Annexes

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Annex 1. Additional Information on Biodiversity within the Project Area (by: S. Aucoin)

1. PROJECT OVERVIEW

Project "*Implementing a 'Ridge to Reef' Approach to Protecting Biodiversity and Ecosystem Functions within and around Protected Areas in Grenada*" (hereafter 'ridge-to-reef project') focuses on 22 documented sites of conservation interest and concern across Grenada and Carriacou (see *Project Identification Form—PIF*). The 22 sites cover a total area of ~16300 ha (163 km^2), comprising ~3400 ha of land (~10 % of all land nationwide—344 km^2) and ~12800 ha of coastal marine environment (bordering >25 % of the national coastline) (see Table 1).

Table 1: Total areal extent of ridge-to-reef project sites by current classification

Current classification[1]	Terrestrial area (ha)	Marine area (ha)	Total area (ha)
Designated protected area	2001	498	2499
Proposed/pending designation	237	752	989
Undesignated protected area	45	-	45
Proposed protected area	1160	11590	12750
Total area of 22 sites	**3443**	**12840**	**16283**

1. See below for description of classification/status

Classification/status of sites are summarized as follows:

Designated protected areas are officially protected sites—legally established with an approved management plan and/or actively managed.

Proposed/pending areas are sites that are currently under active initiatives to becoming established (e.g., within parliamentary process and/or have draft management plans).

Undesignated protected areas are sites where management activities have been put in place and are treated as designated protected areas, but have no true legal establishment (i.e., unofficial/not legislated).

Proposed protected areas are recognized priority areas of conservation interest planned by the ridge-to-reef project, as well as emphasized by seminal country reports *Plan and Policy for a System of National Parks and Protected Areas* (Huber and Vincent 1988) and *Grenada Protected Area System Plan* (Turner 2009).

The following Table 2 profiles the current classification/status at each of the 22 ridge-to-reef project sites and indicates their areal extent. Corresponding maps 1, 2, and 3 identify ridge-to-reef site locations (with their existing borders or projected boundaries) showing land classes and habitat types within and around project sites.

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

Table 2: Ridge-to-reef project site profiles

Official name / current designation / site status	Land (ha)	Sea (ha)	Total area (ha)	Source
Protected Area legally designated/established, approved management plan, actively managed				
Perseverance Protected Area[1]	113	-	113	Management plan
Grand Etang Forest Reserve	~1600	-	~1600	Management plan
Annandale Forest Reserve	236	-	236	Management plan
High North Forest Reserve	52	-	52	GPASP[2]
Moliniere-Beausejour Marine Protected Area	-	60	60	Management plan
Woburn Clarks Court Bay Marine Protected Area	-	438	438[4]	Management plan
Pearls	-	-	To be determined	GPASP[2]
Proposed/pending designation active initiatives, draft management plan, in parliamentary process				
Beausejour Protected Area	60	-	60	Management Plan
Sandy Island/Oyster Bed Marine Protected Area	50[3]	737	787	Management plan
Mt. Hartman National Park and Protected Area[5]	62	-	62	GPASP[2], PIF[7]
Levera Pond Protected Area	65	15	80[6]	Management Plan
Undesignated protected area existing management activities, but no management plan; lacks legislative designation				
Morne Gazo	25	-	25	GPASP[2],
Richmond Hill	8	-	8	GPASP[2], PIF[7]
Grand Bras	4	-	4	GPASP[2], PIF[7]
Mt. Moritz	8	-	8	GPASP[2], PIF[7]
Proposed protected area priority area of interest established; projected initiatives				
Mt. St. Catherine	1000	-	1000	GPASP[2], PIF[7]
High North addition	-	160	160	GPASP[2]
Levera marine area addition	25[8]	725	750	GPASP[2], PIF[7]
Moliniere-Beausejour marine area addition	-	240	240	PIF[7]
White Island marine area	130[9]	1970	2100	GPASP[2], PIF[7]
Grand Anse marine area	-	1500	1500	GPASP[2], PIF[7]
Southeast Coast marine area	5[10]	6995	7000	GPASP[2], PIF[7]

1. Revised name: Perseverance Protected Area and Dove Sanctuary (unofficial)
2. Grenada Protected Area System Plan (Turner 2009)
3. Includes southeast mainland areas of mangroves, Mabouya and Sandy islands
4. Excludes Hog and Calivigny islands; includes yacht mooring areas
5. Revised name: Mt. Hartman National Park and Dove Sanctuary (unofficial)
6. Includes Sugar Loaf Island and area between Sugar Loaf Island and Levera Beach
7. *Ridge-to-Reef Project Identification Form*
8. Includes Green and Sandy islands
9. Includes White, Saline, Frigate, and Bird islands
10. Glover Island

2. MARINE AREAS

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

Knowledge of the areal extent and distribution of ecosystems is essential in the implementation of 'ridge-to-reef' approaches to conservation (Douvere and Ehler 2009, Baldwin and Mahon 2011). Available information on ecosystems critical for conservation (coral reefs, seagrass beds, mangroves) for marine project sites is summarized in Table 3. Percentage shown indicates the estimated proportion of these ecosystems present at each ridge-to-reef marine project site (i.e., within existing site borders or projected site boundaries) in relation to total nationwide extent (see Maps 1 and 2). In summary, the ~12800 ha of coastal marine environment covered by the ridge-to-reef project (see Table 1, Maps 1 and 2) includes: 34 % of the estimated total coral reef area, 51 % of the estimated seagrass area, and 67 % of the estimated mangrove area nationwide.

Table 3: Areal extent of marine ecosystems critical for conservation in Grenada in relation to ridge-to-reef project sites

	Estimated area from available GIS data					
GRENADA	**Reef Area 3052 ha[1]**	**%**	**Seagrass 894 ha[1]**	**%**	**Mangrove 172 ha[2]**	**%**
Moliniere-Beausejour MPA	7	0.2	0	-	0.1	0.05
Moliniere-Beausejour addition	77	3	0	-	n/a	-
Woburn Clarks Court Bay MPA	77	3	127	14	9	5
Levera Pond & Levera addition	172	6	0	-	37	22
Grand Anse	177	6	134	15	0.4	0.2
Southeast Coast	954	31	226	25	79	46
Project area for Grenada	**1464 ha**	**49 %**	**487 ha**	**54 %**	**126 ha**	**73 %**

CARRIACOU	**Reef Area 2043 ha[1]**	**%**	**Seagrass 407 ha[3]**	**%**	**Mangrove 112 ha[1,4]**	**%**
Sandy Island/Oyster Bed MPA	22	1	80	20	34	30
White Island	268	13	93	23	9	8
High North addition	n/a	n/a	n/a	n/a	21	20
Project area for Carriacou	**290 ha**	**14 %**	**173 ha**	**43 %**	**64 ha[4]**	**58 %**

Grenada + Carriacou	**Reef Area 5095 ha[1]**	**%**	**Seagrass 1301 ha[3]**	**%**	**Mangrove 284 ha[5]**	**%**
Ridge-to-reef project area covered nationwide	**1754 ha**	**34**	**660 ha**	**51**	**190 ha**	**67 %**

n/a: not applicable

1. GIS data from the Land Use Division of the Ministry of Agriculture, Lands, Forestry and Fisheries (Grenada) and crossed referenced with other available sources (e.g., Reefbase 2013)
2. Data from Helmer *et al.* (2008), circa 2001
3. Seagrass data from the Land Use Division of the Ministry of Agriculture, Lands, Forestry and Fisheries (Grenada) and crossed references with other available sources (e.g., UNEP-WCMC 2005) and includes data obtained from the Sandy Island/Oyster Bed Marine Protected Area Management Plan (i.e., from classification maps)
4. Available data on mangrove cover on Carriacou are more than likely overestimations (see Section 2.2.2)
5. Sum of mangrove data for Carriacou (from the Land Use Division of the Ministry of Agriculture, Lands, Forestry and Fisheries) and Grenada (from Helmer *et al.* 2008)

2.1 Coral reefs

2.1.1 Historical and present context

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

Coral cover across Caribbean reefs has declined by an average of 80 % since the mid-1970s (i.e., a reduction from about 55 % hard-coral cover to less than 10 % during the last 40 years) (Gartner *et al.* 2003, Jackson *et al.* 2012; see Figure 1). Concerted impacts to the marine environment from multiple human activities(Hughes and Connell 1999, Crain *et al.* 2008) along with Caribbean-wide declines in carbonate production threaten future coral reef growth (Perry 2013).

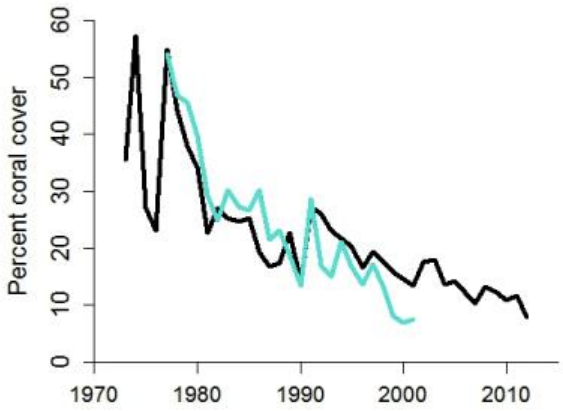

Fig. 1: Decline in percent live coral cover in Caribbean coral reefs from 1973 to present. Black line represents compiled data based on yearly averages weighted by the area surveyed per study; blue line represents data adapted from Gardner *et al.* 2003 (in Jackson *et al.* 2012).

2.1.2 State and extent of coral reefs in Grenada

The Lesser Antilles (including Grenada) has been identified as the global region with the 2nd highest proportion of reefs considered in critical stages (i.e., showing a recent 50-90 % coral decline and with a number of reefs likely to be effectively lost during the next 20 years) (see Wilkinson 2008). Virtually all coral reefs and adjacent marine areas of the Lesser Antilles are classified as being at significant risk from human activities (Bryant *et al*. 1998, Roberts *et al*. 2002, Bouchon *et a*l. 2008), with Grenada placing in the highest risk quartile from current threat analyses conducted on 27 countries and territories considered most vulnerable (Burke *et al.* 2011).

From the assessment by Burke and Maidens (2004), Table 4 shows the *Reefs at Risk Index* for Grenada (i.e., proportional scale of threat across all reefs) in relation to (1) fishing pressure—unsustainable harvesting of fish and invertebrates, (2) coastal development—runoff from coastal construction, sewage discharge, and impacts from unsustainable tourism, (2) watershed-based pollution—erosion and nutrient fertilizer runoff from agriculture delivered by rivers to coastal waters, (4) marine-based pollution and damage—solid waste and contaminants from gas installations or shipping, and physical damage from anchors and ships.

Table 4: Ranked threats to reefs in Grenada showing proportional scale (%) of threats across reefs; *Reef Threat Index* indicating the cumulative rating (%) of reef threats in the country (adapted from Burke and Maidens 2004)

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

Individual threat	Low	Medium	High
Fishing pressure	0	37	63
Coastal development	15	22	63
Watershed-based pollution	43	27	30
Marine-based pollution and damage	76	14	9

All threats together	Low	Medium	High	Very high
Reef Threat Index[1]	0	20	40	40

1. The index is rated *very high* where three or four of the individual threats are high

Large-scale mapping data and analyses used to produce current reef estimates remain too coarse to measure explicit coral reef structures or coral cover (Palandro *et al.* 2008). Past and current estimates of reef areas for Grenada and Carriacou vary (Table 5) and the available data does not identify the proportion of live coral and/or healthy contiguous reef habitat. Note that indicating *reef area* (as is often done) instead of coral cover can be misleading. For example, many large reef areas indicated for Grenada (notably on the southeast side of the island; see Map 1) do not have any major reef structures (e.g., reef crests), but instead are comprised mostly of fleshy algal pavements or dense stands of algae (e.g., *Sargassum* spp.) that overlie carbonate foundations (presumably from ancient *Acropora* spp. accretion) (Adey and Burke 1976).Taking this general *reef area* characterization into account, 60 % of the estimated *reef area* occurs in Grenada and 40 % in Carriacou.

Table 5: General estimates[1] of coral reef areas nationwide

Total reef area[1] (km^2)	Source
51	UNEP-WCMC, WorldFish Centre, WRI and TNC (2010) IMaRS-USF and IRD (2005) IMaRS-USF and IRD (2005)
160	Burke and Myers 2004
150	Spalding *et al.* 2001

1. Note that estimates do not necessarily differentiate between live/dead corals or rocky bottom substrates (e.g., coral rubble, bedrock)

The actual proportion of live coral cover across reefs in Grenada is largely unknown and higher resolution surveys of reef areas are needed. Spalding *et al.* (2001) indicated that even though there are fringing and patch reefs across all coasts of Grenada also highlighted that "the total area of reef is not great", presumably referring to contiguous reef habitat or live coral cover. The majority of Grenada's shallow reef environment is overgrowing with algae (Anderson *et al.* 2012). Deeper more offshore reefs have been noted as being relatively healthier, with algal growth said to be mostly seasonal (Creary 2008).

Anderson *et al.*(2012)further report that existing coral reef habitat in Grenada's nearshore waters is comprised mostly of low-density stands of branching corals: *Agaricia* spp. and *Porites* spp. (notably in the southwest). There are some relatively significant stands of *Acropora* sp. to the

north (despite hurricane damage in the recent past) and large bank barrier reefs off the eastern coast of Carriacou provide relatively better reef habitat than that found off mainland Grenada(GoG 2001, Bouchon *et al.* 2008; pers. comm. 2013, D. Winsborrow—local sport diver).

Systematic reef surveys have only been conducted off the southwest coast of Grenada (Table 6), where the majority of established coral dive sites occur (Bouchon *et al.* 2008). Low values of coral cover in relation to algae are similar to many reported findings from across the Caribbean (see Figure 1).

Table 6: Summary of reef cover surveys across a number of locations in the Grand Anse reef system (southwest Grenada)

Survey year	**2006-2007[1]**	**2007[2]**	**2008[3]**	**2010[3]**
Number of survey locations	9	6	5	5
Live hard coral (%)	24 - 38	10	17	15
Fleshy algae (%)	37 - 53	42	46	53

1. Bouchon *et al.* 2008
2. Creary 2008
3. Anderson *et al.* 2012 (only data from point line transects are shown)

The Fourth National Report of Grenada to the Secretariat on the Convention on Biological Diversity (2009) states that coral reef surrounding Grenada is estimated at 12.5 km^2 (no further information or reference provided). A coral reef area of 12.5 km^2 would result by applying an estimate of 25 % live coral cover to the total reef area estimated for Grenada (i.e., 51 km^2, see Table 5). A 15 % live coral cover (from data in Table 6) applied to the total reef area estimated (51 km^2) would yield an estimate of ~8 km^2 of live coral reef cover nationwide.

2.1.3 Reef biodiversity and species of conservation concern

Caribbean reefs likely contain about 30000 described species (Reaka-Kudla 2005). In an inventory of 5 major taxonomic groups within the Caribbean, 12046 marine species were directly identified, with 1441 species from these groups occurring in the Lesser Antilles (Miloslavich *et al*. 2010). Table 7 summarizes species numbers within these major groups identified for the Lesser Antilles (excluding crustaceans—except amphipods; and excluding fish—see Section 2.1.3.2).

Only hard corals, reef-associated fish and sea turtles are examined in this section. Many other important coastal species of conservation concern (e.g., bottlenose dolphins and other cetaceans) and/or reef-associated species (e.g., Queen conch, spiny lobster, tube sponges, etc.) are not included in this species assessment.

Table 7: Number of species identified in 5 major taxonomic groups in the Lesser Antilles

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

(adapted from Miloslavich *et al.* 2010)

Major taxonomic group	Number of species
Hard corals	71
Sponges	126
Molluscs	1119
Echinoderms	79
Amphipods	46
Total species	1441

2.1.3.1 Coral species

Of the 71 *hard coral* species (order Scleractinia) known to occur in the Lesser Antilles (Miloslavich *et al*. 2010), 54 species from 10 family taxa are identified as occurring in Grenada (see Appendix 1; Anderson *et al.* 2012, Sealifebase 2013, IUCN 2013, UNEP-WCMC 2013). To simplify, only scleractinian corals are addressed in this report as they are considered the basic reef-forming/building corals (Humann and Deloach 2002). Information on *octocorals* (e.g., gorgonian sea fans), *hydrocorals* (e.g. *Millepora* fire corals) and other important reef invertebrate components in Grenada cannot be evaluated in this report because little information is available. Note that hydrocorals were included as hard coral cover in reef surveys identified in Table 6. Almost all of the hard coral species identified as occurring in Grenada have been assessed under the protocol of the IUCN Red List of Threatened Species, and 11 species are currently red-listed (Table 8; IUCN 2013).

Table 8: Conservation status of hard corals (i.e., reef-building) in Grenada

Species	Common name	IUCN status[1]
Acropora cerviconis	Staghorn coral	*Critically Endangered*
Acropora palmata	Elkhorn coral	
Montastraea annularis	Boulder star coral	*Endangered*
Montastraea faveolata	Mountainous star coral	
Porites branneri	Blue Crust Coral	*Near Threatened*
Agaricia lamarcki	Lamarrck's sheet coral	*Vulnerable*
Montastraea franksi	Boulder star coral	
Dichocoenia stokesii	Elliptical star coral	
Dendrogyra cylindrus	Pillar coral	
Mycetophyllia ferox	Rough cactus coral	
Oculina varicosa	Large ivory coral	

1. IUCN Red List of Threatened Species (2013)

2.1.3.2 Reef-associated fish

Appendix 2 shows 317 reef-associated fish from 72 family taxa identified as occurring in Grenada (Fishbase 2013). Of these, 81 fish have beenassessed under the protocol of the IUCN Red List of Threatened Species, and 23 species are currently red-listed (Table 9; IUCN 2013). Past annual surveys conducted at five reefs across the southwest coast (i.e., Grand Anse) showed that fish diversity indices were high and similar across sites, but that the density of most major fish groups

examined decreased significantly from 2008 to 2010 (Anderson *et al.* 2012). Overfishing of reef fish in Grenada has been documented in the past (Jeffrey 2000) and remains a major threat largely unabated (see Table 4). Increasing exploitation of reef fisheries along with increasing tourism—one of the fastest growing economic sectors in the Eastern Caribbean, is more than likely affecting fish stocks adversely (Jeffrey 2000). Threats to reef fish populations are now compounded by invasive lionfish (*Pterois volitans*—known to significantly reduce recruitment of coral reef fishes; Albins and Hixon 2008). Lionfish were first reported in Grenada circa 2010 (Loughney 2013) and recent eradication projects have captured more than 50 individuals in one day in the Moliniere-Beausejour Marine Protected Area (pers. comm. 2013, P. Phillipson—Scubatech Dive Center, Grenada).

Table 9: Conservation status of reef-associated fish in Grenada

Species	Common name	IUCN status[1]
Epinephelus itajara	Atlantic goliath grouper	*Critically Endangered*
Epinephelus striatus	Nassau grouper	*Endangered*
Albula vulpes	Bonefish	
Carcharhinus acronotus	Blacknose shark	
Carcharhinus falciformis	Silky shark	
Carcharhinus leucas	Bull shark	
Carcharhinus limbatus	Blacktip shark	
Negaprion brevirostris	Lemon shark	
Aetobatus narinari	Spotted eagle ray	*Near Threatened*
Scarus guacamaia	Rainbow parrot fish	
Dermatolepis inermis	Marbled grouper	
Mycteroperca bonaci	Red grouper	
Mycteroperca bonaci	Black grouper	
Mycteroperca venenosa	Yellowfin grouper	
Paralabrax dewegeri	Vieja	
Balistes vetula	Queen triggerfish	
Lachnolaimus maximus	Hogfish	
Lutjanus analis	Mutton snapper	
Lutjanus cyanopterus	Cubera snapper	*Vulnerable*
Megalops atlanticus	Tarpon	
Mycteroperca intestitialis	Yellowmouth grouper	
Hippocampus erectus	Lined seahorse	

1. IUCN Red List of Threatened Species (2013)

2.1.3.3 Reef-associated turtles and turtle nesting

Of the four marine turtles known to frequent waters of Grenada, only hawksbill and green turtles occur in reefs and adjacent foraging habitats (e.g., seagrass beds and mangroves). Loggerhead turtles occur further offshore and leatherback turtles will come inshore during the nesting season (Grazette *et al.* 2007) but only to beaches near deep water and typically away from coral reefs.

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

Sea turtle nesting occurs intermittently along northeastern beaches of Grenada and generally on most beaches around Carriacou. Beaches at four ridge-to-reef project sites have significant turtle nesting activity documented (Table 10) and appear to include the majority of recent sea turtle nesting sites (SWOT 2013). Nesting turtle populations in Grenada are under significant pressure from illegal harvesting of sea turtle eggs and a legal turtle fishery (Lloyd and King 2006, Grazette *et al.* 2007, Isaac 2010).

Table 10: Conservation status and nesting of sea turtles in Grenada[1]

Species[1]	Common name	IUCN status[2]	Site	Max. annual nesting frequency[3]
Dermochelys coriacea	Leatherback turtle[4]	Critically Endangered	Levera Pond & Levera addition High North additon White Island Sandy Island / Oyster Bed MPA	>1000 <500 <100 <25
Eretmochelys imbricata	Hawksbill turtle	Critically Endangered	High North addition Levera Pond & Levera addition	<100 <25
Chelonia mydas	Green turtle	Endangered	High North addition	<25

1. Note that IUCN red-listed *Endangered* loggerhead turtle (*Caretta caretta*) also occurs in national waters, but further offshore
2. IUCN Red List of Threatened Species (2013)
3. Maximum estimate of binned turtle clutches from data presented from 2006 to 2010 (SWOT 2013)
4. Both marine turtles are also associated with mangrove and seagrass habitats (see Sections 2.2.3 and 2.3.3)

2.2 Mangroves

2.2.1 Historical and present context

Mangroves are disappearing worldwide by 1-2 % per year, a rate greater than or equal to declines in adjacent coral reefs (Duke *et al.* 2007). Large-scale analyses across the Americas (including Grenada) indicate that at least 38 % of mangrove forest area has been lost over recent decades (Valiela 2001). More recent studies using improved spatial analyses now show that worldwide mangrove cover is even less than previously estimated (by at least 12 %; see Giri *et al.* 2011).

Impacts to mangrove forests come from direct human activities (Ellison and Farnsworth 1996, Farnsworth and Ellison 1997, Alongi 2002, Gillman *et al.* 2008) and indirect qualitative degradation, where other coastal vegetation and mangrove associates (e.g., *Acrostichum* spp.) replace typical, valuable, and functional true mangrove species with no change in vegetation cover to the initial mangrove area (see Dahdouh-Guebas *et al*. 2005, Ellison *et al.* 2005). The protection and restoration of mangroves are probably among the most important conservation priorities for Grenada (Helmer *et al.* 2008).

2.2.2 State and extent of mangroves in Grenada

Loss of mangroves in Grenada has occurred primarily because of clearing for construction and land conversion (e.g., the removal of mangroves for marinas and yachting activities; Thomas 2000; Moore 2004), followed by waste disposal (e.g., landfill garbage, asphalt manufacturing effluents;

Rusk 2010) and firewood/charcoal production (FAO 2007, Rusk 2009, Spalding *et al.* 2010). Recent estimates of mangrove distribution over time for Grenada indicate an annual mangrove areal decline of 1.2 to 1.3 % occurring from 1980 and projected to 2005 (FAO 2007). However, with large unaccounted mangrove declines due to clearings around Levera Pond (in Grenada; Rusk 2009) and Tyrell Bay (in Carriacou; Moore 2004) the estimated annual mangrove decline over time is likely greater than currently specified.

The most reliable estimate of total mangrove area in Grenada (excluding Carriacou) is currently calculated at 172 ha (see Table 3 and Map 1; Helmer *et al.* 2008). Levera Pond remains the largest stand of mangrove forest and accounts roughly for 20 % of the estimated mangrove area on the island (~33 ha; Spalding *et al.* 1997, FAO 2007). Remaining mangroves in Grenada are located mainly along the northeastern and southwestern coasts spread out in pockets alongside fringing coastal forests. Available GIS data sourced from the Land Use Division of the Ministry of Agriculture, Lands, Forestry and Fisheries (Grenada), Spalding *et al.* (2010), and including mangrove cover estimated on Saline island (gleaned from GoogleEarth), yield a total areal estimate of 112 ha of mangroves for Carriacou (see Table 3 and Map 2). Nevertheless, this areal extent is based on large-scale classification analyses considered very course and does not take recent hurricane damage into account. It is more than likely that mangrove cover on Carriacou is much less than currently estimated (see Moore 2004a, 2004b).

2.2.3 Mangrove biodiversity and species of conservation concern

A total of 10 mangrove tree species from 4 genera are found in Atlantic Latin America and the Caribbean (Lacerda 1993). Five true mangrove tree species are present in the Lesser Antilles (Imbert *et al.* 2000), and all have been identified in the mangal flora of Grenada (Table 11; Tomlinson 1994, FAO 2007, Massó-Alemán *et al*. 2010). These are listed as 'Least Concern' under the protocol of the IUCN Red List of Threatened Species (IUCN 2013); however, it is important to note that at insular local scales (such as Grenada), these mangrove species and entire mangrove ecosystems are generally considered threatened (see Polidoro *et al*. 2010).Many plant species also occur associated with mangrove forests in the Caribbean, with flora varying from region to region and even from forest to forest in a given region (de Lacerda 1993). No systemic faunal or floral species assessments have been conducted in mangroves across Grenada.

Table 11: The five mangrove tree species identified as occurring in Grenada

Species	Common name	IUCN Status[1]
Avicennia germinans	Black mangrove	Least Concern[2]
Avicennia schaueriana		
Conocarpus erectus	Silver-leaved buttonwood	
Laguncularia racemosa	White mangrove	
Rhizophora mangle	Red mangrove	

1. IUCN Red List of Threatened Species (2013)
2. Pertains to the global distribution range; note that the areal extent of mangroves in Grenada accounts for ~0.5 % of the total land area and ~3 % for Carriacou, thus warranting a greater local conservation concern

Mangrove fauna is large and diversified—hundreds of species of terrestrial and marine invertebrates, along with over 140 bird and 220 fish species identified, create a variety of dynamic and diverse assemblages across mangroves in the Americas (de Lacerda 1993). In nearby Trinidad,

over 350 species of invertebrates (e.g., insects, crustaceans) and vertebrates (e.g., birds, reptiles) were recorded in just one mangrove forest (de Lacerda 2002).

Much of the fauna found in mangroves also occurs in other coastal habitats; for example, many typical coral reef fishes have been recorded to occur frequently in mangroves (Alvarez-Leon 1993) and *Critically Endangered* hawksbill turtles and *Endangered* green turtles are also known to feed along mangrove edges (Limpus and Limpus 2000, Guebert-Bartholo *et al.* 2011, Gaos *et al.* 2012).

Many species occupy mangroves during some stage of their life cycle or as part of their daily activities or migrations. Whether resident, transient or vagrant, 106 of the 222 bird species recorded in Grenada (Appendix 3) are known to occur/frequent mangrove forests or mangrove edges (Frost and Messiah 2003, Rusk 2008, BLI 2012, Ridgley *et al.* 2012, Avibase 2013, Cornell 2013; IUCN 2013). Of all the birds identified in Grenada and known to occur/frequent mangrove forests or mangrove edges (see Appendix 3), 3 species are of conservation concern and the scaly-breasted thrasher has a restricted range across the Lesser Antilles (out of 3 birds considered regional endemics known to occur in Grenada) (Table 12). Moore (2004) notes that without mangrove habitats in Carriacou it is unlikely that many waterbirds would remain on the island.

Table 12: The four birds of conservation concern known to occur/frequent mangroves in Grenada and/or mangrove habitat edges.

Species	Common name	IUCN Status[1]
Calidris pussilla	Semipalmated sandpiper	Near Threatened
Fullica caribaea	Caribbean coot	Near Threatened
Dendrocygna arborea	West Indian whistling-duck	Vulnerable
Allenia fusca	Scaly-breasted thrasher	Regional endemic[2]

1. IUCN Red List of Threatened Species (2013)
2. IUCN status *Least Concern*; (i.e., restricted range); formerly known as *Margarops fuscus*

2.3 Seagrass

2.3.1 Historical and present context

Global seagrass cover has been reduced by at least 29 % (by ~51000 km^2) over the past century, with rates of decline increasing nearly 8-fold from before 1940 through to 1990 (Waycott *et al.* 2009). Comparable to rates of decline reported for coral reefs and mangroves, seagrass loss has been estimated at 110 km^2 per year since 1980 (Orth *et al.* 2006, Waycott *et al.* 2009).

Threats to seagrasses worldwide are similar and widespread (Green and Short 2003, Short *et al.* 2011). In tropical regions, the major impacts by human activities responsible for seagrass loss include those affecting water quality or clarity (e.g., eutrophication leading to algal blooms) as a result of nutrient loading (e.g., fertilizers) and increased turbidity (e.g., sedimentation) from agricultural runoff and sewage disposal, upland clearing (e.g., erosion of watersheds due to deforestation), mechanical damage (e.g., dredging and deposition, boating activities), construction and coastal development (e.g., tourism), water pollution (e.g., leaching of pesticides, disposal of toxic wastes) and fisheries (e.g., trawling, aquaculture) (Short and Wyllie-Echeverria 1996, Green and Short 2003, Orth *et al.* 2006, Short *et al.* 2011). Insufficient data is available to provide a comprehensive assessment of Caribbean seagrasses (Green and Short 2003), and much less so for Grenada, but acknowledged general declines in the region have resulted from a combination of these impacts—also related to declines in coral cover (see Table 13; compare to Table 4).

Table 13: Percentage of global seagrass species affected by the top 4 major threat categories (adapted from Short *et al*. 2011).

Major threat category[1]	Percentage of affected species[2]	Percentage of affected species at significant risk[3]
Coastal development	93	21
Water quality	58	26
Mechanical damage	44	9
Fisheries	38	4
Sedimentation/siltation	36	12

1. Threat categories are not mutually exclusive (e.g., water quality can also be affected by coastal development)
2. 72 species assessed worldwide
3. Percent of affected seagrass species classified as either IUCN status *Threatened* or *Near Threatened*

2.3.2 State and extent of seagrass beds in Grenada

Nayer *et al.* (2009) indicate that seagrass beds are predominantly concentrated on the eastern and southeastern coasts of Grenada and around the eastern and southwest coasts of Carriacou, based on sea urchin harvesting sites (typically, shallow seagrass habitats). The lack of urchin harvesting sites on the western and northern coasts suggests that such habitat is not as common in these areas. Based on reports from the early 1980s, the Ramsar Convention on Wetland's country profile for Grenada also notes the presence of extensive seagrass beds off the eastern and southern coasts of Grenada and off western Carriacou (see Scott and Carbonell 1986).

Available estimates of seagrass areas in Grenada and Carriacou have been calculated to total ~1300 ha (see Table 3). Ridge-to-reef marine sites include ~50 % of this estimated area (see Maps 1 and 2). Nevertheless, one needs to take into account that this data, provided by UNEP-WCMC (2005), is best limited to large-scale analyses as it is reported to have substantial inaccuracies, poor spatial representation, and limited spatial resolution (Wabnitz 2008). More reliable and current estimates of seagrass cover are necessary for small island states such as Grenada, especially since seagrass distribution generally changes on the micro-scale level and over very short periods (Short *et al.* 2007). Note that optical remote sensing is now providing detailed high-temporal resolution for mapping seagrass areas with much greater confidence (Pu *et al*. 2010).

Despite few historical reports available that document the permanent loss of seagrass beds in the Caribbean, Green and Short (2003) report on the loss of seagrasses in Carriacou between 1969 and 1994 in their report *World Atlas of Seagrasses* (but provide no further detail). Recently, Moore (2004a) reported that sand mining near the Sandy Island/Oyster Bed Marine Protected Area, as well as land-reclamation activities resulting in cleared mangroves within Tyrell Bay, have created a permanent disturbance to surrounding seagrass beds. Removal of sand from beaches and coastal areas for use in the construction industry is widespread throughout the Caribbean, particular in the smaller island states (Green and Short 2003). Sand mining is now prohibited in Grenada(Singh 2010), but smaller scale removals still occur (Isaac 2010). GIS data obtained from the Land Use

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

Division of the Ministry of Agriculture, Lands, Forestry and Fisheries indicated that sand mining activities occurred predominantly on the northeastern side of the island in the recent past (south of Levera on beaches between Conference Bay and Great River Bay—see Map 1) where extensive seagrass habitat is purported to occur (Nayer *et al.* 2009), significant areas of mangrove forests are found (Helmer *et al.* 2008) and *Critically Endangered* leatherback turtles have been known to nest (Dow and Eckert 2007).

2.3.3 Seagrass biodiversity and species of conservation concern

A total of 12 seagrass species from 5 genera are found in the tropical Altlantic (Short *et al.* 2007). Six of these seagrass species have been identified in nearshore waters of Grenada (Table 14), including the recent discovery of the potentially invasive seagrass *Halophia stipulacea* (Willette and Ambrose 2009).

Table 14: The five seagrass species identified as occurring in Grenada

Species	Common name	IUCN status[4]
Thalassia testudinum	Turtlegrass[1]	
Syringodium filiforme	Manatee grass[1]	
Halodule wrighti	Shoal grass[1]	Least Concern
Halophila decipiens	Paddle grass	
Halophila stipulacea	Halophia seagrass[2]	
Halophila baillonii	Cover grass[3]	Vulnerable

1. Most common and dominant seagrasses
2. Introduced/invasive species, originally from Indian Ocean
3. Restricted range—includes Lesser Antilles, thus most probably occurring in Grenada (Littler and Littler 2000
4. IUCN Red List of Threatened Species (2013)

The majority of seagrasses are listed as 'Least Concern' under the protocol of the IUCN Red List of Threatened Species (IUCN 2013); however, at insular local scales (as highlighted for mangroves—see Section 2.2.3) such ecosystems are generally considered threatened.
Of the 115 species assessed under IUCN protocol that occur in seagrass habitats worldwide, there is currently 31 species of conservation concern (27%); specifically, 9 species—*Critically Endangered*, 7 species—*Endangered*, and 15 species—*Vulnerable* (Short *et al.* 2011). Many other species found in seagrass habitats have not been assessed, and especially so across the Caribbean. It is important to note that both *Critically Engangered* hawksbill turtles and *Endangere*dgreen turtles will forage in seagrass habitats, with green turtles feeding directly upon seagrasses in Grenada.

Seagrass habitats have consistently shown to have important levels of biodiversity, with comparisons to adjacent coral reefs often showing similar to significantly higher levels of diversity (Hemminga and Duarte 2000). Despite this high diversity and the importance of associated species (e.g., sea turtles), there are few detailed studies of species associated with seagrass beds in the Caribbean (Heck 1977, Weinstein and Heck Jr. 1977, Nagerlkerken *et al.* 2001). Although some species appear to be primarily restricted to seagrass ecosystems (e.g., Queen conch, Stoner *et al*. 1996; various urchins, Valentine and Heck 1999) or dependent on seagrasses for at least part of their life cycle (e.g., spiny lobster, Acosta 1999), still many of the species that have been recorded have also been found in other ecosystems (e.g., coral reefs, mangroves) (Green and Short 2003).

3. LAND AREAS

3.1Historical and present context

Forests in Grenada are primarily secondary growth as most of the original native forests were cleared during the plantation era. The decline of sugar cane cultivation, the banana industry, and other land-use shifts away from agriculture have caused forest cover in Grenada to increase significantly during the last half century (Table 15, Figure 2) (Helmer *et al*. 2008, FAO 2010a). During 1990-2005, Grenada is said to have gained 12.5 %[1] of its forest and woodland habitat (FAO 2006). Leipzig (1996) and FAO (2006) report that the state owns 69 % (4830 ha) of classified forests and woodlands in Grenada and that 31 % (2170 ha) is privately owned. However, with estimated increases in forested areas from abandoned agriculture and/or fallow land; especially after past hurricanes in the last 10 years, the proportion of privately owned forested areas and woodlands is expected to be much higher. Interestingly, Singh (2010) indicates that over 85 % of the land in Grenada is privately owned.

Table 15: Land-cover change from about 1945 (Beard 1949) to 2001 (Helmer *et al.* 2001).

Land-cover/forest class	1945 (ha)	2001 (ha)	Change[1] (%)
Drought deciduous woodland, inactive agriculture, and all grassy areas[2]	405	2397	+ 491
Drought deciduous or Semi-deciduous forest, and dry shrub woodland	1052	8584	+ 716
Seasonal evergreen, evergreen, and cloud forests[3]	3946	7208	+ 83
Cultivated land[4]	27661	9784	- 65
Urban or built-up land[5]	202	3153	+ 1458

1. Percent change = [value for 1945] – [value for 2001] ÷ [value for 1945] x 100 %
2. Includes savannas and grazing areas
3. Includes rain forest, lower montane rain forest, montane thicket, elfin woodland, palm brake and secondary rain forest
4. Includes herbaceous agriculture, mixed and woody agriculture
5. Includes other uncultivated land (e.g., golf course, sparsely vegetated areas)

[1]Defining total rate of habitat conversion as the [change in forest area] + [change in woodland area] – [net plantation expansion]

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

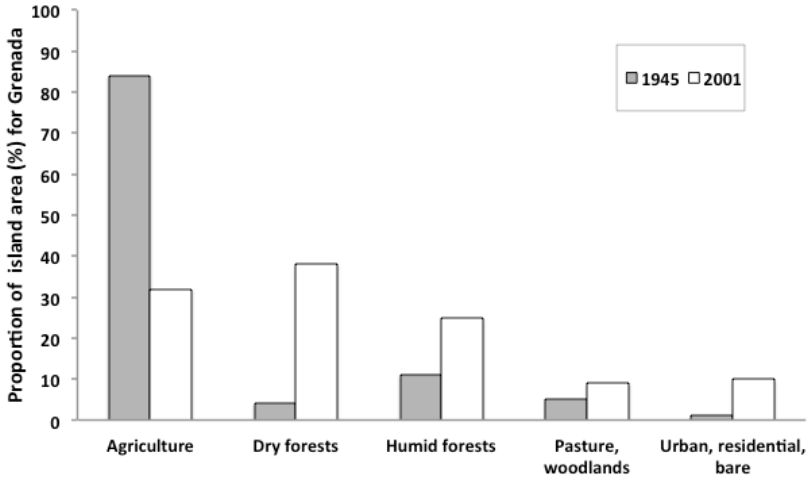

Fig. 2: Land-cover distributions in Grenada between 1945 and 2001 (adapted from Helmer *et al.* 2001)

3.2 State and extent of forest habitats in Grenada

3.2.1 Land cover and forest formations

Available information on land-cover and forest class distributions for all ridge-to-reef terrestrial project sites is summarized in Table 16 (for mangroves—see Table 3). Areal proportions (%) in Table 16 represent the total area for each land class distributed at project sites (see Map 3). Table 17 profiles the different land classes at each project site.

Table 16: Areal extent of forest and land-cover classes for Grenada and Carriacou in relation to the ridge-to-reef project (all sites together).

Land classification for Grenada[1] (ha)	Total area in Grenada (ha)	Total area in project	%
Drought deciduous open woodland	54	4.0	7.3
Deciduous, evergreen coastal, mixed forest or shrubland	2162	96.3	4.5
Semi-deciduous forest (includes semi-evergreen forest)	6422	136.9	2.1
Seasonal evergreen & evergreen forest	6347	1914.7	30.2
Sierra palm, transitional & tall cloud forest	663	563.0	84.9
Elfin & Sierra palm cloud forest	198	185.7	93.8
Nutmeg & mixed-woody agriculture)	8984	280.4	3.1
Coconut palm & mixed-woody agriculture	469	12.1	2.6
Pasture, hay, or inactive agriculture	2343	34.4	1.5
Emergent wetland	43	2.1	4.9
Water (permanent)	63	22.8	36.1
Rivers (length in km)	822 km	124.4 km	15.1
Low-density built-up land (rural/residential)	2439	5.5	0.2

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

Land classification for Carriacou[2] (ha)	Total area for Carriacou (ha)	Total area for project sites	%
Deciduous forest	295	54.3	18.4
Scrub and cactus	1189	127.3	10.7
Open scrub and cactus	632	1.1	0.2
Pasture and grazing with fruit trees	318	0.5	0.2
Open & controlled grazing	405	8.8	6.2
Rivers (length in km)	83 km	2.0 km	2.3

1. Data from Helmer *et al.* (2008), circa 2001
2. Data from the Land Use Division of the Ministry of Agriculture, Lands, Forestry and Fisheries (Grenada), provided by The Nature Conservancy

Table 17: Areal extent of land-cover and forest class for reef-to-ridge project sites

Land class and area for Grenada[1] (ha)	Perseverance	Beausejour	Mt. Hartman	Grand Etang	Annandale	Mt. St. Catherine	Levera[2]	Richmond Hill	Mt. Morritz	Morne Gazo	Grand Bras	Pearls
Drought deciduous open woodland	-	-	4.0	-	-	-	-	-	-	-	-	-
Deciduous, evergreen coastal, mixed forest or shrubland	14.9	15.6	49.9	-	-	-	11.2	4.2	-	-	-	0.5
Semi-deciduous forest includes semi-evergreen forest	65.2	38.9	3.3	-	-	-	14.0	3.9	8.9	0.5	2.3	-
Seasonal evergreen & evergreen forest	4.5	0.4	-	1174.0	189.5	533.5	-	-	-	12.7	-	0.1
Sierra palm, transitional & tall cloud forest	-	-	-	348.0	23.0	192.2	-	-	-	-	-	-
Elfin & Sierra palm cloud forest	-	-	-	39.5	2.6	143.6	-	-	-	-	-	-
Nutmeg & mixed-woody agriculture	3.4	0.2	3.0	111.6	26.8	121.1	-	-	-	12.4	1.6	0.3
Coconut palm & mixed-woody agriculture	-	-	-	-	-	-	4.5	-	-	-	-	7.6
Pasture, hay, or inactive agriculture	14.6	2.9	7.1	3.5	0.3	1.6	2.4	-	-	0.1	0.5	1.4
Emergent wetland	0.7	-	-	-	-	-	1.4	-	-	-	-	-
Low-density built-up land (rural/residential)	2.2	-	0.2	2.2	-	-	0.1	-	-	-	-	-
Water (permanent)	-	-	-	10.3	-	-	12.4	-	-	-	-	-
Rivers (km)[3]	2.0 km	19.0	-	64.1	8.2	29.3	0.9	-	-	0.4	-	-

Land class and area for Carriacou[3] (ha)	High North	High North additon	Sandy Island/Oyster bed
Deciduous forest	9.3	45	-
Scrub and cactus	42.5	82.4	2.4
Open scrub and cactus	-	0.3	0.9
Pasture and grazing with fruit trees	-	-	0.5
Open & controlled grazing	-	8.8	-
Coconut palm	-	-	-
Rivers (km)[3]	0.1 km	1.9	-

1. Data from Helmer *et al.* (2008), circa 2001
2. Includes both proposed Levera Pond Protected Area and Levera marine area addition (see Map 2)
3. Data from the Land Use Division of the Ministry of Agriculture, Lands, Forestry and Fisheries (Grenada), provided by The Nature Conservancy; note river measurements are in kilometers

Table 18: General areal extent of forest class and land cover for Carriacou

Land class and area for Carriacou[1]	Total areal extent (ha)
Deciduous forest	1869.8
Semi-deciduous forest	580.7
Evergreen and seasonal evergreen forest	19.6
Agriculture – cultivated land	185.3
Agriculture – woody land	18.5

1. Data from FAO (2010a), circa 2001

Table 18 likely provides more reliable land cover data for forest classes in Carriacou than those estimated in Table 17. Note that land classes for Carriacou used in Table 18 are also similar to parameters used for land classes in Grenada (Helmer *et al.* 2008), and thus would facilitate more complete nationwide analyses of forest types. Unfortunately, detailed data was not obtained and respective land cover analyses could not follow (e.g., identifying land-cover proportions and mapping forest types at project sites).

3.2.2 Land use and forestry

FAO (2010a, 2010b) reports a total forest area of ~17000 ha in Grenada, which corresponds with information presented on forest cover for Grenada and Carriacou in Table 16. As reported by FAO (2010a, 2010b), primary designated functions of forests in Grenada are presented in Table 19.

Table 19: Primary designated function of forested areas in the country

Primary designated function of forests	%	Approx. area[1] (ha)
Timber production	1	170 - 210 ha
Protection of soil and water	3	510 - 560 ha
Conservation of biodiversity	14	2320 - 2380 ha
None or unknown	82	13900 - 13940 ha

1. Proportional to the ~17000 ha of forest cover reported for Grenada in FAO (2010a, 2010b).

Outside of land cover reported in Helmer *et al.* (2008), little information on land use in Grenada is available. Timber extraction/production is reported as harvests of 139 m^3 for 1990, 2000, and 2005 FAO (2010a) and no data exists concerning wood-fuel removals (i.e., firewood, charcoal production).

A phasing out of timber production from natural forests is reported to have begun in the 1990s (Leipzig 1996), with reforestation initiatives increasing over the last 10 years (e.g., 15000 seedlings produced in 2009; GoG 2009). Forest extractions for non-timber forest products (e.g., baskets and other handicrafts) have been reported as using primarily screw pine (*Pandanus utilis*) and bamboo (*Bambusa vulgaris*) (GoG 2000), but no further information on these types of increasing forest extractions are available.

The Fourth National Report of Grenada to the Secretariat on the Convention on Biological Diversity (2009) indicates main threats to forest biodiversity in Grenada as the clearing of land for agricultural production, animal grazing, infrastructure, housing settlement and commercial activities, invasive and pest species, and natural disasters (e.g., hurricanes and fire), but provide no further data.

FAO (2010a) provides some information on the above noted threats and reports the following (starting from 2004):

- that hurricanes and tropical storms have impacted ~90 % of forests in Grenada
- a total of 10 forest fires have affected 5 ha of forested land

- mealybug pests have affected 500 ha of forested land (stemming from 38-90 ha of Blue mahoe reportedly destroyed and/or felled after mealy bugs were first recorded in 1994—Kairo *et al.* 2000, Sagarra and Peterkin 1999)
- that invasive bamboo is increasing rapidly in area (but no data is available to quantify the extent)

3.3 Forest biodiversity and species of conservation concern

Ridge-to-reef project sites include much of the critical habitat important for Grenadian wildlife and, most notably include much of the habitat range for all IUCN red-listed species of concern in Grenada. Table 16 and 17 highlight the diverse forest habitats and land areas of the project. The terrestrial ridge-to-reef project sites in Grenada (see Table 17) currently comprise 7 of the 9 areas highlighted nationwide for priority biodiversity conservation within reported Caribbean biodiversity hotspots—defined as areas of high levels of endemism and threat (Anadon-Irizarry 2012).

3.3.1 Flora

Beard (1949) reports a total of over 2000 species of flowering plants and 243 tree species distributed across the Lesser Antilles (cited in Lugo *et al.* 1981). IUCN (1998) reports that 1068 vascular plant species are encountered in Grenada. Excluding mangrove species assessments (see Table 11). There are 4 species currently red-listed (Table 20; IUCN 2013) from a total of 44 plants and trees assessed under the protocol of the IUCN Red List of Threatened Species (see Appendix 4).

Table 20: IUCN red-listed plants in Grenada

Species	Common name	IUCN status[1]
Guaiacum officinale	Commoner Lignum Vitae	Endangered
Melocactus broadwayi	Turk's cap	Near Threatened
Opuntia triacantha	Big pine key prickly-pear	
Dedrela odorata	Spanish cedar	Vulnerable

1. IUCN Red List of Threatened Species (2013)

The majority of plants in Grenada have been described in Hawthorne *et al.* (2004). Endemic flora has been recorded (e.g., *Charianthus grenadensis, Maytenus grenadensis, Lonchocarpus broadwayi, Rhytidophyllum caribaeum*, *Cyathea elliottii),* but systemic surveys to provide a complete assessment is needed. Huber and Vincent (1988) report that overall floral diversity in Grenada is less than other islands in the Lesser Antilles, but habitat biodiversity indices calculated for Grenada remain one of the highest for the Lesser Antilles (Ricklefs and Lovette 1999, Henderson 2004).

3.3.2 **Mammals** (native and introduced species)

Similar to other islands of the Lesser Antilles, the land mammal fauna of Grenada is typically depauperate (Allen 1911). The land mammal fauna known to be present on the island (i.e., excluding known extinctions/extirpations) is comprised of 21 species of which none are endemic and more than half are bats (Appendix 5) (Nowak 1994, Genoways 1998, MacPhee *et al.* 2000, IUCN 2013). The majority of mammals are listed as 'Least Concern' under the protocol of the IUCN Red List of Threatened Species (IUCN 2013) (see Appendix 5); however, it is important to

note that at insular local scales (such as small islands like Grenada), some populations of species are naturally small, thus warrant extended protection.

3.3.3 Reptiles and Amphibians (native and introduced species)

The current Grenadian herpetofauna is comprised of 4 amphibian species (1 endemic) and 14-18 reptiles (i.e., 4 species are strongly suspected extirpated, and no true wild population of the red-footed tortoise or Morocoy occurs) (see Appendix 6) (Germano *et al.* 2003, Henderson 2004, Powell and Henderson 2005, Henderson and Berg 2011, Powell and Henderson 2012). Few species of Grenadian herpetofauna have been assessed under the protocol of the IUCN Red List of Threatened Species, but 3 species are currently red-listed (Table 21) (IUCN 2013).

Table 21:IUCN red-listed terrestrial herpetofauna of Grenada (see Table 10 for sea turtles)

Species	Common name	IUCN status[4]
Pristimantis euphronides	Grenada frog[1]	Endangered
Typhlops tasymicris	Grenada bank blindsnake[2]	
Sphaerodactylus kirbyi	Grenadines sphaero gecko[3]	Vulnerable

1. Endemic; species also commonly referred to as *highland piping frog*
2. Suspected as extirpated in Grenada—only recent records from Union Island, St. Vincent and the Grenadines (Rogriguez *et al.* 2011)
3. Native in Carriacou, not expected to occur naturally in Grenada
4. IUCN Red List of Threatened Species (2013)

Important critical habitat for IUCN red-listed herpetofauna of Grenada is provided by Levera (potential presence of the *Endangered* bank blindsnake), High North and H. North addition (*Vulnerable* Grenadines sphaero gecko), and Grand Etang and Mt. St. Catherine provide species-specific habitat for the *Endangered* Grenada frog. Grand Etang and Mt. St. Catherine are of particular importance as they provide sufficient area for the larger of the land mammal species (see Appendix 5) and many IUCN red-listed birds (see Appendix 2) (Huber and Vincent 1988).

3.3.4 Birds (natives, migrants and vagrants)

The avifauna of Grenada is known to be primarily West Indian but with still a strong South American influence. A total of 222 species have been recorded nationwide (see Appendix 3; Frost and Messiah 2003, Rusk 2008, BLI 2012, Ridgley *et al.* 2012, Avibase 2013, Cornell 2013; IUCN 2013), with 35 species considered resident landbirds (Rusk 2009). A total of 5 birds are red-listed (Table 22), with the majority of specieslisted as 'Least Concern' under the protocol of the IUCN Red List of Threatened Species (IUCN 2013).

Table 22: IUCN red-listed birds in Grenada

Species	Common name	IUCN Status[1]
Leptotila wellsi	Grenada dove	Critically Endangered
Calidris pussilla	Semipalmated sandpiper	Near Threatened
Fullica caribaea	Caribbean coot	
Tryngites subruficollis	Buff-breasted sandpiper	
Dendrocygna arborea	West Indian whistling-duck	Vulnerable

1. IUCN Red List of Threatened Species (2013)

Along with regional endemics (see Appendix 3), of particular conservation importance is the national bird and endemic, the Grenada dove (*Leptotila wellsi*)—with a current population between 130-140 individuals (pers. comm. 2013,B. Rusk—Forestry Division). Three of the five

identified *Important Birding Areas* (IBA) that provide dry forest habitat and directly support the population of Grenada doves are sites included in the ridge-to-reef project (Perseverance, Beausejour, Mt. Hartman) (Rusk 2009). The largest of all 6 identified IBAs is also included in the ridge to reef project (i.e., the Grand Etang and Annandale Forest Reserves).

3.3.5 Other

Islands in the Lesser Antilles, with the exception of Trinidad and Tobago (see Phillip *et al.* 2013; 66 brackish/freshwater fish reported) typically have few freshwater fish (Briggs 1984). Generally, freshwater fish assemblages of the Lesser Antilles are characterized by semi-marine mountain mullets (Mugiliidae) and gobies (Gobiidae), with the only *true* freshwater fish being the introduced poeciliids or guppies (i.e., *Lebistes reticulatus*, *Poecilia vivipara*) and cichlids (e.g., *Oreochromis* spp.) (Myers 1938). No systemic surveys for freshwater fish species in Grenada have been conducted, and existing data in the literature is mostly misleading and/or inadequately substantiated (e.g., see referenced material for Grenadian freshwater fish in Fishbase 2013).

Several types of aquatic environments are present in Grenada. Steeply flowing watercourses drain from the mountains, with many small streams exhibiting periods of intermittent flow and some larger rivers flowing slowly across narrow coastal lowlands forming marshes (prior to entering the sea). Some marine/brackish fish, such as the rare marbled swamp eel or *tête chien*(*Synbranchus marmoratus*) and common snooks (e.g., *Centropomus* spp.) are known to reside in such coastal aquatic environments in Grenada, but species distribution is not documented.

Freshwater macroinvertebrate faunas of the islands of the Lesser Antilles are also typically sparse (Bass 2003a). A total of 101 species of freshwater macroinvertebrates (including terrestrial species with aquatic life stages) from 12 taxonomic groups have been identified in Grenada (see list in Bass 2004), but still very little information is available and more studies are needed. It is likely that more studies would record many more additional species (Bass 2003b, 2004).

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4. ECONOMIC VALUATION OF ECOSYSTEMS AND PROTECTED AREAS

The concept of ecosystem services has become an organizing principle in international conservation practice and policy.Recent comprehensive reviews have reported on an increasing number of valuation applications and methods used in assessing the value of ecosystem services and biodiversity (Atkinson *et al.* 2012, Ferraro et *al.* 2012). This can provide economic incentive and ultimately help leverage sustainable financing for protecting critical ecosystems and livelihoods. Outside of one valuation study focusing on past and potential revenue generation in relation to Grenadian protected areas (e.g., implementation of user fee programs projected to generate over US$1400000 yearly) (Sector 2006), no further assessments have been conducted.

It is necessary to highlight that the following valuation data must be taken in circumspect until studies specific to Grenada are conducted. Note that any given site must be assessed in its specific context, and the values presented in this report (including extrapolations by Sector 2006; see Tables 23 and 25) are to be used indicatively, and primarily to facilitate further policy thinking/action on economic valuingof ecosystems in Grenada.

4.1 Marine ecosystems

The value of Caribbean coral reefs, seagrass beds, coastal mangroves and associated habitats in relation to ecosystem processes has long been recognized as providing important goods and services both individually and through functional linkages (e.g., coastal defense, sediment production, primary production, fisheries, the maintenance of high species diversity, etc.) (Moberg and Folke 1999, Moberg and Ronnback 2003,Harborne *et al.* 2006). More recently, their value has been further highlighted in relation to greenhouse emission reductions and CO_2sequestering in countering climate change (Nellemann *et al.* 2009, McLeod *et al.* 2011) (Table 23).

Table 23: Monetary values in relation to coastal ecosystem services(including provisioning services, regulating services, cultural and social services) and reported values on carbon stocks

Ecosystem	**Estimated monetaryvalue ($US/ha/year)[1]**	**Source**
Coral reefs	$15 – $1195500 $1100	TEEB 2013 Sector 2006
Mangroves & salt marshes	$1995 – $215350 $5590[2]	TEEB 2013 Sector 2006
Seagrasses	no monetary estimates available	-
Other coastal systems (e.g., shallows, rocky shores, estuaries)	$250 –$79600	TEEB 2013

Carbon stock	**Below-ground C values (tonnes of C/ha/year)[3]**	**Above-ground C values (tonnes of C/ha)[4]**
Mangroves	0.20 – 9.5	145.3 (average)
Salt marshes	0.18 – 17.3	0.6 – 8.1
Seagrasses	0.45 – 1.9	0.000001 – 0.0055

1. Provisioning, regulating, cultural and social services provided by ecosystems—see de Groot *et al.* (2002) for classifications, descriptions and valuation ofecosystem functions, goods, and services
2. Does not include values for salt marshes
3. Data from McLeod *et al.* 2011
4. Data from Hutchison *et al.* 2013 (mangroves), Chmura 2013 (salt marshes), Fourqurean *et al.* 2012 (seagrasses)

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The purpose of valuation is to make the value of each ecosystem explicit, rather than to put a monetary value on nature. Despite the fact that seagrass beds provide a wide range of ecosystem services, including coastal protection, erosion control, maintenance of fisheries, water purification, and carbon sequestration among others, no estimates of monetary values for most of these services are available (see Barbier *et al.* 2011)(Table 23). Nevertheless, in terms of fisheries valuation and economic contribution, ~12700 ha of seagrass degradation has been equated with fishery production losses valued over US$220000 (in Australia; McArthur and Boland 2006). Queen conch, spiny lobster, sea urchin, as well as sea turtle yields are directly linked to seagrass beds (see Section 2.3.3) and represent important sectors in the Grenadian fishery (total fish exports ~US$3900000 reported for 2009; GoP 2011). In 2004, yields of conch, lobster and turtles generated US$262000 (referenced in Sector 2006) and limited sets of catch statistics indicate a significant seagrass urchin fishery ongoing today (Pena *et al.* 2009). In terms of valuing coastal protection, even low-canopy and low-biomass seagrass beds coastal provide significant protection from coastal erosion (Christianen *et al.* 2013). Coastal erosion in Grenada has been reported as high as 3.6 m/year[1] in the past (specifically, Grand Anse and Levera; Gajraj 1988), thus further highlighting the importance of seagrass ecosystem services in Grenada.

4.2 Forest ecosystems

Among timber production, general agroforestry and non-timber forest products (i.e., direct use values), some of the other benefits delivered by forests via ecological function (i.e., indirect use values/regulating services) provide carbon storage,safeguard watersheds andsoils, enable water and nutrient cycling,increase soil fertility and other associated benefits such as the enhancement of agricultural productivity (Cavatassi 2004, Ferraro *et al.* 2012). Valuation studies that quantify ecosystem services for tropical forests are few (Cavendish 2002, Bernard *et al.* 2009, Ferraro*et al*. 2012). No monetary estimations in relation to forest ecosystem services could be provided as for coastal ecosystems—see Table 23. Nevertheless, the relative importance of direct-use and indirect-use value components for tropical forests (typical of Grenada)is summarized in Table 24.

4.2.1 Forests and watersheds

The safeguarding of watersheds is a major priority for Grenada (Geoghegan *et al.* 2003, CEHI 2007, Peters 2010). Forest ecosystems provide a range of watershed services, including hydrological regulation, flood control, groundwater recharge, water quality enhancement, and soil conservation (Sharachandra 2009), which is of particularly importance for Grenada because rainfall is highly seasonal, locally limited (e.g., Carriacou), and important agrarian landscapes downstream (e.g., nutmeg, cocao) are affected by soil-hydrological processes from upstream forests (see Bonell and Bruijnzeel 2004). No current data is available in relation to watershed processes in Grenada (e.g., peak and low-flow levels, groundwater recharge rates, water quality, erosion rates) (but see Ternan *et al*. 1987, 1989), hence no estimates of monetary values forthe aforementionedecosystem services are currently possible. Further, few studies with sufficient original data are available, presenting a major technical challenge for valuation studies or payment for these types of ecosystem services (Ternan *et al.* 1989, Locatelli and Vignola 2009). However, in terms of broader economic valuation, water supply revenue in Grenada was over US$3880000 (1 % of GDP) (in 2004; from Sector 2006).

[1]Gajraj (1988) does not provide further detail on purported erosion rate

Annex 1: Additional Information on biodiversity within the project area (by: S. Aucoin)

Table 24: Ranked economic values by forest type (adapted from SCBD 2001)

Direct-use value	Mangrove	Montane[1]	Moist broadleaf[2]	Semi-deciduous
Timber	✗	✗	✓✓	✓✓
Fuelwood/charcoal	✓	✗	✗	✓
NTFPs[2]	✓	✗	✓	✓
Genetic information	✗	✓	✓	✓
Recreation/tourism	✗	✓	✓	✓
Research/education	✓	✓	✓	✓
Cultural	✗	✓	✓	✓
Indirect-use value				
Watershed services				
☐ Soil conservation	✓	✓✓	✓✓	✓
☐ Water supply	✓	✓	✓	✓
☐ Water quality	✓	✓	✓	✓
☐ Flood/storm protection	✓	✗	✗	✗
☐ Fisheries protection	✓	✓	✓	✓
Global climate				
☐ Carbon storage	✓	✓	✓	✓
☐ Carbon fixing	✓	✗	✗	✗
Biodiversity	✓	✓✓	✓✓	✓

✓benefit, ✗ ☐no effect

1. Associated to *Sierra palm, transitional & tall cloud forest* and *Elfin & Sierra palm cloud forest*—see Table 16
2. Associated to *Seasonal evergreen & evergreen forests*
3. Non-timber forest products

The main focus for watershed management activity in Grenada is within the interior mountain range, and especially at the Grand Etang/Annandale Forest Reserve and Mount St. Catherine project sites (see Map 1) (Geoghegan e*t al.* 2003). Surface water (e.g., watershed catchment basins) provides the majority of the island's potable water (~90 %), with groundwater use increasing during the dry season (Geoghegan *et al.* 2003). The largest of all watersheds is by far Great River (Ternan 1989—Watershed 29), which feeds the island's major natural water storage reservoir at Grand Etang. Grand Etang and Annadale supply potable water to the capital city of St. George's and the surrounding area (where the majority of the island's population is established) and provide the estimated 85 % of all non-domestic water, which is consumed in St. George Parish (Geoghegan e*t al.* 2003, Sector 2006).

Severe watershed soil erosion has not appeared to be an island-wide issue in the past, particularly because much of the agriculture in Grenada is based on tree crops (Ahmad 1977, GoG 2009). However, high-suspended sediment concentrations in excess of 1000 mg/L have been recorded in rivers of the Beausejour watershed during rainstorms (ridge-to-reef project watershed focal area) (see Ternan 1989—Watershed 11). Under such circumstances, this translates to an estimated rainstorm discharge that includes 150 kg of soil leaving the watershed every minute (Ternan *et al.* 1989). While 1000 mg/L suspended sediment concentration may not be an absolute indicator of accelerated erosion in Grenada, high sediment concentrations discharged into the sea following rainstorms markedly affect water clarity. Coral reefs south of St. George's are degrading due in part to this reduced water clarity and sediment deposition (Ternan et al. 1989, pers. comm. 2013, R. Baldeo—Fisheries Division).

4.2.1 Forest carbon storage

Evaluating contributions of forest ecosystems to climate change mitigation requires well-calibrated models with quantified baseline carbon stocks, which is not currently accessible for many countries including Grenada (see Keith *et al.* 2010). However, biome-average approaches are often used in the tropics to estimate national-level forest carbon stocks and are still widely accepted (Gibbes *et al.* 2007). This approach is fairly generalized (i.e., with a high degree of uncertainty), but nonetheless is noted to work better for smaller areas than larger ones (and thus reasonably suited for Grenada within the current scope of the ridge-to-reef project).

Carbon stock estimates (including above- and below-ground carbon stores) calculated for ridge-to-reef project sites are presented in Table 25, and correspond to carbon stores indicated in the project identification form (PIF—see component 1).

Table 25: Forest carbon stocks for ridge-to-reef project sites in Grenada and Carriacou (all sites together)

GRENADA[1]

Biome classification	Biome estimates of carbon stock[2] (tonnes of C/ha)	Forest area at project sites (ha)	Carbon stock estimates[3] at project sites (tonnes of C/ha)
Tropical dry forest	47–126	237.2[4]	15900 – 42626
Tropical equatorial forest	193 – 200	748.7[5]	144499 – 149740
Tropical seasonal forest	128 – 140	2195.1[6]	280972 – 307314
Mangrove forest	145[7]	126[8]	18270
Total estimated tonnes of C at project sites in Grenada			**459641 – 517950**

CARRIACOU[9]

Tropical dry forest[8]	193 – 200	182[10]	35126 – 36400
Mangrove forest	145[7]	64[11]	9280
Total estimated tonnes of C at project sites in Carriacou			**44406 – 45680**

1. Land-classification data from Helmer *et al.* (2008), circa 2001
2. Biome-average forest biomass carbon stock estimates from reviewbyGibbs *et al.* (2007), and includes estimates from guidelines by the *Intergovernmental Panel on Climate Change* (IPCC 2006)
3. Includes estimates of *above-* and *below-ground* carbon stocks
4. From Table 16: *Drought deciduous open* woodland (4.0 ha) + *Deciduous, evergreen coastal, mixed forest/shubland* (197.4 ha) + *Semi-deciduous forest* (136.9 ha)
5. *Sierra palm, transitional & tall cloud forest* (563 ha) + *Elfin & Sierra palm cloud forest* (185.7 ha)
6. *Seasonal evergreen & evergreen forest (1914.7 ha) + Nutmeg & mixed-woody agriculture* (280.4 ha)
7. From Table 23: average value for mangrove carbon; only includes above-ground carbon stock
8. Includes mangroves within and bordering marine project sites
9. GIS land-classification data from the Land Use Division of the Ministry of Agriculture, Lands, Forestry and Fisheries
10. From Table 16: *Deciduous forest* (54.3 ha) + *scrub and cactus* (127.3 ha)
11. Available data on mangrove cover on Carriacou are more than likely overestimations (see Section 2.2.2)

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5. SUMMARY INFORMATION ON SOCIO-ECONOMIC CONDITIONS

5.1 Background

In 2008[1], Grenada had one of the highest unemployment rates in the Caribbean (25 %), where citizens in the 15-24 year-class accounted for almost half of all unemployed, and female unemployment was nearly twice that of male unemployment (CPA 2010). Further, an estimated 37.7 % of the population resided below the poverty line (<US$2205/year, CPA 2010; GDP per capita 2008—US$8094, 2013—US$8586, Bisset and Francis 2012) and the majority of citizens in rural areas were living in poverty (IFAD 2013) (Table 26).

Table 26: Summary of socio-economic data[1] and available indicators (for 2008—unless otherwise noted; focus on poverty) (adapted from CPA 2010)

		Population distribution	Percent distribution (%)	Registered employers[2]	Employability ranking[3]	Population distribution living in poverty	Percent distribution living in poverty (%)	Parishioners living in poverty (%)
Grenada (parish)	St. George	36289	33.1	392	2	11893	10.8	32.8
	St. Andrew	29413	26.8	204	5	13195	12.0	44.9
	St. David	12334	11.2	68	7	3637	3.3	29.5
	St. Patrick	11280	10.3	76	6	6392	5.8	56.7
	St. John	9486	8.6	72	4	3478	3.2	36.7
	St. Mark	4310	3.9	35	3	2347	2.1	54.5
	Carriacou	6650	6.1	88	1	437	0.4	6.6
Total population		**109762**	-	-	-	**41379**	**37.7**	-

1. Poverty line in 2008: <US$2205/year (CPA 2010)
2. Data for 2011 (pers. comm. 2013, R. Jacobs—Statistical Division, Grenada)
3. Data for 2011; Ranking produced with a rudimentary index calculation of employability: [registered employers]÷[population] and does not include any other variable (e.g., education level)

Table 27 shows the percent distribution of employed citizens by employment sector. Analyses of consumption quintiles (see CPA 2010) indicate that lower incomes are strongly correlated with the *Agriculture & Fishing* and *Construction* sectors, whereas higher incomes are correlated with the Education/Social Security sector (CPA 2010). No other clear correlations were apparent between levels of income and other employment sectors.

[1] The National Census Report for Grenada (compendium for 2011) is pending and available information is currently limited

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Table 27: Population frequency distribution by employment sectorin 2008 (focus on poverty) (adapted from CPA 2010)

Employed (pop. %)	Agriculture & Fishing	Manufacturing	Construction	Wholesale & Retail	Hotel & Restaurant	Transportation	Services	Admin./Social Security	Education/Social Work	Unknown
Living below the poverty line (%)	11.9	0.7	23.5	2.4	3.2	3.5	30.0	0.7	4.3	19.9
Living above the poverty line[1] (%)	7.5	3.2	18.2	6.1	2.7	3.1	35.1	0.9	8.4	14.5

1. Population frequency distribution by consumption quintile in CPA (2010)

Table 28: Demographics and poverty index of local communities at project sites in 2011 (Grenada only) (adapted from data provided by the Statistical Division, Grenada)

Project site[1]	No. of villages in the vicinity of project site	Total population	Male:female	Poverty index[2]
Grand Anse	8	5355	0.97	31
Grand Bras	5	4544	1.05	43
Grand Etang & Annandale	30	8151	1.01	34
Levera Pond & addition	4	1703	1.07	60
Moliniere-Beausejour & addition	6	3469	0.97	27
Morne Gazo	5	765	0.88	27
Mt. Hartman	1	422	0.71	33
Mt. Moritz	3	1750	1.09	29
Mt. St. Catherine	14	4458	1.00	55
Pearls	4	2695	1.13	50
Perseverance & Beausejour	3	532	0.95	33
Richmond Hill	4	771	1.05	15
Southeast Coast	15	5512	0.98	29
Woburn Clarks Court Bay	5	1969	0.97	18

1. Note that information is site specific as some of the same villages are repeated at different project sites due to proximity (see Appendix 7); any multiplicity of data is removed in tallied totals (Section 5.2, Appendix 7)
2. As poor citizens of Grenada are more likely to use wood-based materials than any other type of material in home construction (from CPA 2010), available data on the use of *wood*, *plywood*, and *makeshift* materials of homes (from 2011) were used as a proxy to calculate a basic poverty index for each project site: [no. of homes made of wood+ plywood + makeshift materials]÷[total no. of homes] x 100 %

5.2 Socio-economic conditions of local communities at project sites

A total of 96 local communities (pop. 38643) are found in the vicinity of project sites (Grenada sites only) (Table 28). Few data on socio-economic conditions or information on key demographics of local communities at project sites are currently available (Isaac 2010, Blackman 2013). Some data provided by the Statistical Division is presented in Appendix 7. This data is from the pending National Census Report for Grenada (compendium for 2011), which will provide more complete information upon publication.

No information on local community livelihoods at project sites could be assessed since relevant census information was being compiled at the writing of this report (pers. comm. 2013, R. Jacobs—Statistical Division, Grenada). Nonetheless, some accessible data provided preliminary information on the degree of poverty at the local communities around project sites (Table 28) and background information presented (Section 5.1) can provide some insight on general socio-economic conditions.

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Annex 2: Additional Information on Fisheries

I. Stocks

1. A highly multispecies of migratory large pelagics targeting:
(i) *Oceanic Bill fishes* (Marlins, Sailfishes etc.) and;
(ii) *Tunas* (Yellow fins, King-fishes and Dolphin fish etc.)

- Seasonal catches for the smaller vessels, 8-10 meters but mostly year-round for vessels 11-17 metres.
- The Fishing area: 10-40 miles off shore.
- Approximate contribution to national production (1978-2012): 25-75% of total landings.

2. A highly multispecies fishery targeting coastal Dolphin fish, King fishes (mainly wahoo), Skip Jacks, Blackfin tunas, Frigate Tunas, Bullet Tunas, Atlantic Bonitas (*Sarda sarda*).

- Mostly seasonal annual fishing recruitment that is highly responsive to the North Equatorial current and Orinoco current flows and the biodiversity it brings with it.
- Fishing area: 5-10 miles offshore and on the island shelf edge.

The close-to-shore stock of coastal pelagics

- A multi-species close-to-shore, Beach seine fishery (significant) for mainly big-eye and round scads of the carangidae sp. with Balahoo, Sprats, Anchovies, Herrings Atlantic Bonitas and Rainbow Runners.
- This fishery is not seasonal since gross abundance is constant, with various species in highs and lows with time.
- Fishing area: close-to-shore bays, 5-50 meters offshore and fishing is conducted under a Territorial Use Rights System(TURF).
- Approximate contribution to national production(1978-2012): *10-70%* of total landings.

3. A demersal fishery that is the most multispecies stock-based fishery, for mainly groupers, snappers, grunts and other red-fish/rock species. This fishery is coral reef-based and supports the subsistence fishery in a significant way.
NB: The category of unclassified landings in the table following, refers to the landings that were inconvenient to record(note that this category decreased between 1988 and 2008 due to keener data collection practices). The four (4) categories given however reflect the variability of catch abundance even more than any market preference or fishing effort applied by fishers. Overall, the unclassified stock/catch reflect landings of the demersals more so than any other species/stock.

- This is a seasonal fishery because of the life-cycle characteristics of Snappers, groupers types and grunts which *fatten-up* (build body mass)then; *build eggs* (roe)then; *take hole* (ecological refuge to lay the eggs ans protect hachlings) then; roam about *lean-an-meagre* (aggressive feeding). These fish are alsoresponsive to the biodiversity and salinity and water quality of the ocean currents and Orinoco green water. The catchability/vulnerability to fishing pressure of this stock, depends on the tides/and currents. Pot-fishing has become less popular than before but efficiencies of other gear/methods have increased vulnerability of the stock.

- Fishing area: close-to-shore,/500 meters unto the island shelf edge 5-8 miles offshore and on traditional mounds/of aggregation points on the offshore (*Seche*). The *seche*also attracts migrant oceanic species.

- Approximate contribution to national production(1978-2012):5-10% of total landings.

4. The Shellfish fishery that involves free divers and SCUBA divers who target species such as SpinY lobsters, Conch (Lambi), Turtles, Topshells and other sea-snails etc. These fishers also target whitesea-eggs (since 2001 this species stock has been under strict controls but the stock is recovering from the collapse in 2000/2001) ;and fishers target Seamoss (gracilaria seaweeds).

This fishery is seasonal mainly because ofan annual law-based *close season* restriction for growth/size of specimens in the catch and for recruitment over fishing (egg-laying).

The Fishing area: 1-5 miles offshore.

Approximate contribution to national production (1978-2012):3-5% by weight but 10-20% by moneyvalue.

II: ISSUES AND KEY POINTS TO NOTE

1. The Grenada Fishery is chiefly pelagic and ocean-based. The ocean fisheries target mainly the mobile species/of regional or international shared stock and hence stocks that can use ecological refuges such as spaces beyond the ocean shelf (deep) to escape fishing pressure; stocks that have reduced vulnerabilities due to bad sea-weather conditions that restrict fishers' access to them.

- The oceanics and coastal pelagic -migrate
- The demersals/rock fish – go to life-cycle refuges.

2. For the stocks (mainly rock-fish/demersals) that are more vulnerable to a subsistence and rural population and dive services providers, having easier access to the closer-shore reef fish and pelagic fish, there are distinct threats:

- Threats due to improving efficiencies of gear and methods available to subsistence fishers;
- Threats of high demand for juvenile "scads", as bait, for the oceanic pelagic fishery.
- Threat of high demand for larger "scads", as bait, for the oceanic pelagic fishery; making less scad fishless available to the rural population.
- Threats of high demand for the roe of species such as white sea eggs.
- Threats such as spear fishing pressure on the close-to-shore reefs.
- Threats of over use of traditional dive sites that are highly accessible because of convenient depth of reef.

3. The engagement of such a large segment of Grenada fishers with the offshore fishery allows for less pressure on the closer-shore reef species, and stocks.

Even as rural fishers on the east coast of Grenada would opportunity to access the more extended deep sea coral reefs in the area, yet constant adverse sea weather conditions due to the prevailing impact of the North-East trade winds make demersal fishing risky and unprofitable, for most of the year. On the other hand, on the west coast there is considerably less shelf and rock fish stocks except for the shelf edge and on banks/mounds on the offshore where fishing is more productive.

4. Engagement (of fishers) with the fish stocks, depends on subsistence needs, access to fishing grounds and in the case of commercial fishing, private profitability.

5. Dive services providers facilitate tourist by using the reef Ecology/environment, an eco-asset, as a tourist product. Although as a non-consumptive use of stocks and habitat, the practices used by dive services providers have had adverse impacts that an MPA program is attempting to control on the one hand and to exploit opportunity for on the other. The yachting industry (significant) also has impacts on the coral reefs, as eco-assets, especially, but not only, among the out islands of the south Grenadines.

Annex 2: Additional Information on Fisheres

Table 1: Recorded fish production Grenada

	1978		1988		1998		2008	
Category of fish stock	**Tonnes**	**% of catch**	**Tonnes**	**% of catch**	**Tonnes**	**% of catch**	**Tonnes**	**% of catch**
1. Oceanic pelagics Bill fishers, Tunas	**1171.2**	**62.6**	**812.5**	**40.6**	**1346.9**	**73.6**	**1779.2**	**74.5**
2. Coastal pelagics and Dolphins Kingfishes smaller Tunas Beach seine/close to shore pelagics Carangidae sp. Seads	**468.9**	**25.0**	**343.2**	**17.2**	**180.1**	**9.7**	**84.9**	**3.6**
3. Demersal fish Snappers, Groupers grunts	**93.7**	**5.0**	**227.0**	**11.4**	**103.7**	**5.6**	**508.3**	**21.3**
4. Shell fish lobsters	**28.6**	**1.5**	**46.4**	**2.3**	**60.8**	**3.3**	**14.2**	**0.6**
5. Unclassified fish(mainly demersals)	**109.9**	**5.9**	**570.9**	**28.5**	**154.4**	**8.3**	**21.3**	**0.9**
TOTAL	**1872.2**	**100**	**2000**	**100**	**1853.9**	**100**	**2386.9**	**100**

Annex 2: Additional Information on Fisheres

Annex 2: Additional Information on Fisheres

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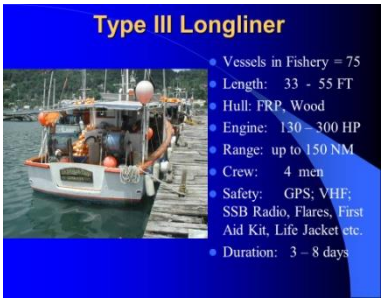
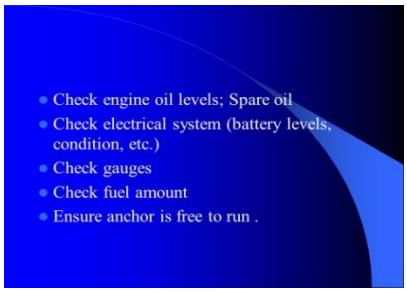
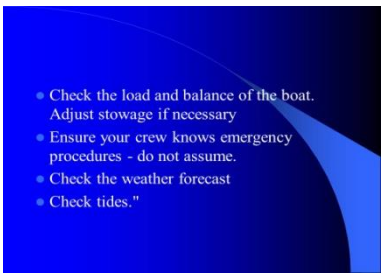
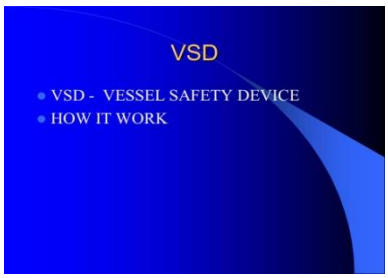
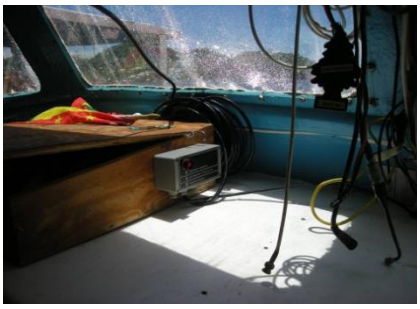








Annex 2: Additional Information on Fisheres



MAIN CAUSES OF DISTRESS FOR THE PAST 25 YEARS

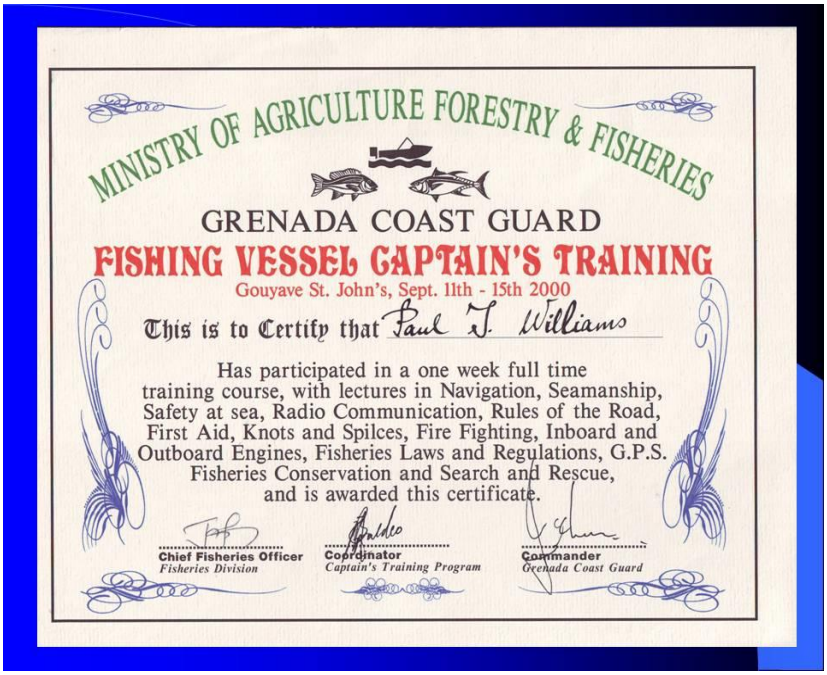
FACTORS	PERCENTAGE	DEATHS
ENGINE FAILURE.	34 %	9
DISCHARGED BATTERIES	12 %	3
INSUFFICIENT FUEL.	12 %	4
DISORIENTATION.	5 %	4
COLLISION	8 %	2
ROUGH SEAS	15 %	11
UNKNOWN	14%	17

MANDATORY SAFETY ITEMS – *SAFETY AT SEA REGULATIONS*

- VHF MARINE RADIO
- GPS
- COMPASS
- FLASHLIGHT
- LIFE JACKET
- DAY AND NIGHT DISTRESS FLARES
- ENGINE REPAIR TOOLS
- FIRST AID KIT
- WATER AND SPARE DRY FOODSTUFF

Annex 2: Additional Information on Fisheres

Annex 2: Additional Information on Fisheres



MINISTRY OF AGRICULTURE FORESTRY & FISHERIES

GRENADA COAST GUARD

FISHING VESSEL CAPTAIN'S TRAINING

Gouyave St. John's, Sept. 11th - 15th 2000

This is to Certify that Paul J. Williams

Has participated in a one week full time training course, with lectures in Navigation, Seamanship, Safety at sea, Radio Communication, Rules of the Road, First Aid, Knots and Spilces, Fire Fighting, Inboard and Outboard Engines, Fisheries Laws and Regulations, G.P.S. Fisheries Conservation and Search and Rescue, and is awarded this certificate.

Chief Fisheries Officer
Fisheries Division

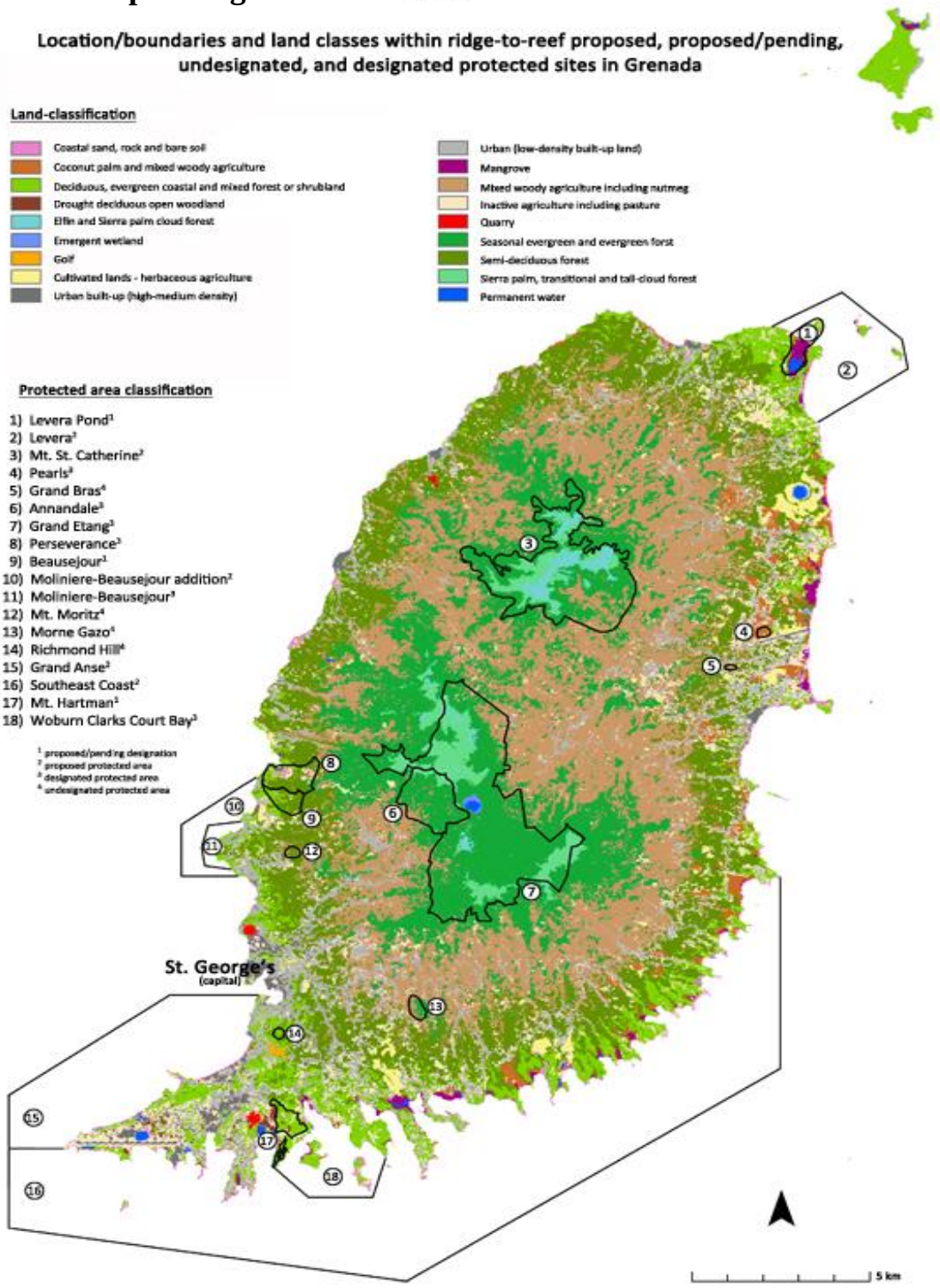
Coordinator
Captain's Training Program

Commander
Grenada Coast Guard

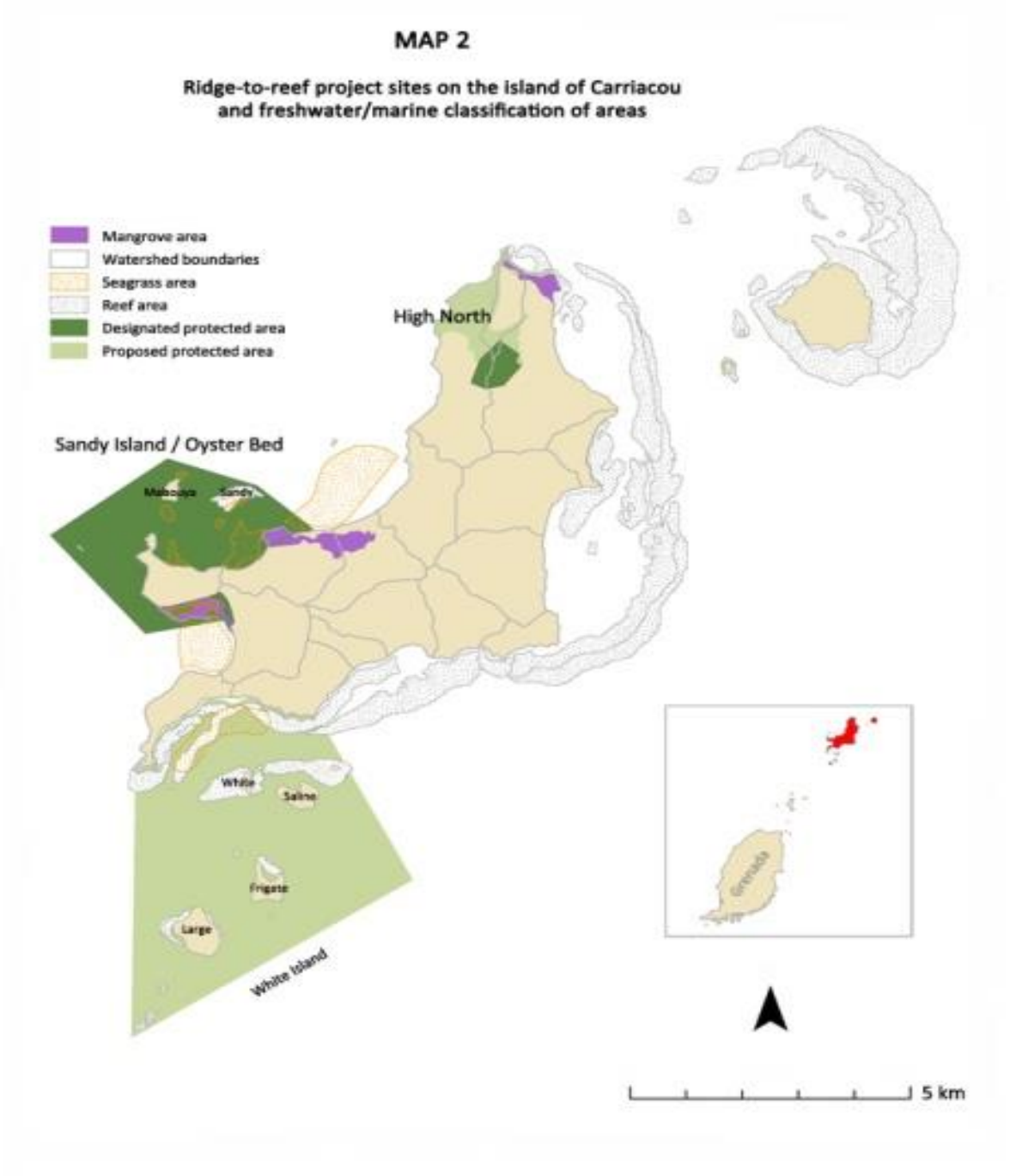
Annex 2: Additional Information on Fisheres

Annex 3: Maps & Figures

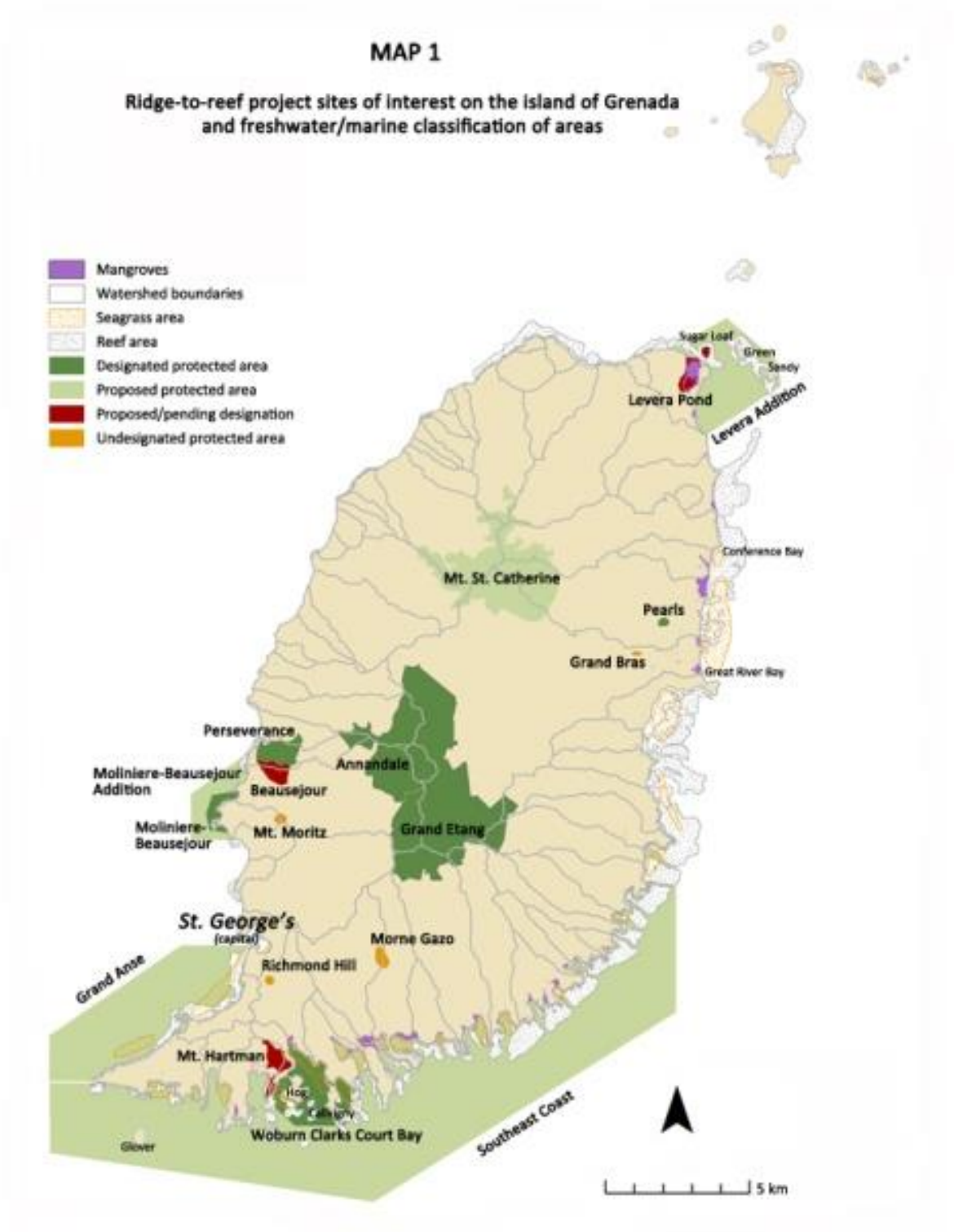
MAP 3



Annex 3: Maps & Figures



Annex 3: Maps & Figures



Annex 4: Information on PAs within the Project Area

1. PROTECTED AREA SYSTEM AND MANAGEMENT EFFECTIVENESS

1.1 Context and background

The basis for the establishment and management of a comprehensive National Protected Area System in Grenada are largely provided in reports *Plan and Policy for a System of National Parks and Protected Areas* (Huber and Vincent 1988), *Review of the Policy, Legal, and Institutional Frameworks for Protected Areas Management in Grenada* (Gardner 2006) and notably so in the recently approved *Grenada Protected Area System Plan* (Turner 2009). These reports reveal the major issues and impediments still largely relevant today (and reiterated through the proposed ridge-to-reef project), while indicating the necessary steps to address the challenges in legislation and institutional organization that have affected Grenada's efforts to establish a centralized protected area system and efficiently manage existing/future protected areas.

In summary, the main obstacle in enabling a centralized/single-act legislative protected area system required to efficiently manage existing/future protected areas, resides in implementing the number of legislative and strategic tools currently available. Existing protected area legislation in Grenada is well defined and offers significant powers through (1) the *1949 Forest, Soil and Water Conservation Act*, (2) the *1986 Grenada Fisheries Act* and its accompanying *Fisheries* (*Marine Protected Areas Regulations) Regulations 2001*, (3) the *1990 National Heritage Protection Act*, and (4) the *1991 National Parks and Protected Areas Act* (see Turner 2009). The latter, which has yet to be implemented, would require the appointment of a Director of National Parks, the necessary staff for the administration of a centralized national parks system (detailed in Turner 2009), the establishment of the *National Park Advisory Council*[4] (see Section 1.3.1) and the *National Parks Development Fund*[2], where revenue generated by protected areas (e.g., fees, licenses) would flow directly into the *Fund* instead of the government's consolidated revenue (see framework provided in Sector 2006). Further, under this *Act* the government can acquire land for protected area designation through purchase, lease, exchange or donation.

The implementation of the *1991 National Parks and Protected Areas Act*, alongside the present *1949 Forest, Soil and Water Conservation Act 1986*, the *Grenada Fisheries Act* and *Fisheries Regulations 2001 (Marine Protected Areas)*, currently ensures the legislative tools necessary to manage a National Protected Area System; however, said issues of legislative conflict/overlap and confounded policy directions would still remain (see Gardner 2006, Turner 2009). Nonetheless, solving issues of overlapping legislation associated with protected area management would be facilitated by the implementation of the existing *Draft Protected Area, Forestry and Wildlife Act*[5] (Cirelli 2003) and with assistance provided through the *OECS Protected Areas and Associated Livelihoods Project* (OPAAL); specifically, the report on *OECS Policy on Protected Areas Systems and Model Protected Areas System Act* (Knetchte and Nichols 2007) as suggested by the Grenada Protected Area System Plan (Turner 2009). Although these issues have long been recognized and many initiatives have been undertaken, more pressing demands (e.g., education, housing, unemployment, natural disasters) have been placed on government resources (Turner 2009).

[4] Project identification Form *(PIF)* expected **Output 1.1**: Institutional Framework for PA System Management
[5] *PIF* expected **Output 1.2**: Legal / Regulatory Framework for Protected Areas

1.2 Government budgets in relation to managing protected areas

Terrestrial and marine protected area programs, including provisioning/permitting of tourism & recreation opportunities and protection of natural/cultural resources are provided by (1) the *Ministry of Agriculture, Lands, Forestry, Fisheries & Environment* (MALFFE) through the *Forestry and National Parks Department* and *Fisheries Division* and, (2) the *Ministry of Tourism, Civil Aviation & Culture* (MTCAC) and its statutory *Grenada Board of Tourism*. Total budget allocations for all governmental programs within these ministries in 2013 (including recurrent and capital expenditure) accounted for just below 6 % of the total country budget (MALFFE: ~US$11,840,000; MTCAC: ~US$12,460,000—GoG 2013). It is likely that these budget allocations include external grant support, but this could not be confirmed at the writing of this report.

The ridge-to-reef Project Identification Form (PIF) has projected that MALFFEwill spend an estimated US$6,130,000 to coordinate its environmental policy, laws and programs, and that an estimated US$10,030,000 will be directed towards protected area management and related conservation activities (during the 5-year period of the proposed project). The latter amount is indicated to include US$2,250,000 through the *Forestry and National Parks Department,* US$4,630,000 through the *Fisheries Division,* and US$2,166,667 through the *Ministry of Tourism, Civil Aviation & Culture* (MTCAC), but no further information is available.

Gardner (2006) reported that budget projections and financial needs for site-level management of protected areas in Grenada are rarely if ever documented in any detail, and that no model of financial planning for protected areas management exists. Generally, past annual government financial commitments to its officially designated protected areas and other recognized protected areas[6] totals some US$1,500,000 to US$1,800,000 (~US$1,500,000 identified for the 2008 fiscal year—Turner 2009; ~US$1,800,000 annually, reported by the ridge-to-reef Project Identification Form—PIF). In 2008, the total budget of above-said government providers to overall protected area programs was approximately US$1,300,000 with contract services and support (outside of government, but sourced by government) providing an additional ~US$185,000 (Turner 2009). At the writing of this report, current budget information was not yet released by the newly elected government (incumbent since March 2013). Details on present financial commitments remain pending.

Turner (2009) further reported that the *Department of Forestry & National Parks*' annual budget was ~US$750,000 (including capital), that the Ministry of Tourism 's (MTCAC) annual budget for 14 tourism sites, including the visitor complex at the *Grand Etang Forest Reserve* was estimated at ~US$426,000 (including a ~US$26,000 cooperative contract at one site), and that the *Grenada Board of Tourism* (which provides permits to vendors) further provides ~US$150,000 for the maintenance of some beaches, including *Grand Ans*e, as well as occasionally funds tourism initiatives. The *Fisheries Division*'s annual budget towards managing protected areas is not known.

1.3 Protected area site-level governance framework

Turner (2009) reports that present institutional structures in both the *Department of Forestry & National Parks* and the *Fisheries Division* has been workable at the level of management responsibility in the recent past; however, as protected areas have now begun to increase and continue to progress (primary aims of the ridge-to-reef project and other existing parallel initiatives—see Byrne 2006, Sector 2006, MacLeod 2007, Turner 2009), it is critical that steps outlined in existing key documents (see section 1.1), which aim to implement a protected area system, are now undertaken to begin providing the basic

[6] Actively managed, but not officially designated (e.g., Levera, Richmond Hill, etc.)(see Turner 2009)

framework and tools necessary for effective protected area management in Grenada (which will ultimately facilitate country obligations under the *Grenada Declaration*—see PoWPA 2012[7]).

Gardner (2006) reported that 24 government institutions/agencies and 8 non-governmental organizations (NGOs) have various functions in relation to environmental management in Grenada (refer to Appendix 6 in Gardner 2006). Of these, one non-governmental organization (the *Carriacou Environmental Committee*) and the mentioned government providers (see Section 1.2) have the primary responsibility of carrying out daily operations at protected areas in Grenada. Staffing among government providers (Section 1.2) is reported at approximately 80 full-time employees or rather full-time equivalents[8] (Turner 2009); however, several positions at this time are vacant due to retired staff, and respective posts will unlikely be filled in the near future (pers. communication 2013, A. Fonteau—Chief Forestry Officer). Turner (2009) provides the most recent study on protected area management in Grenada, and since then government allotments of human resources and support funding have been reduced (pers. communication 2013, M. Turner).

1.3.1 Department of Forestry and National Parks

Turner (2009) reported that the *Department of Forestry and National Parks* had up to 16 full-time equivalents[3] dedicated to Department objectives (in the recent past), including administrative management of terrestrial protected areas and reserves (*Perseverance*, *Grand Etang*&*Annandale*) and related forest initiatives, as well as up to 24 field staff providing forest ranger and foreman duties. However, in terms of present-day permanent staffing focused directly on servicing terrestrial protected areas, the range of involvement for permanent staff is currently said to vary between 1 to 7 employees, along with a constantly varying number of temporary fieldworkers, determined by seasonal programs largely built up on *ad hoc* bases (pers. communication 2013, A. Fonteau—Chief Forestry Officer).

In Carriacou, one forest officer and the equivalent of two field staff provide forest management for the *High North Forest Reserve* and other crown lands (and report to the *Ministry of Carriacou and Petite Martinique Affairs*) (Turner 2009).

Legislation administered by the *Department ofForestry and National Parks* calls for the establishment of the *National Park Advisory Council*[1] (mandated under the *1991 National Parks and Protected Areas Act* as yet implemented—see Section 1.1) to counsel government on issues other than day-to-day management of Grenada's national parks and terrestrial protected areas (Turner 2009).

1.3.2 Fisheries Division

The Fisheries Division has 1 full-time employee dedicated to marine protected areas. Although initiatives on providing marine park wardens are in progress (McConney *et al.* 2010), there is no field staff at present to directly support management of existing marine protected areas (*Woburn Clarks Court Bay*, *Moliniere-Beausejour*, *Sandy Island/Oyster Bed*). Nonetheless, other *Division* staff (9 permanent, 1 temporary) will provide support on a need-by-need basis (pers. communication 2013, R. Baldeo—Marine Protected Area Coordinator).

Legislation administered by the *Fisheries Division* calls for a co-management agreement between the

[7] Submitted to the *Secretariat of the Convention on Biological Diversity* on the 04/13/2012
[8] Full-time equivalent equates to one person for one year of employment—see Turner (2009)

National MPA Management Committee[9] (mandated under the *Fisheries Regulations 2001* to manage all MPAs nationally, and in the case of Carriacou in collaboration with the *Ministry of Carriacou and Petite Martinique Affairs*) and locally established *MPA Co-Management Boards* (see McConney *et al.* 2010; Jeffrey *et al*. 2012) to assist in fulfilling on-site marine protected area responsibilities (in the case of Carriacou, currently facilitated by the *Carriacou Environmental Committee*) (Jeffrey *et al.* 2012).

1.3.3 Ministry of Tourism, Civil Aviation & Culture

Turner (2009) reports that 3 full-time equivalents are dedicated to the administrative management of tourism and heritage sites/protected areas, and that up to 37 field staff are provided at 14 tourism sites, including staff for the visitor complex at the *Grand Etang Forest Reserve.* Field staff includes booth attendants, interpreters, laborers, cleaners and security personnel providing management services and five staff under contract for security (Turner 2009).

2. SUMMARY OF MAIN BARRIERS TO IMPROVED MANAGEMENT AND PROTECTED AREA DEVELOPMENT

The barriers to sustainable environmental and land management in Grenada are well documented in the report *Capacity Building and Mainstreaming of Sustainable Land Management in Grenada* (GoG 2007) and correspond with barriers to improved environmental and protected area management faced today. Recapitulated in part from this report (GoG 2007), and further emphasized in the recent *National Environmental Summary* (Singh 2010), the barriers that impede effective environmental and protected area management in Grenada are summarized as follows:

2.1Institutional and policy

As detailed in Section 1.1, there is no comprehensive system for protected areas or a central coordinating authority in Grenada (nor is there one with respect to physical planning/land development–see Section 2.4) that would harmonize roles, responsibilities and resources for effective administration/management. There is a marked lack of coordination between current agencies with responsibilities related to environmental administration/management (including protected area management). In some cases there is an overlap in agency jurisdiction or no clear authority for actions taken (e.g., regulation of development in mangroves and coastal wetlands in the region of Tyrell Bay and Sandy Island/Oyster Bed Marine Protected Area). Further challenges persist with respect to commitments and administrative backing within and across agencies, including internal buy-in and employee engagement from the different agencies with responsibilities to sectors dependent on environmental resources.

There are 45 Acts said to govern protection and management of Grenada's environment and natural resources (BSAP 2000, Singh 2010), often cited as impeding clear policy direction and management. However, the fact remains that the main barrier to effective protected area management, specifically the "*operationalization* [sic] *of the protected area system*"as outlined in the ridge-to-reef Project Identification Form (PIF) or from other key documents directed at protected area management in Grenada (Sector 2006, Turner 2009) has been political resolve. Indeed, legislative tools are in place (refer to Section 1.1), and work would be well guided (wholly or in part) by frameworks provided by an approved

[9] The Grenada Fisheries (Marine Protected Areas) Order, 2001 (SRO No 77 of 2001) regulations section (4) provides for a Management Committee for MPA. This Committee which was appointed by Cabinet in 2010 has the legal responsibility for the management of all MPAs in the tri-island state.

protected area system plan (Turner 2009), as well as by a number of approved protected area management plans and recent management strategy reports (e.g., Annandale & Grand Etang–Turner 2007; Levera–GoG 2009; Perseverance/Beausejour–Rusk 2010; Moliniere/Beausejour–GoG 2010, Baldeo *et al.* 2012; Sandy Island/Oyster Bed–Barriteau *et al.* 2007).

At a minimum, two key factors required for effective management of protected areas in Grenada lie in the establishment of the *National Parks Advisory Council* (mandated by the *1991 National Parks and Protected Areas Act*, yet to be implemented) and the *Management Committee* for marine reserves (or their equivalent under revised legislation) (see Turner 2009). This *National Parks Advisory Council* and the *Management Committee* could be implemented without substantial cost and would greatly assist in ensuring public support for protected areas. Their establishment is one of the primary objectives of the reef-to-ridge project and key to an eventual protected area system. This, in concert with the establishment of sites that are already treated as designated protected areas (e.g., Mt. St. Catherine) but have yet to be legislatively recognized should incur minimal cost as much of the groundwork has already been conducted (as indicated in Turner 2009).

2.2 Economic and financial

In general, current agencies/institutions have been previously assessed as having insufficient financial resources to effectively perform mandates, as well as inadequate human and technical capacity. Research and monitoring programs are minimal because of limited investment. The Ministry of Agriculture, Lands, Forestry, Fisheries & Environment (MALFFE) through the Forestry and National Parks Department does have relevant outreach programs, but these do not extend beyond crop/livestock production and control of infractions within forest reserve areas on account of resource limitations. Stakeholders such as farmers and fishers, where the poorest often rely exclusively on resources near protected areas and/or vulnerable areas for their livelihoods, are unable to take required conservation measures either because they cannot afford them or have no options.

Reports have indicated the economic contribution that protected areas make to the Grenadian economy (Sector 2006–*Sustainable Finance Plan for Grenada's Protected Areas System*) and further provide frameworks to establish financial management plans for greater revenue generation (see Sector 2006, Turner 2009, Turner 2007 for Grand Etang & Annandale); however, related government initiatives have not yet ensued effectively.

Resource capacity has yet to have been adequately evaluated at either institutional and individual levels, and relatively little in state investments appears to be directed to building capacity across agencies and personnel accountable for environmental resource and protected area management (as well as towards collaborating community groups and associations).

2.3 Technology, knowledge and insufficient capacity

Limited investment in technology, management training and environmental education occurs. While there has been commended efforts by the Fisheries Division and the Department of Forestry and National Parks (e.g., soil conservation), the appropriate technologies to systematically monitor, assess, manage and mitigate environmental degradation are lacking, and insufficient private sector participation in implementation of best practices is said to occur. Besides lacking technological programs and equipment, capacities within state, non-state agencies and stakeholders need to be strengthened to ensure sustainability of technological applications.

Major protected areas initiatives mostly tend to be results of external arrangements and not from national planning processes. Protected area implementation initiatives and management have for the most part

remained project-driven in Grenada, lacking a systematic process of protected area program planning, evaluation, and reporting (Gardner 2006). Under previous project-driven initiatives, personnel from various state and non-state agencies, community-based organizations, farmers and other stakeholders have been exposed to technological applications that are of relevance to sustainable environmental and protected area management; these have ranged from demonstrations of land management techniques to application of information technology to facilitate decision-making. However, once projects come to an end the status quo resumes with little continuity of the initiative. A key barrier in many cases is the lack in effort to institutionalize these initiatives into the business plans of agencies and organizations from a human resource development perspective. Personnel who may have benefited from capacity building themselves are often not sufficiently empowered to become resource providers, and there is generally little attempt at creating the environment that warrants active demand of skills attained in real world applications.

The relatively high turnover rate of skilled technical personnel in government agencies is of further concern. Once personnel obtain valued skill sets they tend to seek alternative more lucrative employment, in many cases within the private sector. A general perception is that the mandate for human resource capacity building in technical areas lies with the state. As a result, expertise that may reside in the private sector is often overlooked as a potential ally in building overall national human resource capacities for environmental management. There are generally only weak attempts to solicit active engagement of private sector partners in human resource development.

National level planning is also challenging because access to information on past and existing land resources and environmental conditions is lacking or difficult to access. The Land Use Division within the Ministry of Agriculture, Lands, Forestry, Fisheries & Environment (MALFFE) manages the spatial information system and services; however, much of the data still needs archiving, some datasets need to be revised (e.g., coral reef areas, seagrass distribution) and others updated (e.g., land classifications). All staff with geographic information systems (GIS) responsibilities should be provided with further training to facilitate data access, management, integration, analysis, standards and communication. Among the other agencies that generate and utilize spatial information products (e.g., Physical Planning Unit, Cadastral Surveys Unit), information used are sometimes different, with data at times being incompatible with other systems in use rendering dissemination of information difficult. An environmental resources information system based on spatial information systems technology that is accessible to technical and policy level professionals has been repeatedly identified as a pressing need. Such a system would greatly enhance harmonized and coordinated planning efforts by all agencies concerned with land development, environmental and protected area management.

2.4 Land acquisition and protected area development

Lack of a land registry limits the availability and access to information on state land assets, which hinders planning processes in relation to potential land allocations for protected areas. Grenadians have clear transferable property rights for land, with the exception of crown lands and coastal areas. However, adjacent lands in coastal areas are considered prime real estate, and these areas in development continue despite consequent degradation to environmental quality. Land markets are not influenced by environmental factors, including natural hazard risk exposure. Further, the land tax pricing system is not risk-based and does not discourage investment into highly vulnerable areas.

The majority of all land in Grenada is privately owned (85 %–Singh 2010), with a pricing system controlled by market factors. This renders the acquisition of private lands for protected area development potentially costly without clear co-management mechanisms (but see Section 1.1 referring to the as yet implemented *1991 National Parks and Protected Areas Act*, where mechanisms do exist to acquire land for protected area designation). Unfortunately, some existing policies can also be used to formalize the

use of vulnerable and ecologically important areas (e.g., tourism development, land claims through squatting), and where other policies/regulations meet aims of sustainable land management they are often not enforced. In general land management planning processes in Grenada tend to be sector driven and do not sufficiently take into consideration principles of ecosystem services (water, soil productivity, biodiversity, buffers to natural hazards, etc.).

A *National Physical Development Plan* provides the framework for land zoning and development planning, but policy initiatives are relatively new and full implementation has not yet been achieved. Current programs of physical planning need to identify and classify all existing and pending/projected terrestrial/marine protected area programs to facilitate protected area planning processes and accelerate their implementation. The national land use policy has yet to be finalized and implemented, thus unplanned development, expansion of residential activities into vulnerable and ecologically important areas (e.g., steep watersheds, riverine borders, encroachment in critical wildlife/habitat areas) persists. This is of particular relevance in the ridge-to-reef approach of the project focal area of Beausejour (along watershed catchments stemming from Annandale & Grand Etang Forest Reserves, stretching to Perseverance/Beausejour and through to Moliniere/Beausejour Marine Protected Area and Grand Anse– ridge-to-reef projected marine protected area).

3. CAPACITY BUILDING AND TRAINING NEEDS

Turner (2009) reports that current governmental staff has a long history of protected area management (notably for forest reserves and tourism sites), but that their needs have been severely challenged due to other government priorities. Recruitment of protected area staff, retention of staff, and required training need to be emphasized priorities for efficient protected area management and notably so for the implementation of the *1991 National Parks and Protected Areas Act* (see organizational structure proposed for the protected area system in Turner 2009) and the *Draft Protected Area, Forestry and Wildlife Act* (Cirelli 2003). The subsequent establishment of the supportive *National Park Advisory Council* (for national parks and terrestrial protected areas) as well as the *National MPA Management Committee* and *MPA Co-Management Boards* (for marine protected areas) will also require opportunities for training of their respective members in legislation, policy, and best practice techniques for protected area management (Turner 2009).

Training and assessment needs have previously been identified as part of the capacity building component of the *OECS Protected Areas and Associated Livelihoods Project* (OPAAL) (see Parsram 2007). The assessment recommended training listed as follows, which was reiterated in the approved *National Protected Area System Plan* (Turner 2009). This applies wholly to reef-to-ridge project objectives, aside from supplementary training needed with regards to biophysical survey methodologies, data collecting and analyses, and fire prevention & erosion control management techniques (concerning the ridge-to-reef Beausejour watershed focal area).

Training needs identified at the protected area level

- tour guiding skills
- project development
- business management
- environmental education
- customer service training
- site operations and management
- product development and marketing
- communication and negotiation skills

- cooperation/collaboration partnerships
- organizational management and leadership
- protected areas planning methods and management plan development

Training needs identified at the protected area system level

- fundraising
- communications
- project management
- networking techniques
- participatory processes
- protected areas financing
- identifying and building partnerships
- community outreach and management
- organizational management and leadership
- protected areas systems and network planning
- education and awareness strategy/methods/tools
- integrated conservation and development planning
- planning methods and management plan development
- protected areas regulation protection and enforcement
- tourism/associated livelihoods strategic planning operations

The Nature Conservancy in association with Grenada's National Implementation Support Program also prepared a capacity development plan that identified and prioritized goals, objectives and actions to guide identified strategic directions on protected area management, ranging from protected area designation to public awareness (MacLeod 2007). The plan was based on a management effectiveness assessment and identified integrated management, government policy, human resource capacity and sustainable financing (Turner 2009).

The capacity development plan further addressed 13 strategies with a comprehensive action plan identifying objectives, performance indicators and responsibility. Its capacity building assessment also identified livelihood-training needs for those wishing to provide commercial recreation services in protected areas. The needs included:

- marketing
- tour guiding
- communications
- health and safety
- customer service
- strategic planning
- product development
- business management
- environmental education
- cooperation and collaboration
- financial resources management
- negotiation and conflict resolution
- project development and management
- organization management and leadership

To assist capacity development, formal educational partnerships need to be established with educational institutions and outside park agencies to facilitate capacity development and training. Further, the

opportunities and financial support should be afforded to governmental staff for professional development. The delivery of ridge-to-reef project objectives, including the protected area system and subsequent management depends on the collaborative effort of government, non-government organizations, the private sector and individuals (Turner 2009).

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Annex 5: Stakeholder Participation Plan for Implementation

Objectives of the stakeholder participation plan

The formulation of a stakeholder participation plan had the following objectives:

To ensure full knowledge by those involved concerning the progress and obstacles in project development and to take advantage of the experience and skills of the participants to enhance project activities (1) to clearly identity the basic roles and responsibilities of the main participation in this project; identity the key instances I the project cycle where stakeholders involvement can occur. The ultimate purpose of the stakeholder participation plan will be the long-term sustainability of the project achievements based on transparency and the effective participation of key stakeholders.

During the PPG phase the inception workshop participants visited the Beausejour watershed to get sense of the scope of issues exemplifying the ridge of reef perspective of landscape to seascape environmental impacts.

Participation Mechanism

Three key phases for stakeholders' participation have been identified for the implementation phase of the ridge to reef project: planning, implementation and evaluation. Project planning will include annual meetings with key PA stakeholders (including members of the steering committee) during which annual assessments will be made and goals will be set for each component of the project. These annual planning meetings will also serve to specific activities that are to be funded through each co financing source.

It is envisaged that, according to UNDP procedures and practices that the project must be managed by a practices board or project steering committee constituted by UNDP and senior services providers as an external project management body and since UNDP will treat project implementation as a partnership and allow the local executing agency Ministry of Agriculture, Lands, Forestry, Fisheries and Environment to adopt a management mechanisms one cot inconsistent with that of UNDP, then this local executing agency may set up a local steering committee to advise the project board through the local executing agency. This local steering committee may be set up constituting of representatives of MALFFE (chair), Ministry of Finance/Planning, Ministry of Tourism, IAGDO and CBOs representative. The project evaluation will occur annually with the participation of key stakeholders at the end of each year and before defining the annual work plan for the following year of project implementation. There will also be mid-term and final evaluation that will be carried out as part of the project cycle. Since the evaluation process will be an independent exercise, opportunity will be given for all stakeholders to express their views; concerns and assessing whether the projects outcomes were being achieved and if required suggest a change in the course of action.

It is therefore important that the views of the local steering committee by communicated to the project board/steering committee as a formatted documented response to questions and that such documentation be transparently communicated. Such a mechanism will allow for meaningful and focused periodic evaluations by both project management and stakeholders.

Annex 5: Institutions participating in project's implementation

Summary of Stakeholders Roles in Project Implementation

Stakeholders	Projects Implementation Role
Ministry of Agriculture Lands, Forestry, Fisheries, and Environment (MLFFE)	The department of central government designated as executing agency for the implementation of the project on the local level and as agency of government with "command and control: over various technical divisions expected to deliver services essential to the delivery of the project. The divisions and their roles include the following:-
Forestry and National Parks Department(FNPD)	• The Forest and National Parks Department is the authority that is responsible for management and conservation of forest ecosystems that include. Landscape vegetation and wildlife and with a special focus on ecosystems services. The FNPD is expected to administer SLM, SFM REDD+, BD and CC mitigation. Principles and practices in collaboration with various other experience of government by design various activities of the project will involve the FNPD in co-management engagements with local area groups and NGOs, CBOs.
Land Use Division(LUD)	• The agency responsible for tracking the status and trends with regards to vegetative coverage, land uses and audit of water within the water source on all landscapes. The LUD will be charged with responsibilities for collaborating with other agencies of government for the application of SLM, SFM/RDD+, And CC mitigation principles and practices in collaboration with local area groups, NGOs/CBOs, in INRM exercises.
Agricultural Extension Division (AED)	• The agency within the Ministry of Agriculture charged with the responsibility for liaison with farmers for promotion of sustainable use of lands for production and for marketing of farmers' production, the AED will exercise key roles in mobilizing and animating farmers for applying SLM, SFM/REDD+, BD and CC mitigation practices in the content of mixed farming and INRM practices.
Agronomy and Veterinary Division (A/VD)	• The agencies responsible for promoting efficiency in animal and plant production systems and for animal health and security. The A/VD will be charged with the task of promoting INRM through SLM, BD and CC mitigation practices.
Marketing and National Importing Board (MNIB)	• The MNIB is a para-statal/Statutory agency of government mandated to facilitate marketing of farmers' production and for enhancing value-added for farm products. The MNIB will be expected to collaborate with various agencies within the Ministry Agriculture for promoting sustainable agricultural production especially with respect to the pilot project at Beausejour watershed.
Fisheries Division (FD)	• The agency responsible for the sustainable management and development of fish stocks habitat and sea space in

Annex 5: Institutions participating in project's implementation

	the context of the marine environment that was traditionally utilized as a common property resource within an open access/ free entry regime. The FD will be charged with the task of leading in the process of establishment of MPAs in collaboration with various sea users in a highly contested common property zone. The FD will then have to collaborate with the community of dive services providers yachtsmen and fishers among others; they will also have to collaborate closely with land users and land management authorities together with local area groups in order to ensure SLM, SFM/REDD^{+}, BD and CC mitigation and INRM practices are applied for minimizing adverse impacts form landscapes to seascapes.
Ministry of Tourism (MoT)	• The department of central government responsible for, among other things, the development/enhancement and management of tourist attraction sites, most of these sites form a part of earmarked or designated PAs. The park management unit of the MOT will collaborate with various other agencies for the establishment and expansion of PAs as either nature reserves or other attraction.
National Water and Sewerage Authority (NAWASA) Parastatal/ Statutory Agency)	• The agency of central government mandated to control surveillance and monitor all sequestration of water from any and all terrestrial water sources and also to collect and dispose of sewerage wastes. NAWASA therefore has a critical interest in the sustainable management of the water source and must directly cooperate with all the agencies within the MALFFIE and others in the appreciation of SFM, SFM/REDD+ and BD and CC mitigation practicing for sustainable use of landscapes and seascapes.
Regional and local Centres of Excellence in support of sustainable management and conservation of the BD and Ecosystems services	• Academic and technical services institutions with special competences that could enhance sustainable management and conservation of the biodiversity and ecosystems services, with the appropriate enabling support would be able to assist the ridge to reef project in meeting specific objectives. These institutions as specialized bodies would be able to provide enabling that the agencies of government are not able to generate sufficient competency in collaboration of local operation management agencies with such centres of excellence (COE) can be beneficial to both; training for local operations agencies and opportunity for COE to enhance their mission and competency. Among the institution identified are:
St. Georges' University (SGU)	• SGU has some experience in monitor/measurements of land based sources of pollution
CEHI	• CEHI has competences and experiences in environmental monitor and measurement.

Annex 5: Institutions participating in project's implementation

CREMES	• CREMES (Barbados) has experience in environmental measurement and monitoring.
UWI	• UWI has experience in M/M also these institutions, having special skills competencies and knowledge can therefore collaborate with the local operations agencies notably, hand use, fisher's provision/MPA, NAWASA for satisfying certain specific objectives.
Recreation Dive-Services Providers	• The association of dive-services providers together with independent dive services operations are expected to collaborate with the MPA coordinating authority, the fisheries division for the purpose of negotiating and adopting best management practices (BMP) in the utilization of coral reef habitats and sea spaces.
Non-Government Organization (NGOs)	• The professional non-profit bodies equipped with skills and experience for engaging local area commonly groups and persons for the purpose of facilitating collaboration between Government agencies for funding agencies and these local area groups in order to apply the co-management approach for community-based INRM.
Community-Based Organizations	• Organized groups of persons dedicating to promoting the interest of communities such as farmers or fishers or landowners/farmers or commercial services or goods suppliers such group will collaborate with NGOs and Government agencies for enhancing SLM, SFM/REDD+ BD and CC mitigation measures. Examples being the Grenada chamber of Industry and Commerce in its support for the "outing " of the use of GHG(Green House Gases); and concessionary loans for alternative energy sources such as solar panels.

This Grenada Ridge to Reef project will be using the technical services of baseline recurrent programs while not having a technical support unit of its own. By design, the GEF core funding together with committed support of grant-aid agencies will act as incremental support to the baseline initiatives for the purpose of implementing activities in support of conservation and management of the BD and ecosystems functions within and around PA that would be enhanced and expanded.

Annex 6: SWOT Risk Matrix for GEF Ridge to Reef Project Implementation

Ranking: Weakness/ threats (A) as negatives (-1 to 5) Strengths/ Opportunities (B) as positives (+1 to +5)
Total Level of Risk: Sum of (A/2 + B/2); Low Risk (3.8-5.0); Medium Risk (1.9-3.7); High Risk (1.0-1.8)

RISK LEVEL FOR ASPECTS OF PROJECT INVESTMENT	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
1. Institutional Enhancement and Enabling Framework.	An institutional framework exists and can accommodate GEF enhancement. [+4]	The limited institutional capacity ,now existing, is a reflection of limited resources available to Government. [-3]	GEF initiative will provide support to alleviate current weaknesses in Governments delivery systems. +5	Government's inability to adapt to changing economic conditions e.g. retooling staff that now exists. [-2]
2. Legal and Regulatory Enhancements and Enabling Framework.	A body of law and administration exists and coupled with new law and regulations can accommodate INRM.	Insufficiency in existing law and regulations reflecting limited capacity for enforcement of INRM measures.	Enhancements to law and regulations are inexpensive to enact/promulgate but can satisfy Grenada's International Obligations.	Persistent Government Apprehensions about enactments that obligate to costly institutional provisions.
3. Capacity Building Support Initiative	A level of capacity exists and GEF initiatives are designed to enhance further.	Limited Resource Support,,limits management capacity.	GEF support coupled with existing capacity expected to provide synergies.	Support for the application of policy instruments, proved to be insufficient. Mt. St. Catherine co-management initiative might fail.
4. Expansion in the Protected Areas System.	Experience in Sites management exists and with felt need for further development.	Larger sites are more remote to the local public while closer smaller sites lack attractiveness.	GEF initiatives provides for the programmatic approach to PAs development and management.	Sustainable financing remains weak. Mt. St. Catherine issues remain unresolved.
5. Institutionalization of the PAs System	Government current policy promotes PAs as instruments for INRM and GEF initiatives are designed to support.	Sustainable financing for a fuller PAs systems is highly challenging for Gov't.	The GEF initiatives promotes the systemic approach to financing and management.	MPAs and TPAs, as space-based management, is insufficiently sold for its benefits to local area people.
6. Applications of INRM Principles and Practices.	Both Government and GEF promote INRM.	Currently stakeholders having limited accustomedness for INRM and Comanagement.	The GEF initiative allows for the multi-focal; multi-agency and comanagement approach to INRM.	CBOs/ NGOs and Competent Authorities are constrained in accommodating collaboration and comanagement.
7. Engagement with Local Area Stakeholders.	Both Government and GEF promote engagements with local area persons as first step in comanagement.	Building accustomedness to INRM and co-management is a time-consuming and extended process.	GEF initiative is designed to promote cost-effectiveness and multi-stakeholder co-management.	Key Local area stakeholder do not recognize sufficient prospects for private profitability in participation.
8. Applications of Science Based and TEK/LA Based Knowledge.	There is a willingness to accommodate TEK and science-based knowledge and	Optimizing benefits from farmers' use of both science based and TEK is a skillful	The GEF initiative has 'designed-in' mini-projects that are geared towards	There is limited uptake and participation by local area persons.

Annex 6: Risk Matix

RISK LEVEL FOR ASPECTS OF PROJECT INVESTMENT	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
	vice versa.	process.	cooperation.	
9. Application of Science.		That must show private profitability/	Existing practices considered by farmers as having private profitability but needing support.	If farmers and landowners conclude that their private profitability is compromised rather than enhanced.
10. Applications of Specific INRM. SFM/REDD+ (Terrestral)	Farmers/ Landowners strength of interest in private profitability from participation in the GEF initiative.	Skill in demonstrating private profitability from community activity is challenging for resource persons.	The GEF initiatives is designed to demonstrate SFM/ SLM practices that can generate private profitability.	Insufficient designed-in and implement demonstrations of SFM/ SLM practices generating private profitability.
11. SLM and LD	Farmers/ Landowners strength of interest in private profitability from GEF initiative.	Skill in demonstrating private profitability while using community activities is challenging.	The GEF initiative can, with support, demonstrate how SLM/ LD practices can enhancing farmers and landowners' profitability.	Insufficient demonstrations of private profitability.
12.SLM in the marine	Marine services providers and local area person's strength of interest in using the marine as ecoassets.	The MPA and TPA is by nature space restrictive to traditional resource users.	Opportunity to further demonstrate how access to and use controls can yield benefit.	Contest in the use of PAs are not sufficiently managed.
13. Coupling of Vested Interests: Sustainable Agricultural Production . (Terrestrial)	Strong felt need by farmers for generating agricultural value-added in both production and marketing	Demonstrations of INRM to small-scale farmers are challenging.	GEF initiative is designed to show BMP for agriculture value-added.	Insufficient demonstrations of private profit from community activities.
14. Coupling Vested Interests: Sustainably Rangeland Management (Terrestral)	Strong interest by animal farmers in testing community initiatives that control grazing that is unsustainable.	Farmers as individuals accustomed to free grazing and seeing low individual profitability from individual restraints.	The GEF initiative is designed to help farmers to make and enforce by rule- making ,community-based restraints not possible as individuals.	Low prospects of private profitability with low uptake by individuals and community.
15. Coupling Vested Interest: SFM/REDD^{+} in agro-forestry. (Terrestrial)	Strong interest by farmers and landowners for improving the value-added from improving the integrity of lands by Agro-forestry.	Farmers profit from Agri-forest is a long-term investment while the profit for landowners is even lower.	The GEF initiative can demonstrate low long-term investments can yield twin benefits of INRM and profitable livelihoods.	Low prospects of private profitability; low individual and community uptake of INRM principles and practices.
16. Enterprise Development and Management at 3 MPA Communities.	MPAs/ TPAs resource use having prospects for entrepreneurial livelihoods.	The scope for enhancement and development of livelihoods from the resource base depends on many external factors.	The GEF initiative can help local area livelihoods persons to cooperate for INRM.	Individualism in context with collectivism inn local area persons is mismanaged.

Annex 6: Risk Matix

RISK LEVEL FOR ASPECTS OF PROJECT INVESTMENT	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
17. Enterprise Development and Management at 3 TPA Communities.	Already existing vested interests involved in livelihoods from the resource base around PAs.	Scope for utilization of the resource base for livelihoods depends on many external factors.	The GEF initiative can help local area livelihoods persons to cooperate for INRM.	Individualism in contest with collectivism in local area persons is mismanaged.

Annex 7: Terms of Reference for Key Project Staff

The following are the indicative terms of references (TOR) for the project implementation staff. The project implementation unit (PIU) will be staffed by a full-time project coordinator and project administrator/financial officer supported by a secretary all of whom will be nationally recruited positions. The TOR of the personnel in the PIU will framed so as to be compatible with UNDPSCO and standard procedures and practices. Furthermore during the inception exercises (IWD) for the implementation of the FSP the TORs for the specific consultants and subcontractors will be fully discussed, and for those consultancies to be undertaken during the first six months of the project, full TORs will be drafted and selection and hiring procedures will be defined.

Project Coordination (PC)

The UNDP county office (for Barbados and Eastern Caribbean) will hire the PC to carry out the duties detailed below and to provide further technical assistance as required by the project team to fulfill the objectives of the project. The PC will be responsible for ensuring that the project meets its obligations to the GEF and UNDP with particular regard to management aspects for the project, including the supervision of staff, strong as stakeholder liaison, for implementation of activities and for reporting. The PC will support and coordinate the activities of all partners, staff and consultants and they relate to the implementation of the project. The PC will report to the UNDP project officer and will be responsible for the following tasks.

Tasks:

- Prepare detailed work plan and budget under the guidance of the SC and UNDP;
- Make recommendations for modifications to the project budget and, where relevant, submit proposals for budget revisions to the SC, and UNDP;
- Facilitate project planning and decision-making sessions;
- Organize the contracting of consultants and experts for the project, including preparing ToRs for all technical assistance required, preparation of an action plan for each consultant and expert, supervising their work, and reporting to the UNDP Project Officer;
- Provide technical guidance and oversight for all project activities;
- Oversee the progress of the project components conducted by local and international experts, consultants, and cooperating partners;
- Coordinate and oversee the preparation of all outputs of the project;
- Foster, establish, and maintain links with other related national and international programs and national projects, including information dissemination through media such as web page actualization etc.
- Organize SC meetings at least once every semester as well as annual and final review meetings as required by UNDP, and act as the secretary of the SC;
- Coordinate and report the work of all stakeholders under the guidance of the UNDP;
- Prepare PIRs/APRs in the language required by the GEF and the UNDP's CO and attend annual review meetings;
- Ensure that all relevant information is made available in a timely fashion to UNDP regarding activities carried out nationally, including private and public sector available, which impact the project;

- Prepare and submit quarterly progress and financial reports to UNDP as required, following all UNDP quality management system and internal administrative process;
- Coordinate and participate in M&E exercises to appraise project success and make recommendations for modification to the project.
- Prepare and submit technical concepts and requirements about the project requested by UNDP, the GoG, or other external entities;
- Perform other duties related to the projects in order to achieve its strategic objectives;
- Ensure the project utilized best practices and experiences from similar projects;
- Previous experience working with a GEF-supported project is considered an asset.

Project Administration/Finance Assistant

The Project Administrator/Finance Assistant is responsible for the financial and administrative management of the project activities and assists in the in the preparation of quarterly and annual work plans and progress reports of review and monitoring by UNDP. The Project Administrator/Finance Assistant will have the following responsibilities:

- Responsible for providing general financial and administrative support to the project;
- Take own initiative and perform daily work in compliance with annual work schedules;
- Assist project management in performing budget cycle: planning, preparation, revisions, and budget execution;
- Provide assistance to partner agencies involved in project activities, performing and monitoring financial aspects to ensure compliance with budgeted costs in line with UNDP policies and procedures;
- Monitor project expenditures, ensuring that no expenditure is incurred before it has been authorized;
- Assist project team in drafting quarterly and yearly project reports concerning financial issues;
- Ensure the UNDP procurement rules are followed during procurement activities that are carried out by the project and maintain responsibility for the inventory of the project assets;
- Perform preparatory work for mandatory and general budget revisions, annual physical inventory and auditing, and assist external evaluators in fulfilling their mission;
- Prepare all outputs in accordance with the UNDP administrative and financial office guidance;
- Ensure the project utilizes the available financial resources in an efficient and transparent manner;
- Ensure that all project financial activities are carried out on schedule and within budget to achieve the project outputs;
- Perform all other financial related duties, upon request.

Qualifications and skills

- At least an Associate's Degree or equivalent work experience and competency in finance, business sciences, or related fields;
- Experience in administrative work, preferably in an international organization or related to project implementation;
- A demonstrated ability in the financial management of development projects and in liaising and cooperating with government officials, NFOs, etc.;
- Self-motivated and ability to work under the pressure;
- Team-oriented, possesses a positive attitude, and works well with others;
- Flexible and willing to travel as required;

- Excellent interpersonal skills;
- Excellent verbal and writing communication skills in Spanish and English;
- Good knowledge of Word, Outlook, Excel, and internet browsers is required:
- Previous experience working with a GEF-supported project is considered an asset.

Secretary

This position provides support to the PC for the day-to-day management of the project and secretarial or assistance functions. The Project Secretary will have the following responsibilities:

- Assist the PC in all project implementation activities;
- Make logistical arrangements for the organization of meetings, consultation processes, and media;
- Ensure the project utilizes the available final resources in an efficient and transparent manner;
- Ensure that all project activities are carried out on schedule and within budget to achieve the project outputs;
- Solve all scientific and administrative issues that might arise during the project;
- Development of SFM/SLM plans for two (2) watershed and provide technical support of r SFM/SLM plan implementation.

Outputs:

- Detailed work plans indicating dates for deliverables and budget;
- Documents required by the control management system of UNDP;
- ToRs and action plan of the staff and monitoring reports;
- List of names of potential advisors and collaborators and potential institutional links with other related national and international programs and national projects;
- Quarterly reports and financial reports on the consultant's activities, all stakeholders' work, and progress of the project to be presented to UNDP (in the format specified by UNDP);
- A final report that summarizes the work carried out by consultants and stakeholders during the period of the project, as well as the status of the project outputs at the end of the project;
- Minutes of meetings and/or consultation process;
- Yearly PIRs/APRs;
- Adaptive management of project
- SFM/SLM plans for (1) watershed: Beausejour watershed
- Development plans for up to 15 municipalities in the southeastern region incorporating SFM/REDD+ and SLM principles and their implementing measures
- Field visits to PAs to provide technical support for the piloting of the gate and concession fees system and monitoring reports.

All documents are to be submitted to the UNDP Project Officer and MS Word and in hard copy.

Qualifications (indicative):

- A graduate academic degree in areas relevant to the project (e.g. SFM, SLM, CC mitigation, and BD conservation);
- Minimum 5 years of experience in project management with at least 3 years of experience in at least two areas relevant to the project (e.g. SFM, SLM, CC mitigation, and BD conservation);
- Experience facilitating consultative processes, preferably in the field of natural resource management;

- Proven ability to promote cooperation between and negotiate with a range of stakeholders, and to organize and coordinate multi-disciplinary teams;
- Strong leadership and team-building skills;
- Self-motivated and ability to work under the pressure;
- Demonstrable ability to organize, facilitate, and mediate technical teams to achieve stated project objectives;
- Familiarity with logical frameworks and strategic planning;
- Strong computer skills;
- Flexible and willing to travel as requires;
- Excellent communication and writing skills in English
- Provide secretarial support
- Draft agreements for entities related to the project, in accordance with instructions by the Contracts Office at UNDP;
- Draft correspondence related to assigned project areas; provide clarification, follow up, and responses to requests for information;
- Assume overall responsibility for administrative matters of a more general nature, such as registry and maintenance of project files;
- Provide support to the PC and project staff in the coordination and organization of planes activities and their timely implementation;
- Assist the PC in liaising with key stakeholders from the GoG counterpart, co-financing agencies, civil society, and NGOs, as required;
- Ensure the proper use and care of the instruments and equipment used on the project;
- Ensure the project utilizes the available administrative resources in an efficient and transparent manner;
- Ensure that all project administrative activities are carried out on schedule and within budget to achieve the project outputs;
- Resolve all administrative and support issues that might arise during the project;
- Provide assistance in all logistical arrangements concerning project implementation;
- Perform all other administrative duties, upon request.

Qualifications and Skill:

- Demonstrated experience in administrative work, preferably in an international organization or related to project implementation;
- Self-motived and ability to work under the pressure;
- Team-oriented, possesses a positive attitude, and works well with other;
- Flexible and willing to travel as required;
- Excellent interpersonal skills;
- Excellent verbal and writing communication skills in Spanish and English;
- Good knowledge of Word, Outlook, Excel, and Internet Browsers is required;
- Previous experience working with a GEF-supported project is considered as asset.

Information Technology Technician (ITT)

The information technology technician provides support to the PC for generating and maintaining the database on various key aspects regarding tracking performance of the project. The ITT will have the following responsibilities:

- Maintain a database on all key activities of the project.
- Support the PC for all data and records requirements.

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Annex 9: Co-financing Commitment Letters

Ref. No. .....
In replying the above Number and date of this letter should be quoted.

MINISTRY OF TOURISM,
CIVIL AVIATION AND CULTURE
MINISTERIAL COMPLEX
BOTANICAL GARDENS
ST. GEORGE'S
GRENADA, W.I.

February 12, 2014

Adriana Dinu
UNDP/GEF Officer-in-Charge and Deputy Executive Coordinator
United Nations Development Programme
304 East 45th Street, 9th Floor
New York, NY 10017
UNITED STATES OF AMERICA

Dear Ms. Dinu,

RE: Expression of Commitment to Co-finance GEF/UNDP Project 5069 Implementing a "Ridge to Reef" Approach to Protecting Biodiversity and Ecosystem Functions Within and Around Protected Areas in Grenada

This letter serves to express the commitment of the Ministry of Tourism, Civil Aviation and Culture to co-finance activities of the project in Grenada titled, *Implementing a "Ridge to Reef" Approach to Protecting Biodiversity and Ecosystem Functions Within and Around Protected Areas in Grenada.*

Our Ministry is extremely pleased with this intervention due to its direct contribution to enhancing the enabling environment for protected areas management at the national level. The overarching strategic focus on expansion of the protected area system, and improvement of the infrastructure at selected sites is vitally importance in strengthening the tourism product. Equally significant is the intervention's thrust to support the sustainable financing of protected areas, which is extremely critical within the context of current economic challenges.

The Ministry of Tourism, Civil Aviation and Culture therefore unreservedly supports this initiative through provision of technical, organizational and financial assistance to the following project components:

- Formal establishment of the National Parks Advisory Council;
- Finalization of the legal and regulatory framework for protected area management;
- Expansion of the Protected Area System;
- Conservation and sustainable use of natural resources at the community level.

We therefore allocate a total of US$ 2,166,667 in-kind services to project implementation.

We anticipate a successful project that will improve national capacities for wise management of our national parks and protected areas, while stimulating the income generating potential of our communities.

Yours Sincerely,

.....
Sibyl Alexander (Ms.)
PERMANENT SECRETARY

Fax: (473) 440-0443 ● Tel.: (473) 440-0366-8 ● E-mail: tourism@gov.gd / mot@spiceisle.com

Annex 9: Co-financing Letters

Ref. No. .....
In replying the above Number and date of this letter should be quoted.

MINISTRY OF AGRICULTURE,
LANDS, FORESTRY, FISHERIES
AND THE ENVIRONMENT
MINISTERIAL COMPLEX
BOTANICAL GARDENS
ST. GEORGE'S
GRENADA, W.I.

January 31, 2014

Ms. Adriana Dinu
UNDP/GEF Officer-in-Charge
And Deputy executive Coordinator
United Nations Development Programme
304 East 45th Street, 9th Floor
New York, NY 10017
USA

Dear Ms. Dinu,

Re: Expression of Commitment to Co-finance GEF/UNDP Project 5069 Implementing a "Ridge to Reef" Approach to Protecting Biodiversity and Ecosystem Functions Within and Around Protected Areas in Grenada

This letter serves to express the commitment of the Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment to co-finance activities of the project in Grenada titles, Implementing a "Ridge to Reef" Approach to Protecting Biodiversity and Ecosystem Functions Within and Around Protected Areas in Grenada.

The Ministry is extremely pleased with this intervention due to its direct contribution to the expansion and improved management of protected areas at the national level. Specifically, the project is expected to contribute significantly to attainment of the conservation targets of the Grenada Declaration, and the action programmes of key multilateral environmental agreements to which our country is signatory.

In addition, the project's focus on sustainable forests and land management is of paramount importance cognizant of the detrimental impacts from Hurricanes Ivan and Emily, and the invaluable services provided by these resources in supporting socioeconomic growth and development, and human health and wellbeing. Equally commendable is the intervention's thrust on sustainable livelihood creation, especially within the context of current economic challenges experienced at the global and national levels.

My Ministry endorses this initiative which is consistent with our strategic focus for enhanced ecosystem management, diversification of the agriculture sub-sectors and livelihood creation. The Ministry with responsibility for Agriculture therefore fully supports implementation of the project through provision of technical, organizational and financial assistance valued at US$ 13,010,155.

Phone: (473) 440-2708/3386/3078 Facsimile: agriculture@gov.gd. Fax: (473) 440-4191

Annex 9: Co-financing Letters

The co-financing resources are allocated as follows:

- Environment Division US$ 6,130,525 will be provided through synergistic activities under the Integrated Climate Change Adaptation Strategies (ICCAS) project funded by the BMU and Government of Grenada. Specifically US$ 3,259,167 through UNDP component and US$ 2,871,358 from the GIZ component.
- Forestry and National Parks Division, US$ 2,250,000.
- Fisheries Division, US$ 4,629,630.

Co-financing resources will be provided in-kind with an assigned annual budgetary allocation from each of the above technical Divisions.

We anticipate a successful project that will enhance national capacities for wise management of environmental resources, while strengthening communities' income generating potential.

Yours respectfully,

M. Austin Leadore

MARILYN AUSTIN-CADORE (Mrs.)
PERMANENT SECRETARY
***with responsibility for* FORESTRY AND FISHERIES**

N.B. The US$6,100,000 from GIZ/ ICAAS is a bilateral project between the Government of Grenada and the Government of Germany and provides no further signed letter of commitment at this time since this assistance is based on a bi-lateral agreement already signed.

Annex 9: Co-financing Letters

United Nations Development Programme

Empowered lives.
Resilient nations.

29 May 2014

Dear Ms. Dinu,

Re: Expression of Commitment to Co-finance GEF/UNDP Project 5069 Implementing a "Ridge to Reef" Approach to Protecting Biodiversity and Ecosystem Functions Within and Around Protected Areas in Grenada

This letter serves to express the commitment of UNDP Barbados and the OECS to co-finance activities of the project in Grenada entitled, implementing a "Ridge to Reef" Approach to Protecting Biodiversity and Ecosystem Functions Within and Around Protected Areas in Grenada

UNDP Barbados and the OECS therefore fully supports implementation of the project through provision of technical, organizational and financial assistance valued at US$250,000.

The co-financing resources are allocated as follows:

- US$ 100,000 Sustainable Land Management, EU
- US$ 50,000 Multidimensional Poverty Measures / Social Protection
- US$ 100,000 through UNDP component for Programme on Integrated Climate Change Adaptation Strategies in Grenada (ICCAS)

Ms. Adriana Dinu
UNDP/GEF Executive Coordinator and Director a.i.
United Nations Development Programme
304 East 45th Street, 9th Floor
New York, NY 10017
USA

UNDP Barbados and the OECS Subregional Office | UN House, Marine Gardens, Christ Church, Barbados
Tel: +1 (246) 467-6000 | Fax: +1 (246) 429-2448 | E-mail: registry.bb@undp.org | Website: www.bb.undp.org

Annex 9: Co-financing Letters

United Nations Development Programme

Empowered lives.
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The co-financing resources derived from the aforementioned projects which are under execution during this project's implementation period. We anticipate the success of this project in synergy with our broader portfolio in Grenada that will enhance national capacities for wise management of environmental resources, while strengthening communities' income generating potential.

Yours sincerely,

Stephen O'Malley
Resident Representative

UNDP Barbados and the OECS Subregional Office | UN House, Marine Gardens, Christ Church, Barbados
Tel: +1 (246) 467-6000 | Fax: +1 (246) 429-2448 | E-mail: registry.bb@undp.org | Website: www.bb.undp.org

Annex 10: Capacity Development Scorecard

Project/Programme Name: Implementing a "Ridge to Reef" approach to protecting biodiversity and ecosystem functions within and around protected areas in Grenada.

Project/Programme Cycle Phase: 2014-2019 **Date:** January 29th, 2014

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
CR 1: Capacities for Engagement						
Indicator 1: Degree of legitimacy/ mandate of lead environmental organizations	Organizational responsibilities for environmental management are not clearly defined	0				Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha).
	Organizational responsibilities for environmental management are identified	1				
	Authority and legitimacy of all lead organizations responsible for environmental management are partially recognized by stakeholders	2				
	Authority and legitimacy of all lead organizations responsible for environmental management recognized by stakeholders	3	**3 (2.5)**	The organizational responsibilities for SLM are generally well defined at the national level. Some clarity in the perceived role and responsibility of the Planning Development Authority is needed however.	Review and solidify the role of the PDA within the context of the Physical Development and Control Act 2002 and parent legislation, emerging SLM needs and the recommendation of the LMMS.	
Indicator 2: Existence of operational co-management mechanisms	No co-management mechanisms are in place	0				Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha).
	Some co-management mechanisms are in place and operational	1				
	Some co-management mechanisms are formally established through agreements, MOUs, etc.	2	**2**	Co-management represents a key component of the governance framework for	Develop and implement co-management mechanisms for SFM, SLM and TPA	

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
				marine protected areas. Although co-management is identified as the governance model for SLM, SFM and terrestrial PA management, no formal mechanism are instituted.	management. Implement the institutional framework for protected areas as stipulated in the National Parks and Protected Areas Act and the Grenada Systems Plan for Protected Areas to allow for effective authority and legitimacy for TPA management.	
	Comprehensive co-management mechanisms are formally established and are operational/functional	3				
Indicator 3: Existence of cooperation with stakeholder groups	Identification of stakeholders and their participation/involvement in decision-making is poor	0	**3**	Very good involvement of stakeholders in policy and programme implementation. Insufficient engagement of communities in programme implementation.	Working in collaboration with civil society organization, strengthen capacities within the public sector for community participation and engagement in sustainable land, forest and protected area management.	Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha).
	Stakeholders are identified but their participation in decision-making is limited	1				
	Stakeholders are identified and regular consultations mechanisms are established	2				
	Stakeholders are identified and they actively contribute to established participative decision-making processes	3				
Total score for CR1			**8**			

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
CR 2: Capacities to Generate, Access and Use Information and Knowledge						
Indicator 4: Degree of environmental awareness of stakeholders	Stakeholders are not aware about global environmental issues and their relevant possible solutions	0				Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha).
	Stakeholders are aware about global environmental issues, but not about the possible solutions	1				
	Stakeholders are aware about global environmental issues and the possible solutions, but do not know how to participate	2				
	Stakeholders are aware about global environmental issues, and are actively participating in the implementation of related solutions	3	**3**	There is need for a more synergistic approach between the key agencies with respect to implementation of these solutions.	Implement the recommendations of the Land and Marine Strategy for enhancing inter-agency collaboration for environmental management.	
Indicator 5: Access and sharing of environmental information by stakeholders	The environmental information needs are not identified, and the information management infrastructure is inadequate	0				Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha). Outcome 2: Climate resilient SLM technologies implemented by local communities in the 1,547 hectares of the Beausejour Watershed lead to improved habitat integrity in the Annadale Forest Reserve within the watershed and the surrounding landscape, as well as the two MPAs directly downstream.
	The environmental information needs are identified but the information management infrastructure is inadequate	1				
	The environmental information is partially available and shared among stakeholders, but is not covering all aspects and/or the information management infrastructure is limited	2	**2**	The Grenada Land Information System (GLIS) is the principal repository of land information at the national level. Inadequate application of datasets to inform land management planning. There are some mechanisms in	Develop and implement a protocol that facilitates the documentation of all land management related research in the GLIS. Augment capacity of land management officials to analyze data sets in the GLIS to generate information consistent with the	

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
				place for information sharing. For instance rainfall and stream flow data collected and analyzed by the Land Use Division in collaboration with the National Water and Sewerage Authority is stored in the Grenada Land Information System (GLIS) and sent to more than 20 agencies each month. Albeit this, information contain the GLIS although extensive is not adequately shared or utilized by stakeholders. Added to this there are a lot of gaps in existing environmental information particularly on status of environmental indicators and impact of interventions on ecosystem integrity.	priorities of the aligned NAP, the National Forest Policy, NPDP and the LMMS. Develop a GIS forest data base in collaboration with the Land Use Division.	
	Comprehensive environmental information is available and shared through an adequate information management infrastructure	3				
Indicator 6: Existence of environmental education programmes	No environmental education programmes are in place	0	**1**			Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931)
	Environmental education programmes are partially developed and partially delivered	1		Environmental education is normally project led,	Develop and implement a long term public awareness and	

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
				and culminates generally on completion of the intervention. Some adhoc programming is led by individual agencies, but there is no comprehensive programme in place.	education campaign on land degradation and SLM building on the lessons learnt in the SLM Project. Develop and implement public awareness and education strategies on SFM and protected area management.	and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha). Outcome 2: Climate resilient SLM technologies implemented by local communities in the 1,547 hectares of the Beausejour Watershed lead to improved habitat integrity in the Annadale Forest Reserve within the watershed and the surrounding landscape, as well as the two MPAs directly downstream.
	Environmental education programmes are fully developed but partially delivered	2				
	Comprehensive environmental education programmes exist and are being delivered	3				
Indicator 7: Extent of the linkage between environmental research/science and policy development	No linkage exist between environmental policy development and science/research strategies and programmes	0	**1**			Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha). Outcome 2: Climate resilient SLM technologies implemented by local communities in the 1,547 hectares of the Beausejour Watershed lead to improved habitat integrity in the Annadale Forest Reserve within the watershed and the surrounding landscape, as well as the two MPAs directly downstream.
	Research needs for environmental policy development are identified but are not translated into relevant research strategies and programmes	1		Research does not represent a major focus of environmental programming or policy development. Some limited research is undertaken however.	Articulate and implement a research and development strategy for SLM, SFM and protected area management. Strengthen linkages between research and policy development.	
	Relevant research strategies and programmes for environmental policy development exist but the research information is not responding fully to the policy research needs	2				
	Relevant research results are available for environmental policy development	3				
Indicator 8: Extent of	Traditional knowledge is ignored and not taken into account into	0	**2**			Outcome 1: Protected Areas estate is expanded from 8 to

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
inclusion/use of traditional knowledge in environmental decision-making	relevant participative decision-making processes					9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha). Outcome 2: Climate resilient SLM technologies implemented by local communities in the 1,547 hectares of the Beausejour Watershed lead to improved habitat integrity in the Annadale Forest Reserve within the watershed and the surrounding landscape, as well as the two MPAs directly downstream.
	Traditional knowledge is identified and recognized as important, but is not collected and used in relevant participative decision-making processes	1		Some collection of traditional knowledge (TK) is undertaken informally by technicians and environmental professionals, and formally through interventions funded by grant projects. A mechanism for systematic documentation and utilization of the TK in decision making is not instituted.	Develop and implement a protocol to guide the collection, analysis and application of traditional knowledge in SLM, SFM and protected area management.	
	Traditional knowledge is collected but is not used systematically into relevant participative decision-making processes	2				
	Traditional knowledge is collected, used and shared for effective participative decision-making processes	3				
Total score for CR2			**9**			
CR 3: Capacities for Strategy, Policy and Legislation Development						
Indicator 9: Extent of the environmental planning and strategy development process	The environmental planning and strategy development process is not coordinated, and does not produce adequate environmental plans and strategies	0	**2**			Outcome 1:Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha). Outcome 2: Climate resilient
	The environmental planning and strategy development process does produce adequate environmental plans and strategies but they are not implemented or used	1		Generally, there is a diversity of excellent strategic plans developed to guide environmental management.	Elaboration and implementation of a capacity development plan to address current deficiencies.	

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
				However implementation is severely limited due to a number of factors including inadequate leadership, human and financial capital and political will.		SLM technologies implemented by local communities in the 1,547 hectares of the Beausejour Watershed lead to improved habitat integrity in the Annadale Forest Reserve within the watershed and the surrounding landscape, as well as the two MPAs directly downstream.
	Adequate environmental plans and strategies are produced but there are only partially implemented because of funding constraints and/or other problems	2				
	The environmental planning and strategy development process is well coordinated by the lead environmental organizations and produces the required environmental plans and strategies; which are being implemented	3				
Indicator 10: Existence of an adequate environmental policy and regulatory frameworks	The environmental policy and regulatory frameworks are insufficient; they do not provide an enabling environment	0	**1**			Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha). Outcome 2: Climate resilient SLM technologies implemented by local communities in the 1,547 hectares of the Beausejour Watershed lead to improved habitat integrity in the Annadale Forest Reserve within the watershed and the surrounding landscape, as well as the two MPAs
	Some relevant environmental policies and laws exist, but few are implemented and enforced	1		A plethora of laws and policies are instituted to govern environmental management. Albeit this, implementation and enforcement remain fundamental gaps as discussed above. Added to this, outdated laws, low public knowledge of the various legislation, and inadequate regulatory framework	Document the necessary and important data sets and information needed to inform development of a LUP. Document and disseminate the lessons learnt from developing the Carriacou LUP. Develop and implement a LUP for the State of Grenada.	

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
				constrained enforcement.	Using participatory approaches, review the NPDP to include emerging physical development and SLM issues of relevance. Pursue the formal approval of the NPDP by Cabinet and mainstream in national development planning. Articulate development orders for LAPs for Sauteurs, the Greater Grenville Area and other planned areas. Review and update the Forest Policy to include obligations as set out in the UNCCD, UNFCCC, CITES and Ramsar Convention. Finalize and endorse an interagency collaboration mechanism for SLM. Implement the Systems Plan for Protected Areas (2009) and site specific management plans for protected areas. Align the NAP to the UNCCD 10-year Strategic Plan.	directly downstream.

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
	Adequate environmental policy and legislation frameworks exist, but there are problems in implementing and enforcing them	2			Finalize and gazette the revised PPDC Act and related regulations.	
	Adequate policy and legislation frameworks are implemented and provide an adequate enabling environment; a compliance and enforcement mechanism is established and functions	3			Complete the development and finalization of the Environmental Management Act with required SROs. Finalize the draft Protected Area, Forest and Wildlife legislation and SROs for enforcement. Complete the review of the MPA Regulations and commence enforcement. Train resource managers, rangers and select community stakeholders in enforcement of SFM, SLM and protected area legislation. Sensitive the general public of the SFM, SLM and protected area legislative and enforcement framework	
Indicator 11: Adequacy of the environmental information available for decision-making	The availability of environmental information for decision-making is lacking	0	**1**			Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs
	Some environmental information exists, but it is not sufficient to support environmental decision-	1				

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
	making processes					covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha). Outcome 2: Climate resilient SLM technologies implemented by local communities in the 1,547 hectares of the Beausejour Watershed lead to improved habitat integrity in the Annadale Forest Reserve within the watershed and the surrounding landscape, as well as the two MPAs directly downstream.
	Relevant environmental information is made available to relevant decision-makers, but the process to update this information is not functioning properly	2		Refer to CR2 – Indicator 5	Refer to CR2 – Indicator 5	
	Political and administrative decision-makers obtain and use updated environmental information to make environmental decisions	3				
Total score for CR3			**4**			
CR 4: Capacities for Management and Implementation						
Indicator 12: Existence and mobilization of resources	The environmental organizations don't have adequate resources for their programmes and projects, and the requirements have not been assessed	0				Outcome 1: Protected Areas estate is expanded from 8 to 9 terrestrial PAs covering 2,931 Ha (increase of 1,000 Ha from baseline of 1,931) and from 3 to 7 marine PAs covering 13,180 Ha (increase of 11,400 Ha from baseline of 1,780 Ha). Outcome 2: Climate resilient SLM technologies implemented by local communities in the 1,547 hectares of the Beausejour Watershed lead to improved habitat integrity in the Annadale Forest Reserve within the watershed and the surrounding landscape, as well as the two MPAs directly downstream.
	The resource requirements are known but are not being addressed	1				
	The funding sources for these resource requirements are partially identified, and the resource requirements are partially addressed	2	**2**	Inadequate financial resources to support environmental programming represent a cross cutting issue affecting implementation rate. Although some resources are mobilized, lack of integrated financing strategies for environmental management limits	Complete the IFS for implementation of the aligned NAP. Implement all outstanding Key Actions for Financial Arrangement prescribed under Section 5 of Grenada's Systems Plan for Protected Area (Part 2).	

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
				capacity for resource mobilization.		
	Adequate resources are mobilized and available for the functioning of the lead environmental organizations	3				
Indicator 13: Availability of required technical skills and technology transfer	The necessary required skills and technology are not available and the needs are not identified	0				
	The required skills and technologies needs are identified as well as their sources	1				
	The required skills and technologies are obtained but their access depend on foreign sources	2	**2**	Although there is a national mechanism for enhancing skills and technologies, unsupportive national budget and a cease in government hiring seriously affects capacity building. To a large extent, upgrading technologies and short term expertise will depend on foreign sources.	Develop a capacity development strategy to augment technical skills within the resident organizations in harmony with the priorities for capacity development as outlined in the aligned NAP. Upgrade technical capacity of junior forestry officials through the Government Scholarship Programme and other similar regional training initiatives.	
	The required skills and technologies are available and there is a national-based mechanism for updating the required skills and for upgrading the technologies	3			Recruit additional professional staff to meet the needs of the revised National Forest Policy through a phased approach. Conduct short term capacity building training sessions to	

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
					address the needs identified in Box 2.6 above. Upgrade the hardware and software within the Forestry Department to allow for effective delivery of administrative and field based functions.	
Total score for CR4			**4**			
CR 5: Capacities to Monitor and Evaluate						
Indicator 14: Adequacy of the project/programme monitoring process	Irregular project monitoring is being done without an adequate monitoring framework detailing what and how to monitor the particular project or programme	0	**0**	Some monitoring occurs. For instance, officials from the Physical Planning Unit monitors land development activities to determine compliance. Similarly, rangers from the Forestry Division, and officials from the Land Use and Extension Division are actively involved in monitoring programmes and projects. Albeit this, these efforts are not adequately resource, and therefore not optimally effective.	Develop and implement a strategic framework for monitoring and evaluation of key forest and protected area ecological, social and economic parameters. Finalize development of the Land Degradation Monitoring Network (LADMoN) to track the status and extent of land degradation within the state of Grenada.	
	An adequate resourced monitoring	1				

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
	framework is in place but monitoring is irregularly conducted					
	Regular participative monitoring of results is being conducted, but this information is only partially used by the project/programme implementation team	2				
	Monitoring information is produced timely and accurately and is used by the implementation team to learn and possibly to change the course of action	3				
Indicator 15 – Adequacy of the project/programme evaluation process	None or ineffective evaluations are being conducted, with no adequate evaluation plan or the necessary resources	0	**1**	Evaluation constitutes a major limiting factor in environmental programme. It is normally viewed as an "add-on" in government funded programmes. It must be noted however, that externally funded project have built-in evaluations at the mid and final term stages of projects, the outputs of which would be with the lead implementing agency.		
	An adequate evaluation plan is in place, but evaluation activities are irregularly conducted	1				
	Evaluations are being conducted as per an adequate evaluation plan, but the evaluation results are only partially used by the project or programme implementation team	2				

Annex 10: Capacity Development Scorecard

Capacity Result / Indicator	Staged Indicators	Rating	Score	Comments	Next Steps	Contribution to which Outcome
	Effective evaluations are conducted timely and accurately and are used by the implementation team and the Agencies and GEF Staff to correct the course of action, if needed,and to learn for further activities.	3				
Total score for CR5			**1**			
		Combined total score for CR1-CR5	**26**			
		Combined total % for CR1-CR5	**58%**			

Annex 12: Tracking Tools Summary (full TT provided separately)

*Full Tracking Tool is annexed as an excel file.

Section One: Project General Information

1. Project Name: "Implementing a "Ridge to Reef" approach to protecting biodiversity and ecosystem functions within and around protected areas in Grenada"
2. Project Type (MSP or FSP): FSP
3. Project ID (GEF): 5069
4. Project ID (IA): 5087
5. Implementing Agency: UNDP
6. Country(ies): Grenada

Name of reviewers completing tracking tool and completion dates:

	Name	**Title**	**Agency**
Work Program Inclusion	Aden Forteau, Chief Forestry Officer & Anthony Jeremiah, Wildlife Officer - Forestry Department; Roland Baldeo, MPA Coordinator-Fisheries Division; Consultants, Dianne Roberts & Serge Aucoin	Environmental and Development Specialist	RECS - Roberts Environmental Consulting Solutions
Project Mid-term			
Final Evaluation/project completion			

7. Project duration: ***Planned*** 5 years ***Actual*** _____ years
8. Lead Project Executing Agency: Ministry of Agriculture, Lands, Forestry and Fisheries and the Environment
9. GEF Strategic Program: Improve Sustainability of Protected Area Systems
10. Project coverage in hectares:

Total Extent in hectares of protected areas targeted by the project by biome type (biogeographic province)	**Foreseen at project start**	**Achievement at Mid-term Evaluation**	**Achievement at Final Evaluation**
Tropical and subtropical moist broadleaf forests (tropical and subtropical, humid)	2664		
Tropical and subtropical dry broadleaf forests (tropical and subtropical, semi-humid)	96		
Mangroves	229		

Large lakes	23		
Coral reefs	12277		
Total	**15,266**		

Section Two: World Bank/WWF Site-Level Management Effectiveness Tracking Tool for Protected Areas: Summary of METT scores per protected area[10]

Protected Areas	**METT**	**% of 96**
TPAs		
Perseverance	48	50
Beausejour (Proposed New)	31	32
Mt. Hartman	56	58
Levara Pond	59	61
Grand Etang and Annandale (reported as 1)	69	72
Mt. St. Catherine	46	48
Morne Gazo	48	50
MPAs		
Sandy Isle & Oyster	51	53
Molineare/Beausejour	51	53
Woburn Clarks	52	54
Grand Anse (Proposed New)	32	33
Southeast Coast (Proposed New)	33	34
Levera (Proposed New)	33	34
White Island (Proposed New)	32	33
Average of Existing PAs	**53**	**56**
Average of Proposed New PAs	**32**	**34**

Section Three: Financial Scorecard for the entire PA system, both Terrestrial and Marine PAs:

Total Score for PA System	70
Total Possible Score	**220**
Actual score as a percentage of the total possible score	31.80%

N.B. The low scores not only reflect the lack of capacity to manage PAs but also to properly measure and record data for the Tracking Tool itself, e.g. management effectiveness, # ha.

[10] Based on http://www.gefweb.org/uploadedFiles/Focal_Areas/Biodiversity/Biodiversity_GEF_SO_1_Tracking_Tool%20GEF-4.doc for criteria for assignation of scores

Annex 13. LETTER OF AGREEMENT

STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE GOVERNMENT OF GRENADA FOR THE PROVISION OF SUPPORT SERVICES

1. Reference is made to consultations between officials of the Government of *Grenada* (hereinafter referred to as "the Government") and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.

2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.

3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:
(a) Identification and/or recruitment of project and programme personnel;
(b) Identification and facilitation of training activities;
(c) Procurement of goods and services;

4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the programme support document or project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a programme or project,
the annex to the programme support document or project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.

5. The relevant provisions of the Standard Basic Assistance Agreement (the "SBAA") between the Government of Grenada and UNDP signed by the parties on 30 January 1985, including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support

services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.

7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.

8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

_____

Signed on behalf of UNDP
Mr. Stephen O'Malley
Resident Representative

_____

For the Government of Grenada
Mr. Timothy Antoine
Permanent Secretary,
Ministry of Economic Development, Trade, Planning & Cooperatives.

Annex 13: Letter of Agreement

[*Date*]

Attachment

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between the Ministry of Agriculture Lands, Forestry, Fisheries, and Environment (MoA/MoALFE), the institution designated by the Government of Grenada and representatives of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed project "R2R", "the Project".

2. In accordance with the provisions of the letter of agreement signed on *Date of signature (LOA)* and the project document, the UNDP country office shall provide support services for the Project as described below.

3. Support services to be provided:

Support services* (insert description)	Schedule for the provision of the support services	Cost to UNDP of providing such support services (where appropriate)	Amount and method of reimbursement of UNDP (where appropriate)
1. Payments, disbursements and other financial transactions	During project implementation	Universal Price List	Support Services
2. Recruitment of staff, project personnel, and consultants	During project implementation	Universal Price List	Support Services
3. Procurement of services and equipment, and disposal/sale of equipment	During project implementation	Universal Price List	Support Services
4. Organization of training activities, conferences, and workshops, including fellowships	During project implementation	Universal Price List	Support Services
5. Travel authorizations, visa requests, ticketing, and travel arrangements	During project implementation	Universal Price List	Support Services
6. Shipment, custom clearance, vehicle registration, and accreditation	During project implementation	Universal Price List	Support Services

* UNDP direct project support services will be defined yearly, and for those executed during the period, direct project costs will be charged at the end of each year based on the UNDP Universal Pricelist (UPL) or the actual corresponding service cost.

4. Description of functions and responsibilities of the parties involved:

Annex 13: Letter of Agreement

As described in the Project Document (Management Arrangements), the project will be executed under national implementation modality (NIM), with execution by The Ministry of Sustainable Development following UNDP's Programme and Operations Policies and Procedures, per its role as implementing agency. Execution of the project will be subject to oversight by a Project Steering Committee (described in the Project Document). Day to day coordination will be carried out under the supervision of a Project Coordination Unit and corresponding staff.

As described in the Project Document, the functions of the Participants are the following:

The *Ministry of Sustainable Development (MoSD)* is the official project *Executing Agency*, responsible for the fulfilment of the project's results. In addition, the Government of the St. Kitts and Nevis has designated the MoSD as the official counterpart of UNDP in the country. Its main responsibilities related to the project are to:

- Lead the project implementation with the support of the Project Coordination Unit (PCU);
- Participate together with UNDP, in selecting the Project Coordinator;
- Designate a representative to act as a permanent liaison between UNDP, the Ministry of Foreign Affairs and the Project Coordinator, and to participate in the Project Steering Committee meetings, and others as required, to ensure that the necessary inputs are available to execute the project;
- Prove the technical and administrative capacity to develop the project;
- Monitor the project's work plan and progress;
- Provide the name and describe the functions of the person or persons authorized to deal with UNDP concerning the project's matters;
- Approve ToR for technical personnel and consultancies for project implementation;
- Participate in the selection process of the consultants and approve all hiring and payment request;
- Provide the name and describe the functions of the person or persons authorized to sign the project's budget and/or substantive revisions of the project.
- Coordinating the activities of all other project partners, and providing overall technical oversight of programs and outputs of project contractors and short-term consultants (with the support of the PCU).
- If necessary, to make a written request to UNDP for reports on the project;
- To approve the annual audit plan for the project and, in accordance with UNDP standards and procedures, to convene an information and consultation meeting prior to the audit;
- As required, to participate in tripartite meeting or in any follow-up or reorientation sessions.

The *United Nations Development Programme (UNDP)* is the world development network established by the United Nations with a mandate to promote development in countries and to connect them to the knowledge, experience and resources needed to help people achieve a better life. Its main responsibilities related to the project are to:

- Designate a programme officer responsible for providing substantive and operational advice and to follow up and support the project's development activities;
- Advise the project on management decision making, as well as to guarantee quality assurance;
- Be part of the project's Steering Committee and other Committees or Groups considered part of the project structure;
- Administer the financial resources agreed in the budget / workplan and approved by the project's Steering Committee; monitor financial expenditures against project budgets / workplans; and oversee the provision of financial audits of the project;
- Oversee the recruitment and hiring of project staff, the selection and hiring of project contractors and consultants; and the appointment of independent financial auditors and evaluators;
- Co-organize and participate in the events carried out in the framework of the Project;
- Use national and international contact networks to assist the project's activities and establish synergies between projects in common areas and/or in other areas that would be of assistance when discussing and analysing the project;
- Provide Support in the development and instrumentation of the project's gender strategy.
- Ensure that all project activities, including procurement and financial services, are carried out in strict compliance with the procedures of the UNDP / GEF.