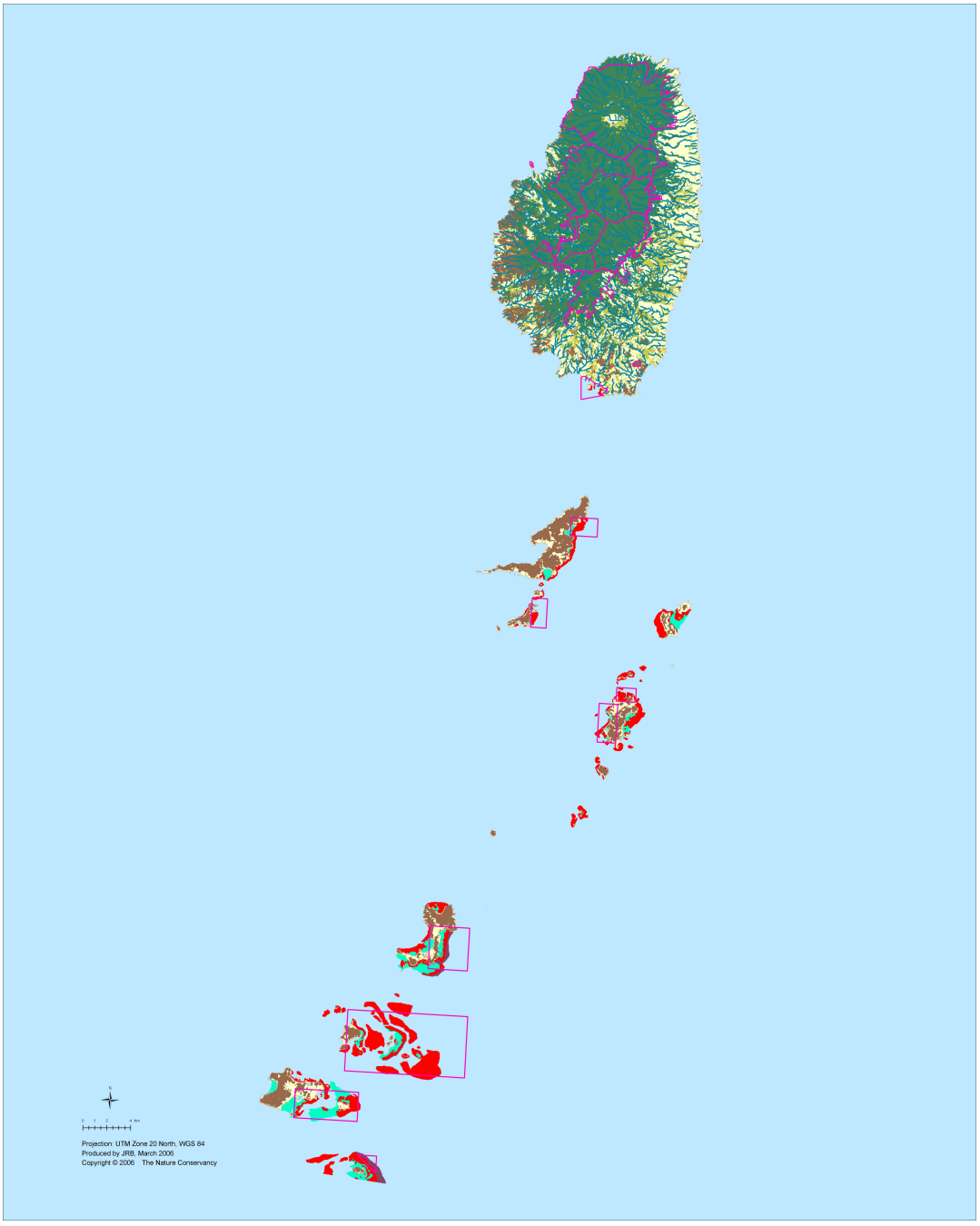
St. Vincent & the Grenadines Protected Areas System Gap Assessment
First Workshop, March 9th & 10th, 2006



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Contact information:

James Byrne
The Nature Conservancy
Eastern Caribbean Program
3052 Estate Little Princess
Christiansted, St. Croix, USVI 00820
jbyrne@tnc.org
340-773-5575

Introduction:

At the 7th Conference of the Parties (COP-7) of the Convention on Biological Diversity (CBD) in 2004, governments adopted an ambitious Global *Program of Work on Protected Areas* (PoW). At COP7, a group of 8 international NGOs committed to support government partners in the implementation of this PoW. As a result of this commitment, The Nature Conservancy, CERMES and RARE signed a Memorandum of Understanding (MOU) with the Government of St. Vincent and the Grenadines, in which parties commit to work together in the implementation of this program of work. This MOU is commonly known as the Protected Area National Implementation Support Partnership (NISP).

One of the early actions under the Global Protected Areas Program of Work is the completion of a National Protected Areas Gap Analysis (to be completed by December 2006). As a result of this and together with the NISP Committee and other country partners, the Nature Conservancy is currently facilitating the completion of this project in St. Vincent and the Grenadines.

The Grenada Protected Areas System GAP Workshops will consist of a series of three workshops to guide and approve the analysis. The first workshop focused on determining the goals of the analysis, the selection of the target biodiversity and an assessment of the effectiveness of the management of the existing protected areas. The Second workshop will examine the Human Activity information which will be incorporated into the analysis and the preliminary results of the analysis on how to best fill the representational gap. The final workshop of the analysis will be to finalize the results and identify the strategies to fill the gaps that are identified.

The National Implementation Support Partnership (NISP) Committee had identified the technical leads from various Governmental, Non-Governmental, and Academic institutions to participate in the First St. Vincent & the Grenadines Protected Areas System GAP Assessment Workshop during a meeting in January 2006. The NISP Committee, composed of Ministry of Agriculture, Fisheries and Forestry, Ministry of Health and the Environment, Ministry of Tourism and Culture, The Nature Conservancy, Centre for Resources Management and Environmental Studies (CERMES-UWI) and RARE, is leading this initiative. The Nature Conservancy through the Parks in Peril project supported by USAID is facilitating this project. The goals of this workshop were to establish the list of Conservation Targets, the goals for each target, and evaluate the effectiveness of the management of the existing Protected Areas.

Conservation Targets:

The Conservation Targets were discussed and the attendees reviewed the data. The classification scheme (Appendix 5) was created to integrate the fine scale habitat data into larger, regional efforts utilizing The Nature Conservancy's approach and the Marine Ecoregions of the World. This enables the data to be viewed in various scales and to be comparable to regional and global efforts. The data that is being used for the GAP Analysis is from varying sources and there was some concern about the classifications used for the data. The terrestrial data is derived from the *International Institute of Tropical Forestry, USDA Forest Service*. The data is described in Appendix 6. The classes were acceptable. It was also decided that the fine scale habitat "Mixed Wood Agriculture" should be included as a target and the other forms of agriculture should not be targets. This habitat was also determined to be a subset of the Windward Island Moist Forest Ecoregion, and drop the Agro-Forestry classification. There were some additional changes to the Freshwater data in that some streams were wrongly classified and these changes were noted. The marine data is based on *The Millennium Coral Reef Maps* produced by Dr. Serge Andréfouët of the University of South Florida, along with other datasets complied by The Nature Conservancy. It was recognized that the data for seagrass is from a regional dataset and that it under represents the occurrence of seagrass, and that seagrass would be dropped as a target and considered nested within the Lagoon Terrace and Reef Flat classes. There was also a lack of data for marine habitat around the main island of St. Vincent. It was determined that this is mostly Shelf Slope, and that James Byrne would explore ways of representing this data by using bathymetry as a proxy for the data. Additional benthic habitat data was supplied to TNC to review and determine if it would be suitable for the analysis or possibly extracting the seagrass data from it for inclusion as a target. This analysis is on-going and will be reported in the follow up workshop.

Conservation Goals

The results of a preliminary representation GAP analysis (Appendix 5) were presented. This allowed the group to examine the current status of the targets and to make informed decisions on what would be realistically achievable. The first discussions centered on an overall goal for the country and at what level in the classification scheme should the goals be set. The groups decided to set goals which were a mixture of individual Fine Filter Habitat Goals and Marine Ecosystem/Terrestrial Ecoregion Goals. The goal discussions started off with setting a goal that is considered the best amount ecologically and then was brought down based on what is realistically achievable to the time frame that is selected, by 2020, and considering the limitations on Government resources. The targets ecological significance and environmental services were also considered in the process. The goals were selected to provide greater protection to the upland resources and to marine nursery habitats. Mangroves were considered a valuable

resource and it was determined that 75% should be located within a protected area and additional legislation should be crafted to provide additional protection to all mangroves. These decisions were the first effort to include ecological conditions into the analysis. The maps of the current extent of the resources and the protected areas were consulted to determine how realistic the goals were. The following tables illustrate the final goals which were determined during the workshop.

Marine Goals

Level 1: Habitat Medium	Level 2: Major Habitat Type	Level 3: Ecosystems GOALS	Level 4: Fine Filter Habitats GOALS
Marine	Shelf	Reef Habitat: 53%	Deep Terrace: **100%**
			Fore Reef
			Inter-tidal Reef Flat
			Pinnacle
			Reef Flat
			Shallow Terrace
			Reticulated Shallow Terrace
			Sub-tidal Reef Flat
			Channel
			Pass
		Shelf Slope: 35%	Outer Slope
			Shelf Slope: **20%**
		Seagrass*	Seagrass: **nested in Lagoon Terrace and Reef Flat**

		Lagoonal Habitat: 45%	Lagoon Terrace
	Nearshore		Enclosed Lagoon
		Rocky Shore	Tidal Pool: **100%**
			Rocky Shore
		Beaches: **20%**	White Sand Beach
			Black Sand Beach: **20%**
			Leatherback Nesting Sites: **30%**
			Loggerhead Nesting Sites
			Green Turtle Nesting Sites
			Hawksbill Nesting Sites: **30%**
		Mangroves	Mangroves: **75 -100%**

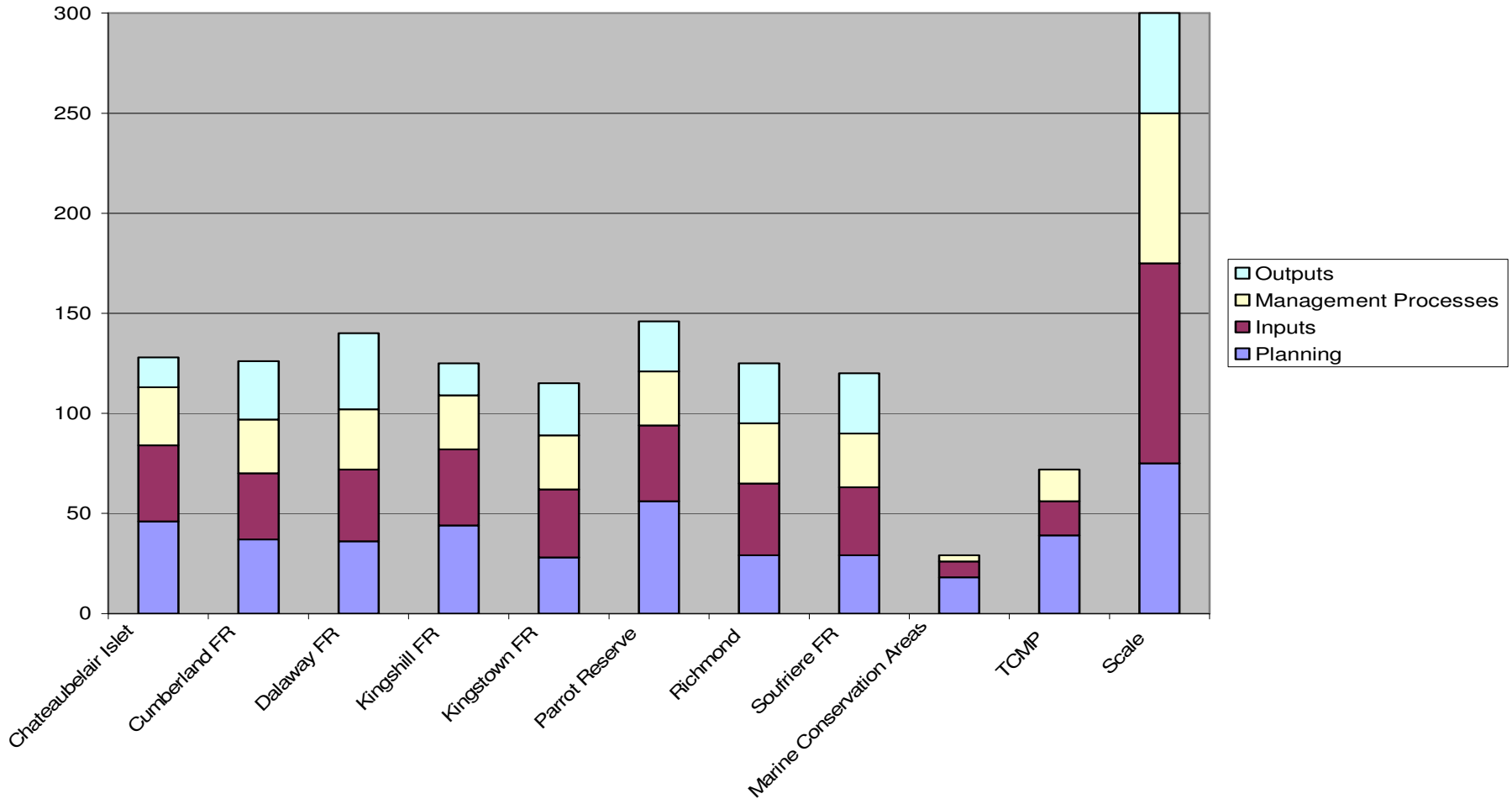
Terrestrial and Fresh Water Goals

Level 1: Habitat Medium	Level 2: Major Habitat Type	Level 3: Ecoregions **Goals**	Level 4: Fine Filter Habitats **Individual Goals**
Terrestrial	Tropical Moist Forest	Windward Island Moist Forest 92%	Forest Cloud Elfin **:100%**
			Cloud Forest**:100%**
			Forest Cloud Transitional**:100%**
			Forest Evergreen and Seasonal**:100%**
			Agriculture Woody **:35%**
	Tropical Dry Forest	Lesser Antillean Dry Forest: **35%**	Forest Dry Deciduous **:35%**
			Forest Semi Deciduous **:35%**
Freshwater	Tropical Island Fresh Water Systems	Fresh Water Bodies: **100%**	Emergent Wetlands **:100%**
			Open Water Bodies **:100%**
		Streams: **53%**	Class 4-6 Streams **:50%**
			Class 7-8 Streams **:100%**

Protected Area Management Effectiveness Evaluation

By following the official guide put forward by the Convention on Biological Diversity to conduct gap assessments of protected area systems: Dudley, N., Parrish, J. 2005. *Closing the Gap: Creating Ecologically Representative Protected Area Systems*. 105 pp., the three Gaps to evaluate include Representation, Ecological and Management. The representation Gap was addressed in the selection of conservation targets and goals. The ecological Gap was considered when selecting the goals and will also be addressed in the next phase of the project, the analysis on how to fill the representation gaps. The Management Gap was addressed at this workshop by conducting a rapid assessment of the effectiveness of the management of the existing protected areas. The methodology chosen for this assessment is the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) created by WWF. This methodology allowed for a systematic approach to quantify the effectiveness of the management of the existing protected areas and identify the gaps in their effective management. The following graph captures in summary the results of the evaluation.

The RAPPAM Results:



This information will be utilized to identify the areas of management of the Protected Area System that need to be improved in order to increase the management effectiveness. This will be included in the final recommendations on how Grenada needs to fill the gaps in the protected area system.

The Next Steps

The workshop wrapped up with a discussion on what the next steps in the process are. The next step is to incorporate the conservation targets and goals decided in this workshop into a Representation Gap Analysis. The human activities which are causing threats and pressures on the biodiversity will be mapped and their impact on the biodiversity will be modeled through the use of GIS software. The result will be used in the analysis utilizing MARXAN software to determine the best recommendations for filling the gap in the conservation of the biodiversity. It was also decided that the analysis should follow an integrated approach, combining terrestrial, freshwater and marine into one analysis. This would provide for better connectivity among the resources and more accurately reflect the reality of the island ecosystem, a ridges to reefs approach. Suggestions for the next workshop included the establishment of a mailing list for keeping everyone up to date on the progress of this project, and to distribute a summary of the next steps before the next meeting. Mr. Weekes was selected as the SVG Coordinator, together with Mr. Edmund Jackson (CBD Focal Point). His main responsibility will be to organize a meeting before the next workshop to prepare participants for it. This coordinator will also ensure participation from a broader group of stakeholders

References

Dudley, N., Parrish, J. 2005. *Closing the Gap: Creating Ecologically Representative Protected Area Systems*. 105 pp.

Ervin, J.2003. *WWF: Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology*. WWF, Gland, Switzerland. 52 pp.

Spalding M, Fox H, Davidson N, Ferdana Z, Finlayson M, Halpern B, Jorge M, Lombana A, Lourie S, Martin K, McManus E, Molnar J, Newman K, Recchia C, Robertson J (2006) *Global Coastal and Marine Biogeographic Regionalization as a Support Tool for Implementation of CBD Programmes of Work. COP8 Information Document 34*. Convention on Biological Diversity, Montreal, Canada. 21pp.

Appendix 1: Invitation

PROTECTED AREAS SYSTEM GAP ASSESSMENT
Anglican Pastoral Center
9 AM – 4 PM
March 9th and 10th, 2006

Dear Workshop Participant,

On behalf of the National Implementation Support Partnership, I would like to invite you to attend the **Protected Area System Gap Assessment Workshop** to take place at the ***Anglican Pastoral Centre conference room on March 9 & 10, 2006***.

The National Implementation Support Partnership (NISP) was created as a direct result of the MOU signed between the Government of St. Vincent and the Grenadines, The Nature Conservancy, RARE and CERMES at the University of West Indies. In this MOU the parties commit to collaborate in the implementation of the Global Program of Work on Protected Areas which was defined by the Convention on Biological Diversity at the COP7 meeting in 2004. The **Protected Area System Gap Assessment** is one of the early deliverables under the Protected Areas Program of Work (it is due in December 2006). The objective of this analysis is to understand how well the current system of protected areas represents St. Vincent and the Grenadines biodiversity and what actions could be taken to ensure good representation of that biodiversity.

This project will follow the official guide put forward by the Convention on Biological Diversity to conduct gap assessments of protected area systems: Dudley, N., Parrish, J. 2005. *Closing the Gap: Creating Ecologically Representative Protected Area Systems*. 105 pp.

This guide builds on the best science available for natural resource planning and regional prioritization. It provides a flexible framework for helping government partners complete rigorous gap assessments that eventually lead to more representative and well-designed protected area systems. Once completed, it will be the guiding tool for future actions to be implemented under the CBD Global Program of Work on Protected Areas. Last but not least, the completion of this assessment will also provide vital information for additional projects ongoing in St. Vincent and the Grenadines (i.e. OECS Protected Areas and Associated Livelihoods Project)

Please do not hesitate to contact me with any questions you may have. You may reach me via phone at 340-773-5575, or via email at rseybert@tnc.org. I look forward to your response.

Sincerely,

Raquel Seybert
Grenadines Program Manager

Appendix 2: Agenda

PROTECTED AREAS SYSTEM GAP ASSESSMENT
Anglican Pastoral Center
9 AM – 4 PM
March 9th and 10th, 2006

The Anglican Pastoral Center is situated next door to the Government House (New Montrose)
Tel. 457-0775

Thursday, 9th March

9:00 – 9:30	• **Introduction & Status of COP 8**	Raquel Seybert
9:30 – 10:15	• **Preliminary GAP Analysis** – Presentation of Results	James Byrne Raquel Seybert
10:15 – 10:30	• **Coffee Break**	
10:30 – 12:00	• **Defining the Conservation Targets** – Objectives – Review of existing data and limitations – Terrestrial and Marine	James Byrne Raquel Seybert
12:00 – 13:00	• **Lunch**	
13:00 – 14:30	• **Defining the Conservation Target Goals** – Goal Options – Selection of Goals Terrestrial, Fresh Water & Marine	James Byrne
14:45 – 15:30	• **Final Review/Update of Data** – Complete review of data and Goals	James Byrne

Friday 10th March

9:00 – 12:00	• **Updating the Protected Areas Data** – IUCN Categories – Missing Data – Management Effectiveness	James Byrne
10:00 – 10: 15	• **Coffee Break**	
12:00 – 13:00	• **Lunch**	
13:00 – 13:45	• **Next Steps** – Cost Surfaces • MARXAN	James Byrne
13:45 – 14:15	• **Conclusions and Wrap Up** – Next meeting • Background Data Collection Needs	Raquel Seybert

Appendix 3: National Implementation Support Partnership Members

National Implementation Support Partnership
(as of February 2006)

- Ministry of Agriculture, Fisheries and Forestry
- Ministry of Health and the Environment
- Ministry of Tourism and Culture
- The Nature Conservancy
- Centre for Resources Management and Environmental Studies (CERMES-UWI)
- RARE

Appendix 4: Attendees

Name	Affiliation	Phone	Email
Fitzgerald Providence	IFMDP/PMU	453-3340	fitzpro@yahoo.com
Hayden Billingy	IFMDP/PMU	453-3340	haydensvg2003@yahoo.com
Sophia Punnett	Fisheries	456-2738	sophiapunnett@yahoo.co.uk
Lucine Edwards	Fisheries	456-2738	lucine.edwards@gmail.com
Adrian Bailey	Forestry	529-2606	badskett_2000@yahoo.com
Cathlene Trumpet	Forestry	528-2080	cathshonls@yahoo.com
Dornet Hull	Physical Planning	450-0329	dornetl@hotmail.com
Colin Campbell	Physical Planning	450-0329	ecolinx@gmail.com
Brian Johnson	Forestry	457-8594	forestrysvg@vincysurf.com
Morrison Baisden	National Trust	456-9222	
Cornelius Richards	Forestry	457-8502	forestrysvg@vincysurf.com
Nigel Weekes	National Parks	457-1003	nigelweekes@yahoo.com
Meritha Small	TCMP	485-8191	tcmp191@hotmail.com
Leslie Straker	Fisheries	456-2738	lesliestraker@hotmail.com
James Byrne	TNC	340-773-5575	jbyrne@tnc.org
Raquel Seybert	TNC	340-773-5575	rseybert@tnc.org

Appendix 5: Preliminary Representation Results

St. Vincent and the Grenadines Protected Area GAP Analysis
Preliminary Results

Prepare by James Byrne
The Nature Conservancy

The protected areas included in the GAP Analysis include the Marine Conservation Areas, the Forest Reserves, and the Parrot Reserve. While these have been designated by regulation they have not been formally gazetted. The only ones that have are the Kings Hill Forest Reserve, and the Chateuabelair Reserve. This is as an integral part of meeting the requirement for the biodiversity protection as it is for effective legal protection.

The seagrass data that was used for the analysis is from a regional dataset and is very poor resolution for the Country level. Thus, the data for seagrass is not reflective of the actual conditions. Also, I included the Agro-forestry categories, as these were considered for other jurisdictions, but will need to be decided on by in Country experts.

There are four levels of analysis to demonstrate the different ways of examining the amounts of Habitats protected:

Level 1 - The broadest level is the **Habitat Medium**, which aggregates all of the Habitats together based on Marine, Freshwater or Terrestrial. This is good for a larger picture of how the Country is doing.

Level 2- The next level is the **Major Habitat Type**, which aggregates the ecosystems into major habitat types which are global in scale. This level is good for comparison and targets on a much larger scale than a country.

Level 3 - The mid-level is the **Ecosystems**, which aggregates the individual habitat types into major ecosystems. This could be a level used to set the overall Country Goals, i.e. 30 % of each of the Marine Ecosystems and 20% of each of the Terrestrial Ecosystems.

Level 4 - The finest level is the **Fine Filter Habitats**, which is consisted of each fine scale habitat type. This level could be used for setting the priority habitat protections to achieve the 30% of the Major Habitats, i.e. 10% minimum of each Habitat Type, and 60% of Fore Reef and Reef Flat in the country, 70% of Mangroves, etc….

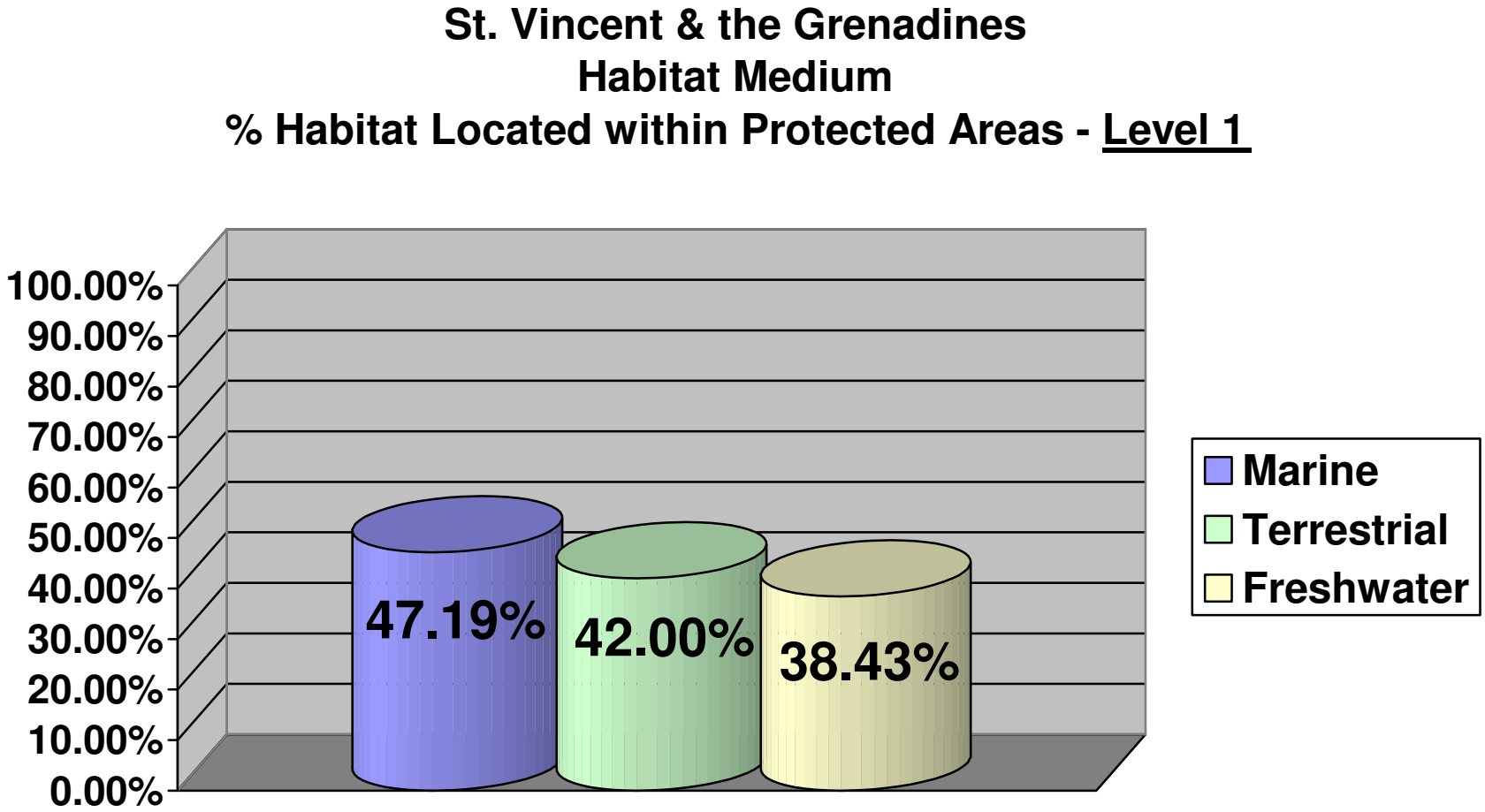
Reference Point – Micronesia Challenge

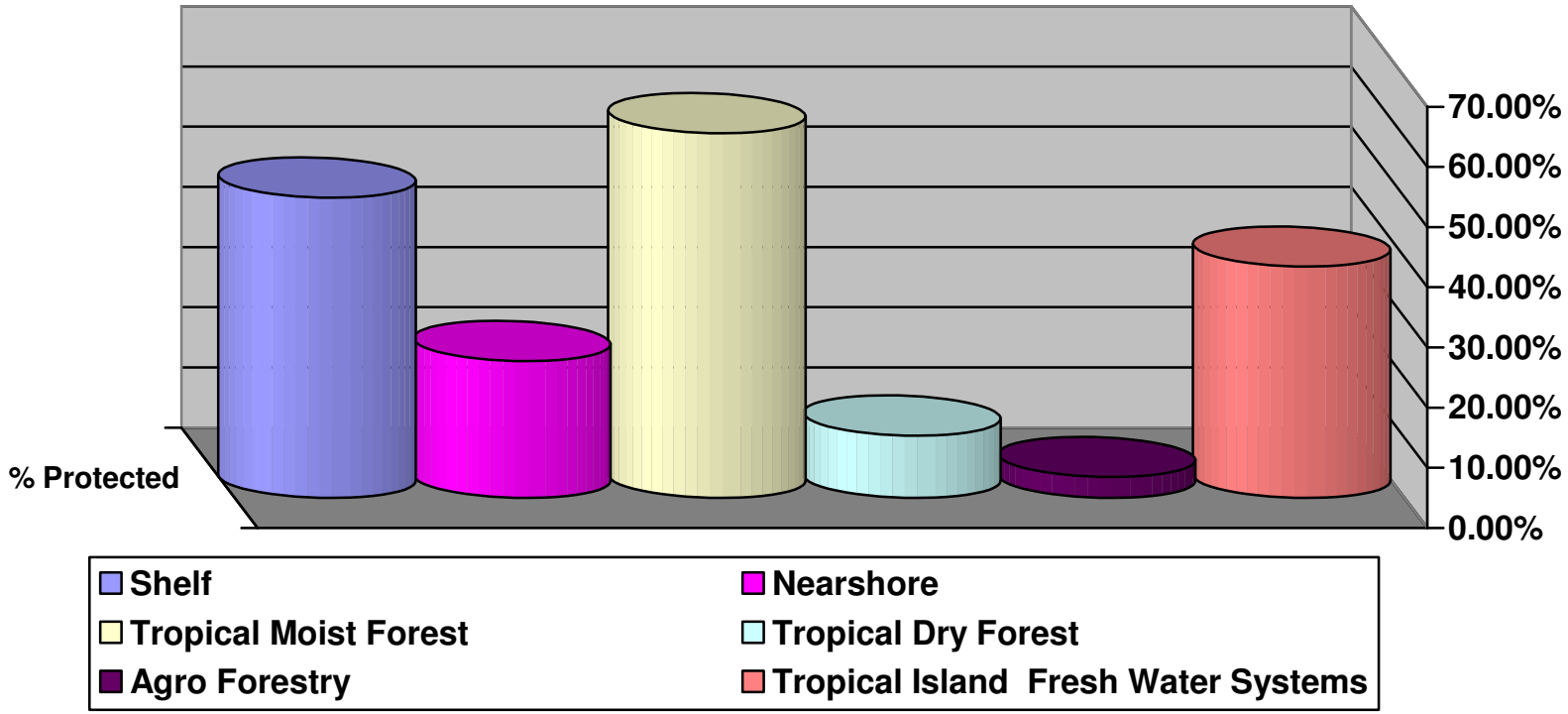
By 2020, effectively conserve at least 30% of the near-shore marine and 20% of the forest resources across Micronesia."

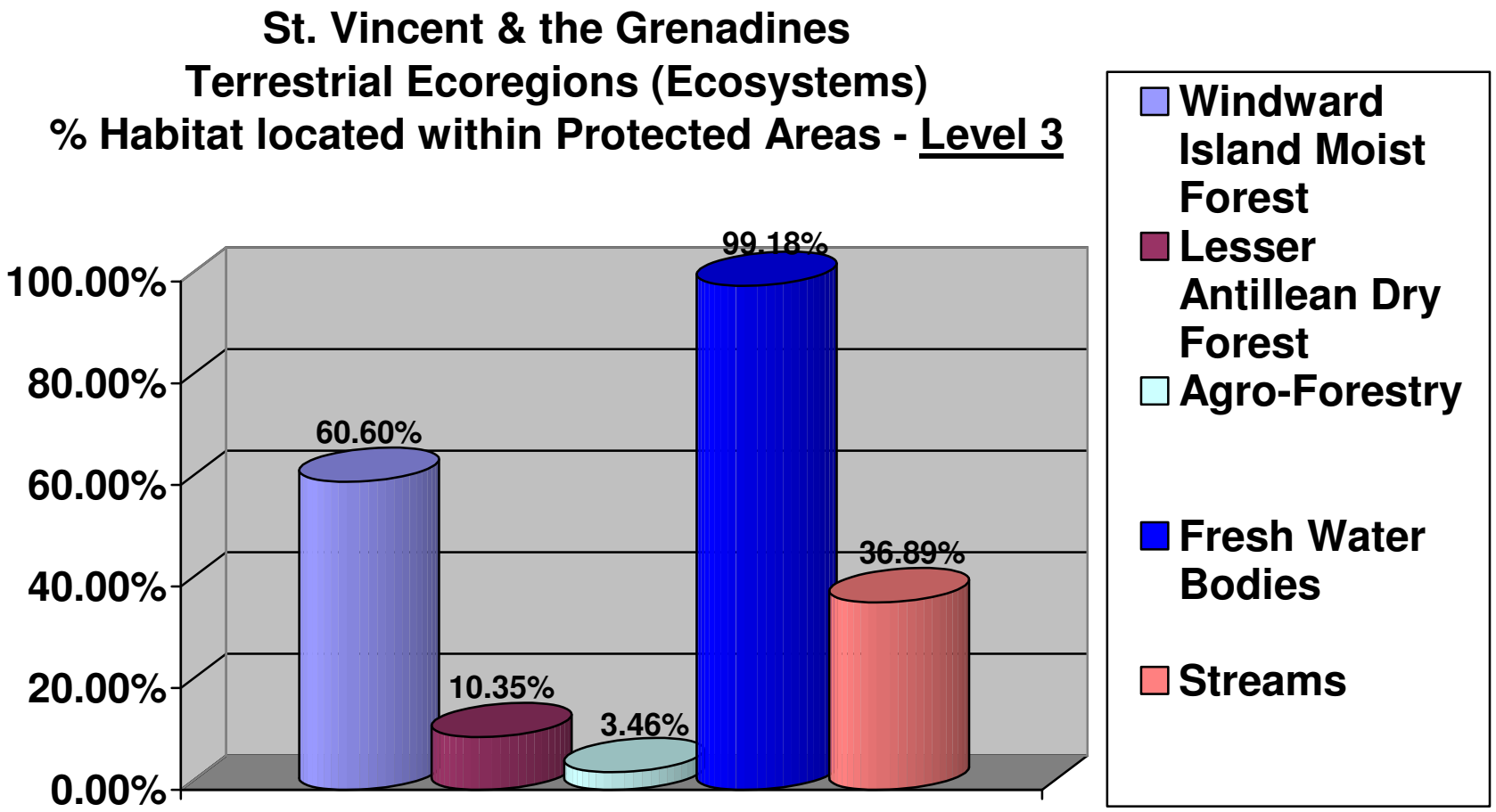
Habitat Classification Scheme

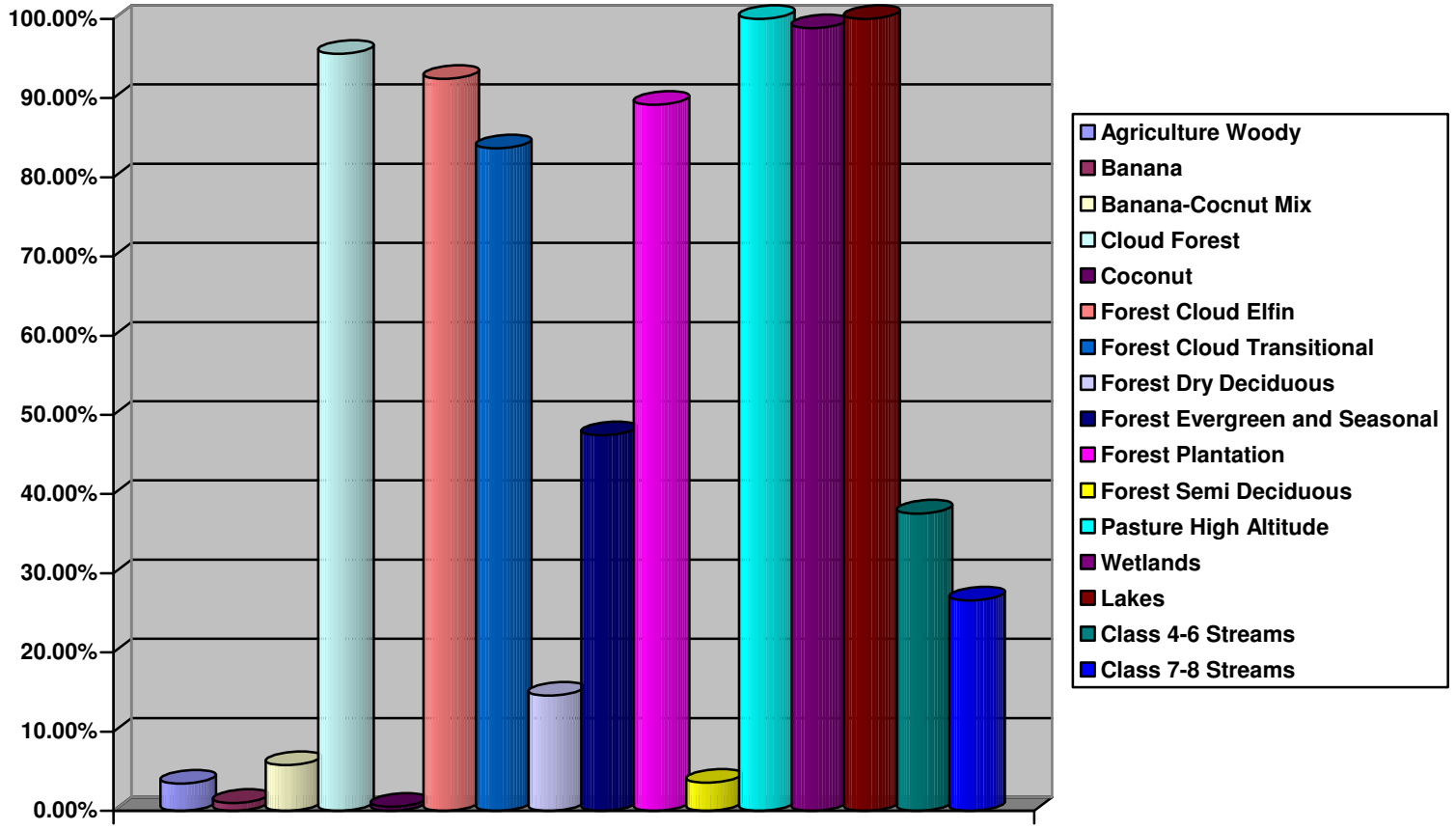
Level 1: Habitat Medium	Level 2: Major Habitat Type	Level 3: Ecosystems	Level 4: Fine Filter Habitats
Marine	Shelf	Reef Habitat	Deep Terrace
			Fore Reef
			Inter-tidal Reef Flat
			Pinnacle
			Reef Flat
			Shallow Terrace
			Reticulated Shallow Terrace
			Sub-tidal Reef Flat
			Channel
			Pass
		Shelf Slope	Outer Slope
			Shelf Slope
		Seagrass	Seagrass
		Lagoonal Habitat	Lagoon Terrace
	Nearshore		Enclosed Lagoon
		Rocky Shore	Rocky Shore
		Beaches	White Sand Beach
			Black Sand Beach
			Loggerhead Nesting Sites
			Leatherback Nesting Sites
			Hawksbill Nesting Sites
			Green Turtle Nesting Sites
		Mangroves	Mangroves
Terrestrial	Tropical Moist Forest	Windward Island Moist Forest	Cloud Forest
			Forest Cloud Elfin
			Forest Cloud Transitional
			Forest Evergreen and Seasonal
	Tropical Dry Forest	Lesser Antillean Dry Forest	Forest Dry Deciduous
			Forest Semi Deciduous
	Agro-Forestry	Agro-Forestry	Agriculture Woody
			Banana*
			Banana-Coconut Mix*
			Coconut*
Freshwater	Tropical Island Fresh Water Systems	Fresh Water Bodies	Emergent Wetlands
			Open Water Bodies
		Streams	Class 4-6 Streams
			Class 7-8 Streams

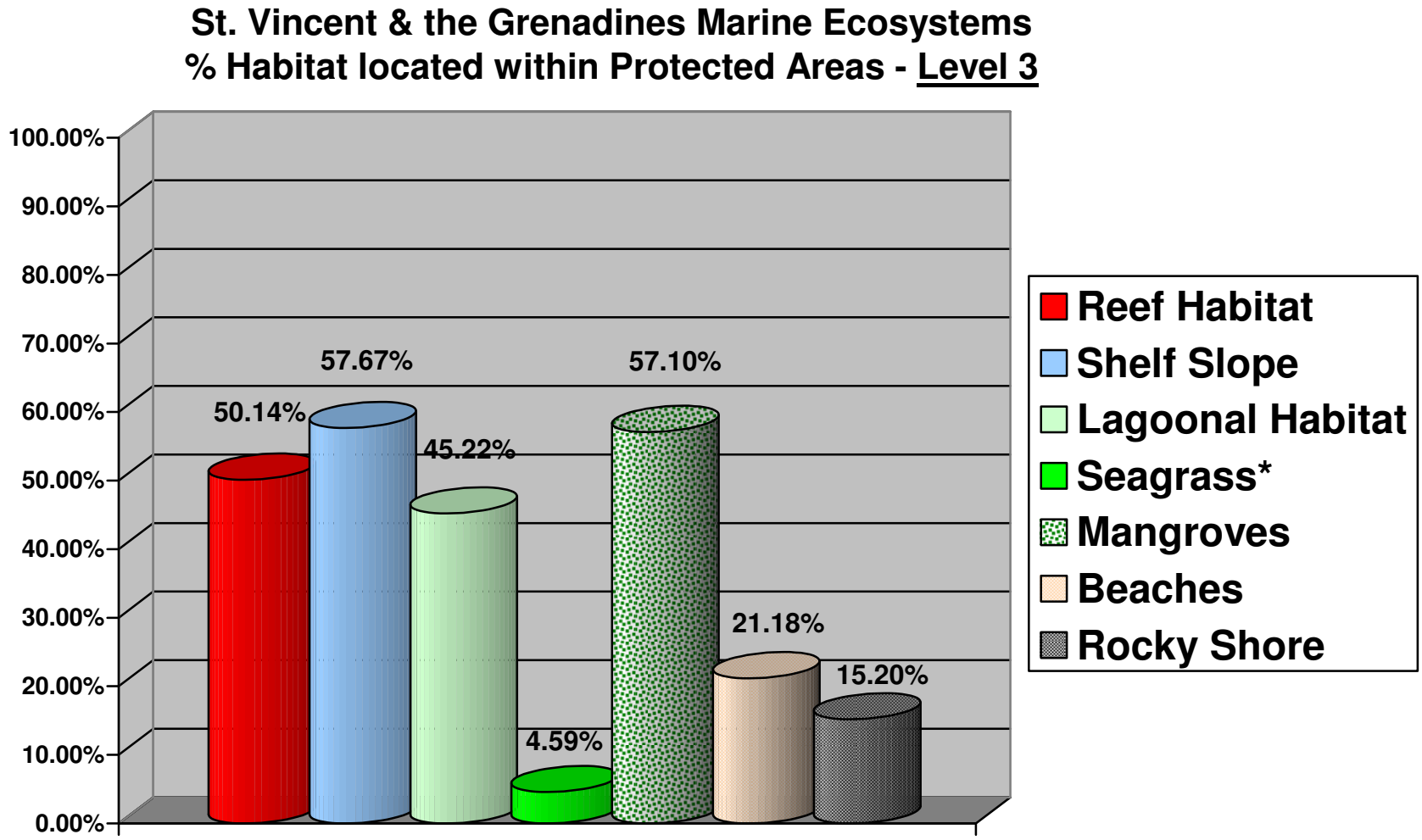
* probably should be excluded as targets


St. Vincent & the Grenadines
Habitat Medium
% Habitat Located within Protected Areas - Level 1
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
47.19%
42.00%
38.43%
Marine
Terrestrial
Freshwater

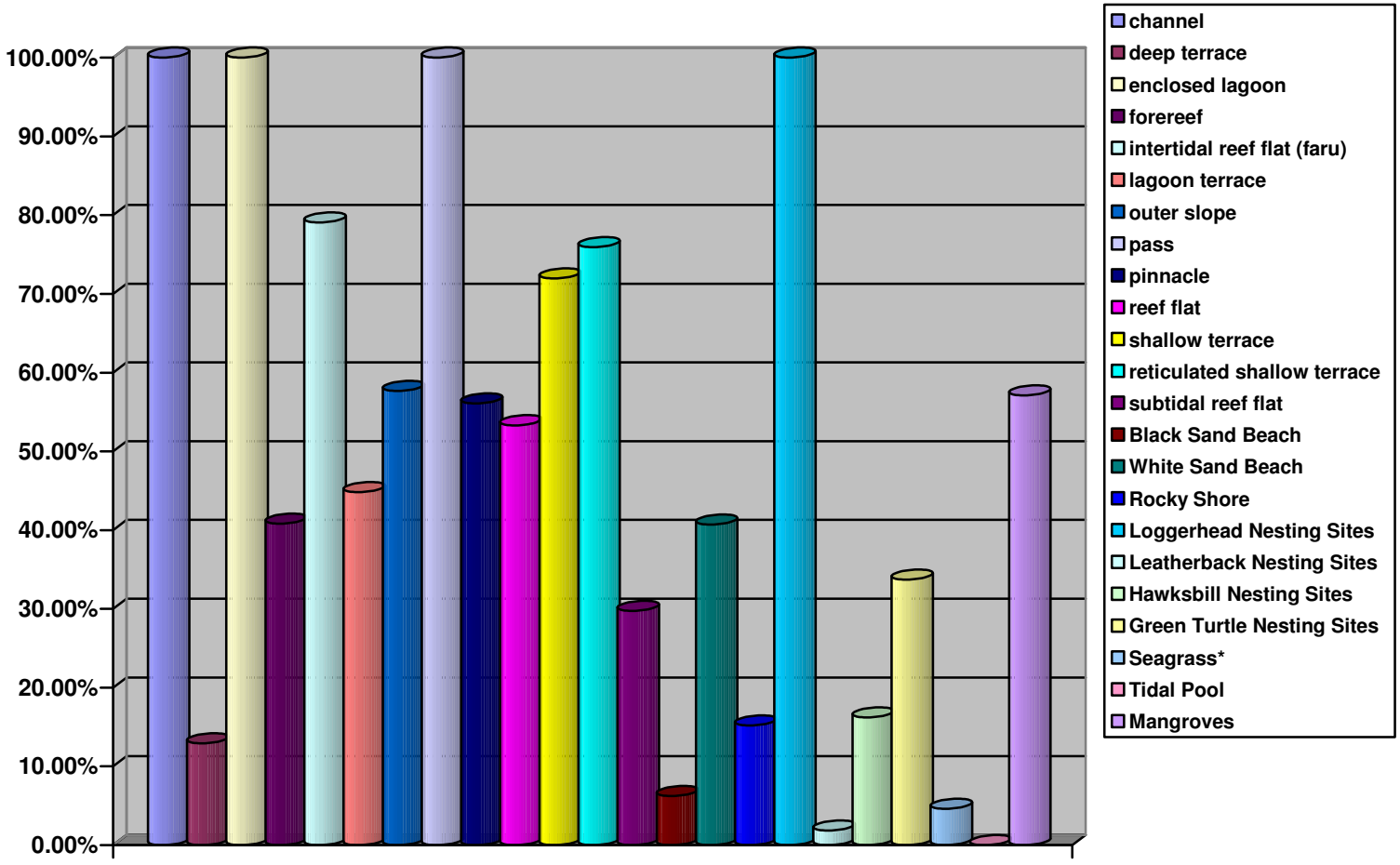

St. Vincent & the Grenadines
Major Habitat Type
% Habitat Located within Protected Areas - Level 2
% Protected
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Shelf
Nearshore
Tropical Moist Forest
Tropical Dry Forest
Agro Forestry
Tropical Island Fresh Water Systems


St. Vincent & the Grenadines
Terrestrial Ecoregions (Ecosystems)
% Habitat located within Protected Areas - Level 3
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
60.60%
10.35%
3.46%
99.18%
36.89%
Windward Island Moist Forest
Lesser Antillean Dry Forest
Agro-Forestry
Fresh Water Bodies
Streams


St. Vincent & the Grenadines
Terrestrial Habitat Types
% Habitat located within Protected Areas - Level 4
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Agriculture Woody
Banana
Banana-Cocnut Mix
Cloud Forest
Coconut
Forest Cloud Elfin
Forest Cloud Transitional
Forest Dry Deciduous
Forest Evergreen and Seasonal
Forest Plantation
Forest Semi Deciduous
Pasture High Altitude
Wetlands
Lakes
Class 4-6 Streams
Class 7-8 Streams


St. Vincent & the Grenadines Marine Ecosystems
% Habitat located within Protected Areas - Level 3
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
50.14%
57.67%
45.22%
4.59%
57.10%
21.18%
15.20%
Reef Habitat
Shelf Slope
Lagoonal Habitat
Seagrass*
Mangroves
Beaches
Rocky Shore

St. Vincent & the Grenadines
Marine Habitat Types
% Habitat located within Protected Areas - Level 4



Appendix 6: Land-cover Classification

Developing a Regional Planning Framework for Biodiversity Conservation, Disaster Preparedness and Economic and Agricultural Development in the Insular Caribbean

Tentative land-cover and woody vegetation formation classification hierarchy suitable for remotely sensed classifications with Landsat

Eileen Helmer, International Institute of Tropical Forestry, USDA Forest Service

(last update: 4/12/2006)

Notes:
Items in **boldface type** are the basic classes that we will map for all 5 of the islands (where they occur). Here, however, we place them in a hierarchy for clarity. Parenthetical climatic zone designations (e.g. dry, moist, wet) refer to likely climatic classification in Subtropical latitudinal zone of Holdridge life zone system.

The forest formation names use seasonality terms from the Federal Geographic Data Committee (FGDC) standards. We substitute the term *Elfin cloud forest* for the term *Dwarf woodland*, and we use Beard's term for *Montane thicket*.

Rather than attempting to map forest successional stages, we are seeking to distinguish land uses because they are spectrally more distinct and because they should be more useful for management. In general, we've found that woody vegetation that still undergoes heavy grazing, or that is intensively cultivated, is spectrally distinct from denser woody vegetation that is recovering from disturbance. On the other hand, dense woody vegetation recovering from disturbance is more often difficult to distinguish from older forest.

Consequently, we use the term *woodland* to refer to woody vegetation that disturbances maintain in an early successional, open-canopy state of 25-60% woody vegetation canopy cover. Typically these disturbances are burning and grazing. In contrast, we call anything *forest* that is not used agriculturally and has a) tree cover of 25-60%, with an understory of shrubs, woody seedlings or saplings, as opposed to grass or heavily grazed grass (it may have residual grass that is no longer grazed), and that is apparently recovering from previous grazing or cultivation, or b) >60% tree cover.

1. **Urban/built-up**
   - **1.1. Hi density**
   - **1.2. Low density residential**

2. **Barren (Sand/rock)**

3. **Water**

4. Agriculture

   4.1. Herbaceous agriculture (row crops, sugar cane, etc.).
   - 4.1.1. Growing or mature crops
   - 4.1.2. Bare or nearly bare fields

4.2. Woody agriculture

4.2.1. Single crop (e.g. coffee, plantain, banana, coconut, citrus, mango)

4.2.2. Mixed woody agriculture (more common, e.g. intermixed or patchy cultivation of 2 or more of the following: banana, plantain, coffee, mango, breadfruit, avocado, soursop, cacao, nutmeg, citrus, acerola, coconut, etc.).

5. Pasture and grassland

5.1. Pasture and grass with <25% woody vegetation

5.2. Golf course (In St. Kitts/Nevis and Barbados, we can distinguish grass in golf courses from other grass).

5.3. Drought-deciduous woodlands (dry) –

Includes: pasture with 25-60% woody vegetation ("rough pasture") that leguminous shrubs dominate and a fairly open understory of grass or highly grazed grass (as opposed to a dense understory that includes many seedlings and saplings and is apparently undergoing succession). The shrubs can become quite tall. Commonly, woody vegetation may include Acacia farnesiana, Prosopis palida, Campeche, Leucaena , or similar species (Beard's Logwood thicket, Logwood-Acacia bush, Leucaena thicket and Thorn savanna). For St. Kitts/Nevis and Puerto Rico, we included fairly dense stands of shrubs if they were very young and monodominiant.

5.4. Montane grassland ("hi-altitude pasture") –

Naturally herbaceous vegetation at very high elevations (not present in St. Lucia)

5.5. Wooded pasture in humid zones (moist, wet, rain) –

In more humid zones, some pasture that is not heavily grazed may have woody vegetation characteristic of early reversion to forest. When canopies are still open and have a grass understory, it's difficult to know whether these patches will become forest or be burned and remain pasture. In moist regions in Puerto Rico *Albizia procera* may dominate woody vegetation. At higher, wetter elevations woody species would likely include *Cyathea arborea.* Depending on canopy closure, distinguishing these areas from woody agriculture or forest can be difficult. For these reasons, in St. Kitts/Nevis and Puerto Rico, we will include these areas with forest.

6. Emergent wetlands and other non-forested wetlands

6.1. Emergent wetlands – wetlands dominated by herbaceous species (e.g. *Typha).*

6.2. Semi-permanently inundated wetlands (may be included with water)

6.3. Tidally or seasonally flooded, non-forested wetlands (e.g. tidal salt or mud flats).

7. Forest and shrublands

7.1. Semideciduous and drought deciduous forest

7.1.1. **Xeric coastal forest (dry)** - succulents very common or dominant, coastal effects evident such as many sclerophyllous species and extremely wind-clipped stands that have also been referred to as shrublands or woodlands (e.g. Beard Cactus scrub). Notes: xeric coastal formations may include patches with evergreen

species common, but these areas can be difficult to distinguish from semi-deciduous and drought deciduous stands. In St. Kitts/Nevis and Grenada, the xeric coastal forest is almost all drought deciduous.

7.1.2. **Drought deciduous forest** (dry) - deciduous tree species dominant. In most of the islands, this is an advanced success ional stage of the "drought deciduous woodland", where the drought deciduous woody vegetation has had a long time to undergo succession, even though it is still secondary forest. We are generally going by the FGDC definitions of vegetation phenology. The FGDC definition for drought deciduous forest is as follows: *"Vegetation where the leaves drop in response to an annual unfavorable season characterized by drought. The foliage is dropped every year. Applied to vegetation adapted to climates with seasonal drought and little cold-season influence (tropical-subtropical)…"deciduous species make up 75% or more of the canopy."*

Note: I remember seeing a lot of this in St. Lucia, we saw dry, drought deciduous forest near the coast (but not right at the water …..I can't remember what is right near the water).

7.1.3. **Semi-deciduous forest** (dry, moist) – deciduous tree species co-dominate with evergreen tree species (e.g. in Puerto Rico, most of the Guanica forest is semi-deciduous….about FGDC definition of semi-deciduous Vegetation: *"Associations (usually tropical and subtropical) in which most of the upper canopy trees are drought-deciduous and many of the understory trees and shrubs are evergreen. The evergreen and deciduous woody plants are not always separated by layers."…."deciduous and evergreen species each make up 25%-75% of the canopy."*

Note: in the Caribbean, I don't think the evergreen and deciduous species are separated by layers at all.

7.1.4. Note: For Puerto Rico, we also distinguish the mixture of semideciduous and seasonal evergreen forest on karst substrate (see class 7.2.3.2)

7.2. Evergreen forest

7.2.1. **Hemisclerophyllous evergreen coastal shrubland (dry)** - dense coastal stands of *Coccoloba uvifera.* We will likely manually recode these from other forest for St. Kitts/Nevis but won't distinguish them for Grenada as they are much less prominent.

7.2.2. **Seasonal evergreen and evergreen forest (moist, moist/wet and wet) –**Note: Along the continum of canopy deciduousness on these islands, it may be difficult to accurately distinguish between semi-deciduous, seasonal evergreen and evergreen forest given the scope and resources of this project. In general, but probably not always, moist seasonal evergreen forest will be grouped with wet evergreen forest.

7.2.2.1.Seasonal evergreen forest (moist)

7.2.2.2.Evergreen forest (wet)

7.2.2.2.1. *Dacroydes/Sloanea* forest.

7.2.2.2.2. Palm brake – forest dominated by Sierra Palm that is not cloud forest

7.2.3. **For Puerto Rico:**

7.2.3.1. **Seasonal evergreen and evergreen forest on alluvial or volcanic substrate**

7.2.3.2. **Semi-deciduous and seasonal evergreen forest on karst substrate**

7.2.3.3. **Seasonal evergreen and evergreen forest on karst substrate**

7.2.3.4. **Seasonal evergreen and evergreen forest on serpentine substrate**

7.2.4. Cloud forest formations (wet and rain) – forest formations at elevations above the cloud condensation level that receive significant portions of their water input from clouds rather than rain

7.2.4.1.1. Tall cloud forest and transitional cloud forest – Tall cloud forest, like "Colorado" forest in Puerto Rico and cloud forest that is transitional between wet evergreen forest and elfin cloud forest. One example is dense stands of *Micropholis* spp. (Beard's Montane thicket).

7.2.4.1.2. Palm cloud forest – cloud forest dominated by Sierra Palm.

7.2.4.1.3. Elfin cloud forest – very short-statured cloud forest (e.g. Beard Elfin woodland)

7.2.4.1.4. Miconia thicket – a canopy of grasses and shrubs and virtually no trees. Note: we may be able to distinguish montane thicket from cloud forest in St. Kitts/Nevis, but we may not be able to distinguish them in Grenada.

7.3. Forested wetlands

7.3.1. Mangrove

7.3.2. *Pterocarpus* swamp

7.3.3. Other – Wetlands dominated by >25% woody vegetation cover that is indicative of disturbance. Dense woody wetlands, with stands dominated by leguminous shrubs, occur close to the southern coast of Puerto Rico in alluvial soils. Open wooded wetlands, reverting from pasture, occur in Nevis.

Important references:

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