

Participatory mapping of heritage sites in the Grenadine Islands

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ACRONYMS

CaMPAM	Caribbean Marine Protected Areas Management
CCA	Caribbean Conservation Association
ESRI	Environmental Systems Research Institute
GIS	Geographic Information System
GPS	Geographic Positioning System
GRE	Grenada
IPN	<i>Institut Pédagogique Nacional</i>
KML	Keyhole Mark-up Language
KMZ	Keyhole Mark-up language Zipped
MarSIS	Marine resource and Space use Information System
MPA	Marine Protected Area
MRU	Marine Resource User
NGO	Non-Governmental Organisation
OAS	Organization of American States
PDF	Portable Document Format
PGIS	Participatory Geographic Information System
PM	Petite Martinique
PSV	Petit St. Vincent
SIOBMPA	Sandy Island Oyster Bed Marine Protected Area
SusGren	The Sustainable Grenadines Inc.
SVG	St. Vincent and the Grenadines
TCMP	Tobago Cays Marine Park
TNC	The Nature Conservancy
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
UWI	University of the West Indies (Cave Hill Campus, Barbados)
WH	World Heritage
WHS	World Heritage Site

1 INTRODUCTION

1.1 History of the Grenadines

The transboundary Grenadine Island chain consists of over fifty islands, islets and cays (nine of which are inhabited) shared between the two countries of St. Vincent and the Grenadines (SVG) and Grenada (GRE). The archipelago is located at the southern end of the Lesser Antilles chain on the eastern border of the Caribbean Sea, beginning south of the island of St. Vincent and extending to the north of the island of Grenada (Figure 1.1). These volcanic islands

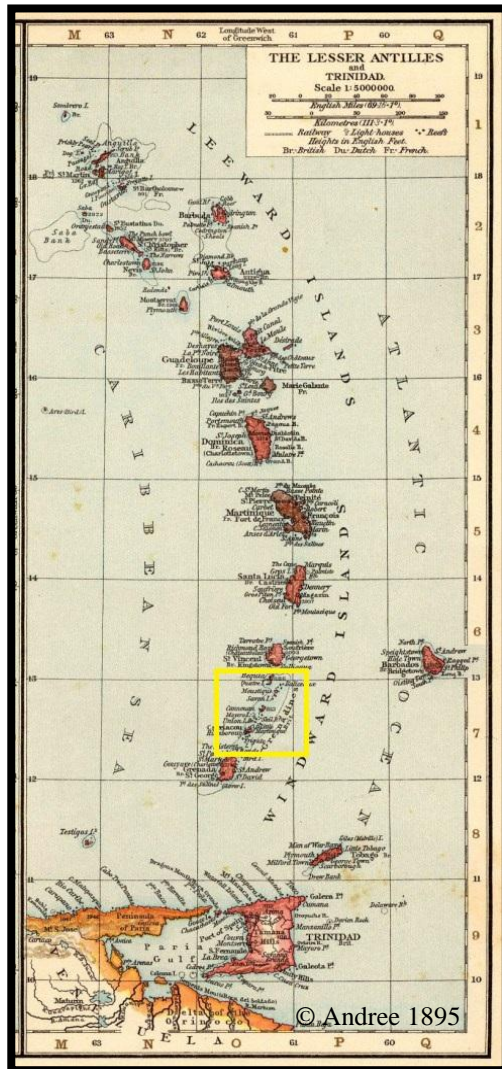


Figure 1.1 Map of Grenadines within the Lesser Antilles

were first inhabited by the hunter-gatherer Ortoiroid people from northern South America as early as 5400–3000BC who left remnants of their voyages in the form of petroglyphs on the islands of Canouan and Petit St. Vincent (Daudin 2009). Between 400BC and 1200AD, at least four waves of the horticulturist Arawak people moved through the Grenadines. The last Amerindian people to arrive in the Grenadines pre-colonialism were the Caribs or Kalinas/Kalinagos, emanating from the lands now divided between the countries of Guyana and Venezuela. The Caribs inhabited the entire Lesser Antilles chain for almost 500 years, through the 1700s, using their warrior skills to prevent the colonisation of the Grenadines (particularly St. Vincent) for longer than the majority of the other islands in the eastern Caribbean.

In the middle of the seventeenth century, the first Europeans in the archipelago were the French who fought for control of the islands against both the British and Caribs. The islands went back and forth between France and Britain with frequent concessions being made in order to keep open the trade of indigo, cotton, and sugar from the slave plantations (Daudin 2009). In 1783, the Treaty of Versailles recognised both St. Vincent and the Grenadines and Grenada as British colonies. The Caribs at this point were a mixed-race of

shipwrecked and runaway African slaves called Black Caribs or Garifuna (de Silva 2010). In 1797, the last of the Black Caribs (minus a small community in the Upper Massarica Valley in St. Vincent) were rounded up and exiled, first on the Grenadine island of Baliceaux and then on Roatán Island, off the coast of Honduras. The couple hundred Yellow Caribs (those without any African ancestry) who had not partaken in the drawn out hostilities were relocated to a reservation in Old Sandy Bay, St. Vincent (Kirby 2004). In 1834, slavery was abolished and the plantation agriculture turned to sharecropping. Isolated in the Grenadines, the African peoples had fewer options for migration and found themselves required to give up large percentages of the proceeds from their farming, fishing, and animal breeding to the European land owners. It

was not until the early 1900s that the former slaves in the Grenadines were finally allowed to own their own lands (Daudin 2009). While Grenada gained independence in 1974, followed soon afterwards by St. Vincent and the Grenadines in 1979, the inhabitants of Mayreau had to wait until 1986 for the right to own their own land (Saul-Demers 2010).

1.2 Geography of the Grenadines

The archipelago is of significant ecological importance due its' extensive coral reef (the largest in the Eastern Caribbean) and related coastal marine ecosystems, endangered and endemic wildlife (four bird species endemic to SVG and GRE, one lizard endemic to Union Island, and the critically endangered Leatherback sea turtles) (CCA 1991). The islands have a growing tourism industry that, coupled with the increasing needs of the local population and limited environmental controls, have led to pollution, deforestation, overfishing, and overall marine and land ecosystem degradation (CCA 1991 a, b; Price and Price 1998; FAO 2002; ECLAC 2004; Mahon et al. 2004; SusGren 2005; FAO 2007; Williams 2008; Lee 2009; Turner 2009; Price 2011). The creation of the Tobago Cays Marine Park (TCMP) in 1998 and the newly established Sandy Island Oyster Bed Marine Protected Area (SIOBMPA) in 2010 provide significant efforts towards preserving coastal and marine habitats. However, in order to protect the ecosystem function of the Grenadine Islands and the Grenada Bank, a wider approach to conservation planning and the sustainable development of resources is necessary (SusGren 2005). A comprehensive strategy or an ecosystem approach to management, which considers both natural and human elements and their interactions, is recommended (Baldwin 2012).

Each Grenadine island, islet, and cay in the transboundary archipelago lies, at the furthest, only 10 km from the next. These relatively small inhabited islands range from 32 km² (e.g. Carriacou) to less than a square kilometre in size (Palm and Petit St. Vincent) in comparison to the respective mainlands of Grenada and St. Vincent (340–344 km²). Historically, culturally, and ecologically the Grenadines have significantly more in common with one another than their larger mainland neighbours to the north and south (SusGren 2005). The unique heritage of these islands is, however, rapidly disappearing. “50% of the youngsters do not know their immediate island environment, as much historically as naturally speaking ... it is time to promote ... folklore groups perpetuating not only the tradition and the culture that are proper to the island but which can also be a supplementary tourist attraction” (Daudin 2009). As Daudin goes on to discuss, the tourism industry needs to be made more aware of the rich heritage that each island possesses and recommends that tourists invest in the place they are visiting through educational tours explaining the history of the islands.

1.3 UNESCO World Heritage Convention

The United Nations Educational, Scientific, and Cultural Organisation's (UNESCO) mission is to encourage international cooperation in the conservation of the world's cultural and natural heritage and to achieve a balance of sustainable development and environmental preservation (UNESCO 2012). Under the World Heritage Convention, UNESCO has designated sites such as the Belize Barrier Reef Reserve System and St. Lucia's Piton National Park in the Wider Caribbean region. World Heritage Site (WHS) designation seeks to: protect natural and cultural heritage by supporting the establishment of management plans and evaluation; provide technical assistance and professional training; offer emergency assistance for sites in immediate danger; support public awareness-building activities for conservation; and encourage the participation of the local population in preservation efforts thereby harnessing international cooperation of

conservation (UNESCO 2012). Achieving a WHS designation would give St. Vincent and the Grenadines and Grenada international status, which can inspire tourism, particularly ecotourism, as well as protect the environment and heritage.

In 2006, Dr. Georgina Bustamante, Coordinator of the Caribbean Marine Protected Areas Management (CaMPAM) Network and Forum, wrote a proposal for UNESCO on potential World Heritage Sites (WHS) in the Caribbean, in which the Grenadines were listed as one of the top ten sites (Figure 2.1). Dr. Bustamante states that the use of the World Heritage Convention is “an international tool to promote the effective management of individual or serial marine protected sites in this eco-region may have a notable impact on marine resources restoration of the entire eco-region” (Bustamante 2006). Despite the potential of the Grenadines as a WHS, Table 1.1 highlights the feasibility factors affecting the nomination of potential new WHS of marine, coastal and small island natural value. Bustamante states difficulties of working in the Grenadines, specifically the presence of low management capacity and government attention. Notwithstanding this, she discusses that a result of WHS designation is an increase in management capacity. At present, the two countries are in process of submitting a joint application to designate the Grenadine Islands as a transboundary mixed (natural and cultural) marine heritage site (SusGren 2011), of which there are only four in existence.



Figure 1.2 Map of current UNESCO World Heritage Sites in the Caribbean

Table 1.1 Feasibility factors affecting the nomination of potential WHS of marine, coastal and small island natural value

Proposed Site <i>(new or expansion of an existing)</i>	Management Capacity	Level of Knowledge of Ecosystems	Local Attention	Government Attention	International Attention
Transboundary Grenadine Islands (St. Vincent & the Grenadines and Grenada)	Low	low	high	low	high

(Source: Bustamante 2006)

1.4 The Sustainable Grenadines Inc.

A civil-society organisation, the Sustainable Grenadines Inc. (SusGren), was founded in 2002, and in 2010, transitioned into a transboundary non-governmental organisation (NGO). SusGren's goal is the conservation of the coastal and marine environment and sustainable livelihoods of the people of the Grenadine Islands, in which its mission is to strengthen the capacity of community groups for self-governance, the protection of biodiversity, and the conservation of natural resources (SusGren 2012). As a transboundary NGO, SusGren has been working as a bridging organisation to assist the management of marine and coastal resources and the preservation of the cultural and ecological heritage of the Grenadine Islands. In 2005, SusGren began to express interest in the importance of the Grenadines as a transboundary marine mixed (natural and cultural) UNESCO WHS to aid the protection of the natural environment and cultural heritage of the archipelago (SusGren 2005). Accordingly in 2009, SusGren held a WHS workshop in St. Vincent to discuss the importance and feasibility of such a designation (SusGren 2009).

In June 2011, the "Grenadine Islands" was one of the two projects proposed by the Latin American and Caribbean Group (GRULAC) to undertake a pilot project to identify options and prepare dossiers for nomination as an UNESCO WHS. This is part of the experimental "Upstream Process" which seeks to reduce the number of locations that experience significant problems with their nomination. In July 2012, two official evaluators from UNESCO spent a week in the Grenadines and discussed which unique Grenadines features to focus on in the proposal.

1.5 Management environment of the Grenadine Islands

Over the past twenty years, there has been a shift in environmental management as scientists have acknowledged the importance of incorporating social and economic information with conventional scientific approaches (Berkes et al. 2001; Bunce and Pomeroy 2003). To do this, CERMES, UWI partnered with SusGren, to assist in the integration of existing environmental information on coastal and marine resources (Blackman et al. 2006) and to develop a transboundary marine and coastal resource and space-use information system. The Grenadines Marine Resource and Space-use Information System (MarSIS) (www.grenadinesmarsis.com), led by Dr. Kimberly Baldwin as part of her Ph.D. research, utilised a Participatory GIS (PGIS) approach (Baldwin 2012). Therefore the MarSIS was developed with the aim of supporting informed environmental decision-making and planning of the Grenadine Islands coastal and marine resources. The MarSIS is unique in that it merges local knowledge with conventional scientific information and is publically accessible. The MarSIS and the application of a PGIS

approach included the use of participatory mapping with local resource users. Participatory mapping is a cartographic process (i.e. maps, photos, imagery) used to solicit and incorporate local knowledge in the data collection process to create understandable and appropriate information for a wide range of stakeholders (IFAD 2009). The process of participatory mapping and the construction of a PGIS seek to provide a wider information base for decision-making and to illustrate the connection between the environment, its uses, and the local knowledge of resource users through the language of cartography (Corbett et al. 2006). Another tenet of PGIS is the collaborative collection and validation of data with stakeholders including communities, NGOs and governments (Baldwin 2012). This process can be empowering in that it can show the involved stakeholders the importance of their knowledge and allow for critical analysis of their environment (Slocum 1995). This participatory approach also allows stakeholders to see the role they can play in the planning and decision-making process, thereby building ownership in the information generated, and serving to strengthen participation in governance (Corbett et al. 2006).

The Grenadines MarSIS and the Grenadines Annotated Bibliography provide a solid foundation for a WHS designation; however an identified data gap is the documentation of the terrestrial resources and cultural landmarks (K. Baldwin pers. comm.). Accordingly, the goal of this study was to expand the MarSIS database with the collection of local knowledge of key terrestrial resources, namely important historical, cultural, and ecological heritage sites, through the use of participatory mapping and validation exercises.

2 METHODS

The study area consists of the islands and cays of the Grenadines, south of St. Vincent extending to the north of Grenada, including the islands of Bequia to Petit St. Vincent (SVG) and Carriacou to Isle de Caille (GRE) (Figure 2.1).

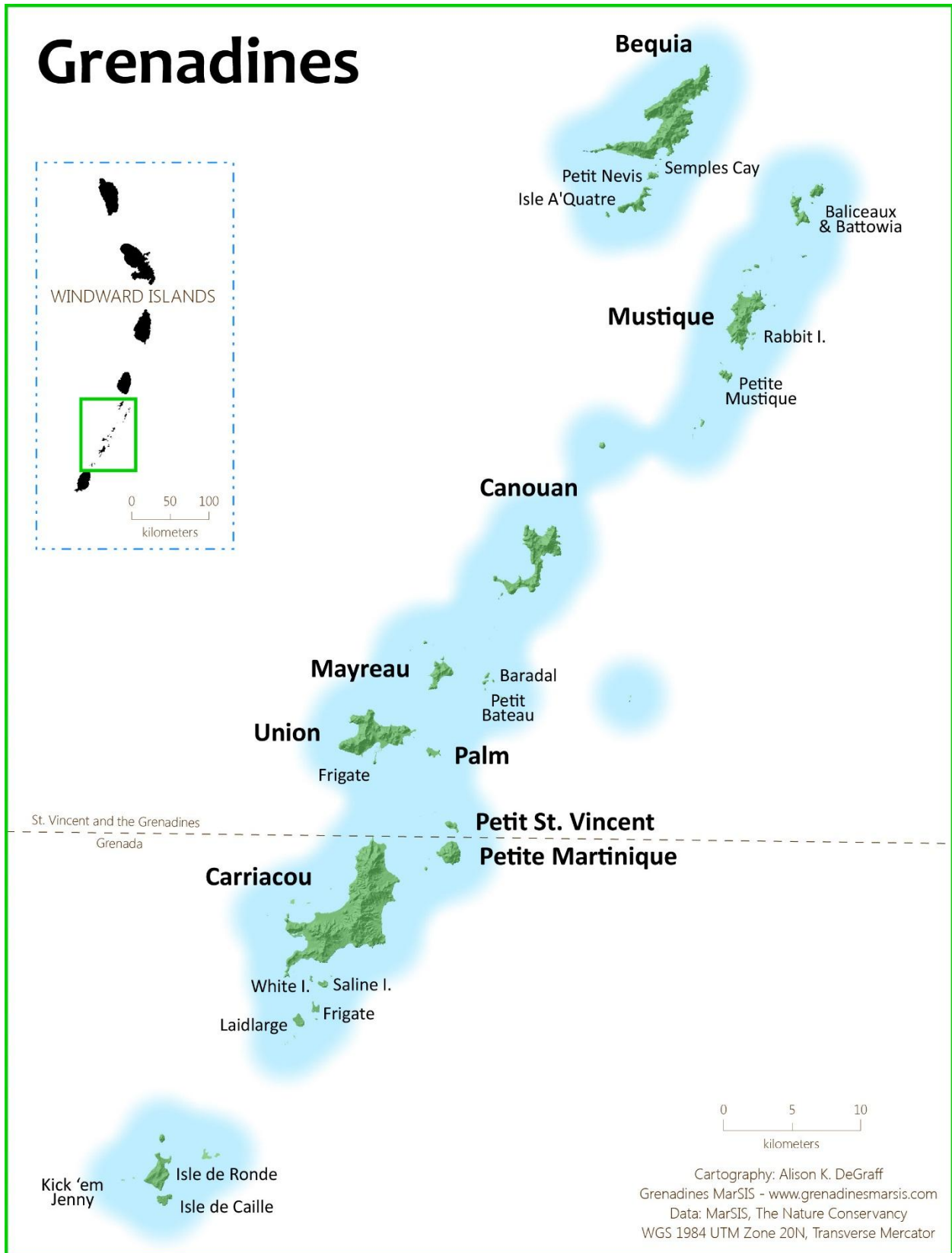


Figure 2.1 Map of Grenadine Islands where heritage sites are located

Sites were located on 26 Grenadine Islands, including the nine inhabited islands highlighted on the following tables (Table 2.1, Table 2.2, Table 2.3).

Table 2.1 Approximate size of relevant islands and cays of the northern Grenadines (SVG)

Bequia	Semples	Petit Nevis	Isle de Quatre	Baliceaux	Battowia	Mustique	Petite Mustique	Rabbit
16km ²	0.01km ²	0.3km ²	1.5km ²	1.4km ²	0.6km ²	5.6km ²	0.5km ²	0.04km ²

Table 2.2 Approximate size of relevant islands and cays of the central Grenadines (SVG)

Canouan	Mayreau	Petit Bateau	Baradal	Union	Frigate	Palm	PSV
7.5km ²	1.8km ²	0.08km ²	0.03km ²	8.5km ²	0.07km ²	0.4km ²	0.4km ²

Table 2.3 Approximate size of relevant islands and cays of the southern Grenadines (GRE)

Carriacou	PM	Saline	White	Frigate	Laidlodge	Isle de Ronde	Isle de Caille	Kick 'em Jenny
32km ²	2km ²	0.3km ²	0.05km ²	0.3km ²	0.5km ²	2.6km ²	0.6km ²	0.2km ²

The research was completed over a one year period (June 2011–July 2012), starting with a data inventory. Next, participatory mapping exercises were conducted with respective community members to document information on the terrestrial-based heritage sites of each Grenadine Island. The list of features and attributes to be collected was based on SusGren’s ‘Characteristics of the Grenadines Displaying Outstanding Universal Value’ chart (SusGren 2011). Over the course of the research, together with discussions with community members and feedback from community meetings, data to be collected was grouped into historical, cultural, and ecological sites and subdivided into attributes as listed in Table 2.4.

Table 2.4 Geodatabase attributes for heritage sites: historical, cultural, and ecological sites

HISTORICAL SITES						
Archaeological Sites	Burial Grounds	Colonial Defences	Early Agro-Processing	Historic Buildings	Ruins	Windmills
Archaeological Dig	Cemetery	Fort	Indigo	Building	Building	Windmill
Shell Median	Gravesite	Coastal Battery	Lime	Church	Church	Wind Turbine
Pottery			Sugar		Estate House	
Work Stone			Cotton		Slave Quarters	
			Storeroom		Road	
			Oven		Bridge	

CULTURAL SITES			ECOLOGICAL SITES			
Cultural Sites	Whaling	Museums	Ecological Sites	Geologic Features	Water Sources	Viewpoints
Regatta	Whaling Station	Historic	Tree	Volcanic	Well	Viewpoint
Festival		Maritime	Garden	Rock Formation	Cistern	
Ceremony			Trail	Cave	Pond	
Music					Manmade Pond	

2.1 Preliminary assessment

A preliminary assessment was conducted through a literature review of articles and books about the Grenadines found in the SusGren Grenadines Bibliography (Blackman et al. 2006) or the internet. Next key informants were identified based on prior participants of MarSIS research meetings (Baldwin 2006; 2008; 2011), or as recommended by SusGren and interviewed. Project objectives were sent as email announcements using both the MarSIS Yahoo e-group (grenadinesmarsis@yahoogroups.com) and the SusGren Yahoo e-group mailing list (susgren@yahoogroups.com), as well as to individuals identified as potential participants. Other stakeholders were contacted via mobile phone, word of mouth, or by personal contact based on the recommendation of informants. A list of participating stakeholders is provided (Appendix V).

2.2 Data collection

Mapping exercises were conducted as interviews (either with individuals or in small groups) in public places. Additionally, field visits were conducted to the actual site locations (accessibility permitting). To start each mapping exercise, participants were provided with the list of heritage features Table 2.5 Number of site visits (of 1-3 days) to inhabited islands and each type of heritage feature (Table 2.4) was carefully explained. Next, participants were shown two base maps. One map was a georeferenced aerial image of the island, and the second map was a simple island coastline map annotated with the local names of coastal/island features, topographic contours, water bodies, roads, building footprints, mangroves, and beaches (Figure 2.2). Stakeholders were then asked to locate features of interest on their respective islands. Additionally participants were asked to validate the locations of mangroves (based on data provided from MarSIS 2012 and TNC 2006) and, when applicable, important bird areas (data provided by BirdLife 2011) to allow for improvements to these datasets and for inclusion in the final maps (Appendix III).

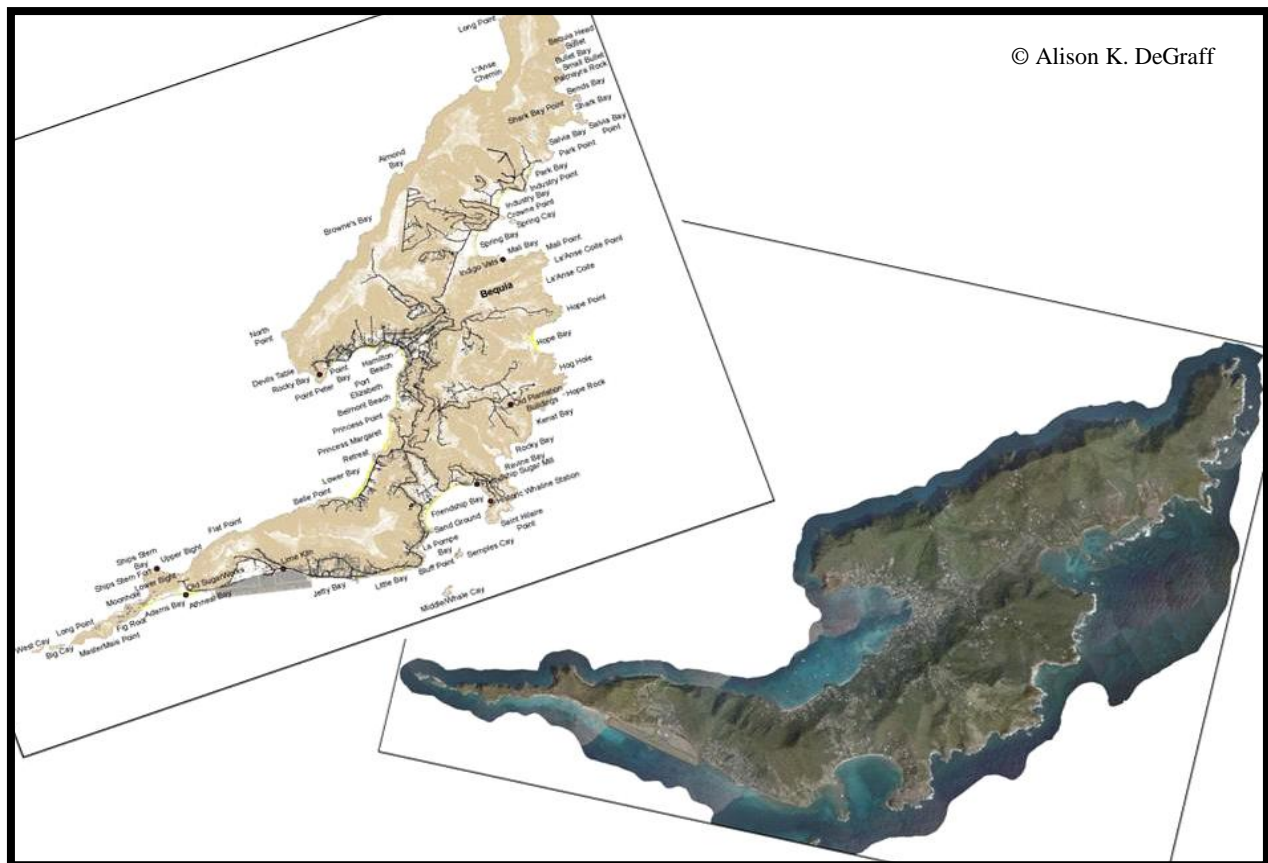


Figure 2.2 Mapping exercise base maps for Bequia

A snowball sampling technique was used to locate additional participants who may have knowledge of the islands' heritage sites. Each participant was asked whom else they would recommend as knowledgeable about a specific site or who could expand on the history and culture of the island. Data collection included between one and six visits per inhabited island

(dependent on island size, length of stay, and number of sites) to assure that a range of stakeholders had the opportunity to discuss and share their knowledge and concerns (Table 2.5).

Table 2.5 Number of site visits (of 1-3 days) to inhabited islands

Bequia	Mustique	Canouan	Mayreau	Union	Palm	PSV	PM	Carriacou
4	1	2	2	6	1	1	1	3

N.B. In addition, the uninhabited cays of Baradal (SVG), Petit Bateau (SVG), Frigate (SVG), Saline (GRE), and White Island (GRE) were also visited.

Initially data was collected with approximate locations drawn on the base map as the knowledge of the participant permitted. Next, a field survey was undertaken with individuals with knowledge of the exact locales of the sites so that each site could be georeferenced with a Garmin 72H global positioning system (GPS) device (Figure 2.3). At each site, pictures were taken using a Canon EOS 10D and Nikon Coolpix AW100. Furthermore when possible, any information on the history and dates associated with each site were collected; however only a few participants had this specialised knowledge. During each field survey between one and twenty sites were georeferenced. Typically each field survey included one to four community members, who were either knowledgeable of the location of the sites or were simply curious to learn more about the natural and cultural history of their island.

2.3 Community validation meetings

From February–March 2012, a total of 12 community validation meetings were held across the Grenadine Islands to present the collected data to the wider community, request further information on missing heritage data, and identify other potential key informants. Depending on the population size, one or two meetings took place on each island. Meetings were held during the early evening in public places (i.e. restaurants and local hangouts such as rum shops) where a wide range of people would feel comfortable and could easily walk in off the street. Hence, community buildings and schoolrooms were avoided as previous research (Baldwin 2006; 2008) found that many stakeholders felt uncomfortable attending meetings in such formal settings and typically resulted in very low attendance amongst community members. In the cases where it made sense to hold separate meetings to accommodate fishermen (e.g. Bequia and Mustique), meetings were held at the fishing camps after the men had returned from the sea.

At each of the community validation meetings, participants were given a short presentation on the purpose of the research, data collection methods, and the use of data/access (Figure 2.3). Next stakeholders were then given printed maps and asked to review the draft heritage map for their respective island. These maps, created using ESRI ArcGIS 10 and Adobe Illustrator CS5, represented each inhabited island and their surrounding cays and included reference features (roads, beaches, local toponyms, etc.) and heritage sites (Appendix IV). In conclusion, the meetings were opened for group discussion and feedback was recorded as facilitators walked around the room to talk to groups of people and clear any confusion in the map interpretation process.



Figure 2.3 Community meeting on Petite Martinique, February 25, 2012

2.4 Final geodatabase and mapping products

GPS data points were downloaded using the Minnesota Department of Natural Resources (DNR) Garmin application. Data was attributed by: site name, type of site, file, method of collection, island, country, latitude, and longitude. Sites that were unreachable were marked as accurately as possible and noted in the metadata either as ‘not geo-referenced’ or ‘validated’ (if accurately placed via satellite imagery). Sites that were located via GPS, were marked with the time and date the point was collected. The geo-referenced data was then overlain with local toponyms (place names), roads, trails, building footprints, airports, beaches, mangroves, important bird areas, seabird breeding sites, water bodies, coastlines, and hillshades to produce the ‘Grenadines Heritage Maps’.

2.4.1 Map production

To allow for widespread understanding, it is seen to be important to present the information in an accessible format (IFAD 2009). For example, local toponyms, beaches, building footprints, roads and other important features were included to give heritage sites local context within each island. Aerial imagery was also added to the background of the maps to provide texture to the hillshade without overwhelming the audience with unnecessary detail.

The final maps were created (using a combination of ArcGIS and Adobe Illustrator applications) and critiqued by professional cartographers (from National Geographic and ESRI). Next, the maps were converted into portable document format (.pdf) files and uploaded to the MarSIS website to provide easy public access. In October and November 2012, the final ‘Grenadines Heritage Maps’ were distributed as hardcopies in the islands of Bequia, Canouan, Mayreau, Union, Petite Martinique, and Carriacou. One large poster map of each island was also laminated and posted in a public location (determined by participating community members) on each island.

2.4.2 Google Earth

Data was converted from GIS to Google Earth as keyhole mark-up language zipped (.kmz) files to allow for wide public access via the Grenadines MarSIS website. The Google Earth

application had been used previously as a free and interactive format to view the MarSIS (Stewart and Baldwin 2012). The Google Earth application allows stakeholders and other interested parties the ability to zoom in and pan around the islands as well as view each heritage site individually. Google Earth also allows georeferenced photography of each site to be attached. To do this, individual shapefiles were exported as keyhole mark-up language (.kml) files and assembled in Google Earth using a free ESRI tool 'Export to KML.' This allowed for the transfer of attribute data associated with each site as an attribute pop-up window in Google Earth. To spatially reference pictures, they were uploaded to a photo sharing website (Google Picasa) and then web link URLs were added to a new field (in the attribute table) before exporting as .kml.

2.4.3 Other interactive datasets

Mapmaking today encourages the use of interactive datasets, especially those accessible directly from an internet browser. In this case, we used two of the most popular free sites: MapBox and CartoDB to integrate the heritage data and photographs. Similar to Google Earth, these programs allow users to zoom in and out, click on the sites to read more about them, and to view photographs. The MapBox interactive map also differentiates between historical, cultural, and ecological sites by colour and shape of the points to make it easier for the audience to get a quick sense of what information they are looking at.

2.4.4 Public access to information

All of the maps are available for download at the MarSIS website (www.grenadinesmarsis.com/Files_and_Maps.html) which includes all of the previously collected data, documents and maps resulting from the MarSIS-related research. Map downloads, photographs, interactive maps, a conference presentation, and a radio interview can also be found on (<http://grenadinesheritage.tumblr.com>).

Additionally, a summary of the project and data is to be published as a National Geographic GeoStory. This is a new platform that combines geolocated multimedia in order to tell a story. Through the combination of maps, photos, and narratives, the audience is able to take a virtual tour of the Grenadines and explore some of its compelling sites. This map-enabled slideshow will be published on the National Geographic Education website, embedded on the MarSIS website, and shared with the Grenadines communities via the MarSIS Yahoo Groups list serve and other pertinent social networking sites when available. While not comprehensive of all sites, the GeoStory will provide viewers a glimpse of this study and serve to draw international awareness to the preservation of the heritage and ecology of the Grenadine Island archipelago.

3 RESULTS AND DISCUSSION

During the study it became apparent that each island and each group of community members had different points of view on what sites are considered to be 'important' on their islands. As the research was community-based, stakeholders were given the power to determine what sites they deemed to be historically, culturally, or ecologically significant, and therefore vital to protect and preserve for future generations. Thus any sites that were recommended within this context were included, and thus each island emerged with a slightly different focus. This also depended on what sites were still in existence, as many historic sites have been lost. Table 3.1 represents how many stakeholders attended the meetings and how many meetings were held on each island.

Table 3.1 Numbers of participants at validation meetings

Union (2)	Carriacou (2)	PM(1)	Mayreau (1)	Canouan (2)	Bequia (2)	Mustique (2)	Total
49	54	30	19	24	73	49	298

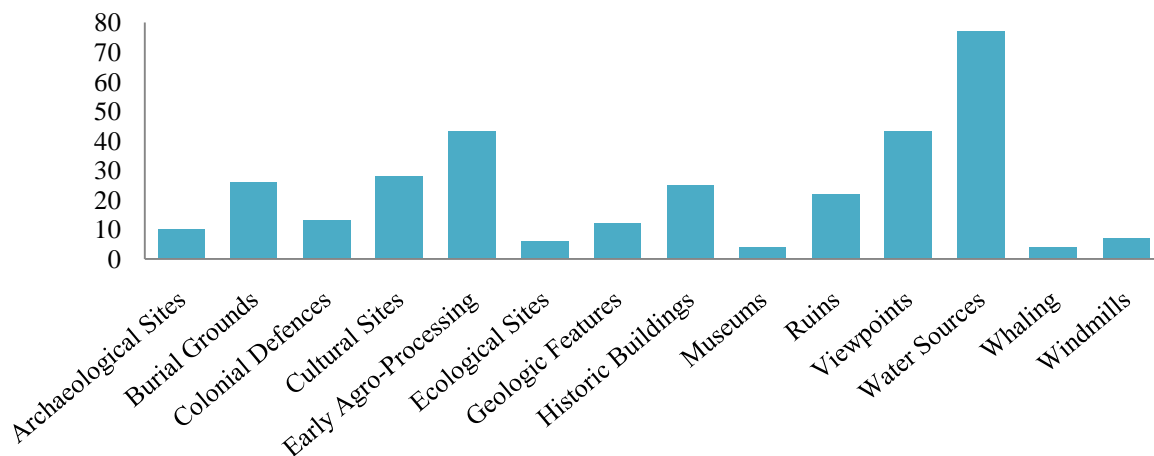
After the community validation meetings, further excursions were planned with community members, and other stakeholders identified at the meetings, to collect the additional site information before finalising the dataset. A total of 160 stakeholders participated in interviews, discussions or data collection (see Appendix V for complete list) (Table 3.2).

Table 3.2 Total number of participants in interviews and data collection by inhabited island

Bequia	Mustique	Canouan	Mayreau	Union	Palm	PSV	PM	Carriacou	Total
23	17	20	19	27	7	5	14	28	160

3.1 Total number of sites

Sites were collected on nine (7 SVG, 2 GRE) inhabited islands and 17 uninhabited islets and cays (10 SVG, 7 GRE) across the Grenadine Islands. The SVG Grenadines have 197 sites and the GRE Grenadines have 124 sites (Table 3.3). Ten archaeological sites, 27 burial grounds, 13 colonial defences, 28 cultural sites, 43 early-agro processing sites, 6 ecological sites, 12 geological sites, 25 historic buildings, 4 museums, 22 ruins, 43 viewpoints, 77 water sources, 4 whaling sites, and 7 windmills were recorded (Figure 3.1).

**Figure 3.1 Number of Grenadine heritage sites listed by type of site**

Carriacou was found to have the highest number of heritage sites (86), followed by Union (55), Bequia (39), Mustique (35), Petite Martinique (28), Canouan (19), Mayreau (18), Palm (9), and Petit St. Vincent (4) (Figure 7). The uninhabited cays ranged between 1–5 sites each (Figure 3.2).

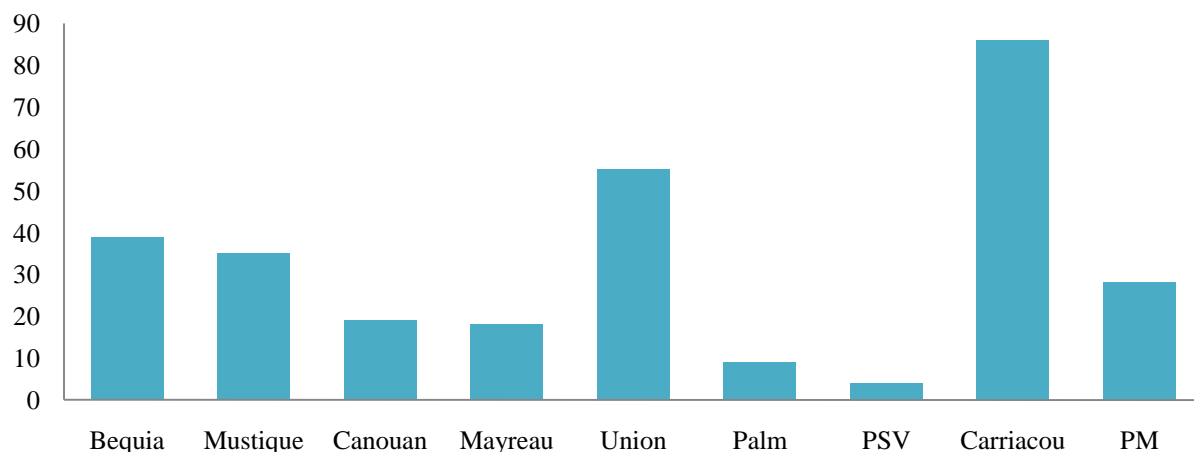


Figure 3.2 Numbers of heritage sites by inhabited island

The largest number of: archaeological sites were found on Mustique (5); burial grounds on Carriacou (9); colonial defences on Union and Carriacou (4); cultural sites on Canouan (7); early agro-processing sites on Carriacou (17); ecological sites on Mustique (2); geological features on Mustique and Isle de Caille (2); historic buildings on Carriacou (12); museums on Bequia (2); ruins on Carriacou (9); viewpoints on Union (10); water sources on Union (20); whaling sites between Bequia and its nearby cays Semples and Isle de Quatre (3); and windmills on Carriacou (6) (Table 3.3).

Table 3.3 Total number of heritage sites by island and attribute

Island	Archaeological Sites	Burial Grounds	Colonial Defences	Cultural Sites	Early Agro-Processing	Ecological Sites	Geologic Features	Historic Buildings	Museums	Ruins	Viewpoints	Water Sources	Whaling	Windmills	Total by Island
ST. VINCENT AND THE GRENADINES															
Bequia	2		1	1	15		1	3	2	2	6	5	1		39
Semples													1		1
Isle de Quatre										1		1			2
Petit Nevis												1	1		2
Baliceaux		1								1		3			5
Battowia					1										1
Mustique	5	3			5	2	2		1	2	4	11		1*	35
Petite Mustique										2					2
Rabbit										1					1
Canouan	1		1	7		1	1	2			4	2			19
Mayreau		1	1	3	1			1			6	5			18
Petit Bateau											2				2
Baradal										1					1
Union	1	4	4	6	1	1	1	4		3	10	20			55
Palm		1				1		1		1	4	1			9
Frigate							1								1
PSV			1								2	1			4
GRENADA															
Carriacou	1	9	4	5	18*	1		12	1	9	3	18		6	86
PM		8		6	1			1			2	9		1	28
Saline					1		1								2
White							1								1
Frigate							1								1
Laidlodge					1										1
Kick 'em Jenny							1								1
Isle de Ronde			1												1
Isle de Caille							2						1		3
Total by Type	10	27	13	28	43	6	12	25	4	22	43	77	4	7	321

* The museum on Mustique is located inside of a converted windmill and the museum on Carriacou inside of a converted cotton gin; both were only counted in the totals as museums.

More detailed tables (including the breakdown of each type of heritage site) are provided in Appendices I and II. The following map (Figure 3.3) symbolises the preceding information spatially represented to better visualise the data geographically and put into context the size of the island in relation to the number of sites recorded. Maps of each individual island and their nearby cays can be found in Appendix IV.

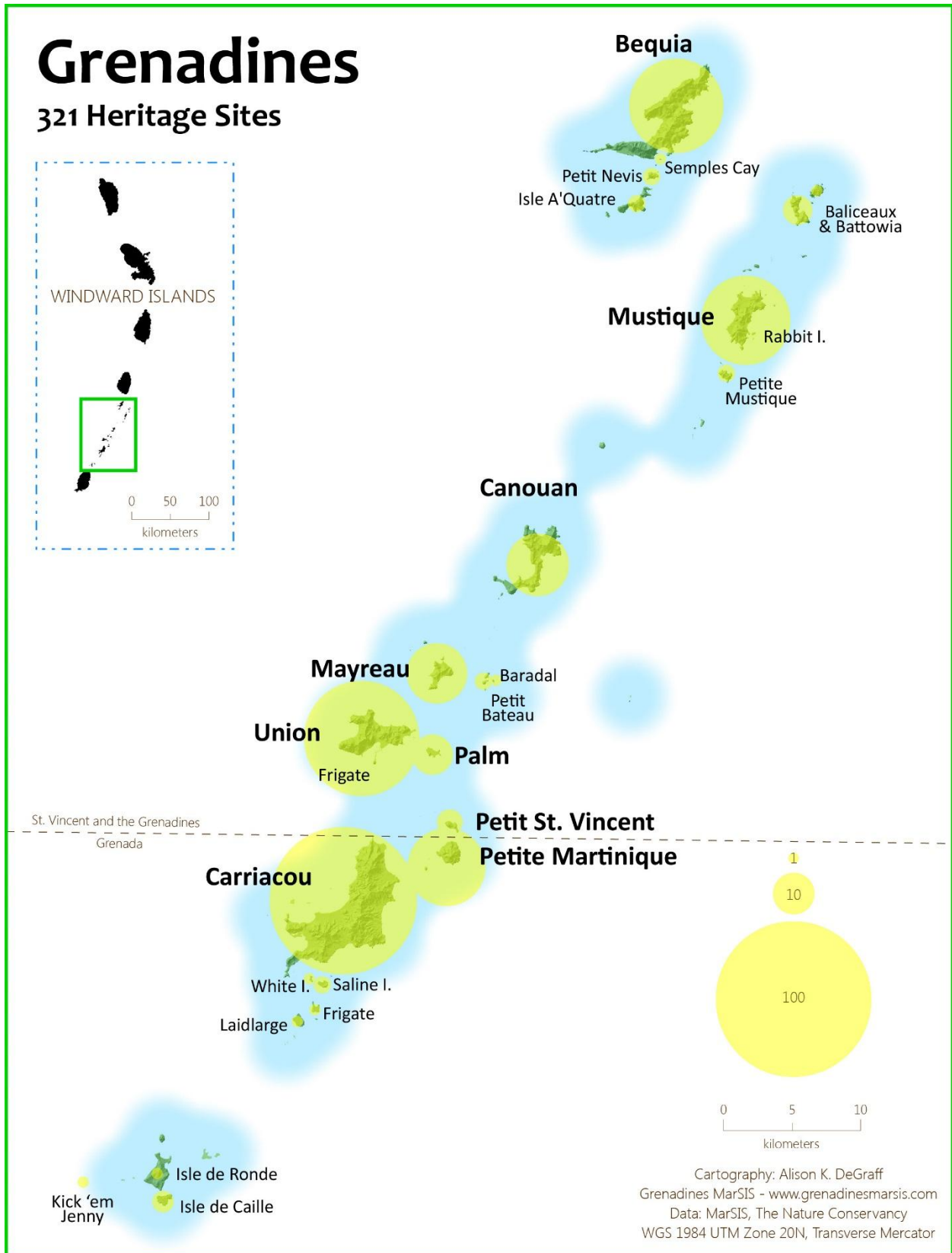


Figure 3.3 Proportional symbol map of heritage sites

Although there appears to be a large split between the number of sites in the SVG and GRE Grenadines, SVG has 179 sites amongst seven inhabited islands and GRE has 114 sites between only two inhabited islands, it should be taken into consideration that Carriacou is the largest (geographically and by population) of the Grenadine Islands. This may also be relevant to the density of resorts in the SVG Grenadines (Mustique, Canouan, Palm, and PSV) in contrast to the GRE Grenadines, in which there are none.

3.2 Findings

The differences in the number of water sites (e.g. wells, cisterns, freshwater ponds) identified from island to island, depends initially on the size of the island and on its accessibility to freshwater outside of the island. Significantly fewer water sources were recorded on Bequia, as an example, despite being the largest of the SVG Grenadines. This may be due to its location and closer connections to St. Vincent (which has numerous natural springs and receives significantly more rainfall). In the Grenadines on the whole, but especially the southern Grenadines, fresh water is extremely scarce. Due to the size, weather patterns, and geology of all of the islands, they have very limited surface and ground water (CCA 1991). A few of the islands have saltwater reverse osmosis or desalination plants (usually for resort or hotel use only), but most communities are culturally opposed to drinking this potable seawater. Many households have their own water collection tanks but community cisterns are heavily used, particularly in the dry season. The fewer number of water sources located on Bequia could also have to do with the fact that stakeholders were primarily focused on recording the large number of early agro-processing sites on the island, and therefore community cisterns and wells were not given as high of a priority.

Some types of sites were found to be unique to certain islands, for example the cultural heritage of whaling in Bequia and its surrounding cays (with the exception of the remains of an American whaling station on Isle de Caille, Grenada). Bequia is one of the few places in the world in which whaling is permitted by the International Whaling Commission. Up to four humpback whales are allowed to be harvested per year through traditional hunting methods, though the limit is rarely met (Joseph 2012). This tradition is of European and American origin, begun around 1875, by Scottish and French settlers, William Wallace and Joseph Ollivierre. Although there is significant debate on whether or not the local community should be allowed to whale under the Aboriginal Subsistence Whaling quotas (Joseph 2012), it is no doubt an important aspect of the culture of Bequia.

Another example of heritage sites unique to specific islands are from the sugar industry. Early sugar mills used draft animals to walk around a central post, thereby moving the rollers, and crushing the cane stalks. Dutch windmills then became the standard of the sugar industry in the early 1800s (Cornwell 2007). Stakeholders identified oxen-powered sugar mills on Mustique and Bequia and windmills on Mustique, Carriacou, and Petite Martinique (Figure 3.4). It is possible that the lack of oxen-powered sugar mills in Carriacou and PM was because they began sugar processing later than on Mustique and Bequia; similarly Bequia might have shifted its focus to a different export product (e.g. indigo, arrowroot, or lime) earlier and therefore not developed the more advanced sugar technologies.

These results depict the most significant patterns observed during data analysis. It is also important to recognise the importance of participatory collaboration in the achievement of these results. “Maps are power. Either you will map or you will be mapped. If you are mapped by those who desire to own or control your land and resources, their map will display their justifications for their claims, not yours” (Nietschmann 1997). In this case, and with the MarSIS, the maps produced display locally-used toponyms (sometimes supplemented by the names used for tourists) and information named, collected, and approved of by the local communities. This makes for results that are accurate as well as ‘geographically authentic’ as the sites were verified by those who know them best.



Figure 3.4 Carriacou windmill

3.3 Difficulties

Finding participants with knowledge of heritage sites was difficult as many have become overgrown, destroyed, or simply forgotten over time. For example, on the small island of Mayreau, the cotton ginnery next to the church has been torn down, the estate house at the top of the hill demolished, Hurricane Ivan destroyed most of the lime kiln in Saline Bay, and maroon festivals (ancient harvest rites brought from West Africa) are no longer celebrated (A. Adams pers. comm.). A very common statement in stakeholder interviews was “we had [i.e. sugar mill], but it mash up”. Many of the older community members discussed how their history and culture are being lost and forgotten and that they hoped that this data collection would raise awareness of the importance of remembering where they came from. On a positive note, the three youngest participants (primary and secondary school aged) led the entire GPS data collection efforts on Petite Martinique.

Another difficulty encountered was a limited ability of some participants to work with base maps. Many had never viewed their environment from an aerial perspective before, or even seen an accurate map of their island, therefore making it a challenge to locate the sites on a base map. For this reason, simple cartography and local names were used to help stakeholders orient themselves in the context of the map. Aerial imagery together with an annotated coastline map (Figure 8) allowed participants to work with whichever cartographic medium they felt most comfortable; or alternatively, none at all, in which case verbal clues were recorded to help locate the sites.

4 RECOMMENDATIONS

This study together with the Grenadines MarSIS provides a fundamental step towards the application for WHS. As mentioned previously, the application process is currently in progress, with representatives from St. Vincent and the Grenadines and Grenada in talks with UNESCO representatives (M. Barriteau pers. comm.). Additionally, the draft marine multi-use zoning plan (Baldwin 2012b) should be implemented to support the sustainable transboundary management of the natural and cultural resources of the Grenadine Islands.

Further research should be undertaken to supplement this baseline heritage dataset with a detailed history of each corresponding site. For example, many of the sites are named as the community members know them, but in some cases that was not the site’s actual use, or was simply their most modern use (i.e. some early agro-processing sites changed uses as the market

for their products changed). Also, many of the cylindrical structures on Carriacou were referred to by community members as windmills, when in fact the smaller ones were actually storerooms built to withstand hurricane season weather, and only the seven largest on the island were windmills. The dates collected through the participatory process also often contradicted each other with one stakeholder claiming the sugar mill was used in the 1800s and the next in the 1700s. Dates were only included in the dataset if they were backed up by more than one source or found in written documentation. These types of information (i.e. to have accurate information corresponding with each of the heritage sites) would be a valuable asset to this research.

Another potential source of confusion in the data is the use of local terminology. For example, in the Grenadines, community members refer to coastal batteries (one or two cannons on top of a hill) as forts (Figure 4.1). On the produced maps, the designation 'fort' is an appropriate term, however, for a broader audience, the term 'fort' implies larger structures with more permanent troop encampments such as Fort George in St. George's, Grenada. Therefore further research should address ways in which these sites can be identified and classified in a way that is relevant to a global audience.

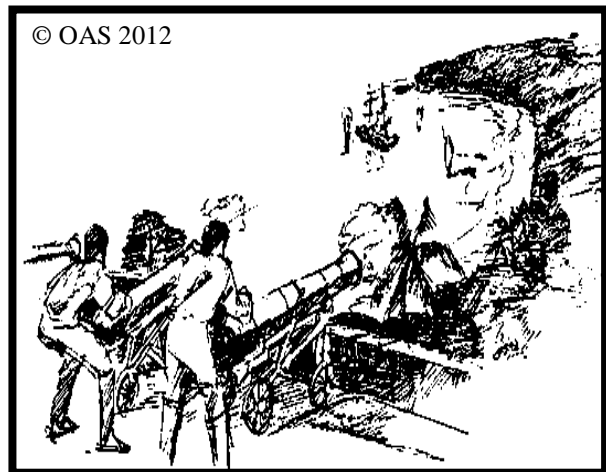


Figure 4.1 Carriacou coastal battery or 'fort'

Toponyms were found to vary widely between community members and the tourism sector, especially in regards to the resort islands. For example, the main bay in Mustique is called Grand Bay by the Mustiquans and Britannia Bay by the resort. The northern bay on Mayreau is called Carnash by the Mayronians and Salt Whistle Bay by the tourists. Future mapping efforts should be aware of this and develop a plan for determining a way to balance these linguistic differences, creating separate maps for local and non-local audiences, and providing further descriptions of the sites. Another cause for confusion is the linguistics of historically French toponyms that have a correct French spelling, but for which the English dialect speaking locals would use alternate spellings to better represent their pronunciations, i.e. Beausejour vs. Bosejou in Carriacou. It would be an interesting and important project for a linguist to do research on how to correctly spell these toponyms with the local pronunciations of historically French and British names. Linguist and anthropologist Dr. Kephart from the University of North Florida (former Peace Corps Volunteer on Carriacou) recommends using the Haitian *Institut Pédagogique Nacional* (IPN) system for spelling French Creole names in the area for such a study (R. Kephart pers. comm.).

In conclusion, is important to keep the MarSIS up to date. For example, as of November 2012, the historic sugar works in Athneal Bay on Bequia were destroyed by construction. It is important to obtain commitment by a local NGO, historical organisation and/or the two governments to take ownership to maintain the datasets.

A final recommendation is the creation of an atlas book to highlight the social, environmental and economic information included in the Grenadines MarSIS. This can allow for greater public outreach, education and awareness of the importance of this unique dataset. Furthermore this type of effort could be beneficial to the implementation of both the draft marine space use

management plan and the designation of the Grenadines Islands as a transboundary marine mixed (cultural and ecological) heritage site.

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6 APPENDICES

Appendix I. Detailed table of St. Vincent and the Grenadines heritage sites

Feature	Bequia	Semples	Isle de Quatre	Petit Nevis	Baliceaux	Battowia	Mustique	Petite Mustique	Rabbit	Canouan	Mayreau	Petit Rameau	Petit Bateau	Baradal	Union	Palm	Frigate	PSV	Total by Type of Site
ST. VINCENT AND THE GRENADINES																			
Archaeological Sites	2						5			1					1				9
<i>Archaeological Dig</i>							1												1
<i>Shell Median</i>							1			1									2
<i>Pottery</i>	1						3								1				5
<i>Work Stone</i>	1																		1
Burial Grounds					1		3				1				4	1			10
<i>Cemetery</i>							1				1				4				6
<i>Gravesite</i>					1		2									1			4
Colonial Defences	1									1	1				4			1	8
<i>Fort</i>	1									1					1				3
<i>Coastal Battery</i>											1				3			1	5
Cultural Sites	1									7	3				6				17
<i>Regatta</i>	1									2	1				1				5
<i>Festival</i>										2	1				2				5
<i>Ceremony</i>										2	1								3
<i>Music</i>										1					3				4
Early Agro-Processing	15					1	5				1				1				23
<i>Indigo</i>	3																		3
<i>Lime</i>	2										1								3
<i>Sugar</i>	8					1	4												13
<i>Cotton</i>																			
<i>Storeroom</i>							1								1				2
<i>Oven</i>	2																		2
Ecological Sites							2			1					1	1			5
<i>Tree</i>							1								1	1			3
<i>Garden</i>																			

<i>Trail</i>							1			1									2
Geologic Features	1						2			1					1		1		6
<i>Volcanic</i>																	1		1
<i>Rock Formation</i>	1						2								1				4
<i>Cave</i>										1									1
Historic Buildings	3									2	1				4	1			11
<i>Church</i>	2									1	1				2				6
<i>Building</i>	1									1					2	1			5
Museums	2						1												3
<i>Historic</i>							1												1
<i>Maritime</i>	2																		2
Ruins	2		1		1		2	2	1					1	3	1			14
<i>Building</i>					1		1	2	1					1	2	1			9
<i>Church</i>																			
<i>Estate House</i>			1											1					2
<i>Slave Quarters</i>							1												1
<i>Road</i>	1																		1
<i>Bridge</i>	1																		1
Viewpoints	6						4			4	6		2		10	4		2	38
Water Sources	5		1	1	3		11			2	5				20	1		1	50
<i>Well</i>	3		1	1	3		5								1				14
<i>Cistern</i>	1										3				3	1			8
<i>Pond</i>	1						6			2	2				15				26
<i>Manmade Pond</i>															1			1	2
Whaling Station	1	1		1															3
Windmills																			
<i>Windmill</i>							1*												
<i>Wind Turbine</i>																			
Total by Island	39	1	2	2	5	1	35	2	1	19	18		2	1	55	9	1	4	197

* The museum on Mustique is located inside of a converted windmill and was only counted in the totals as a museum.

Appendix II. Detailed table of Grenada heritage sites

Feature	Carriacou	PM	Saline	White	Frigate	Laidlodge	Kick 'em Jenny	Isle de Ronde	Isle de Caille	Total by Type of Site
GRENADA										
Archaeological Sites	1									1
<i>Archaeological Dig</i>	<i>1</i>									<i>1</i>
<i>Shell Median</i>										
<i>Pottery</i>										
<i>Work Stone</i>										
Burial Grounds	9	8								17
<i>Cemetery</i>	<i>8</i>	<i>7</i>								<i>15</i>
<i>Gravesite</i>	<i>1</i>	<i>1</i>								<i>2</i>
Colonial Defences	4							1		5
<i>Fort</i>										
<i>Coastal Battery</i>	<i>4</i>							<i>1</i>		<i>5</i>
Cultural Sites	5	6								11
<i>Regatta</i>	<i>2</i>	<i>1</i>								<i>3</i>
<i>Festival</i>	<i>2</i>	<i>3</i>								<i>5</i>
<i>Ceremony</i>		<i>2</i>								<i>2</i>
<i>Music</i>	<i>1</i>									<i>1</i>
Early Agro-Processing	17	1	1			1				20
<i>Indigo</i>										
<i>Lime</i>	<i>4</i>									<i>4</i>
<i>Sugar</i>	<i>5</i>	<i>1</i>								<i>6</i>
<i>Cotton</i>	<i>2*</i>									<i>1</i>
<i>Storeroom</i>	<i>7</i>		<i>1</i>			<i>1</i>				<i>9</i>
<i>Oven</i>										
Ecological Sites	1									1
<i>Tree</i>										
<i>Garden</i>	<i>1</i>									<i>1</i>
<i>Trail</i>										
Geologic Features			1	1	1		1		2	6
<i>Volcanic</i>			<i>1</i>	<i>1</i>	<i>1</i>		<i>1</i>		<i>2</i>	<i>6</i>
<i>Rock Formation</i>										

<i>Cave</i>										
Historic Buildings	12	1								13
<i>Church</i>	<i>4</i>	<i>1</i>								<i>5</i>
<i>Building</i>	<i>8</i>									<i>8</i>
Museums	1									1
<i>Historic</i>	<i>1</i>									<i>1</i>
<i>Maritime</i>										
Ruins	9									9
<i>Building</i>	<i>3</i>									<i>3</i>
<i>Church</i>	<i>1</i>									<i>1</i>
<i>Estate House</i>	<i>5</i>									<i>5</i>
<i>Slave Quarters</i>										
<i>Road</i>										
<i>Bridge</i>										
Viewpoints	3	2								5
Water Sources	18	9								27
<i>Well</i>	<i>8</i>	<i>1</i>								<i>9</i>
<i>Cistern</i>	<i>8</i>	<i>4</i>								<i>12</i>
<i>Pond</i>	<i>2</i>	<i>4</i>								<i>6</i>
<i>Manmade Pond</i>										
Whaling Station									1	1
Windmills	6	1								7
<i>Windmill</i>	<i>4</i>	<i>1</i>								<i>5</i>
<i>Wind Turbine</i>	<i>2</i>									<i>2</i>
Total by Island	86	28	2	1	1	1	1	1	3	124

* The museum on Carriacou is located inside of a converted cotton gin and was only counted in the totals as a museum.

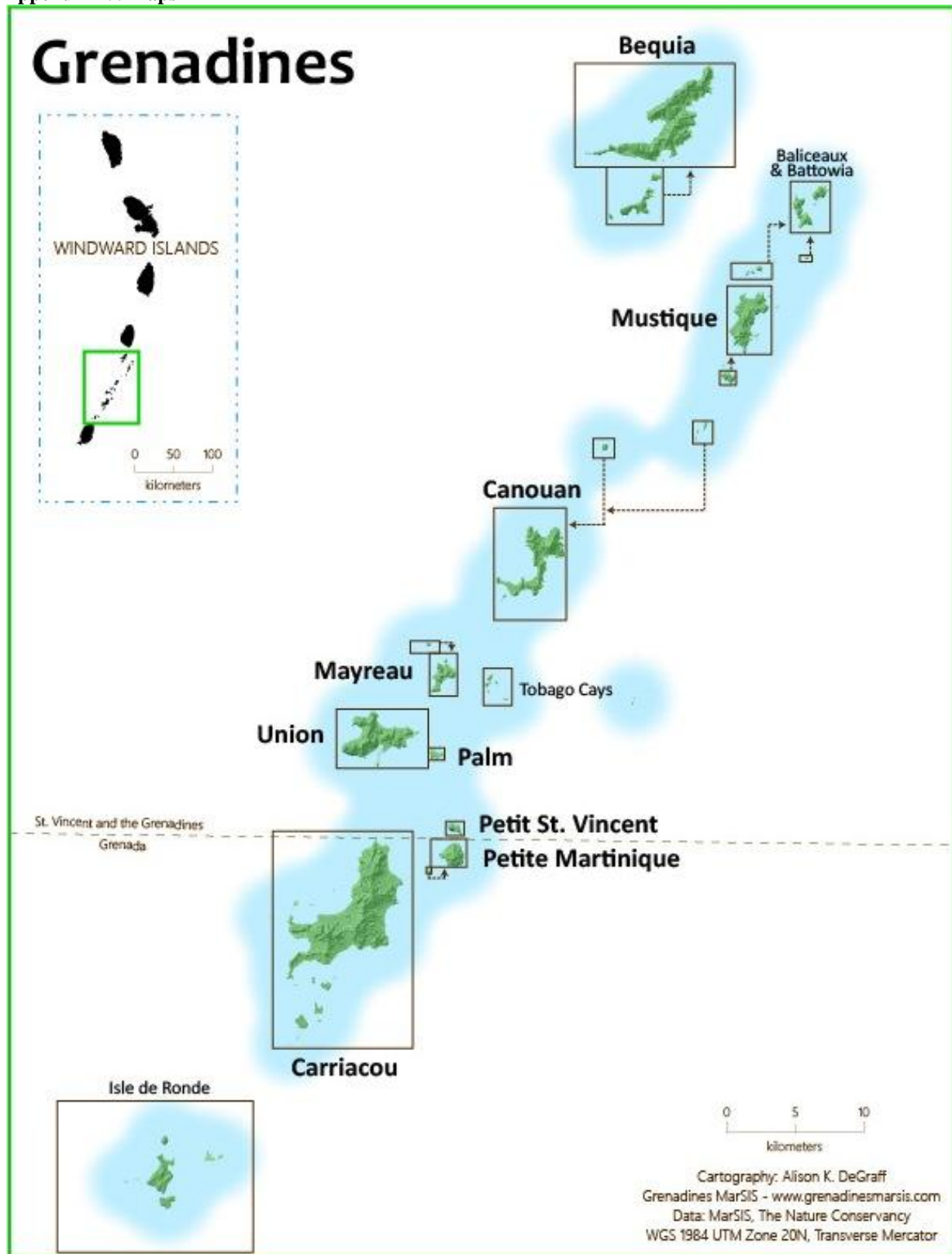
Appendix III. Table of important bird areas and mangrove stands

Feature	ST. VINCENT AND THE GRENADINES									GRENADA					Total by Type of Site
	Bequia	Mustique	Canouan	Mayreau	Petit Rameau	Petit Bateau	Baradal	Union	Palm	Carriacou	Saline	White	Frigate	Isle de Ronde	
Important Bird Areas*		2						2		3	1				8
Mangrove Stands**	7	3	4	2	1	2	1	26	3	23	1	2	1	1	77

**Data from BirdLife and updated through participatory mapping*

***Data from Grenadines MarSIS and The Nature Conservancy and updated through participatory mapping*

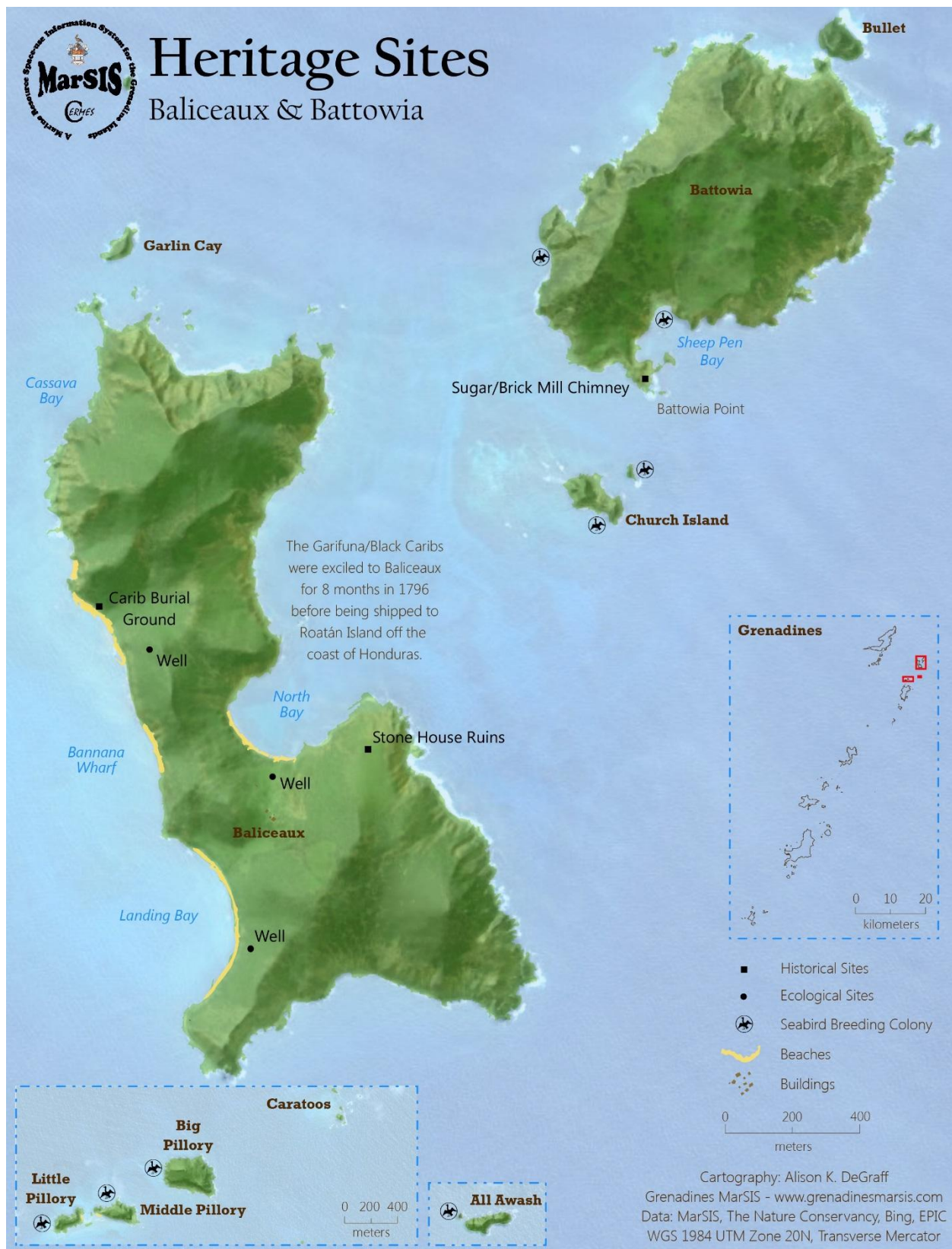
Appendix IV. Maps



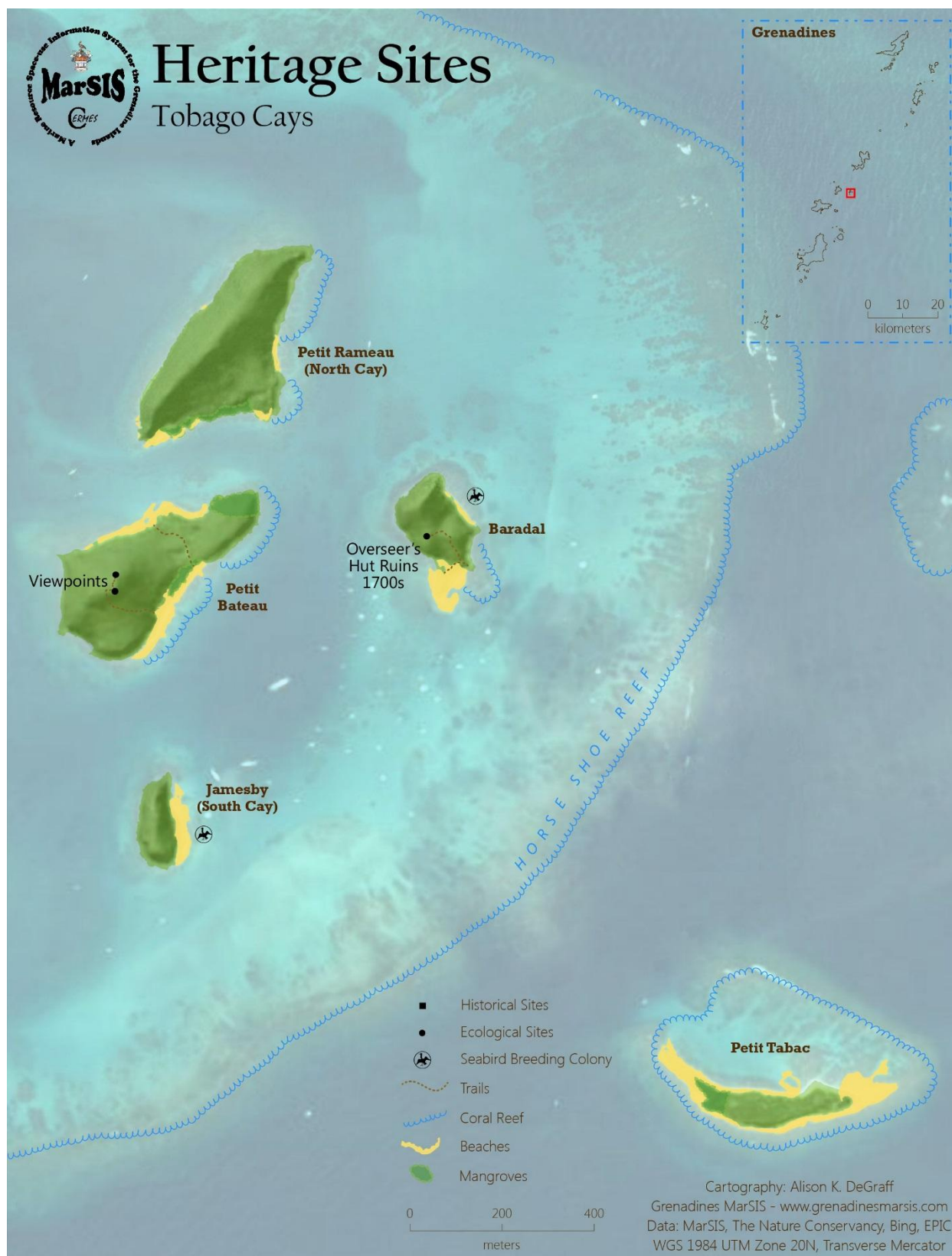


Heritage Sites

Baliceaux & Battowia

















Heritage Sites

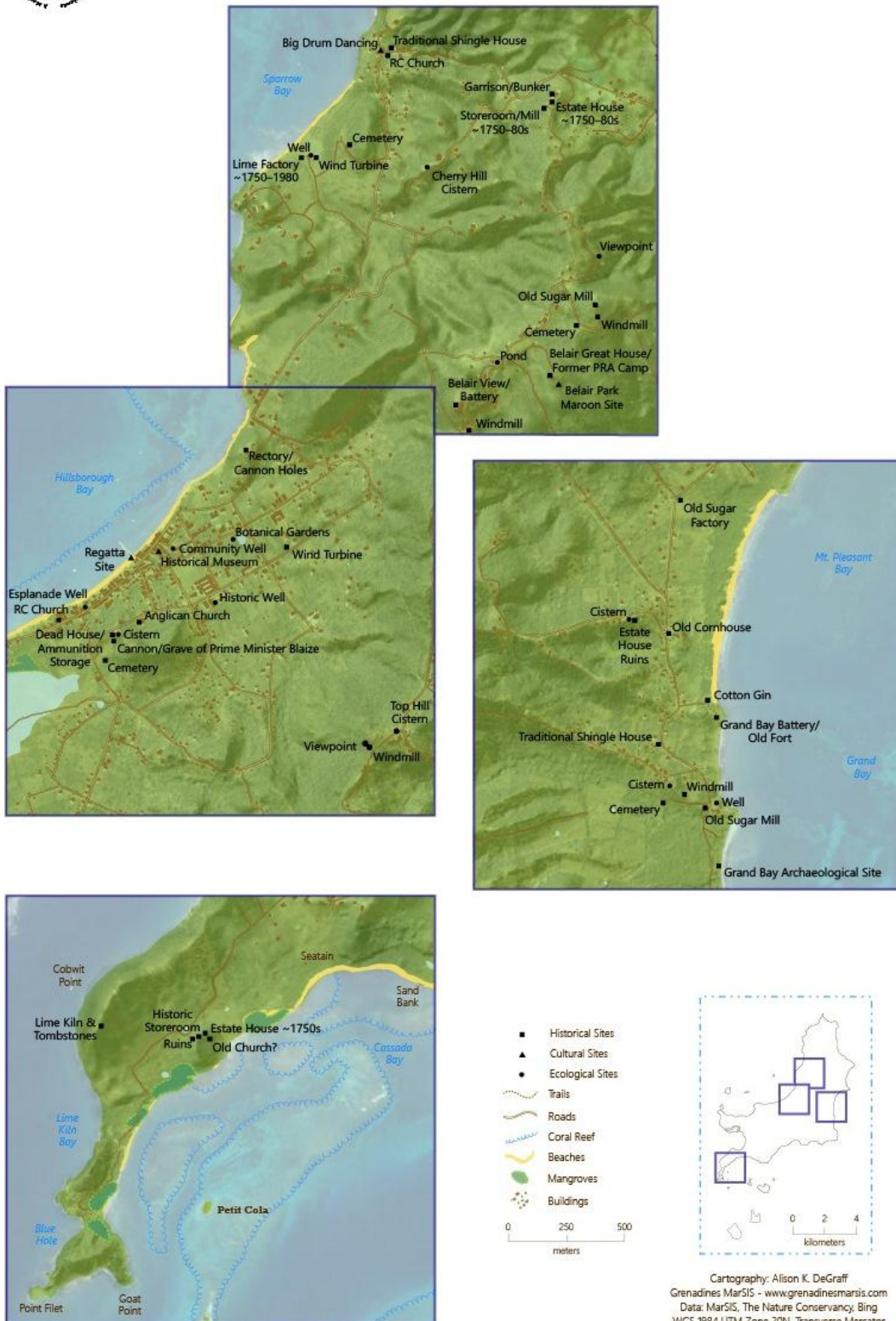
Carriacou

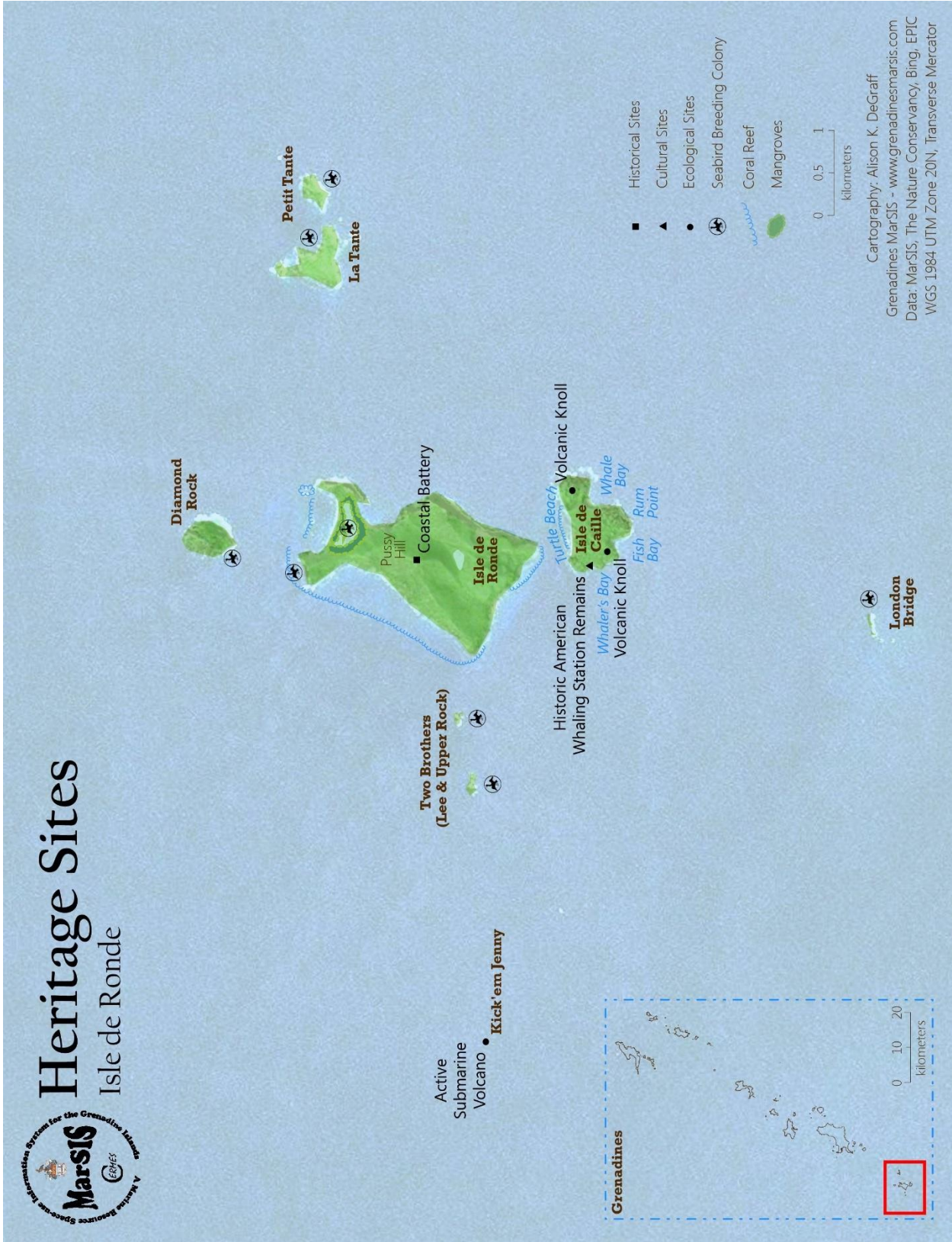




Heritage Sites

Carriacou





Appendix V. Mapping participants

Name	Organisation	Focus	Location	Email	Phone
Bert Davis	Battowia & Baliceaux Caretaker	History	Battowia/ Baliceaux		784.493. 9610
Dive shop guy at Mustique community meeting	Mustique Dive Shop	History	Battowia/ Baliceaux		
Guy in blue hat at Mustique community meeting		History	Battowia/ Baliceaux		
Nicola Redway	Amateur Historian (Colonial and Pre- Colonial Bequia)	History	Bequia	nicola@begos.com	784.532. 9554
Dr. Margaret Bradford	Archaeologist	Archaeology/ History	Bequia	margaretbradford@mehsi.com	784.458. 3819
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Brent “Bushman” Davis	Bushman	History	Bequia		784.495. 2524
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Robert Rooth	Moonhole Company Owner	Conservation	Bequia	robert@moonholecompany.com	504.458. 9871
Winifred “Wynne” Kydd	Managing Director of Moonhole Company	Conservation	Bequia		784.491. 4173
Moonhole Handyman		History	Bequia		
Dougie	Previous Jaden Sun Mechanic	History	Bequia		784.528. 8934
Expat Couple	Own Property with Whaling Station	History/ Conservation	Bequia		

Old man that used to be associated with SusGren		History	Bequia		
Lucille Cozier		History	Bequia	lcozier@vincysurf.com	
Rev Frank Garraway	Anglican Church	History	Canouan		
Juliet King	Canouan Resort	History/Culture	Canouan	julesrocken@yahoo.com	784.430.3586
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Albert Duroche	Island Council/ Supermarket Owner	History	Canouan		
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Rhonda King		History	Canouan		
Yachtie Expat on Carriacou about Canouan Site	Yachtie	History	Canouan		
Old man in rum shop 1		History	Canouan		
Old man in rum shop 2		History	Canouan		
Old man in rum shop 3		History	Canouan		
Guy at Resort in Canouan		History	Canouan		
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Sherwin Noel	Tourism	History	Carriacou		473.406.4122
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Frank Forde	MRU	History	Carriacou		473.404.1169
Man at table with Frank at Harvey Vale Community Meeting	MRU	History	Carriacou		
Indian Man at table inside Lambi Queen	MRU	History	Carriacou		
Short Man at table inside Lambi Queen'	MRU	History	Carriacou		
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Den Bristol		History	Carriacou		
Nick Cox		History	Carriacou/ USA		
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Annie Adams	Combination Café	History	Mayreau		784.433.0427
Julian Ollivierre	Principal of Mayreau Government School	History	Mayreau		
John Roache		History	Mayreau		784.494.1076
Arthur Roache	Bar Owner	History	Mayreau		784.491.7257
Lady with pink hair at community meeting		History	Mayreau		
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Hamlett Trimmingham		History	Mustique		784.527.7166
Percival		History	Mustique		
Vincent		History	Mustique		

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Groundskeeper	Palm Resort Groundskeeper	Conservation	Palm		
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Lady by jetty selling snacks		History	PM		
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Rufus Clement		History	PM		
Raphael Clement		History	PM		
Renata Clement		History	PM		
Lady with weave in PM community meeting		History	PM		
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