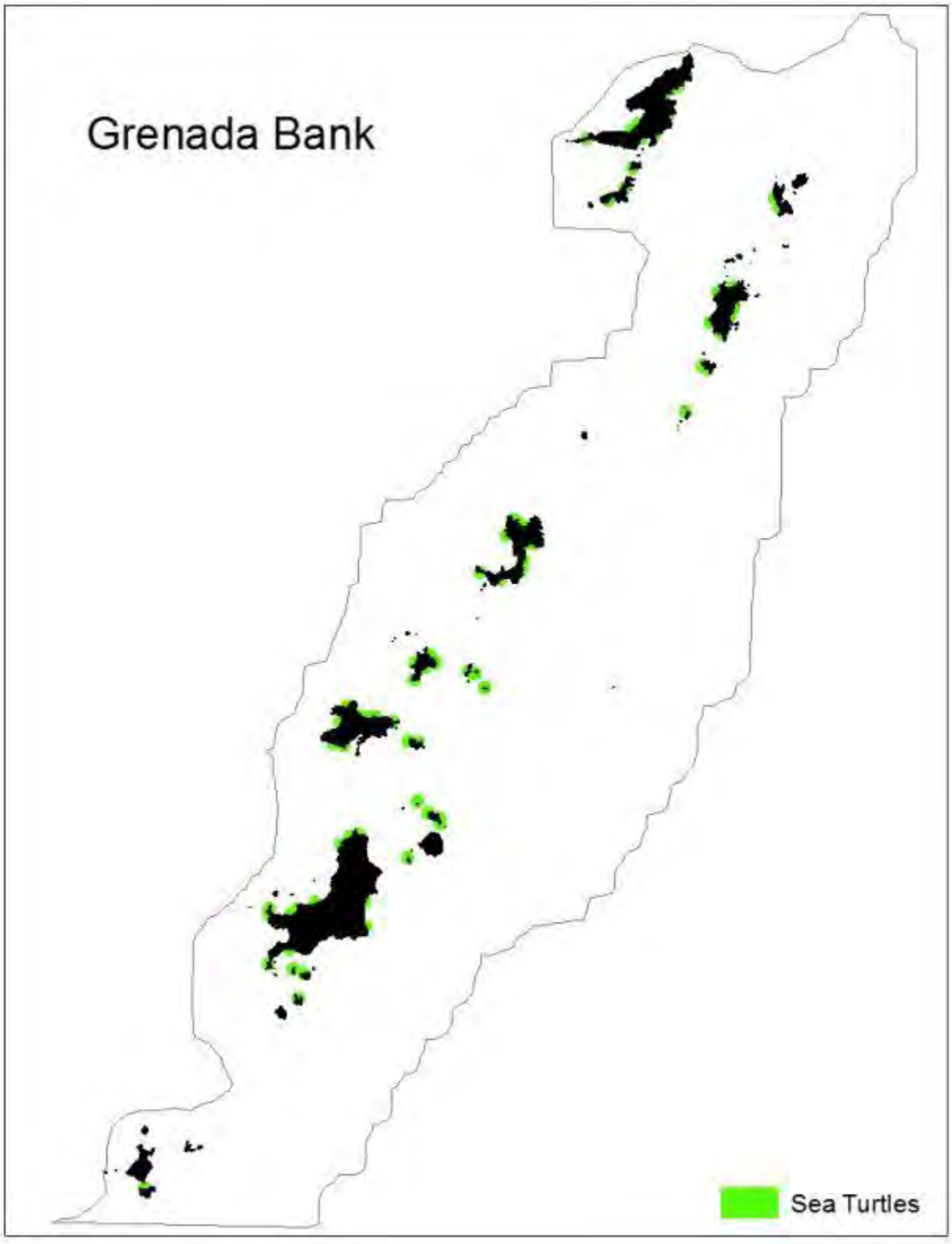

Grenada Bank
Seagrass

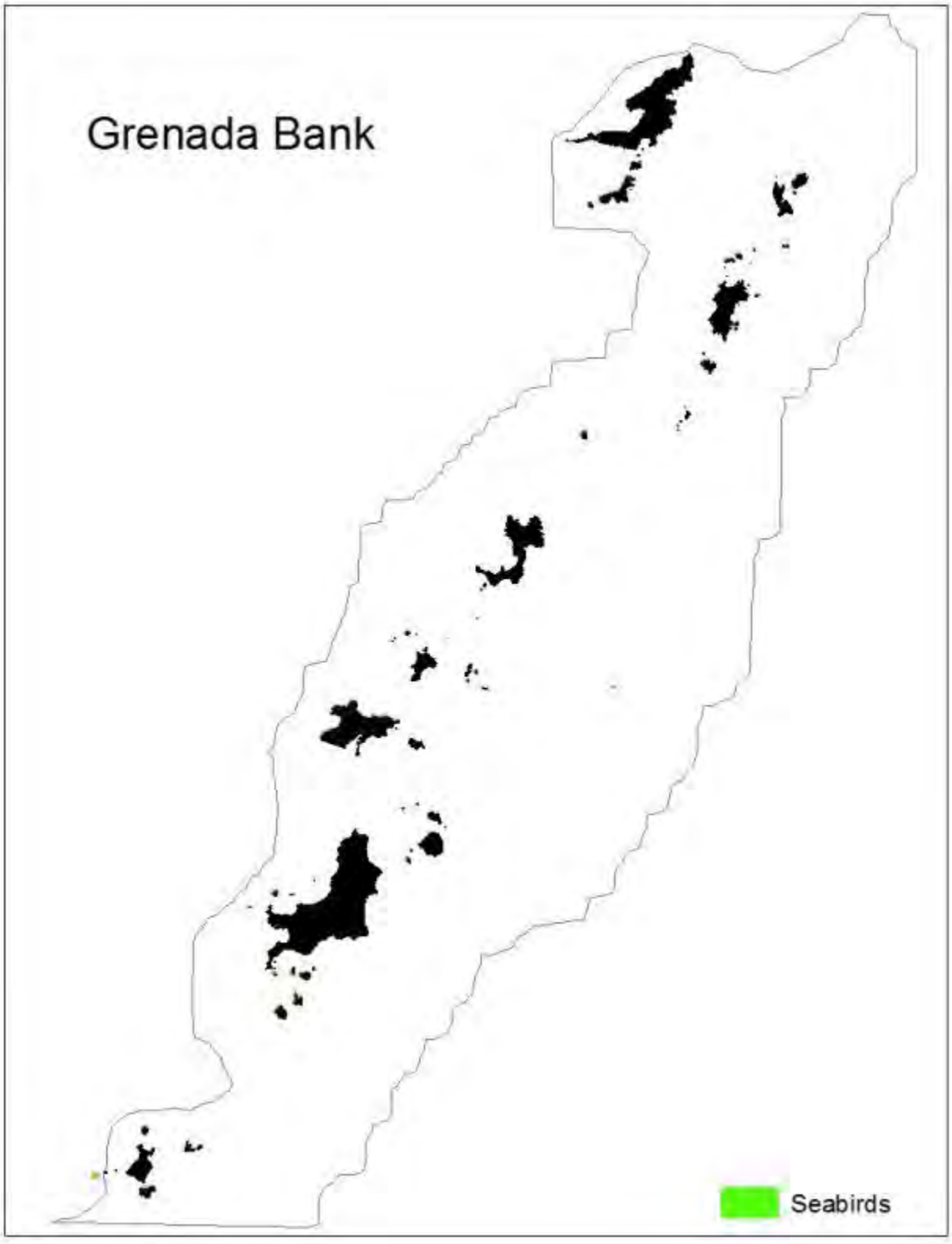

Grenada Bank
Mixed Live Bottom

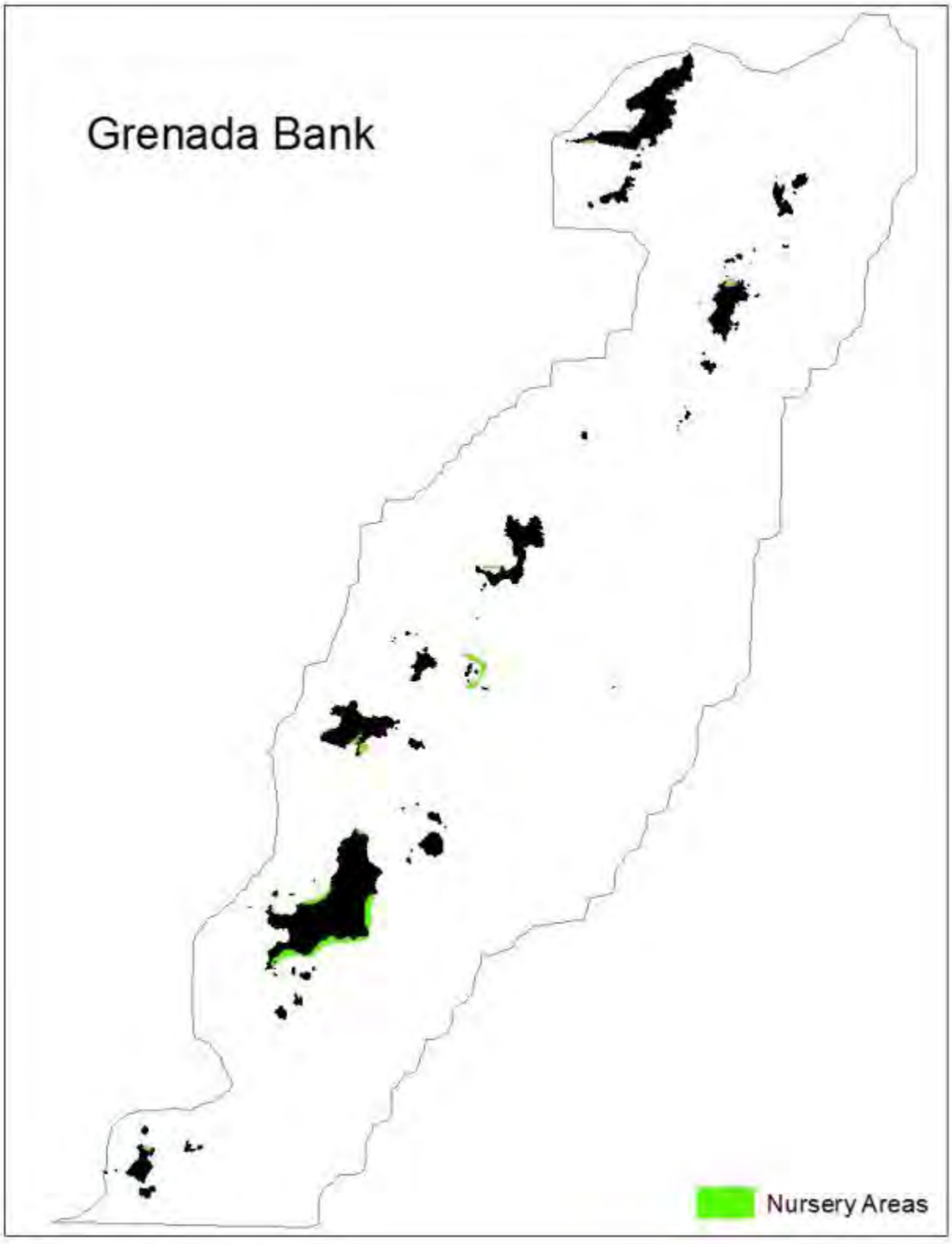

Grenada Bank
Hard Bottom


Grenada Bank
Hard Bottom

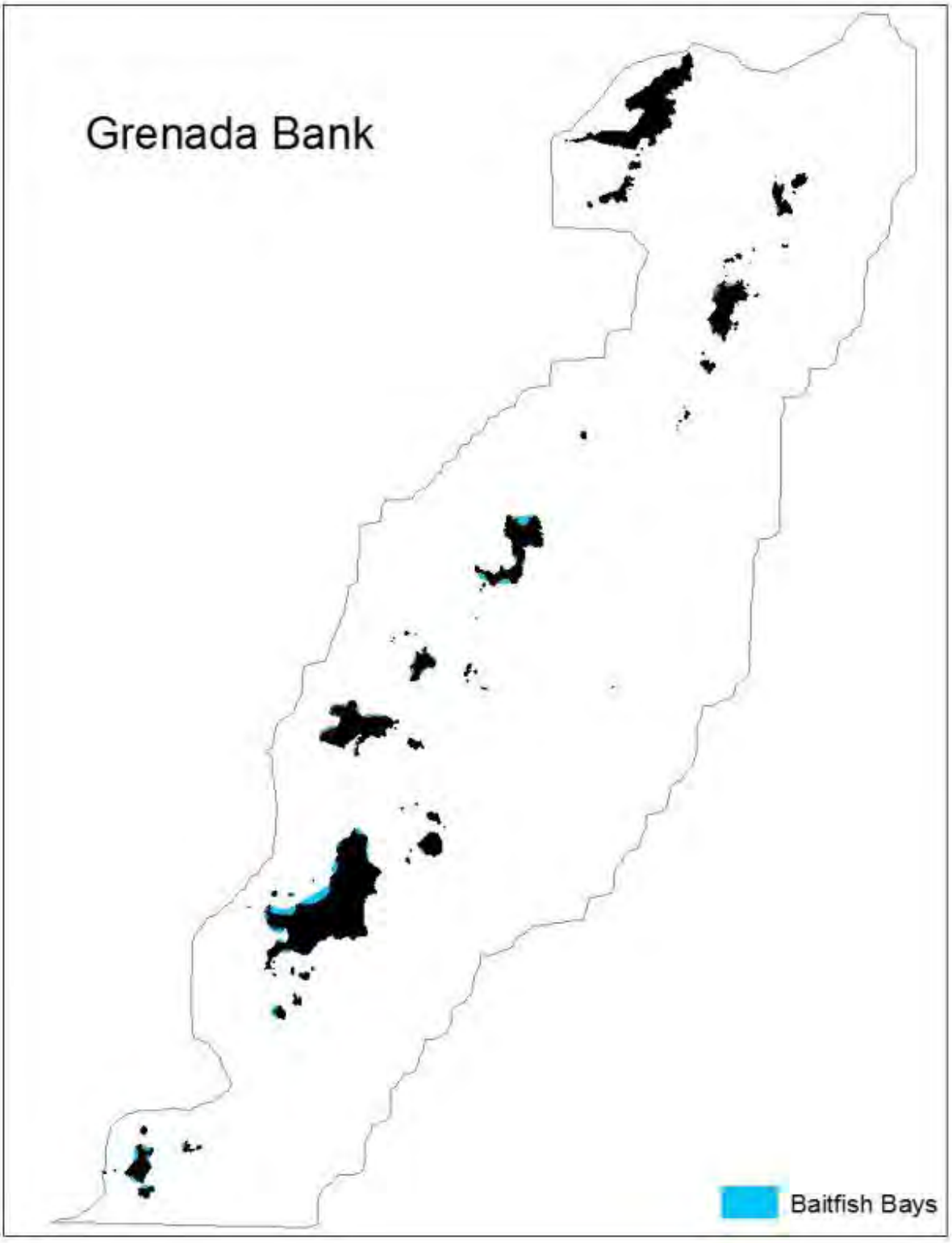

Grenada Bank
Wetlands

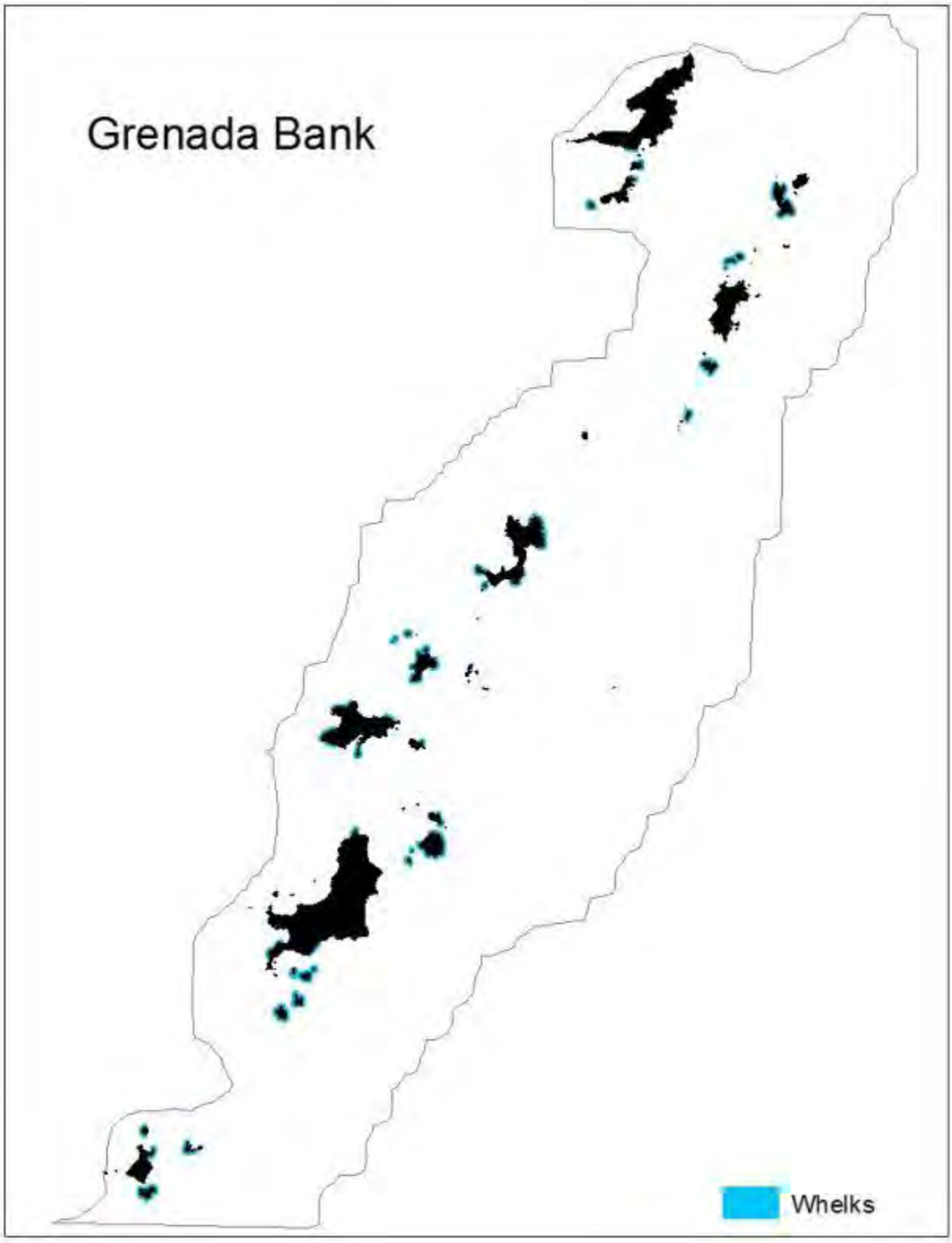

Grenada Bank
Sea Turtles

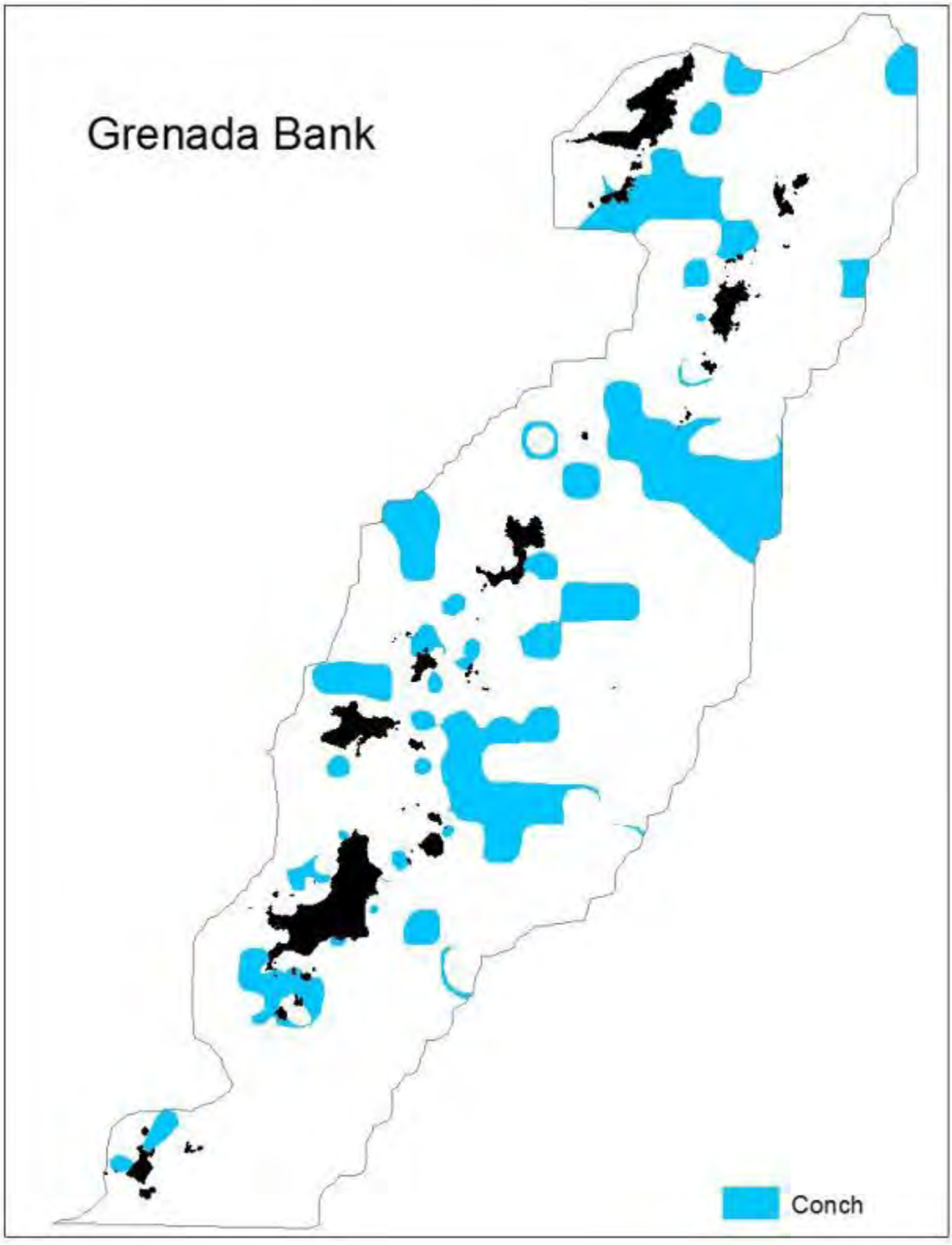

Grenada Bank
Seabirds

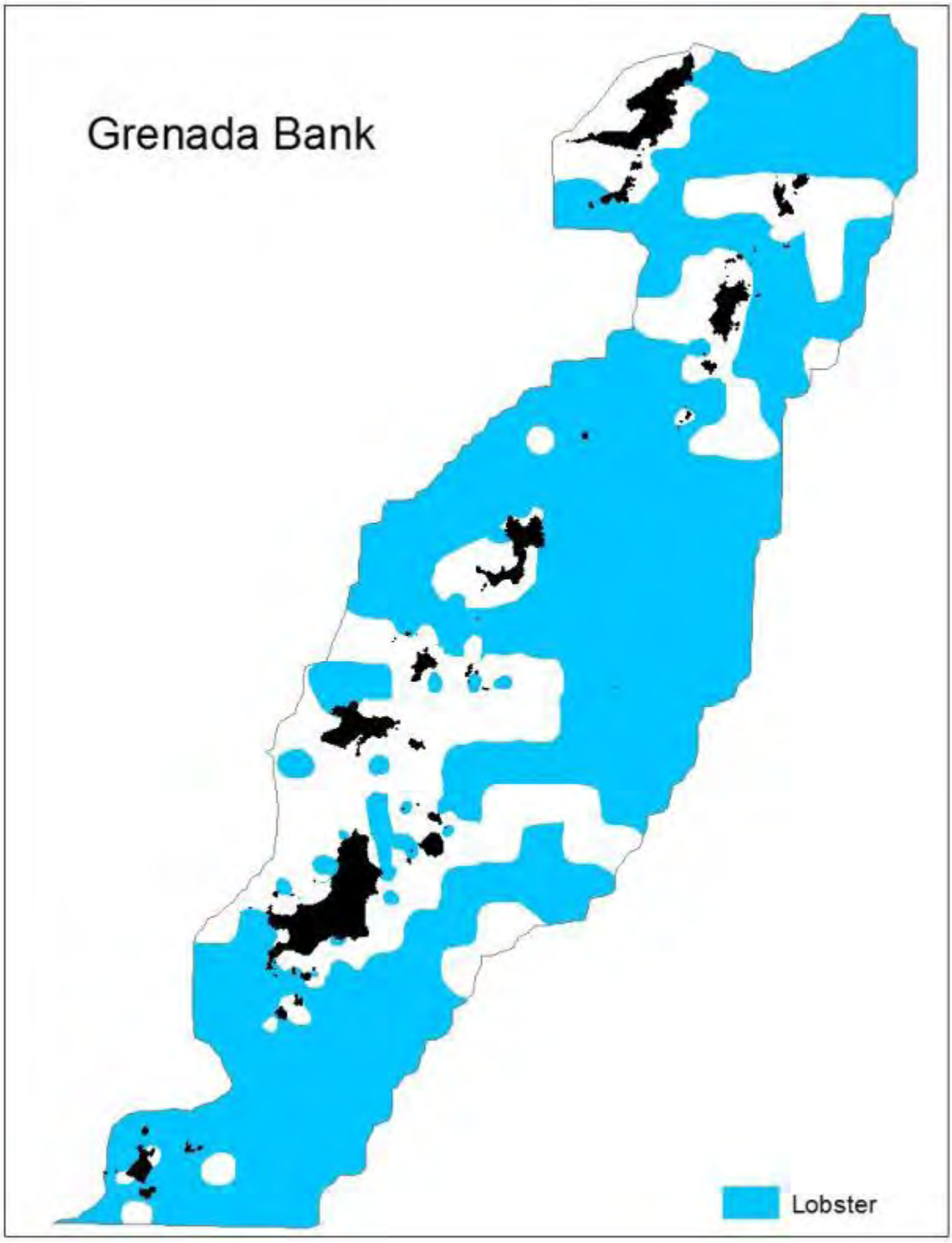

Grenada Bank
Nursery Areas

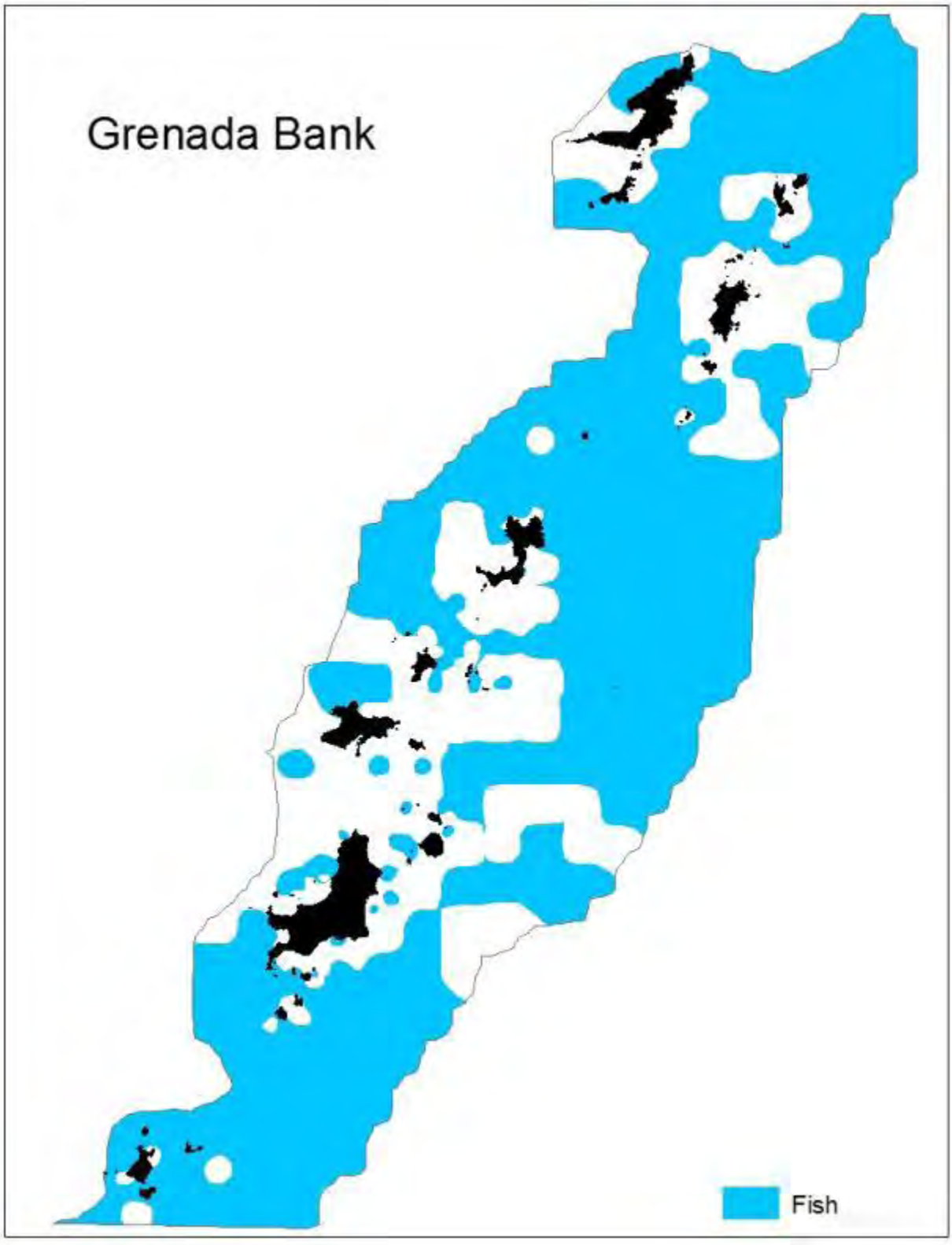
Fishing features



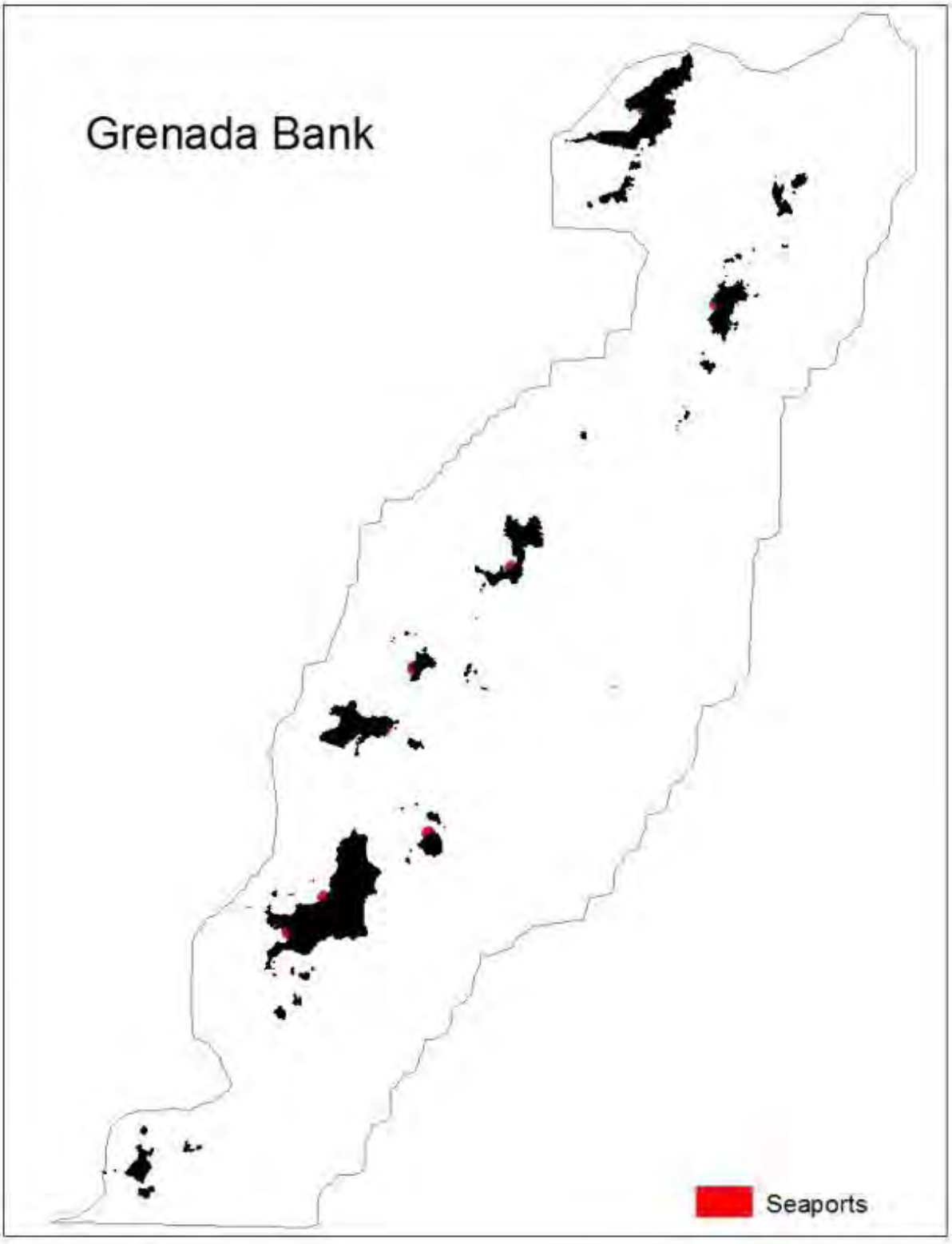

Grenada Bank
Whelks

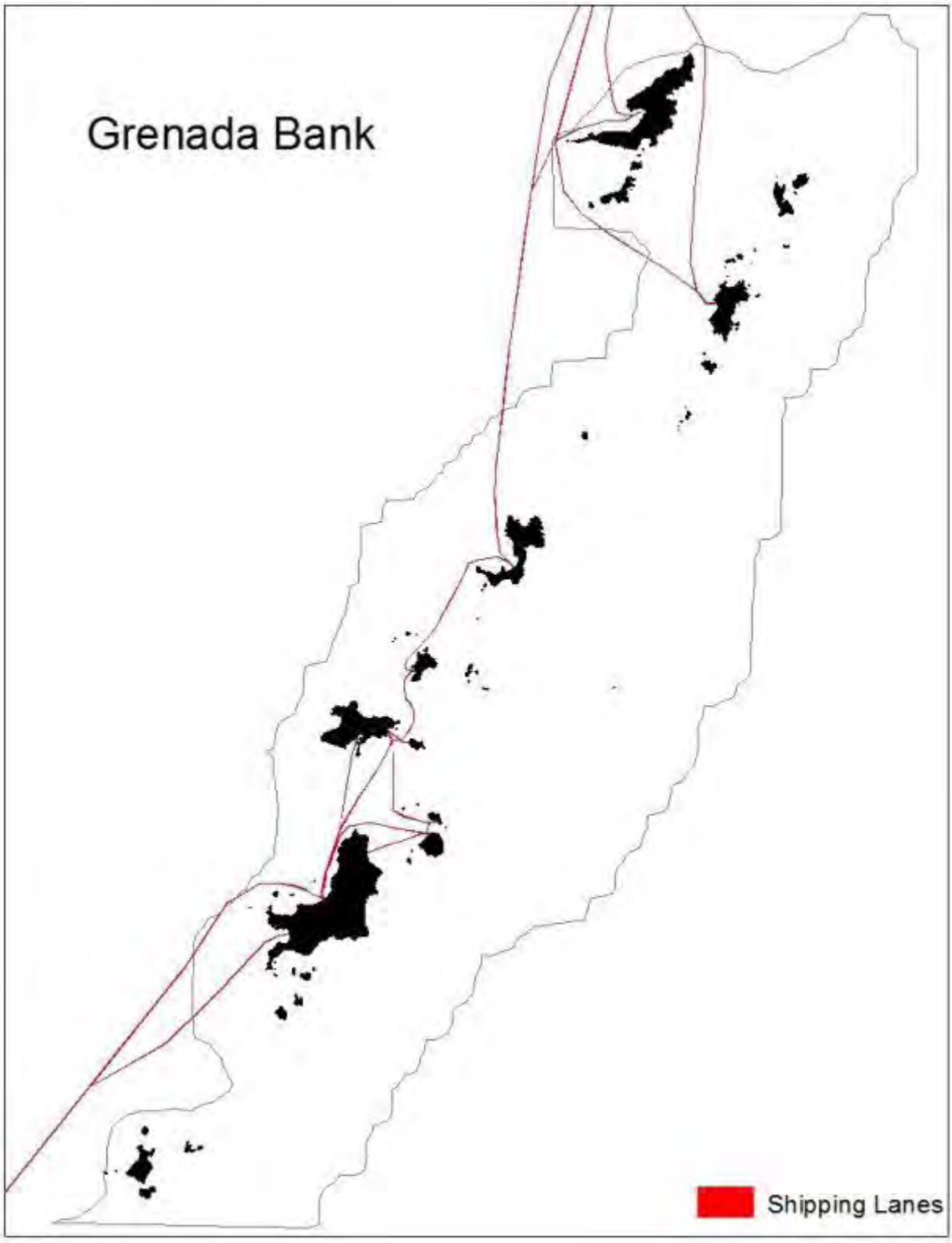

Grenada Bank
Conch

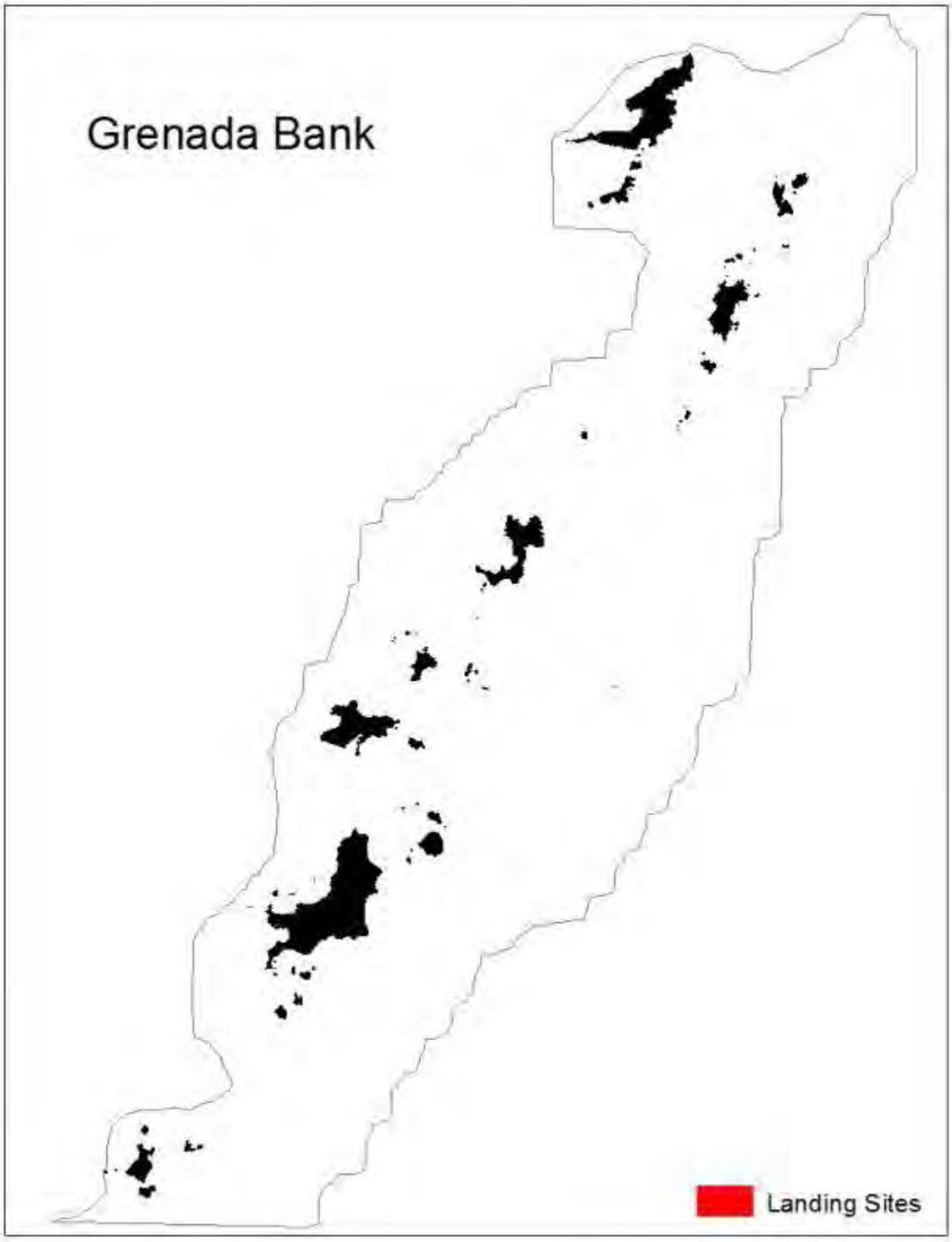

Grenada Bank
Lobster


Grenada Bank
Fish

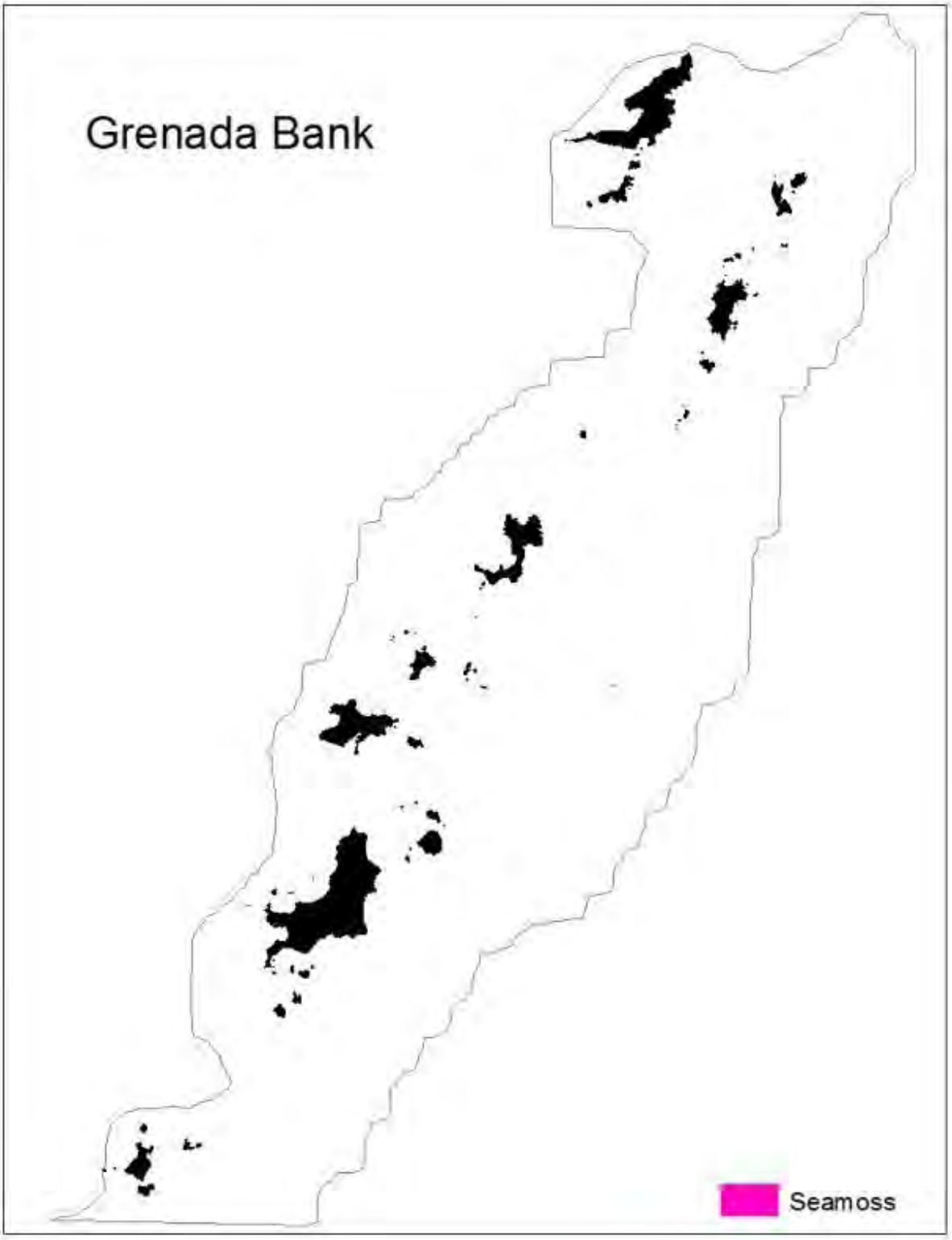
Industrial / Transportation Features

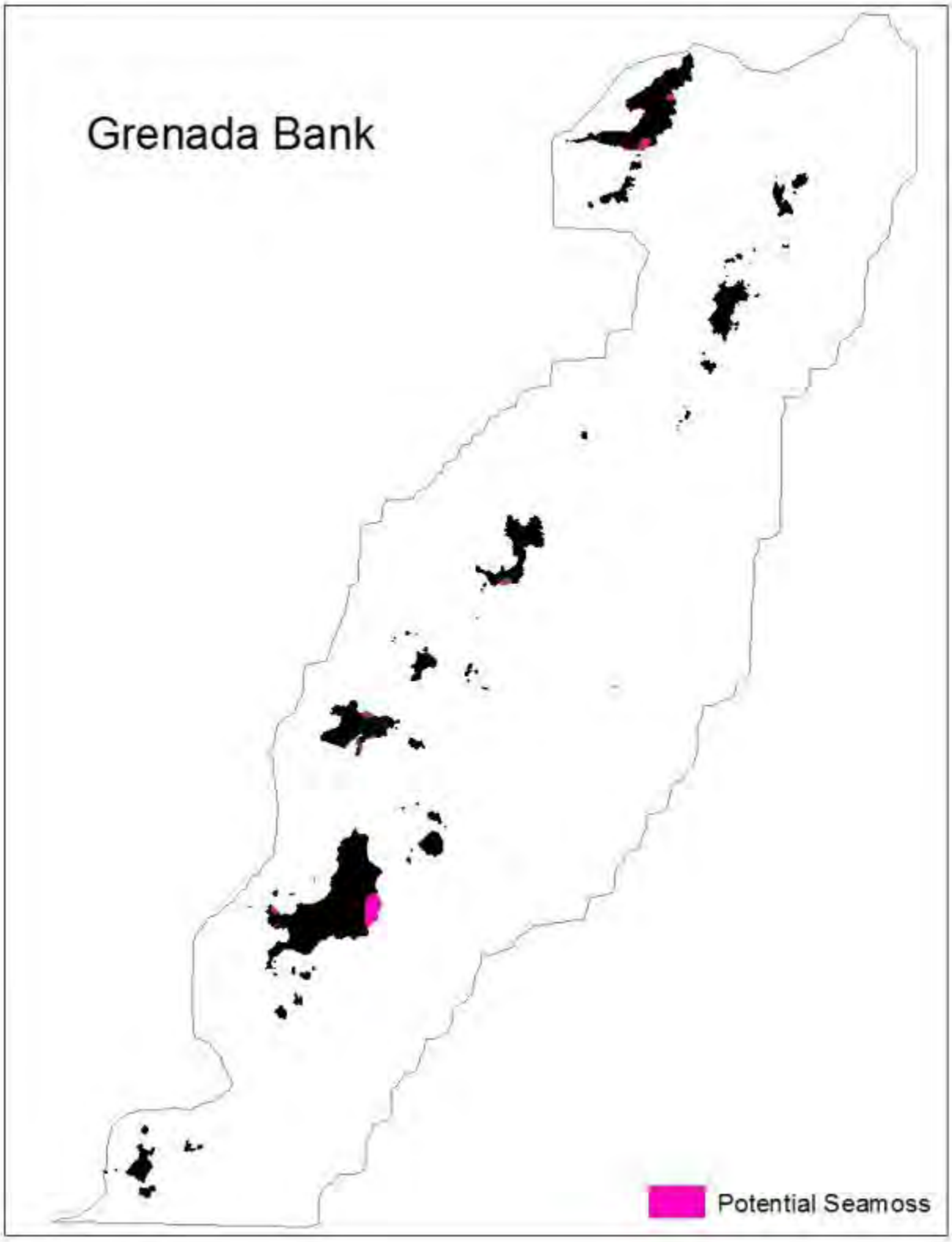



Grenada Bank
Shipping Lanes

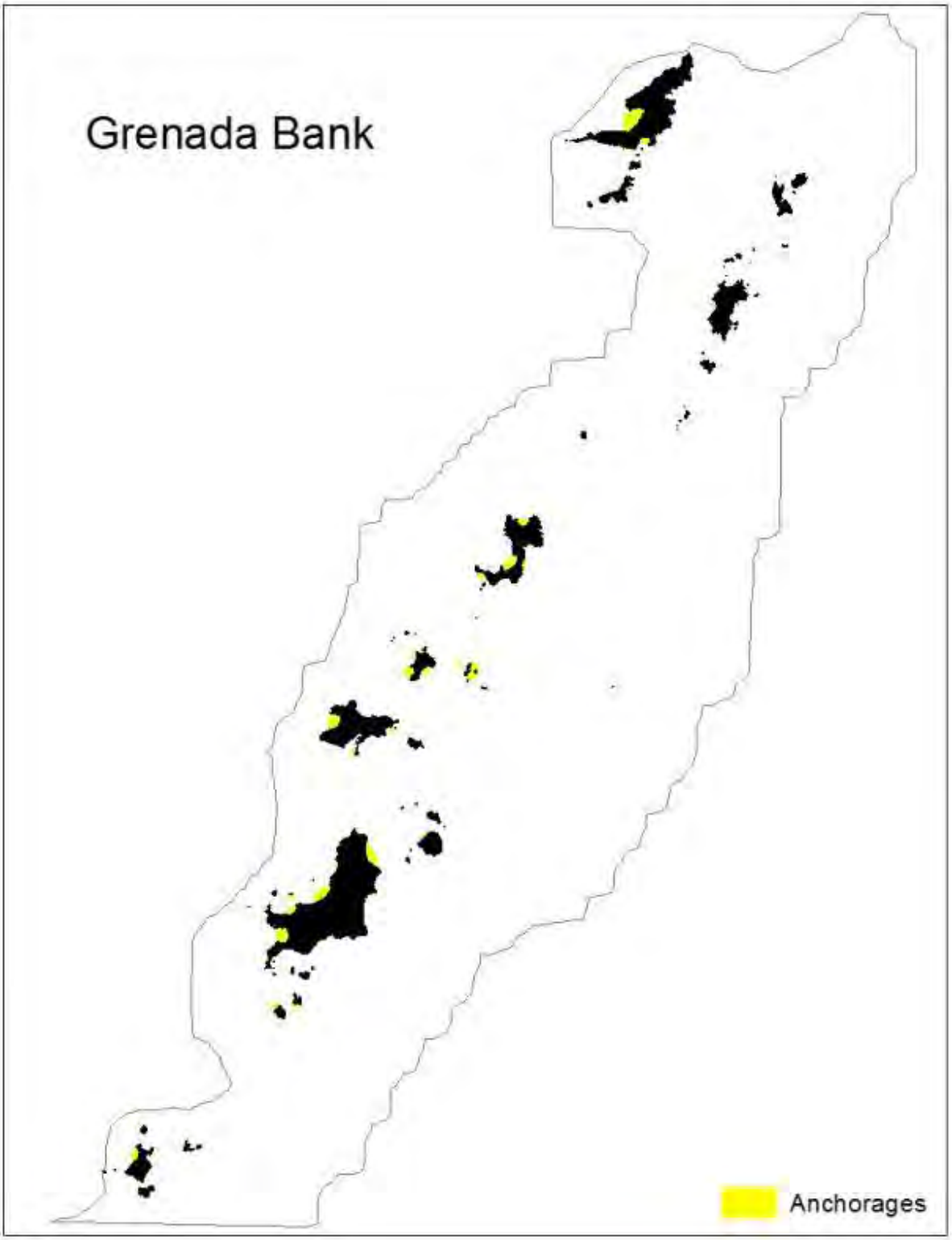

Grenada Bank
Landing Sites

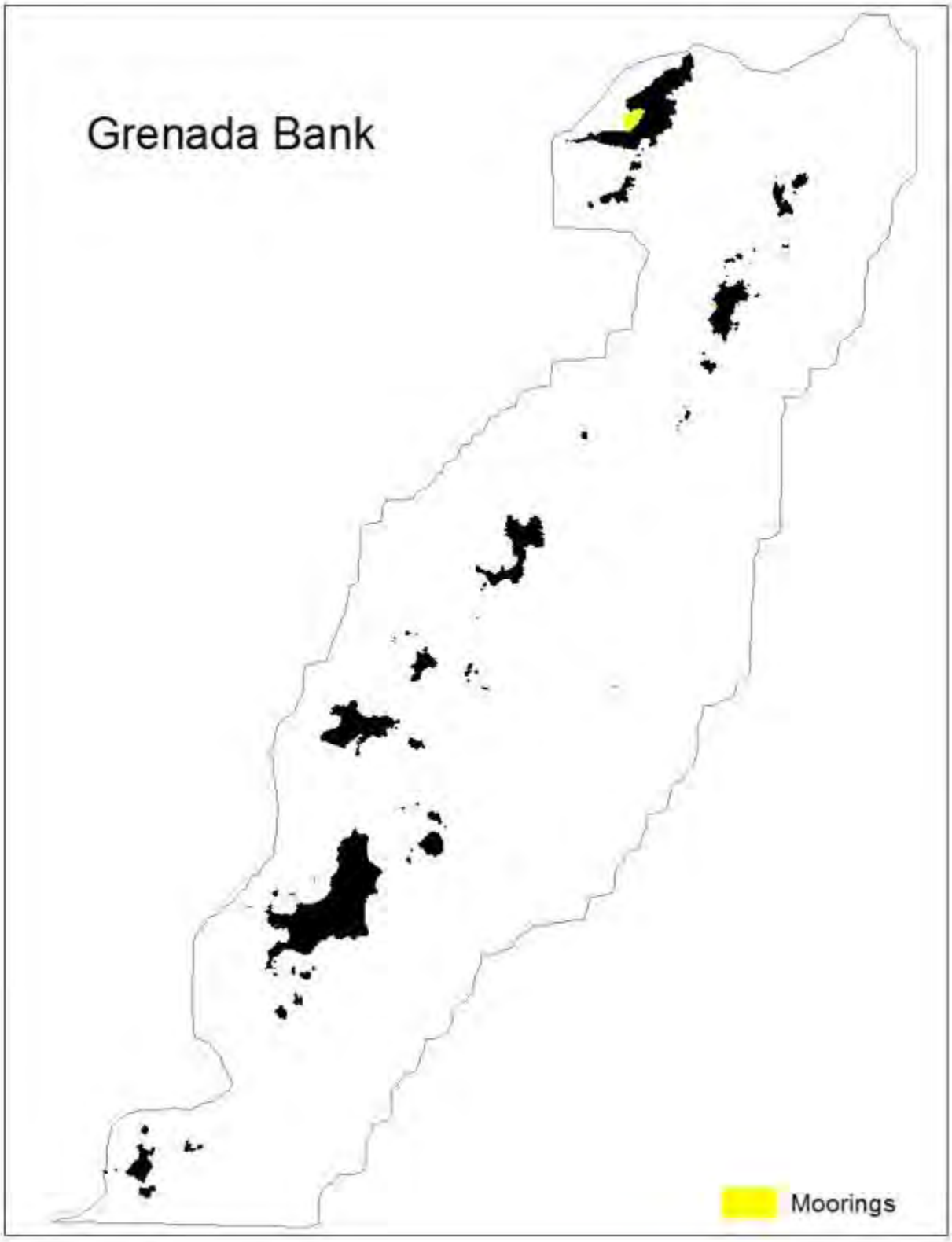
Mariculture

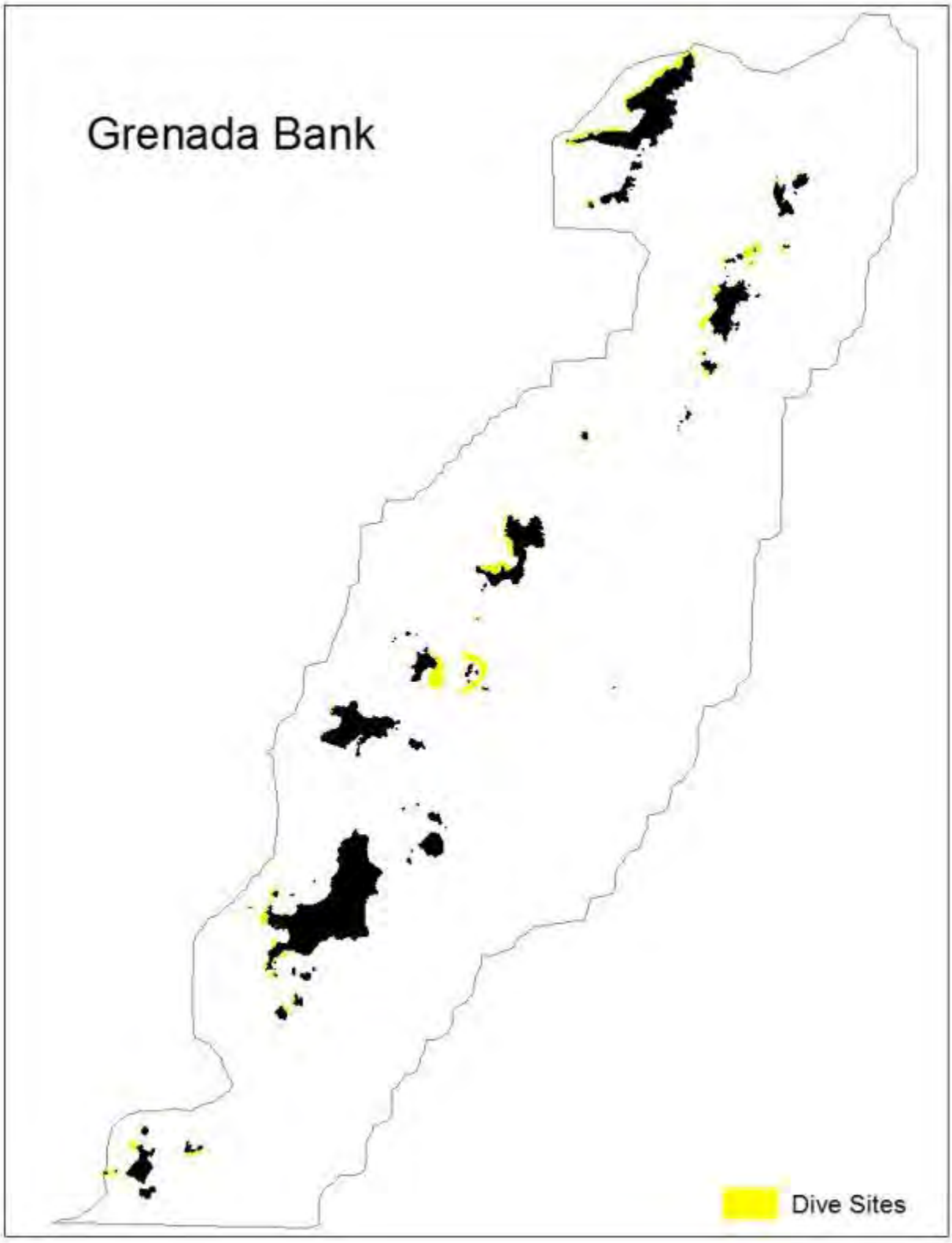


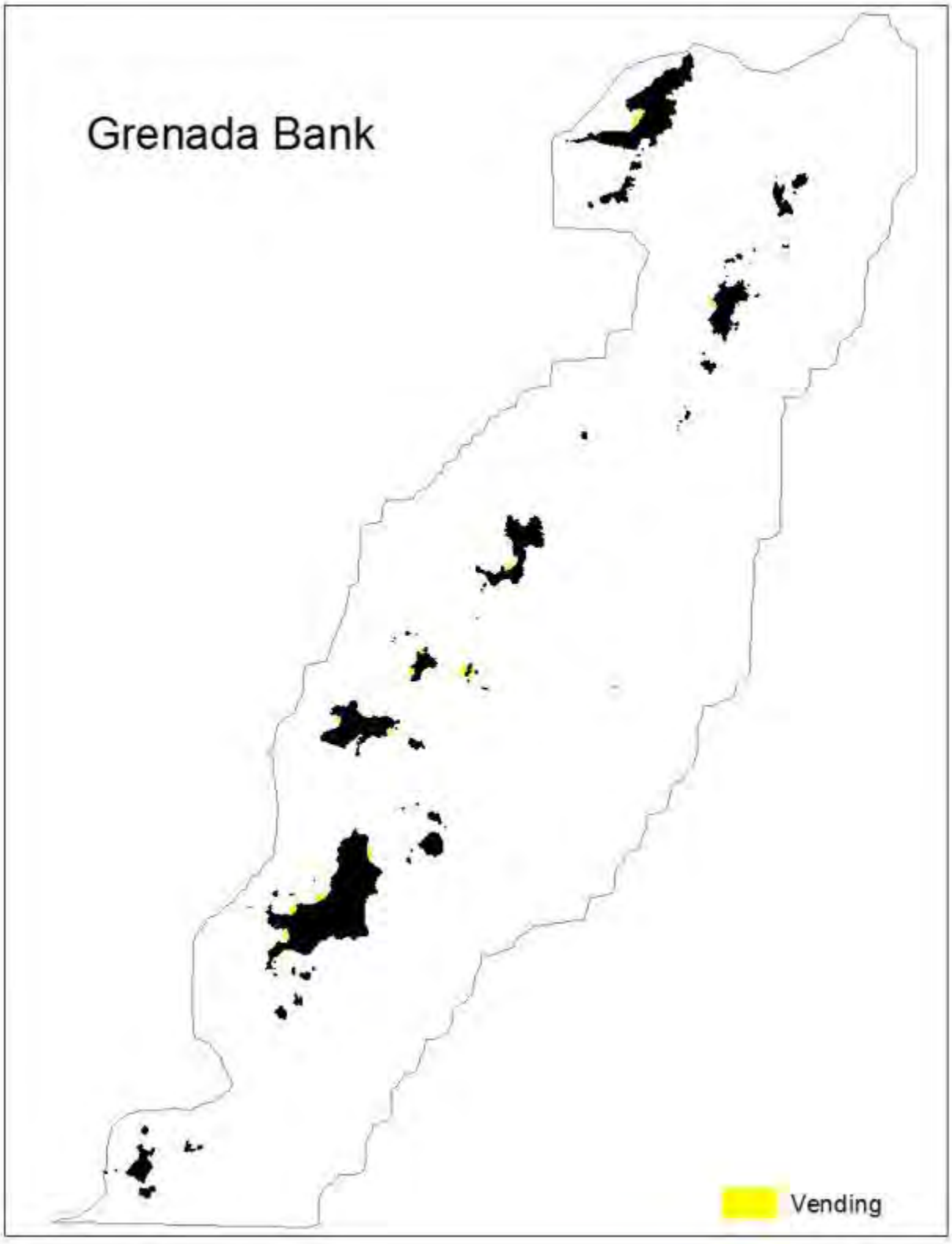

Grenada Bank
Potential Seamoss

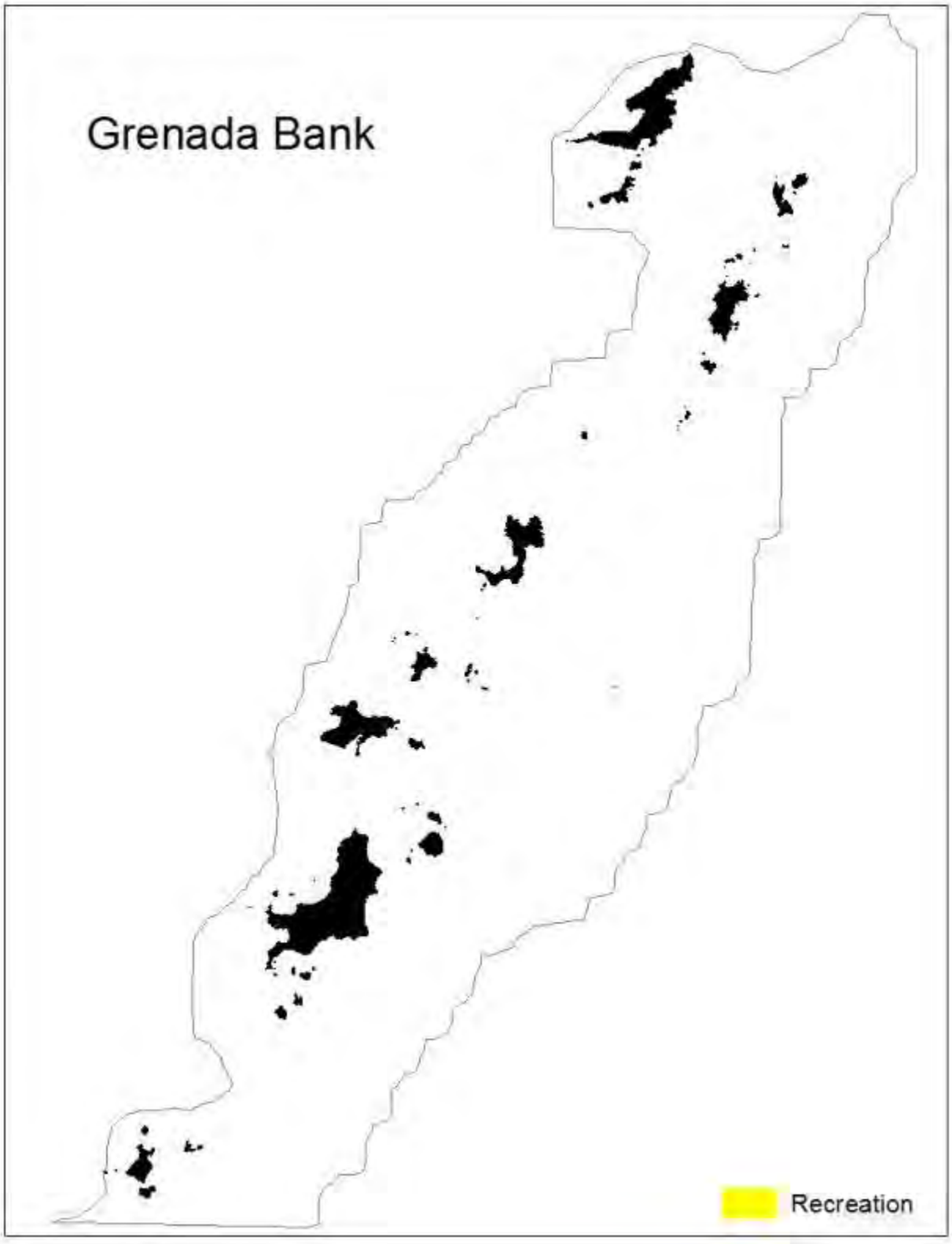
Tourism / Recreation

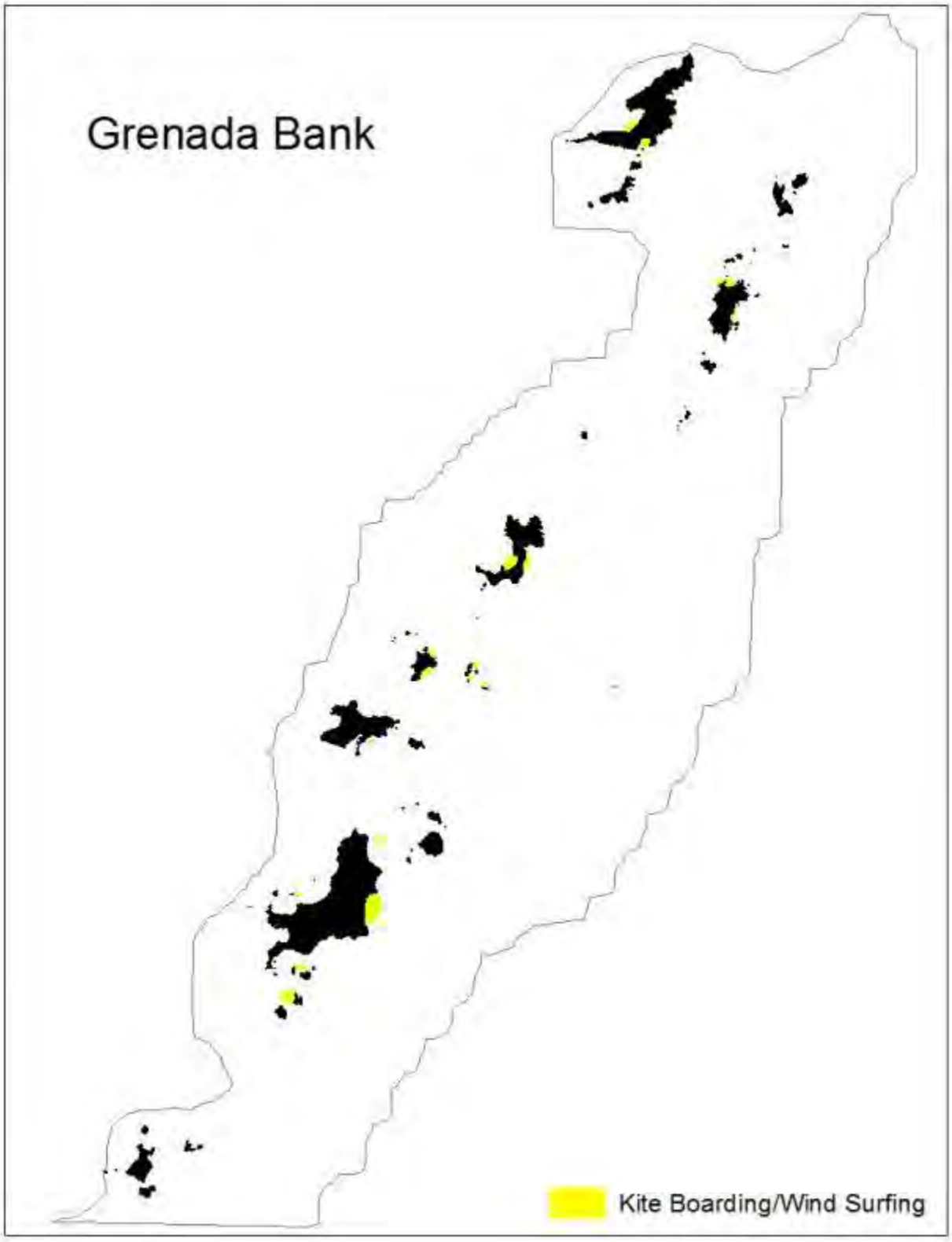


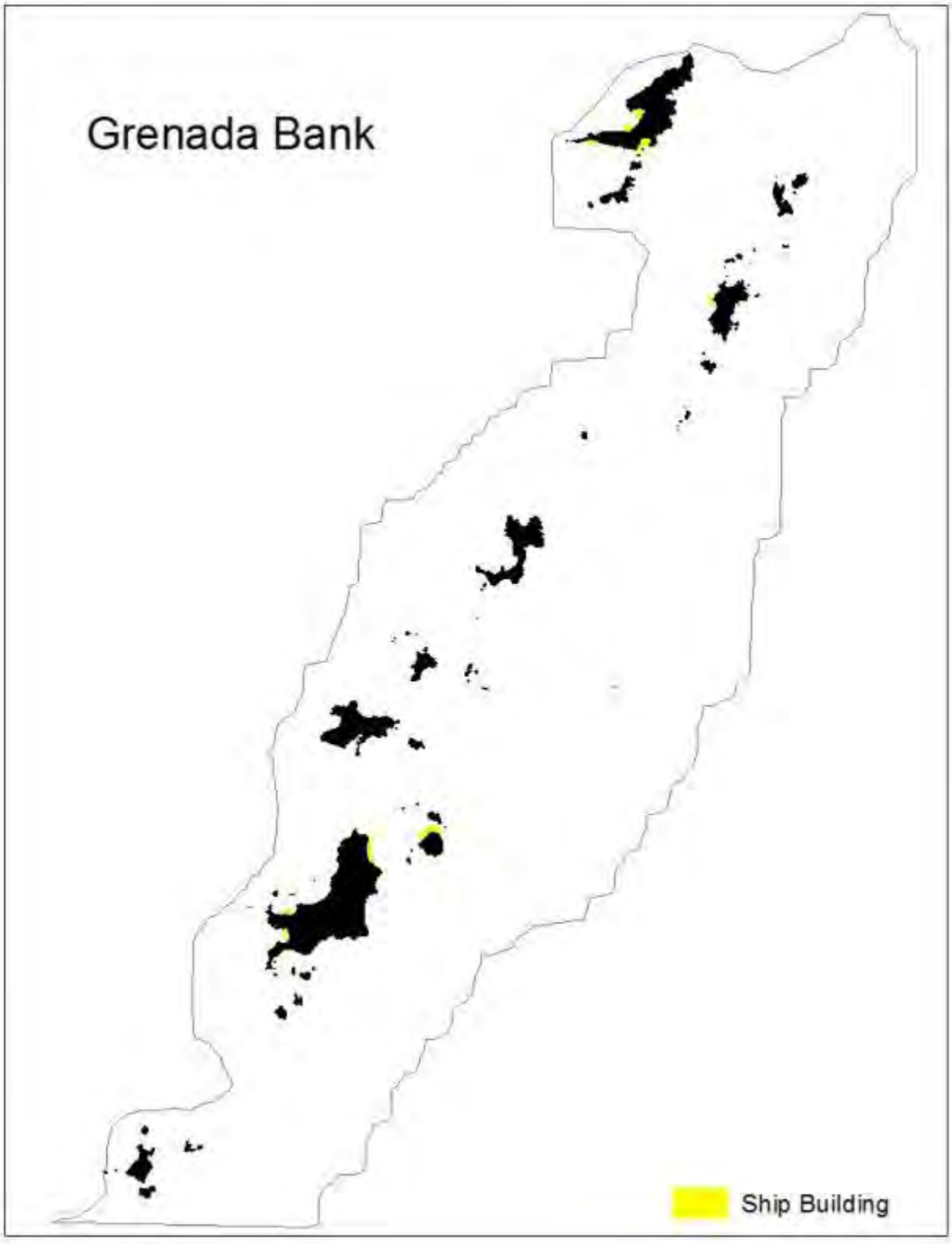

Grenada Bank
Moorings

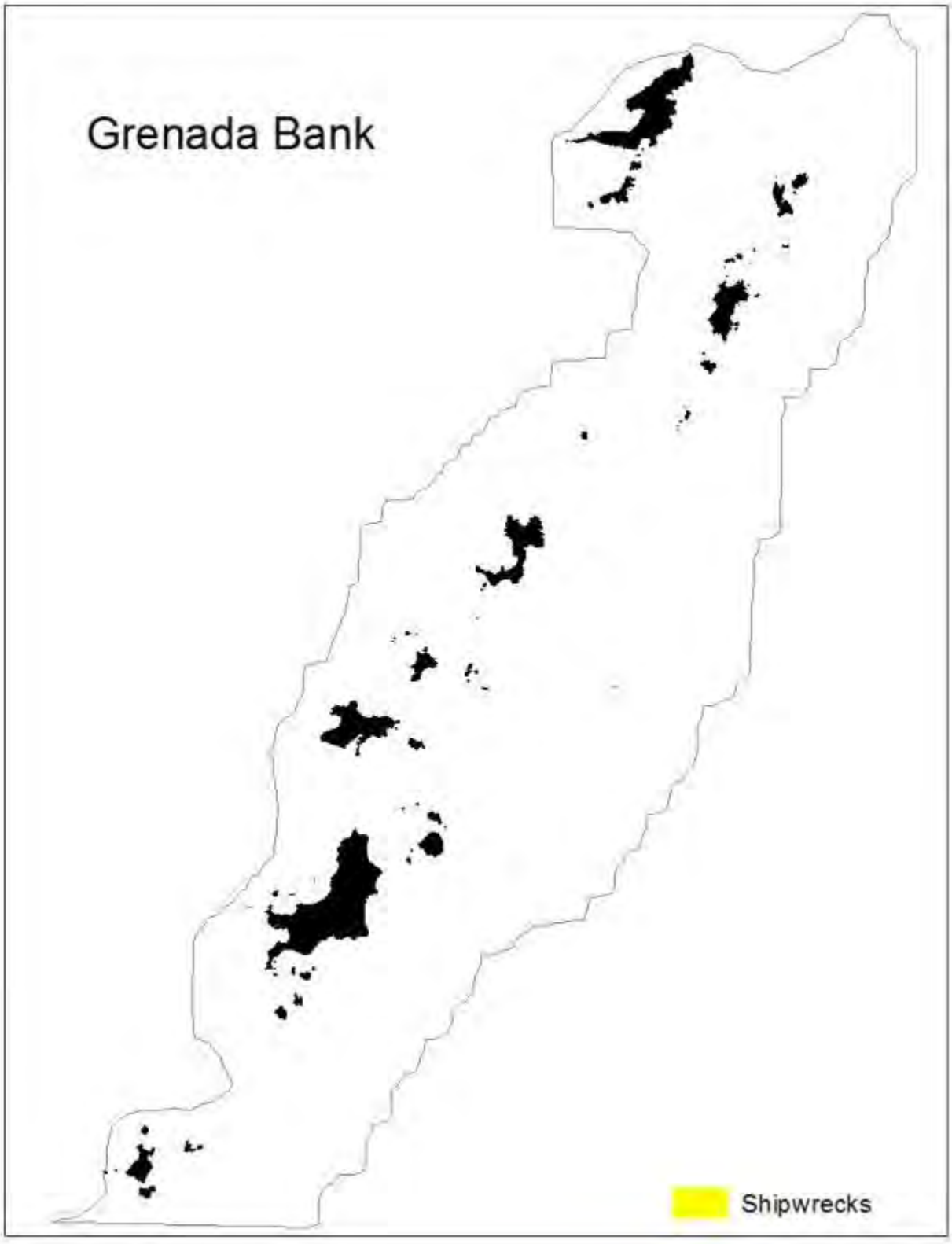

Grenada Bank
Dive Sites


Grenada Bank
Vending

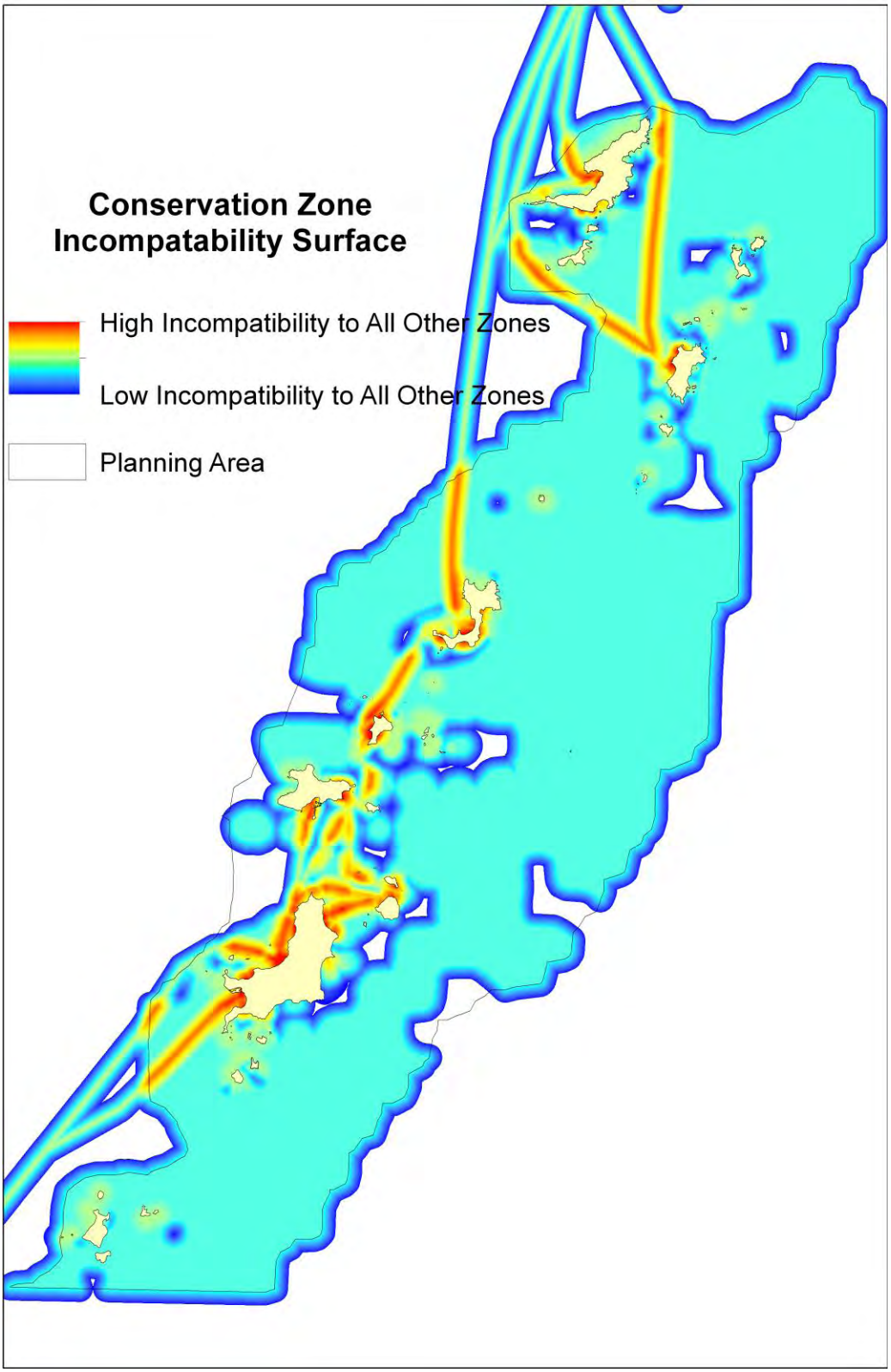

Grenada Bank
Recreation

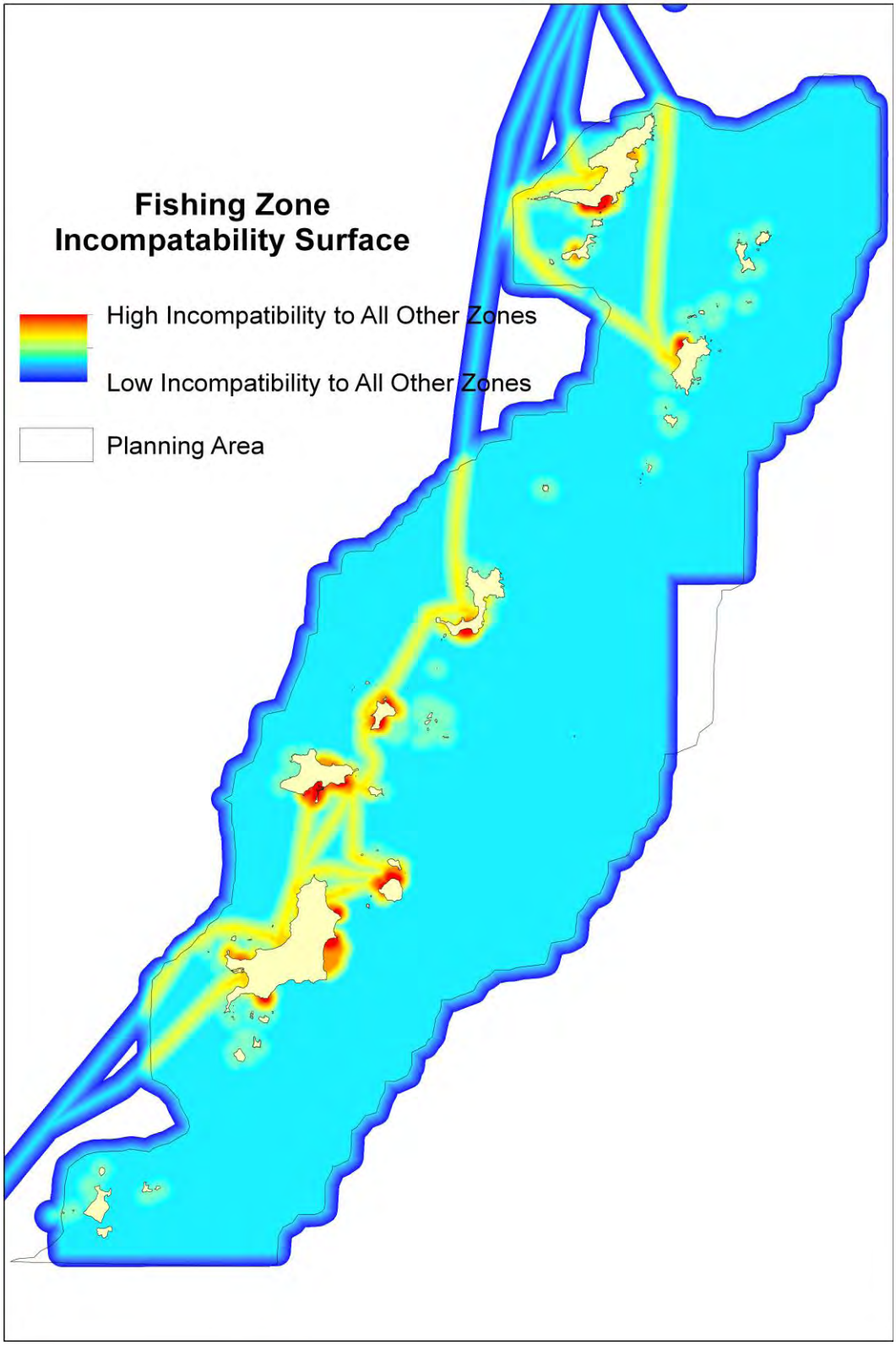

Grenada Bank
Kite Boarding/Wind Surfing

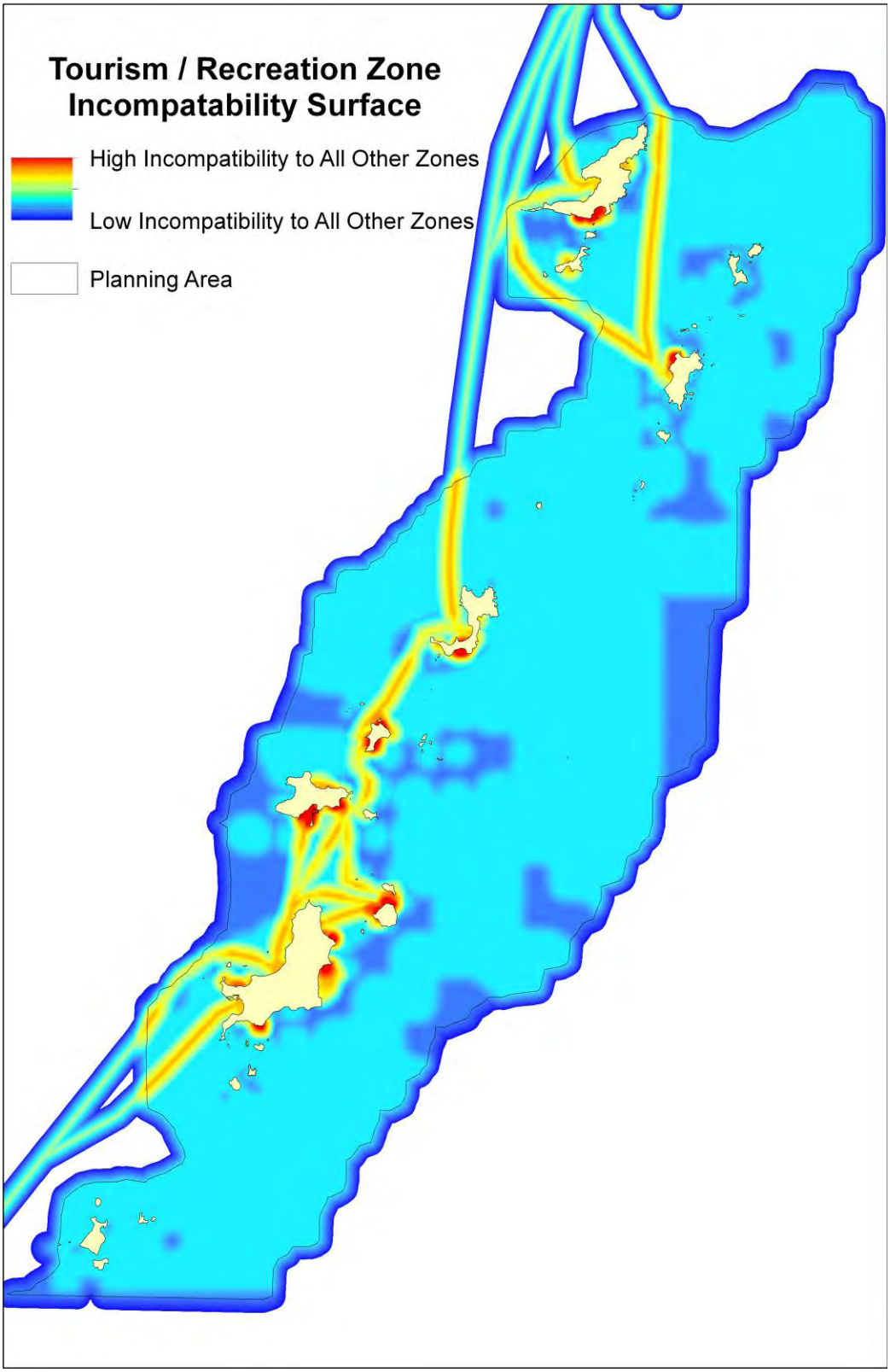

Grenada Bank
Ship Building

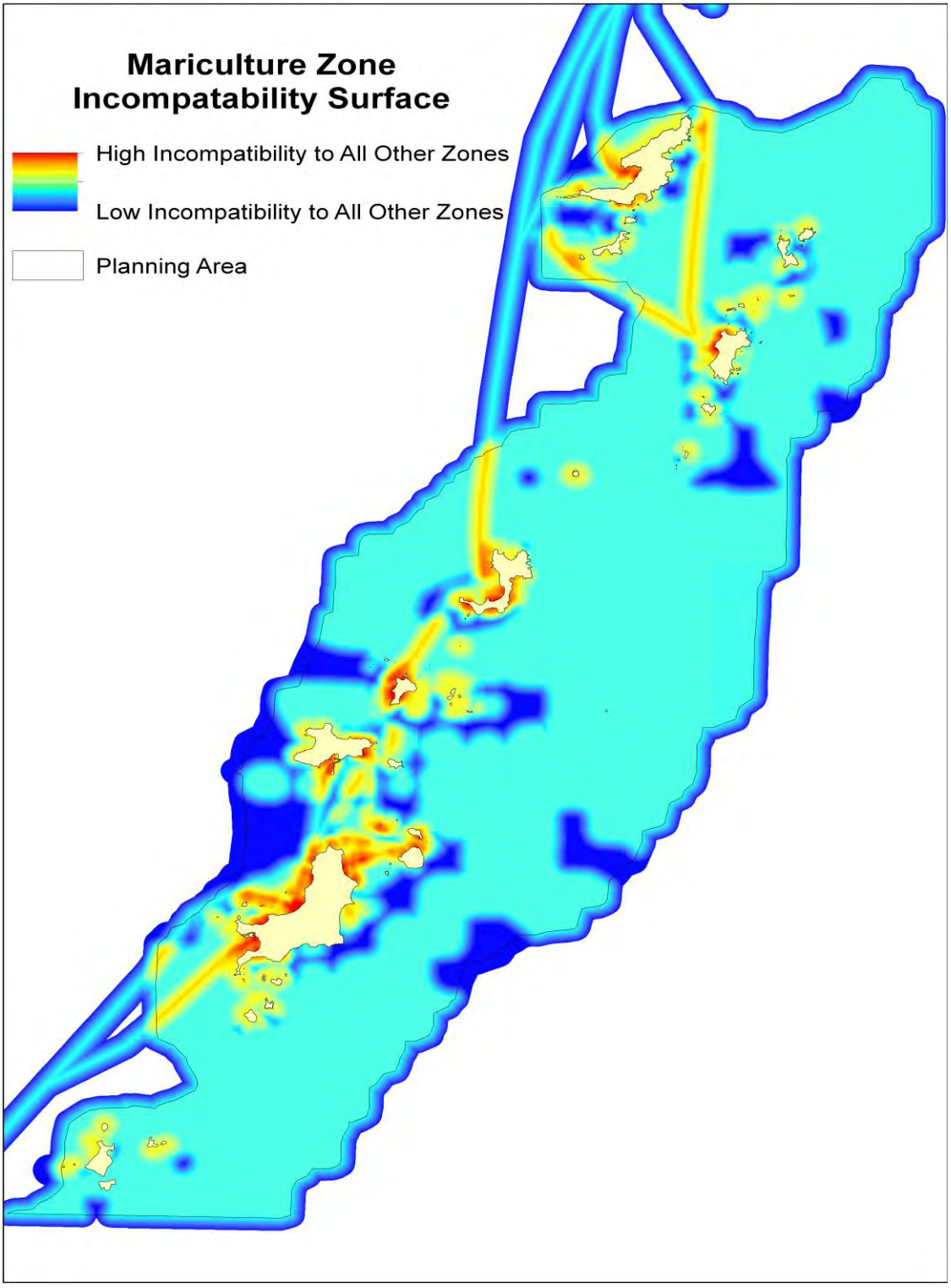

Grenada Bank
Shipwrecks

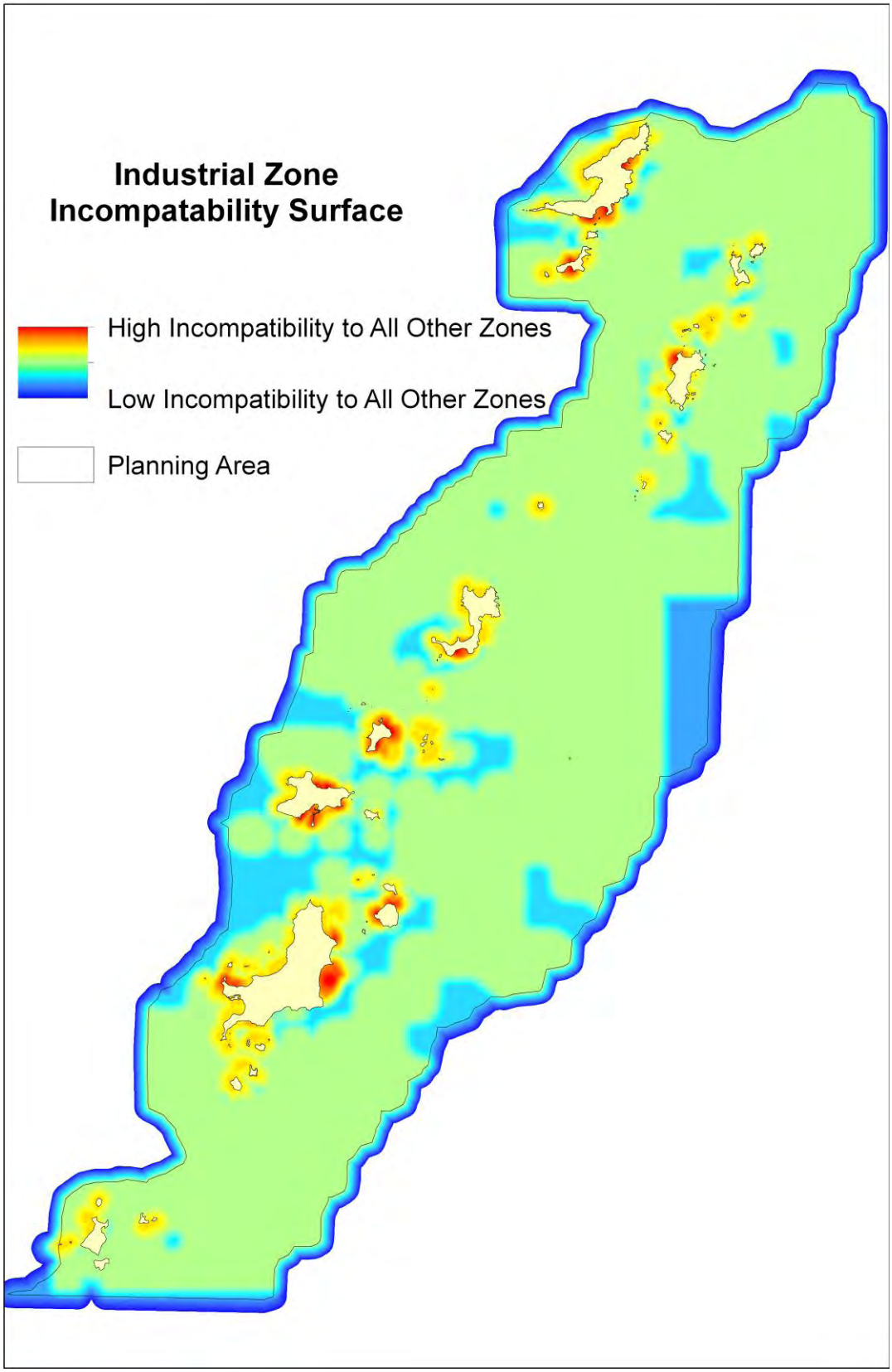
Appendix VI. Incompatibility surfaces developed for each of the various zones.




Fishing Zone
Incompatability Surface
High Incompatibility to All Other Zones
Low Incompatibility to All Other Zones
Planning Area


Tourism / Recreation Zone
Incompatability Surface
High Incompatibility to All Other Zones
Low Incompatibility to All Other Zones
Planning Area


Mariculture Zone
Incompatability Surface
High Incompatibility to All Other Zones
Low Incompatibility to All Other Zones
Planning Area


Industrial Zone
Incompatability Surface
High Incompatibility to All Other Zones
Low Incompatibility to All Other Zones
Planning Area

Appendix VII. Agenda of the Grenadine MRU sub-committee meeting in Mayreau.

START	**Sub-committee Workshop**	**Nov. 17, 2011**
9:00-9:15 am	Prayer, welcome and housekeeping	Martin Barriteau
9:15-10:30	Marine Planning: How do we make decisions?	Kim Baldwin
10:30-10:50	BREAK	
10:50-12:00pm	How can decision-support tools help marine planning?	Kim Baldwin
	12:00-1:00pm LUNCH	
1:00-2:00pm	Evaluate marine multi-use zoning scenarios	Group exercise
2:00-2:30	Discussion of scenarios and the way forward	Group exercise
2:30-2:45	Workshop wrap-up & next steps	Kim Baldwin
2:45-3:00	Workshop Evaluation	Martin Barriteau

Appendix VIII. Presentation given at the stakeholder sub-committee meeting.

12/20/2011

How do we make decisions?

Developing a Framework for a Comprehensive Marine Multi-use Zoning Plan for the Grenadine Islands

Kim Baldwin
University of the West Indies

Natural resources are basis for sustainable development

- Influenced by diverse human activities
- Effective management must involve planning for use and development
- To do this we need a range of information on resources and human activities

With integrated information we can answer questions like:

- Distribution & extent of marine resources
- Areas & patterns of resource use
- Linkages between resources & livelihoods
- Areas of multiple use & potential conflicts

Plan sustainable development

Marine Spatial Planning (MSP)

An integrated approach to managing human activities in the marine environment

MSP is a process to develop a management strategy that accounts for multiple objectives in a coordinated & equitable way

Aims to achieve biological, economic & social goals

STEPS IN Marine Planning

1. Gather data and information
2. Set objectives and define uses
3. Then consider uses, areas of high space use & trade-offs of each to identify an acceptable plan
4. Propose a draft marine multi-use plan
5. Develop legislation to support management

MSP uses GIS as a tool to:

- Provide framework for a range of information
- Move from single sector to integrated management
- Address complexity of marine envt. in a practical manner
- Make information accessible
- Engage all stakeholders
- Identify & address conflicts among human uses

1

MSP - How do we make decisions?

1. Identify the area and the problem
2. Design a goal to achieve
3. Define management priorities
4. Collect information on resources & uses
5. Look at areas of high use & potential conflict
6. Think about trade-offs
7. Think about feasibility of decisions
8. Develop a plan of action

Planning & management of Grenada Bank marine resources is complex








Transboundary island chain

Large diversity of resources & uses

Information not integrated between :

- Countries
- Government Agencies
- Knowledge Systems

Reasons for Marine Planning in Grenadines



- Increasing demand for ocean/coastal space & resources
- Single sector management not meeting multiple demands
- Grenadines Islands are 'one ecosystem'
  - Need for integrated information & regional decision making
- Preservation of livelihoods, conservation & cultural areas

The development of a marine multi-use zoning plan for the Grenadine Islands

Oct 2010 - March 2012

The project is being facilitated by SusGren, Inc. with funding/support provided by:

SGP The GEF Small Grants Programme

NOAA CORAL REEF CONSERVATION PROGRAM

The Nature Conservancy Protecting nature. Preserving life.

Project Workplan: 2010-2012

1st workshop: *January 2011*
- Vision for the future

1st series of community meetings: *June 2011*
- Share results & get feedback

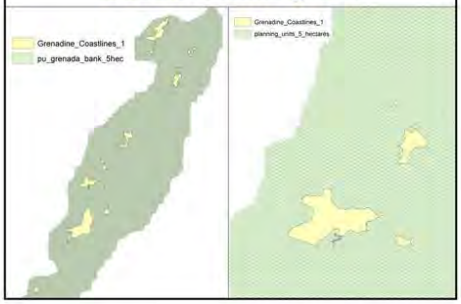
2nd workshop: *August 2011*
- Finalize objectives, zones & determine compatible uses

*** Stakeholder subcommittee meeting**
- **Identify various marine zoning options**

3rd workshop: *February 2012*
- Draft a marine zoning plan for the Grenadines

2nd series of community meetings: *March 2012*
- Obtain feedback on draft plan

1. Define Planning Area



2. Develop Vision & Objectives

- Fishery production
- Environmental conservation
- Cultural conservation
- Tourism income
- Transportation

3. Determine Uses (ZONES)



- Conservation
- Fishing
- Tourism / Recreation
- Industrial / Transportation / Development
- Mariculture


4. Set goals for each zone

What do we want to achieve?

Conservation Goals

- Identify and protect submerged marine resources (critical habitats & species, nursery areas & breeding grounds)
- Identify and protect coastal resources (beaches, mangroves, salt-ponds, whelks, oysters, seabird & turtle nesting)
- Identify and protect culturally important marine areas
- Provide healthy natural resources for everyone
- Integrated land and sea management
- Build resilience to natural and man-made disasters

Fishing Goals

- Manage Grenada Bank as one area (and harmonized regulations across the entire bank)
- Maintain access to landing facilities for fishers
- Manage access to baitfish & coastal pelagic fish
- Ensure undersized fish are not caught & nursery areas protected
- Multi-use zoning areas to include closed areas, open access and other areas where selected gear or access restrictions apply

Tourism / Recreation Goals

- Healthy coastal and submerged ecosystems, clean water & beaches for swimming, sailing, diving, picnicking, etc.
- Adequate areas for swimming and other activities (snorkelling/diving, sailing, wind-surfing/kite-boarding)
- Areas designated for future sustainable tourism infrastructure
- Areas where development is not allowed
- Ample facilities for recreational boating (beach and pier access, moorings)
- Free access for all beaches for locals/tourists

Industrial / Transportation Goals

- Distinct identification and demarcation of ferry and shipping lanes
- Marina development plan
  —identify locations where seaports & marinas may be developed in the future
  (for commercial, local & tourism purposes)

Mariculture Goals

- Identify areas of current and potential for mariculture activities
- Well managed environmentally sound mariculture industry livelihoods

5. Collect information on resources & uses

MarSIS — A Marine Resource Space-use Information System for the Grenadine Islands — CERMES

A Transboundary Marine Resource & Space-use Information System

– Integrates scientific information & local knowledge

MarSIS has information on…

Marine habitats
- reefs, mangroves, seagrass beds, beaches, rocky shores

Infrastructure
- seaports, marinas, roads, hotels, desalination plants

Marine resource users
- Dive shops, tourism facilities, fish landing sites, communities, etc.

Marine space-uses
- anchorages, dive sites, fishing grounds, shipping lanes, recreation areas

Sensitive biological & heritage areas
- sea turtle nesting beaches, seabird nesting sites, marine protected areas, nursery grounds, historical sites, shipwrecks

Areas of threat
- sand-mining, beach erosion, dumping, land-based sources of marine pollution, mangrove cutting

6. Map features

7. Identify priority areas for each zone

Areas important for livelihoods
– Fishing, tourism, transportation, communities

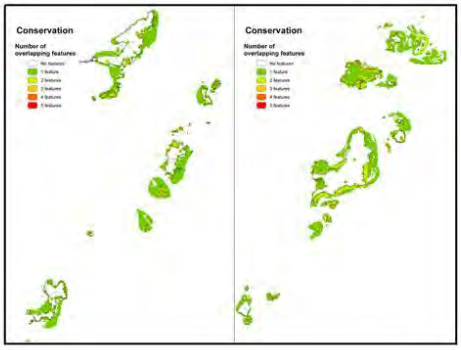
Areas important for conservation
– Reef ecosystems, turtle nesting, nursery areas

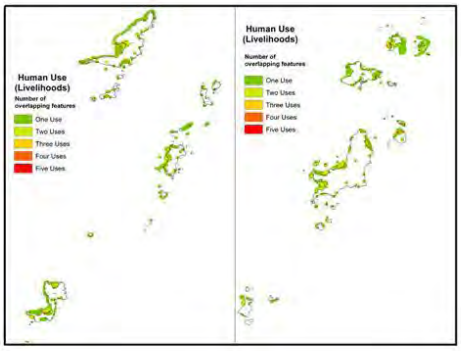
Areas of overlap
– Multiple uses, space-use conflicts/incompatible use

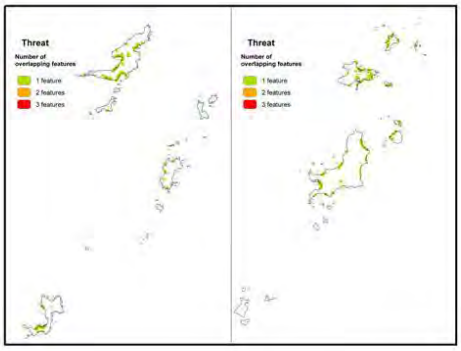
12/20/2011

'Hotspot' GIS Analysis

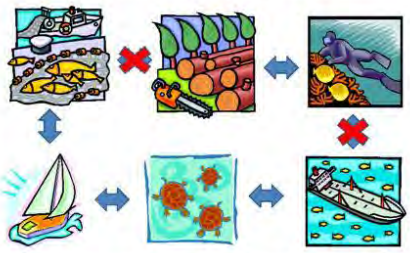
Conservation	Human use	Threat
Coral reefs	Anchorages	Artifical structures
Historical sites	Aquaculture	Desalinisation outfalls
Mangroves	Baitfish bays	Dredging
Nursery grounds	Dive sites	Illegeal dumping sites
Oyster beds	Landing sites	Land based sources of pollution
Seabird nesting sites	Recreation areas	Landfills
Seaturtle nesting beaches	Seaports	Mangrove cutting
Seagrass beds	Ship building sites	Sand mining
Whelks	Ship wrecks	
	Shipping lanes	
	Vending sites	







7. Consider Compatibility of Marine Resource Uses



Group exercise

- 3 groups – Bequia, Mayreau & Carriacou
- Use maps & your knowledge of area
- Identify priority areas for each zone
- Circle areas of high use (overlap) or potential conflict

5

Setting priorities & evaluating trade-offs

- Which features are important to the community?
  - *Keeping in mind vision & goals*
- How much of each feature do to set aside?
- Are uses compatible with each other?
- Is your solution balanced and fair?

Decision Support tools can help marine planning & zoning

1. Incorporate data from ecological, economic, and social systems
2. Transparently assess management alternatives and trade-offs
3. Involve stakeholders in decision-making
4. Evaluate progress towards management objectives

Decision support tools can allow

- Data Management
- Mapping & visualization
- Alternative scenario development & analysis
- Stakeholder participation
- Management proposal options
- Assessment of plan

Decision support tools can help evaluate

- Where are the most important places to represent each resource value?
- How well do various options meet objectives for multiple resource values?
- How comprehensive is the zoning configuration?
- How will trade-offs impact different stakeholders?

Benefits of Decision Support Tools

- Save time, energy, and resources
- Guide users through decision making processes
- Repeat analyses with relative ease
- Reduce requirements for human expertise
- Help users explore a wider range of alternatives
- Document decisions about inputs and parameters
- Increase understanding of planning requirements and limitations for multiple sectors in the planning process

'Marxan with Zones'

Decision Support Tool

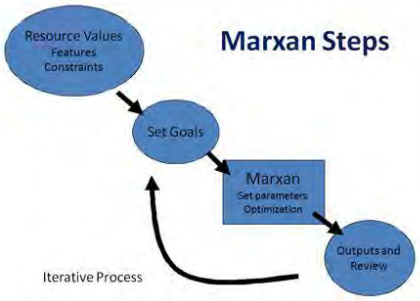
(e.g. provides maps of various options)

– *Not the final decision-maker*

- Produces solutions based on marine use goals
- Identifies tradeoffs
  - *Social vs. Environmental balances*
- Produces alternative scenarios for investigating alternative use zones

MARXAN NEEDS PEOPLE'S INPUT TO BE USEFUL

Marxan Steps



Marxan Decision-Support Tool

INPUTS:

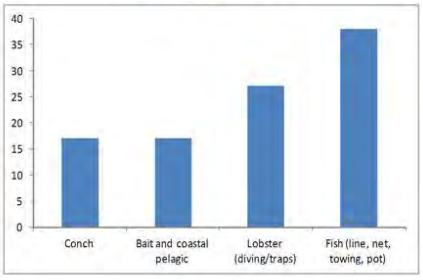
1. Planning area
2. Maps of the resources and uses
3. Priorities (or targets) for each feature
4. Compatibility of uses
5. Management efficiency

Identify marine resource & use priorities

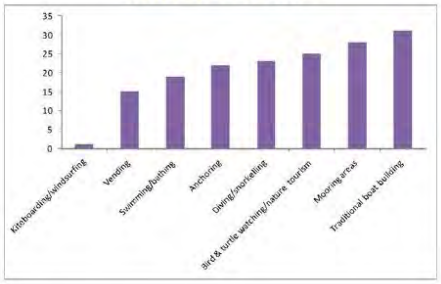
At last workshop:

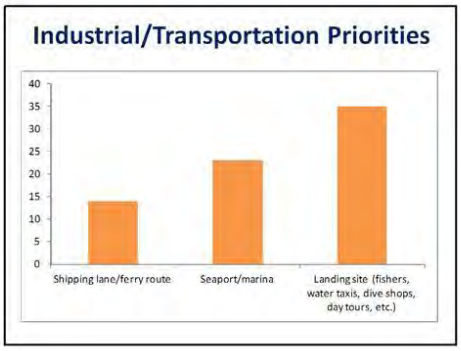
- Range of stakeholders ranked the importance of each features for each of the different zones

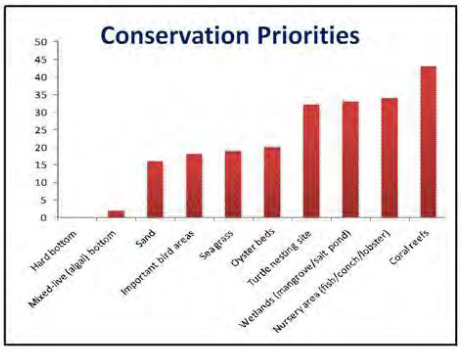
Fishing Priorities

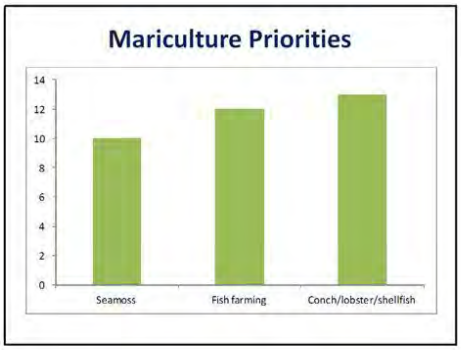


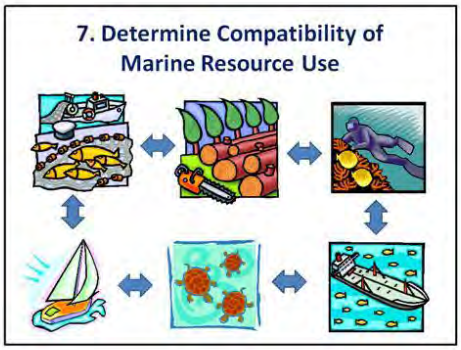
Tourism Priorities

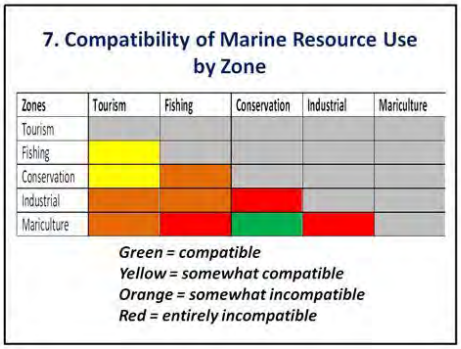


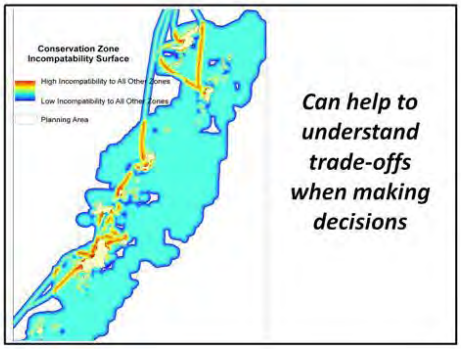

Industrial/Transportation Priorities
40
35
30
25
20
15
10
5
0
Shipping lane/ferry route
Seaport/marina
Landing site (fishers, water taxis, dive shops, day tours, etc.)


Conservation Priorities
50
45
40
35
30
25
20
15
10
5
0
Hard bottom
Mixed live (algal) bottom
Sand
Important bird areas
Seagrass
Oyster beds
Turtle nesting site
Wetlands (mangroves/salt ponds)
Nursery area (fish/conch/lobster)
Coral reefs


Mariculture Priorities
14
12
10
8
6
4
2
0
Seamoss
Fish farming
Conch/lobster/shellfish

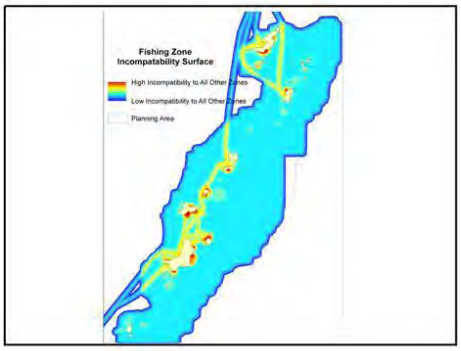

7. Determine Compatibility of Marine Resource Use

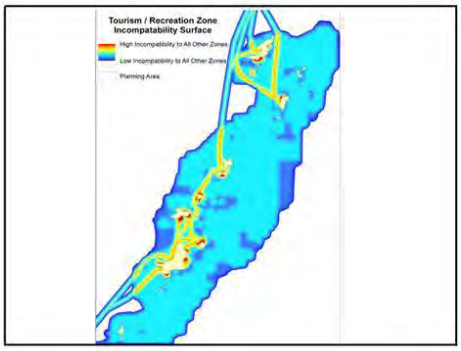

7. Compatibility of Marine Resource Use by Zone
Zones | Tourism | Fishing | Conservation | Industrial | Mariculture
Tourism
Fishing
Conservation
Industrial
Mariculture
Green = compatible
Yellow = somewhat compatible
Orange = somewhat incompatible
Red = entirely incompatible

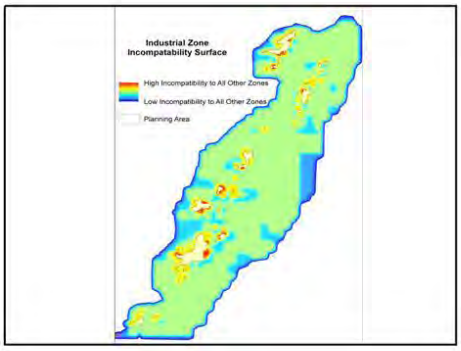

Conservation Zone Incompatability Surface
High Incompatibility to All Other Zones
Low Incompatibility to All Other Zones
Planning Area
Can help to understand trade-offs when making decisions

8

12/20/2011







Management Feasibility

- Is solution representative (or balanced)?
- Is solution equitable (or fair)?
- Are uses compatible with each other?
- Is solution manageable?

Group Exercise

Revisit your island map & zoning plan

- Is solution representative (or balanced)?
- Is solution equitable (or fair)?
- Are uses compatible with each other?
- Is solution manageable?

9

Many factors to consider in planning

- OVERALL VISION, OBJECTIVES & GOALS
- CURRENT USES & FUTURE DEVELOPMENT
- AREAS OF HIGH SPACE USE
- DETERMINE PRIORITIES
- EVAULATE COMPATABILITY OF USES
- THINK ABOUT TRADE-OFFS
- MANAGEMENT FEASIBILITY

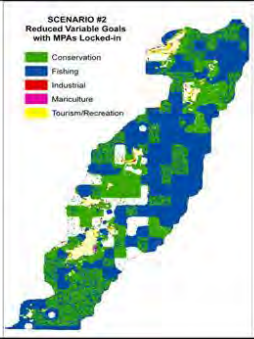
Marxan Decision-Support Tool

SCENARIO #2 INPUTS:

1. Planning area
2. Maps of the resources and uses
3. Priorities (or targets) for each feature
   - *MPAs 'locked-in'*
   - *Stakeholder goals for features*
4. Compatibility of uses
5. Management efficiency

Scenario #2

Stakeholder goals for features with MPAs locked in



Marxan Decision-Support Tool

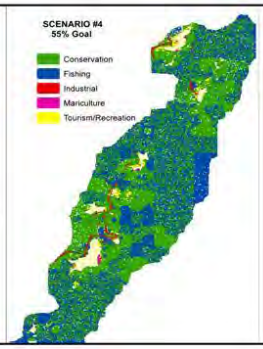
SCENARIO #4 INPUTS:

1. Planning area
2. Maps of the resources and uses
3. Priorities (or targets) for each feature
   - *55% goal - for all features*
4. Compatibility of uses
   - *Not Included*
5. Management efficiency
   - *Not Included*

Scenario #4

55% goal for all features

All features equal

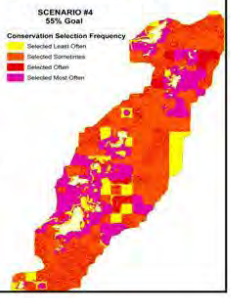


12/20/2011

Other useful Marxan outputs

Selection frequency maps

- Show how often each planning unit was chosen of 100 runs
  - Highlights priority areas
  - Can aid understanding and decision-making



Group exercise
Examine & evaluate scenarios

Benefits of each scenario

Disadvantages of each scenario

Marxan Feedback

- Advantages & disadvantages of each scenario
  - Suggestions / changes to be made
- Other options open for discussion
  - MPAs locked in?
  - Any other zones to be locked in?
  - Are goals appropriate?

Next workshop

- Areas of confusion from today?
- Concerns or unresolved issues?
- What should we present to larger group?
- Any other questions?

11

Appendix IX. Agenda for Workshop 3 held in Hillsborough, Carriacou.

Agenda – Workshop 3 Day 1: February 16th		
8:30-:8:45	Prayer and welcome	Martin Barriteau, Sustainable Grenadines (SuGren)
8:45-9:15	Opening remarks	Davon Baker, Chair, Sandy Island/Oyster Bed Marine Protected Area George Prime, Minister Carriacou & Petite Martinique Affairs
9:15-9:30	• Housekeeping • Workshop objectives and agenda • Icebreaker	Martin Barriteau, SusGren
9:30-10:15	Project Overview •What was the goal and objective •Our vision for the Grenadine Islands •Marine use and zoning •How do we make decisions Decision support tools	Kim Baldwin, University of West Indies (UWI)
10:15-10:30	Coffee Break	
10:30-11:00	What existing policy do we have to support the implementation of a zoning plan?	Sandy Nichols, Environmental Law Institute (ELI)
11:00-12:00	Sub-committee meeting update	Grenadines MRU Sub-committee members (TBD)
12:00-1:00	Lunch Break	
1:00-2:00	Review zoning scenario and discussion of potential marine zoning design	Group exercise- breakout groups, based on regions Lead: Kim Baldwin (UWI) Facilitators: Pauline Beaupre, Michelle Meganetty, Katie McLean, Aly Degraff, Martin Barriteau, Ruth Blyther
2:00-2:45	Compare zoning designs and identify areas of agreement and contention	Group exercise Lead: Kim Baldwin (UWI)
2:45-3:15	Why do we really want to happen in this zone? Discussion of the objectives of each zone	Group exercise Lead: Ruth Blyther, The Nature Conservancy (TNC)
3:15-:345	Share goals for each of the developed zones	Group exercise Lead: Kim Baldwin, UWI
3:45-4:00	Day 1 wrap-up	Martin Barriteau, SusGren

Agenda – Workshop 3 Day 2: February 17, 2012		
8:30-8:45	Prayer, welcome and housekeeping	Martin Barriteau, SusGren
8:45-9:45	Zoning definition	Kim Baldwin, UWI
9:45-10:15	Charting the way forward: Resolving remaining policy questions	Sandra Nichols, ELI
10:15-10:30	Coffee Break	
10:30-11:30	Review of maps/zoning	Group Exercise
11:30-11:45	Upcoming community meetings: How do we get support for our zoning plan?	Kim Baldwin, UWI
11:45-12:00	Implementing the zoning plan – Tasks for the working group •Needs •Resources •Potential funding sources	Ruth Blyther, TNC
12:00-12:30	The future of this project: • Monitoring and Evaluation Strategy and implementation • Communications and outreach activities • Government support & engagement/ Development of a government charter • Post-project committee	Martin Barriteau & Katie McLean, SusGren
12:30-1:00	Workshop wrap-up and evaluation	Martin Barriteau, SusGren

Appendix X. Presentation given at Workshop 3 and MRU community meetings.

Kimberly Baldwin 3/3/2012

Project Overview

Developing a Framework for a Comprehensive Marine Multi-use Zoning Plan for the Grenadine Islands

Kim Baldwin
University of the West Indies
Sustainable Grenadines Inc.

Marine resources are important to the Grenadines

- Influenced by a number of human activities

- Effective management must involve planning for use and development

- To do this we need a range of information on resources and human activities

Marine Spatial Planning (MSP)

An integrated approach to managing human activities in the marine environment

MSP is a process to develop a management strategy that accounts for multiple uses in a fair & equitable way

Aims to achieve biological, economic & social goals

Reasons for Marine Planning in Grenadines

- Increasing demand for ocean/coastal space & resources

- Single sector management not meeting multiple demands
- Grenadines Islands are 'one ecosystem'
  - Need for integrated information & regional decision making

- Preservation of livelihoods, conservation & cultural areas

Planning & management of Grenada Bank marine resources is complex

Transboundary island chain

Large diversity of resources & uses

Information not integrated between :

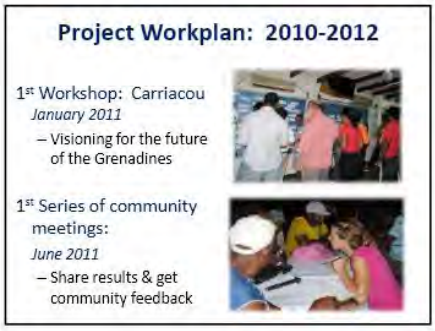
- Countries
- Government Agencies
- Knowledge Systems

STEPS IN Marine Planning

1. Gather data and information
2. Set objectives and define uses
3. Then consider uses, areas of high space use & trade-offs to identify an acceptable plan
4. Propose a draft marine multi-use plan
5. Develop legislation to support management

1

Kimberly Baldwin 3/3/2012



2

Conservation Goals

- Protect marine resources
  (critical habitats & species, nursery areas & breeding grounds)
- Protect coastal resources
  (beaches, mangroves, salt-ponds, whelks, oysters, seabird & turtle nesting)
- Protect culturally important marine areas
- Provide healthy natural resources for everyone
- Integrate land and sea management
- Build resilience to natural and man-made disasters

Fishing Goals

- Manage Grenada Bank as one area
  (and harmonized regulations across the entire bank)
- Maintain access to landing sites
- Manage access to baitfish & coastal pelagic fish
- Ensure undersized fish are not caught & nursery areas protected
- Multi-use zoning areas to include closed areas, open access and other areas where selected gear or access restrictions apply

Tourism / Recreation Goals

- Healthy coastal and submerged ecosystems, clean water & beaches for swimming, sailing, diving, picnicking, etc.
- Adequate areas for swimming and other activities
  (snorkelling/diving, sailing, wind-surfing/kite-boarding)
- Areas designated for future sustainable tourism infrastructure
- Areas where development is NOT allowed
- Ample facilities for recreational boating
  (beach and pier access, moorings)
- Free access for all beaches for locals/tourists

Transportation Goals

- Distinct identification of inter-island ferry and shipping lanes
- Marina development plan
  —identify locations where seaports & marinas may be developed in the future
  (for commercial, local & tourism purposes)

Mariculture Goals

- Identify areas of current and potential for seamoss activities
- Well managed environmentally sound mariculture industry livelihoods

5. Collect information on resources & uses

MarSIS — A Marine Resource Space-use Information System for the Grenadine Islands

Transboundary Marine Resource & Space-use Information System

– Integrates scientific information & local knowledge

www.grenadinesmarsis.com

3

Kimberly Baldwin 3/3/2012

MarSIS has information on...

Marine habitats
- reefs, mangroves, seagrass beds, beaches, rocky shores

Infrastructure
- seaports, marinas, roads, hotels, desalination plants

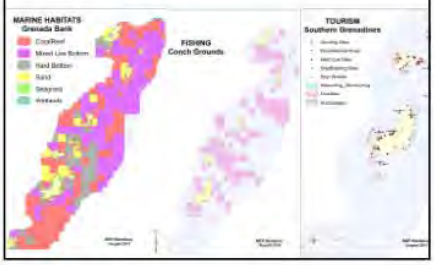
Marine resource users
- Dive shops, tourism facilities, fish landing sites, communities, etc.

Marine space-uses
- anchorages, dive sites, fishing grounds, shipping lanes, recreation areas

Sensitive biological & heritage areas
- sea turtle nesting beaches, seabird nesting sites, marine protected areas, nursery grounds, historical sites, shipwrecks

Areas of threat
- sand-mining, beach erosion, dumping, land-based sources of marine pollution, mangrove cutting

6. Map features



Workshop 2: Union – August 2011

7. Set priorities & evaluate trade-offs

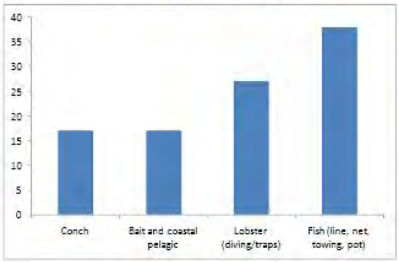
- Which features are important to communities?
  - *Keeping in mind the overall vision & goals for each zone*
- How much of each feature to set aside?
- Are uses compatible with each other?
- Is the solution balanced and fair?

Identify marine resource & use priorities

At Workshop 2:

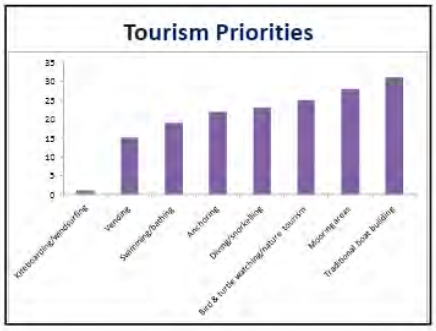
- Range of stakeholders ranked the importance of each features for each of the different zones

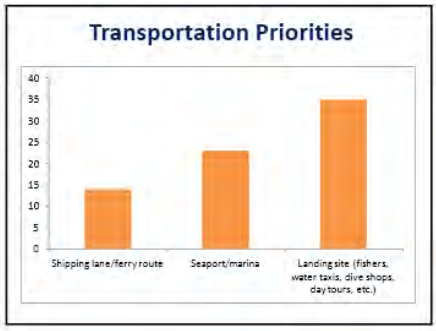
Fishing Priorities

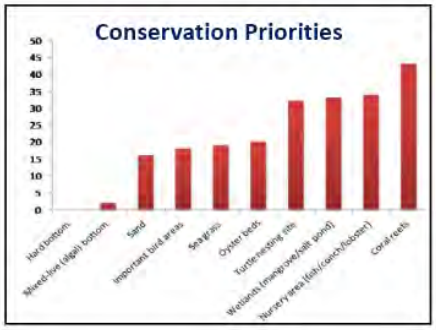


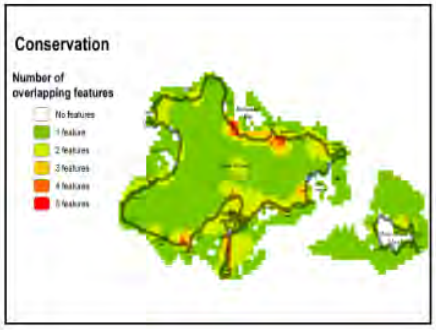
4

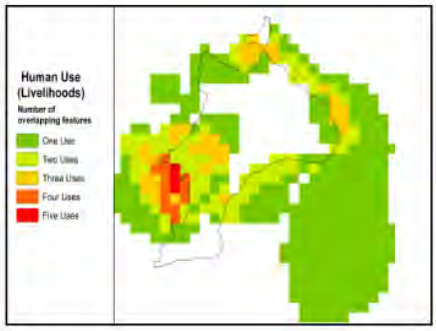
Kimberly Baldwin 3/3/2012









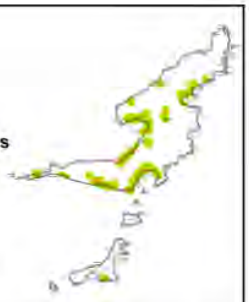


5

Threat

Number of overlapping features

- 1 feature
- 2 features
- 3 features



8. Consider Compatibility of Marine Resource Uses

8. Compatibility of Marine Resource Use by Zone

Zones	Tourism	Fishing	Conservation	Industrial	Mariculture
Tourism					
Fishing					
Conservation					
Industrial					
Mariculture					

Green = compatible
Yellow = somewhat compatible
Orange = somewhat incompatible
Red = entirely incompatible

9. Management Feasibility

- Is the plan representative of vision & goals?
- Is the plan equitable (or fair) for communities and resource users?
- Is the plan manageable?

Decision support tools can help evaluate

- Where are the most important places to represent each resource?
- How well do the options meet the different objectives?
- How comprehensive is the zoning configuration?
- How will trade-offs impact different stakeholders?

'Marxan with Zones'

Decision Support Tool

(e.g. provides maps of various options)
- *Not the final decision-maker*

- Produces solutions based on marine use goals
- Identifies tradeoffs
  - *Social vs. Environmental balances*
- Produces alternative scenarios for investigating alternative use zones

MARXAN NEEDS PEOPLE'S INPUT TO BE USEFUL

6


Grenadine Sub-Committee Meeting
• 15 Grenadine island marine resource users
– Fishers, Day tours, Divers, Yacht, Water-taxis
• Representatives from each Grenadine island
& SusGren and GIS analysts to facilitate


What did we do?
• Gain increased understanding of decision-support tools
• Review developed scenarios and maps
• Provide local feedback on input variables & scenarios
• Identify a feasible scenario to be presented to the larger stakeholder group


'Marxan with Zones' Steps
Resource Values
Features
Constraints
Set Goals
Marxan
Set input parameters
Outputs and Review
Re-Run Based on Sub-Commitee Recommendations


Workshop 3: Drafting a Zoning Design
February 16-17th Carriacou
38 stakeholders from 28 organizations across the Grenadines


Workshop 3 Objectives
• Review and provide feedback on the developed marine zoning scenario and maps
• Draft a potential draft marine multi-use zoning design
• Review existing laws & discuss legislative framework that is needed to support a marine zoning design

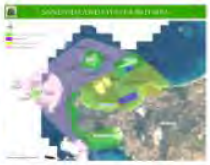
Kimberly Baldwin 3/3/2012

Proposed Marine Zones

- General Use Zone
- Conservation Zone
- Low Impact/Ecotourism Zone
- Mariculture Zone
- Transportation Zone
- Nearshore Fishing Zone
- Offshore Fishing Zone

Conservation Zone

➢ Marine Park (no-take or limited take area)
- Tobago Cays Marine Park, Sandy Island Oyster Bed MPA

General Use Zone

➢ Planned development w/limited restrictions
- Clifton, Hillsborough, Port Elizabeth



Low Impact / Ecotourism Zone

➢ Very limited land development, recreational uses and local fishing allowed
- Balliceaux, Petit Canouan, Sail Rock, Diamond Rock






Mariculture Zone

➢ Seamoss farming only (no fish farming)

Can occur inside other zones

Transportation Zone

➢ Shipping lanes, landing sites, seaports, marinas





8

Kimberly Baldwin 3/3/2012

9


Proposed Marine Zones


Proposed Marine Zones


Thank you
Questions/Comments
Kim Baldwin
784-454-0606
CERMES - UWI
baldwin.kimberly@gmail.com
www.grenadinesmarsis.com

3/3/2012

Marine Zone Examples

Seaflower Marine Protected Area

1) **no-entry**, with use restricted to research and monitoring
2) **no- take**, allowing a variety of non-extractive uses
3) **artisanal fishing**, for use by traditional fishers only
4) **special use**, for specific uses like shipping lanes, large- vessel anchorage, ports, and marinas or uses with the potential to generate conflict like heavily used water sports areas
5) **general use**, where minimal restrictions apply to preserve MPA integrity and promote marine conservation

Great Barrier Reef Zones

Belize - South Water Caye Marine Reserve

- **General Use Zone** - is restricted to fishing by licensed fisherman in accordance with these Regulations. No use of long lines, spear–guns or gill nets; no set or drag any anchor in coral
- **Conservation Zone** - only non–extractive recreational activities. Only moorings used. Every diver shall adhere to the following rules: local dive guides, low wake, 8 divers/boat, no motorized sports.
- **Preservation Zone** - No fishing, sport fishing, diving or any other water activity shall be permitted

Grenadine Proposed Zones

- **Conservation:** Marine Protected Area - mostly non-extractive uses
- **Fishing:**
  - **Offshore** (no industrial fishing, for use by local fishers only)
  - **Nearshore** (fisheries management area: for example some gear restrictions & seasonal closures)
- **General use** (planned development w/limited restrictions)
- **Low impact/Eco-tourism** (no/very limited land development, recreational uses and local fishing is allowed)
- **Transportation:** shipping lane, seaports, landing sites
- **Mariculture:** seamoss (no fish farming)

Appendix XI. Project update flyer for the first draft of the marine zoning design for the Grenadine Islands.

SUSTAINABLE GRENADINES INC.
(SusGren)
SUSTAINABLE INTEGRATED DEVELOPMENT AND BIODIVERSITY CONSERVATION IN THE GRENADINE ISLANDS

1

Planning the Future of Marine Resources in the Grenadines: Marine Multi-use Zoning Project Update, February 2012

Introduction: Multi-use Zoning Project

The project will result in an ecosystem scale draft zoning design for the Grenadines, which can serve to facilitate effective management of marine resources and reduce conflicts between multiple marine uses/users.

There are three project objectives:

Objective 1. develop a draft multi-use zoning design for the Grenadines using new and existing information in order to increase Grenada and Saint Vincent and the Grenadines capacity to protect, use the resources of the Grenadines.

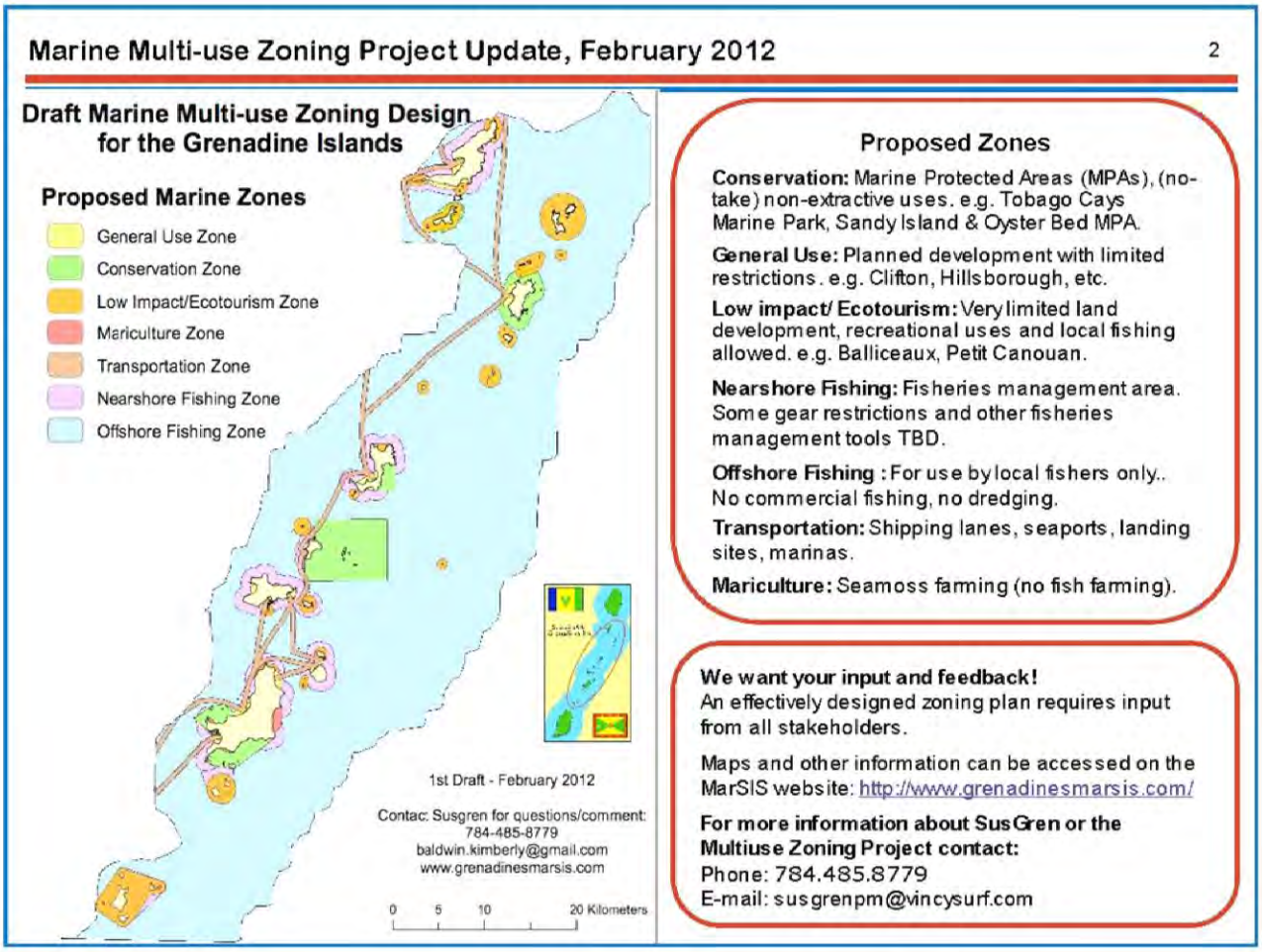
Objective 2. Identify and document policy and legislative gaps and draft policies for multi-use zoning collaboration and coastal zone management for the Grenadines.

Objective 3. Design an awareness campaign to support multi-use zone planning on the importance and economic values of the Grenadines' coastal and marine resources.

Participants at Workshop 3, Carriacou GR, Feb. 17

This project has been ongoing for the past 18 months and has included a wide variety of stakeholders in the process.

We are currently running a series of community meetings across the Grenadines to discuss the draft zoning design (see reverse) with any interested stakeholders.


Marine Multi-use Zoning Project Update, February 2012
2
Draft Marine Multi-use Zoning Design for the Grenadine Islands
Proposed Marine Zones
General Use Zone
Conservation Zone
Low Impact/Ecotourism Zone
Mariculture Zone
Transportation Zone
Nearshore Fishing Zone
Offshore Fishing Zone
1st Draft - February 2012
Contac: Susgren for questions/comment:
784-485-8779
baldwin.kimberly@gmail.com
www.grenadinesmarsis.com
0 5 10 20 Kilometers
Proposed Zones
Conservation: Marine Protected Areas (MPAs), (no-take) non-extractive uses. e.g. Tobago Cays Marine Park, Sandy Island & Oyster Bed MPA.
General Use: Planned development with limited restrictions. e.g. Clifton, Hillsborough, etc.
Low impact/ Ecotourism: Very limited land development, recreational uses and local fishing allowed. e.g. Balliceaux, Petit Canouan.
Nearshore Fishing: Fisheries management area. Some gear restrictions and other fisheries management tools TBD.
Offshore Fishing : For use by local fishers only.. No commercial fishing, no dredging.
Transportation: Shipping lanes, seaports, landing sites, marinas.
Mariculture: Seamoss farming (no fish farming).
We want your input and feedback!
An effectively designed zoning plan requires input from all stakeholders.
Maps and other information can be accessed on the MarSIS website: http://www.grenadinesmarsis.com/
For more information about SusGren or the Multiuse Zoning Project contact:
Phone: 784.485.8779
E-mail: susgrenpm@vincysurf.com

Appendix XII. Media press release for the MRU and community island meetings

COMMUNITY MEETINGS:
Planning the Future of Marine Resources of the Grenadines

The Sustainable Grenadines Inc. invites marine resource users (fishers, cruisers, dive shop operators, day tour operators, water taxi operators, ferries etc.) and community members to take part in a series of community meetings to review the recently drafted marine multi-use zoning plan for long-term management of the marine and coastal resources of the Grenadine Islands. The meetings are a follow-up to a regional workshop held in Hillsborough, Carriacou on February 16th and 17th to develop a 'Marine Multi-Use Zoning Plan for the Grenadines'. This 18-month project has brought together a number of Grenadine marine resource users, government officials, academics and community-based organizations to work together to develop a potential marine multiuse zoning design for the Grenadine Islands and is funded by National Oceanic and Atmospheric Administration (NOAA), the Global Environment Facility Small Grants Programme (GEF SGP) and The Nature Conservancy (TNC).

The development of a marine multiple-use zoning plan is important to guide sustainable development of the Grenadine Islands shared between the nations of Grenada and St. Vincent and the Grenadines. The zoning plan also supports the goals of both countries' National Biodiversity Strategic Action Plans and will enable the countries to meet their obligations as a signatory to the OECS St. Georges' Declaration and the UN Convention on Biological Diversity.

Informative community meetings are scheduled to take place from February 20th – March 4th 2012 across the islands of the Grenadines. These community meetings will involve: an introduction to the project; sharing of the project components; and discussion to obtain community feedback on the collaboratively developed marine multi-use zoning design. All are welcome to attend and learn more about this important project.

The tentative schedule for these community meetings begin at **6:30pm** as follows:

February 20th – Union Island, Clifton – Eagle's Nest
February 21st – Union Island, Ashton – Lassie's
February 23rd – Carriacou, Harvey Vale – Lambi Queen
February 24rd – Carriacou, Hillsborough – Regatta Jupa
February 25th – Petite Martinique -
February 27th – Mayreau – Combination Café
February 28th – Canouan, Friendship - Fishing Camp (2 pm)
February 28th - Canouan - Nasa's
March 1st – Bequia, Port Elizabeth – Hibiscus Bar (Baje)
March 2nd – Bequia, Paget Farm – Step Down
March 3rd - Mustique – Fishing Camp (2 pm)
March 4th – Mustique – Lisa's - Lovell Village

This project is being implemented by SusGren with funding from National Oceanic and Atmospheric Administration (NOAA), The Nature Conservancy (TNC) and the Global Environment Facility Small Grants Programme (GEF SGP). For more information please contact Kim Baldwin (baldwin.kimberly@gmail.com, telephone 784.454.0606) or SusGren (susgrenpm@vincysurf.com, telephone 784.485.8779).