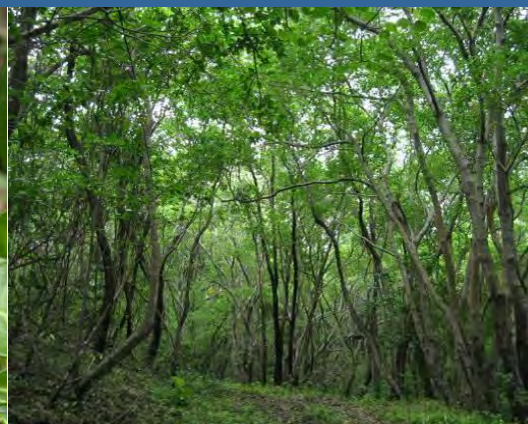
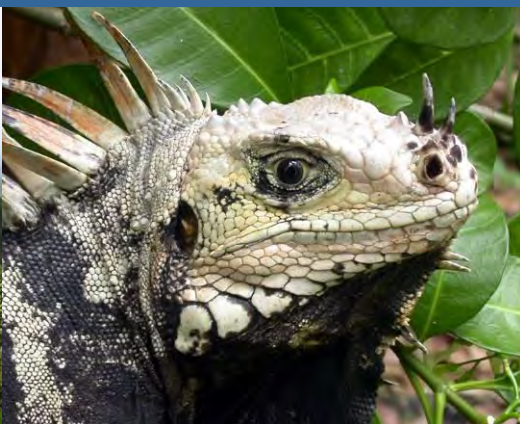


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Banana Industry Trust



**NATIONAL FOREST DEMARCATION AND BIO-PHYSICAL
RESOURCE INVENTORY PROJECT
CARIBBEAN – SAINT LUCIA
SFA 2003/SLU/BIT-04/0711/EMF/LC**

BIODIVERSITY ASSESSMENT OF SAINT LUCIA'S FORESTS, WITH MANAGEMENT RECOMMENDATIONS

By

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2009



Cover illustrations: Cloud Montane Forest on Mount Gimie Range (Roger Graveson, FCG); Saint Lucia iguana (Matthew Morton, FCG-Durrell); Deciduous Seasonal Forest at Grande Anse (Jenny Daltry, FCG-FFI).

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Executive Summary

Saint Lucia's forests perform essential functions in safeguarding and regulating the island's water supply, preventing soil erosion and landslides, storing carbon, and supporting the country's present and future renewable fuel supply. The forests also support, and are maintained by, a rich diversity of animals and plants, many of which are unique to this island.

This report summarises the main findings and recommendations of a series of ecological studies conducted between September 2008 and September 2009. More than 750 person-days were spent in the forests to carry out this research, with more than 25 international and 13 national personnel taking an active part (plus more than 250 local interviewees). More than 300 forest sites were visited nationwide to understand the forest biodiversity and its spatial variation, both inside and outside of the Forest Reserves.

Some of the major achievements and findings of this work were:-

- The development of a robust, user-friendly classification system for all forests and other major vegetation types on Saint Lucia, together with a new vegetation map.
- The discovery of well over 650 forest species not previously recorded in Saint Lucia - most of them invertebrates - and an updated and significantly enlarged inventory of forest plants and animals (species checklists are appended to this report):

	Saint Lucian endemic species	Indigenous species	Alien species	Total species
Seed-bearing plants	10	1,009	282+	1,291
Ferns	0	138	7	145
Mammals	1 (+1 subsp.)	10	7	17
Birds	5 (+13 subspp.)	132	2	134
Reptiles	7 (+5 subspp.)	13	6	19
Amphibians	1	2	3	5
Butterflies & Moths	?	84+	?	84+
Beetles	154	793+	39+	832
Dragonflies	0	26	0	26
Flies	19	c.134	?	134
Total species	197	>2,341	>346	2,687

- An analysis across most taxa revealed that the deciduous and semi-evergreen seasonal forests support an even greater variety of indigenous species than the rainforests, including a larger number of island endemics and globally threatened species. However, the seasonal forests also contain the majority of alien invasive species.
- Improved distribution maps were compiled and new information collated on the ecology and relative abundance of many of the vertebrate animals. By applying international criteria for assessing threat, it was revealed that a large number of Saint Lucian forest species are globally threatened with extinction and should be added to the IUCN Red List accordingly.

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- Twenty-five priority areas for biodiversity conservation were identified both inside the Forest Reserves (12 sites) and outside of the Forest Reserves (13 sites). If managed appropriately, these could conserve virtually all of the indigenous forest species on Saint Lucia.
- A preliminary analysis of the carbon storage of Saint Lucia's forests was conducted, showing that approximately 2.0 million tonnes are stored within the Forest Reserve and 3.5 million tonnes outside the Forest Reserve. There is clear potential for the latter figure to increase by enabling young secondary forests to mature.

A participatory threat analysis was carried out to identify the main threats and pressures on forest biodiversity. Uppermost among the threats were the ongoing degradation and loss of deciduous seasonal forests, mangroves and freshwater swamp forests to residential, tourism and other developments, alien invasive species; and, for a few species, over-exploitation. The threat analysis demonstrated that forests outside of the Forest Reserve system were approximately four times more at risk from major threats than forests inside the reserves: a testimony to the effectiveness of the reserves' management.

The ecological team also identified many promising opportunities to mitigate or reverse the threats to Saint Lucia's forest ecosystems. The top priority recommendations are presented in this report, grouped under the following management objectives:-

- Objective 1: Within the Forest Reserves and existing protected areas, establish and implement site management plans that integrate biodiversity conservation with other forest uses and services.
- Objective 2: Make a concerted effort to safeguard important forests outside of the current Forest Reserves, with particular attention to deciduous and semi-evergreen seasonal forests.
- Objective 3: Revise and amend the national legislation to reflect the current status and needs of Saint Lucia's forest biodiversity.
- Objective 4: Control the introduction and spread of alien invasive species that seriously endanger Saint Lucia's forests and their biodiversity.
- Objective 5: Develop species management plans for threatened and exploited species, and update their Red List status.
- Objective 6: Conduct applied research to inform and monitor the management of Saint Lucia's forest biodiversity.
- Objective 7: Strengthen local and national understanding and support for forest biodiversity conservation, with special attention to the lesser-known forest types.
- Objective 8: Foster the development of a civil society organisation(s) as a tool for lobbying for and enhancing the conservation of forests and their biodiversity.
- Objective 9: Ensure the Saint Lucia Forestry Department and other groups responsible for forest management have the necessary skills, resources and information to manage forest biodiversity effectively.

1. Introduction

1.1. Context of this Report

This report is a synthesis of a series of ecological studies conducted as a part of the National Forest Demarcation and Bio-Physical Resource Inventory Project, funded by the European Community under the Saint Lucia SFA2003 Programme of Economic and Agriculture Diversification and Poverty Reduction through Integrated National Resources Management. The purpose of this project was “to survey and demarcate the physical parameters of the public forest reserve and conduct a comprehensive biophysical inventory/ assessment and management system of forest resources”. The present report is specifically directed towards project Result 3 (“*comprehensive report on the current state of forest resources [...biodiversity, wild fauna etc], with recommendations for sustainable management practices*”, including “*f. vegetation classification*” and “*g. species list*”); Result 5 (“*an assessment of wildlife use attributes identifying critical habitats and recommendation for sustaining habitats of important, rare or endangered animal species*”) and the overlapping Result 9 (“*comprehensive report on the nature, magnitude and geographical scope of forest resources [...biodiversity, carbon storage and processes]*”).

The ecological research programme began during the final quarter of 2008 and continued until August 2009. It comprised original field-based studies of the status, ecology and conservation needs of Saint Lucia’s forest mammals (Clarke, 2009), reptiles and amphibians (Daltry, 2009), birds (Toussaint *et al.*, 2009), beetles, flies, dragonflies and other insects (Ivie, in prep.) and selected vascular plants (Graveson, 2009b). For some of the most threatened forest animals and plants, Morton (2009a) provided a further analysis of their ecology and management needs. A major component of this programme was an assessment of the island’s vegetation, which resulted in the vegetation classification system described by Graveson (2009a) and summarized in section 2.1. Finally, Morton (2009b) examined the use of selected wild forest animals and plants by local people.

All of these studies can be pooled under the title of forest biodiversity assessment. Biodiversity is often considered by forest managers as simply a list of the species present, some of which may be useful. Biodiversity in fact has a much wider definition than that: the Convention on Biological Diversity defined “biological diversity” as the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part. These living organisms drive the ecological processes that create and maintain the forest.

This report draws out some of the team’s major discoveries and presents the main recommendations for conserving Saint Lucia’s remarkably rich yet fragile forest biodiversity. For further details of the methods and findings, please refer to the technical reports cited above for each taxon and theme.

1.2. Biodiversity Research Team

Although the project documents called for one Conservation Biologist to work throughout the project, a larger team was drawn together on the same budget to boost productivity and study as wide a range of taxa and issues as possible (**Table 1**). More than 25 international and 13 national personnel took part (not including more than 200 interviewees in the survey of wildlife use: Morton, 2009b).

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Table 1 The Project Biodiversity Team

Name	Affiliation	Role	Dates	Working with (international)	Working with (national)
Project Conservation Biologist/ Herpetologist					
Dr Jennifer Daltry	Fauna & Flora International	Technical oversight of research outputs. Reptile and amphibian survey	Oct 2008 – Dec 2009 (5 months)	All listed staff below. Additional technical support from Prof. David Warrell, Robert Devaux, Katherine Breach and Esther Bertram.	All listed below. Specifically included Stephen Lesmond Nereus Mitchel and Canice Peterson on reptile survey.
Critical Habitats Specialist					
Matthew Morton	Durrell Wildlife Conservation Trust	Wildlife use, priority species, key conservation areas, Other.	Jan 2008 – Dec 2009 (2 months)	All listed staff below.	All listed below.
Bird Specialist					
Adam Toussaint	Saint Lucia Forestry Department	Bird survey	July, August 2009	M. Morton (analysis)	Lyndon John
Project Mammalogist					
Dr Frank Clarke	University of Aberdeen	Mammal survey	Jan-May 2009	J. Daltry (part), M. Morton (analysis) Vijay Datadin (GIS)	George Antione Timothy Jno Baptiste Alwin Dornelly Mary James Stephen Lesmond Randall Marius Nereus Mitchel Canice Peterson Melvin Smith
Project Entomologist					
Prof. Michael Ivie	Montana State University	Entomological survey	26 Apr – 17 Jul 2009	Dr Donald Bright Dr Shawn M. Clark Dr Andrew Cline Dr Casey Delphia Ian A. Foley Dr Stephen Gaimari Matthew Gimmel Katie J. Hopp LaDonna L. Ivie Eli A. Ivie Dr James B. Johnson Crystal A. Maier Dr Justin Runyon Fred Sibley Ross Winton (plus undergraduates)	Melvin Smith Alwin Dornelly Nereus Mitchel Stephen Lesmond Hannah Dupal Adams Toussaint
Project Botanist					
Roger Graveson	Independent	Plant survey, vegetation classification, herbarium developments	Jan 2008 – Dec 2009 (part time)	J. Daltry (analysis) M. Morton (GIS) Vijay Datadin (GIS)	Chris Sealys, Melvin Smith Rebecca Rock (GIS)

This enlarged team brought a wide range of specialist skills and spent well over 750 person-days in the forests between September 2008 and September 2009. Many of the team members generously gave their time at no charge, for the sake of furthering science and understanding of the island's biodiversity. More than 300 locations were visited nationwide to understand the forest composition and its spatial variation, both inside and outside of the Forest Reserves.

Most of the international scientists who took part in this survey provided „on the job“ training and mentoring to national counterparts, and the author delivered a one-week training class for 15 national personnel on ecological survey techniques. This transfer of skills and information was a two-way exchange, however, as the majority of the national personnel who participated in the surveys (**Table 1**) already had a keen interest in the island's wildlife, its use and its history. Adams Toussaint and members of the Wildlife Unit proved to be especially knowledgeable about the island's wildlife and contributed invaluable information to many of these studies. Melvin Smith must also be singled out here, for his outstanding knowledge of Saint Lucia's flora (Graveson, 2009b).

1.3. Saint Lucia: A Brief Introduction

Saint Lucia is in the Windward Islands of the Lesser Antilles in the West Indies. Its closest neighbouring islands are Martinique, 32km to the north, and Saint Vincent, 40km to the south. It is the second largest island of the Lesser Antilles, with an area of 616km², and with a maximum length and width of 43km and 21km, respectively. The human population today is close to 166,838 residents, giving a mean density of approximately 1,036/km², but much of the island's interior is uninhabited.

Volcanic in origin, Saint Lucia has a mountainous topography dominated by a central ridge running almost the full length of the island from north to south. Numerous steep offshoot ridges extend to both sides of the coasts. Some valleys are broad and occupied by large banana plantations, including Cul-de-sac, Roseau and Mabouya. These valleys, together with the area around the town of Vieux-Fort in the South, account for most of the flat lands of the country. The central southern part of the country has high mountains (Mount Gimie being the highest at 958m). The coastlines, particularly the east coast, are deeply indented by near-vertical cliffs and have a number of narrow sandy beaches.

The island's tropical marine climate is characterized by relatively uniform high temperature throughout the year. The dry season is roughly from January to April and the rainy season from May to August, with usually sunny, warm weather from September to October. (This pattern is variable, however, and the present study regularly experienced torrential storms). Tropical storms and hurricanes are infrequent, with the majority of West Indian tropical cyclones passing to the north of Saint Lucia. The hottest period is May to October, and the coolest, December to March, giving a mean annual temperature of approximately 26°C at sea level. Annual rainfall varies from 1,524-1,778mm in the north to 2,540-3,683mm in the mountainous interior of the south.

Approximately 30% of Saint Lucia's land area is pastoral and arable land. Originally the mainstay of the economy, agriculture has been in decline in recent years, contributing only 3.4% of Gross Domestic Product (GDP) in 2005, with bananas the principal export crop. The economy has shifted to a service economy, with tourism the largest economic sector, accounting for 13.6% of GDP in 2005.

2. The Forests and Their Biodiversity

2.1. Forest Diversity

Forests, defined for the purposes of this study as any area dominated by trees (including woodlands with a broken canopy and plantations, but excluding mixed farmland), cover approximately 34,000 hectares¹, one third Saint Lucia's land area. Almost half are within the network of government Forest Reserves, which have a total area of 9,196 hectares. Much of this forest is mature but secondary, including extensive tracts of deciduous seasonal forest that are reclaiming abandoned cotton plantations at lower elevations. Most of the forest areas in Saint Lucia have also been modified by human activities at one time or another, such as grazing, cutting for charcoal and planting of exotic trees. Natural disturbances, such as landslides and hurricanes, also explain why relatively few of the forest areas display a classic climax structure: they are constantly changing (Graveson, 2009b).

A long history of human disturbance and, even more importantly, natural spatial variation in topography, rainfall, temperature, wind exposure, and geology, have given rise to an astonishingly diverse array of forest forms. These range from cacti-dominated forms on dry offshore islands, which receive less than 1,500mm rain and endure long droughts, to lush rainforests that receive more than 3,000mm of precipitation and are almost permanently enveloped in cloud. As part of the present project, Graveson (2009a) developed a much-needed new classification system for Saint Lucia (as called for by the National Biodiversity Strategy and Action Plan), which identified 10 very distinct, natural forest classes (summarized on **Table 2**) as well as other vegetation types. A new vegetation map shows the distribution of the main vegetation classes (**Figure 1**).

This impressive variety of forest types in turn provides a rich diversity of habitats for numerous animal and plant species, as summarised below and in **Table 3**. Forests are not merely vessels for wildlife, however, but are living ecosystems that actively created and maintained by the animals and plants that inhabit them. As well as their obvious roles above ground, such as pollination and seed dispersal, living organisms are crucial in the recycling of nutrients and formation of soil. As the world has become increasingly aware of the importance of tropical forests and their soils in capturing and storing excess carbon, it should be emphasised that mature natural forests with high biodiversity make a significantly greater contribution than forests that have been degraded and weakened by the loss of native species (Thompson *et al.*, 2009).

Climate change is indicated several times in **Table 2**, and has been identified as a serious threat to Saint Lucia's forests (section 5.1). Maintaining and restoring biodiversity in forests increases their resilience to human-induced pressures and is therefore an essential „insurance policy“ and safeguard against expected climate change impacts. Thompson *et al.* (2009) observed that “*Plantations and modified natural forests will face greater disturbances and risks for large-scale losses due to climate change than primary forests, because of their generally reduced biodiversity.*” Nevertheless, even modified forests are much better at mitigating climate change than almost any other forms of land use.

¹ FAO (1996) registered 20,073 hectares of natural forest, or 35% of Saint Lucia's land area. Definitions, and therefore published measurements, of Saint Lucia's forests vary, however, with some authors measuring only the rainforest areas or areas with an unbroken forest canopy.

Figure 1 Forests and other vegetation types of Saint Lucia
Provisional map from Graveson (2009a).

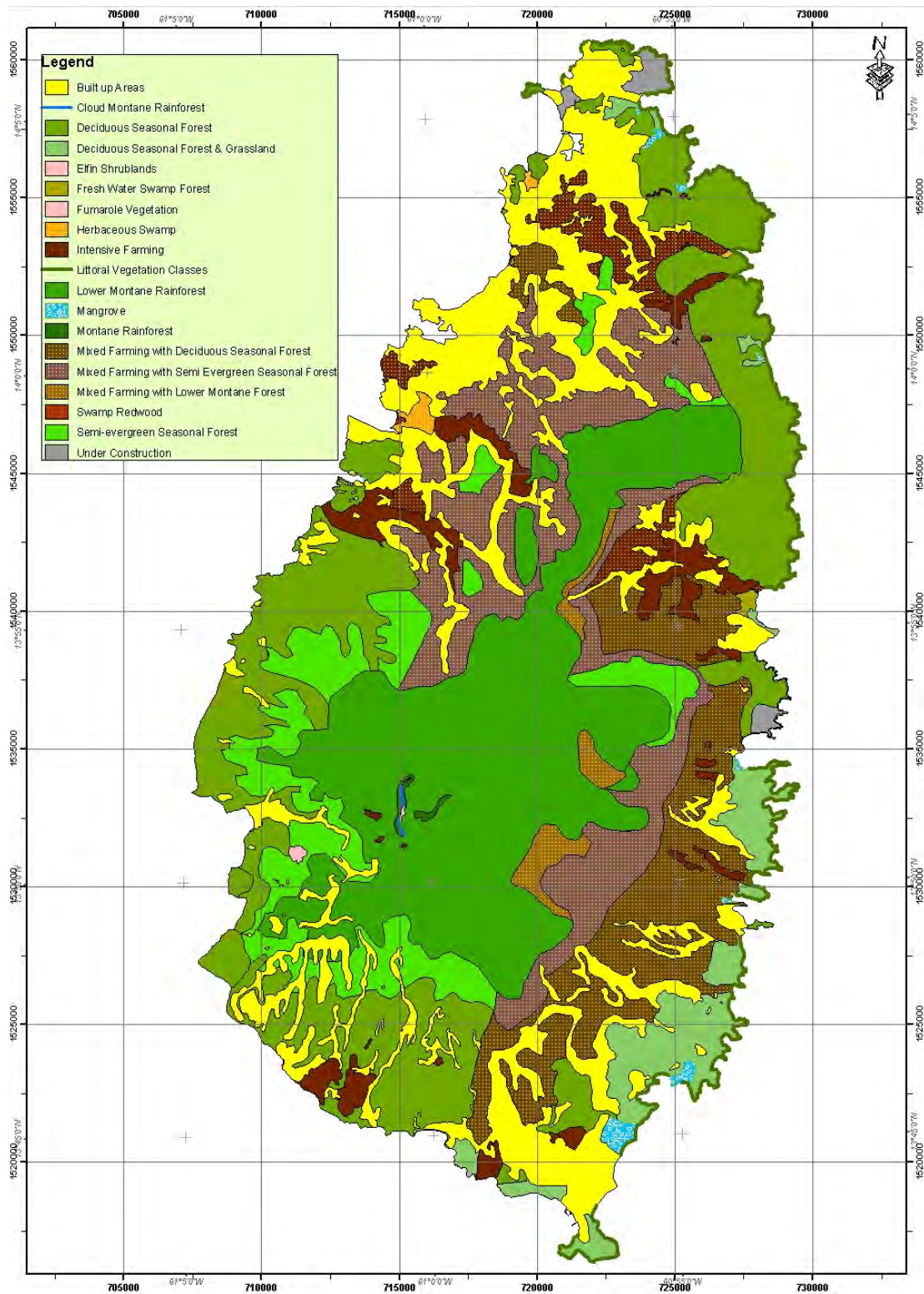


Table 2 Forests and shrublands of Saint Lucia

See Graveson (2009a) for more extensive descriptions and a further eight classes.

1. Elfin Shrublands

Naturally scarce and vulnerable



This rare (8.7 hectares) shrubland vegetation class is found only in the windiest spots on the Mount Gimie/ Troumassée ridges and peaks, at an elevation above 700 metres. The canopy is up to two metres tall, but often less, with an occasional slightly taller *Prestoea acuminata* palms. Cloud and mist cover, with heavy rainfall, is predominant with occasional short periods of sunshine. Relatively few species are found in this vegetation type: mainly a mixture of bromeliads, sedges and grasses and shrubs, with many Lesser Antillean endemics. Because this vegetation type has specialist climatic needs, it is most threatened by climate change (rising temperatures and/or reduced mist and rain).

2. Cloud Montane Rainforest

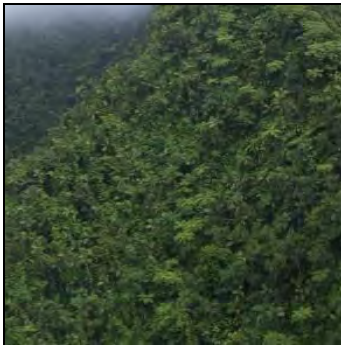
Naturally scarce and vulnerable



This vegetation class is found on the high summits of the Mount Gimie range, including Piton Troumassée (although not in the most windy spots), at an elevation of 700 metres or higher and possibly the eastern interior end of Mount Tabak ridge and a small area on the western end of the La Sorciere ridge. The canopy is about 8m high with occasional much taller trees of *Freziera undulata*. Terrestrial ferns, anthuriums, bromeliads, and epiphytes are very common; moss cover is often several centimetres thick. Cloud and mist cover, with heavy rainfall, is predominant, with only occasional and short periods of sunshine. This vegetation type is most threatened by climate change, because its species need nightly cloud cover during the dry season.

3. Montane Rainforest

Naturally rare



Montane Rainforest is on the western side and sheltered eastern slopes of the Mount Gimie Range, including Piton Troumassée, above 650m. Slopes are extremely steep, rainfall is very heavy, there is little wind and landslides are very common. The steepest areas are covered with tree ferns and palms, with canopy height of four to six metres, with some scattered taller trees on slightly less steep areas. This class is similar to Lower Montane Rainforest in terms of species, but it has a very characteristic appearance. Although this vegetation type is rare, it is not at risk unless climate change is very severe. Together, Montane Rainforest and Cloud Montane Rainforest cover only 84.4 hectares.

4. Lower Montane Rainforest

Abundant and well protected



Trees are evergreen because there is usually no water deficit. Trees of all heights are found (up to 45m), without clear divisions into separate canopy layers. Although there may be a shrub, fern and herbaceous (mainly anthuriums) ground cover, this forest class is easy to walk through except where the canopy has been destroyed and ferns, vines and shrubs colonise the clearing. In comparison to Semi-evergreen Seasonal Forest, the canopy height, wind, and incline are greater and there is a greater abundance of vines, epiphytes, ferns and mosses. Trees are more tightly packed, and the trees can be much wider in girth, and often have buttress roots. This forest class has been recorded from 100-680m above sea level and covers approximately 13,000ha.

5. Semi-evergreen Seasonal Forest

Severely reduced and fragmented



Semi-evergreen Seasonal Forest occupies the zone between Deciduous Seasonal Forest and Lower Montane Rainforest. It is characterized by upper canopy trees with rather thin, often broad, and quite often compound leaves, which may lose some, but not all, of their leaves during a dry spell. There are no, or very few, epiphytes, ground ferns and mosses. Elevation ranges from almost sea-level (in ravines) to the summit of Gros Piton. In comparison with Deciduous Seasonal Forest, this forest has larger trees and a more complete canopy, and occurs in less windy areas and generally at a higher elevation. Most of this mesic forest type has been replaced by farmland (e.g. most banana plantations are in this zone) and that which remains is often degraded.

6. Deciduous Seasonal Forest

Widespread, but degraded and vulnerable



This vegetation class covers over 11,800 hectares in Saint Lucia, from the coast to the summit of Petit Piton (700m), but virtually all is secondary and much of it degraded. It merges inland with the Semi-evergreen Seasonal Forest. The taller trees tend to lose all their leaves in most dry seasons, but the smaller trees and shrubs are evergreen. Its overall appearance during a normal dry season is of a more or less leafless canopy. There is no moss or cover of ground ferns. Vines and herbaceous ground cover are present, particularly in disturbed areas. Residential and tourism developments, livestock grazing and fire are the greatest risk to this class on a large scale.

7. Littoral Evergreen Forest and Shrubland

Widespread, at moderate risk



Behind sandy beaches, rocky cliffs and pavements, an evergreen forest or shrubland is found, especially on the Atlantic coast. The harsh conditions caused by wind, salt-spray, often a thin soil and a water deficit even during most of the wet season, favour an evergreen arborescent flora with thick leathery leaves. *Coccoloba uvifera* (wézen, siwiz, sea grape) is commonly present in this vegetation class. This class is at severe risk from coastal residential and tourism developments.

8. Littoral Scrub, With or Without Cacti

Widespread, at moderate risk



This type of vegetation is found in a narrow zone between littoral rock and cliff vegetation and Deciduous Seasonal Forest or Littoral Evergreen Forest. It consists of shrubs, cacti and sometimes grassy spaces. The dense cactus thickets on Maria Major are an especially fine example of this vegetation type.

9. Freshwater Swamp Forest



Naturally uncommon, at severe risk

Covering only 66 hectares, this rare forest type is independent of direct rainfall and more dependant on edaphic (soil) water. Freshwater Swamp Forest occurs in flat areas close to sea level, with a permanent or seasonal freshwater flow and no inflow of salt water. Trees are evergreen and there is a tendency for single-species stands to form. The soil becomes muddy because the water table reaches the surface for at least part of the year, and is sometimes inundated. This class ranges from permanently muddy, occasionally inundated Swamp Redwood Forest beside rivers with a permanent flow of water, to forest on flat areas behind beaches that rely on seasonal creeks to maintain the high water table. Threatened by manmade changes to water flow.

10. Mangrove



Naturally uncommon, at severe risk

Mangrove is an evergreen forest of brackish water. This well-known vegetation class contains only a few widely distributed, salt-tolerant species. In Saint Lucia, Mangrove forests contain four tree species and are mainly on the Atlantic coast. Mangroves are threatened by manmade changes to water flow and cutting for charcoal. Only 220 hectares of mangroves remain in Saint Lucia.

Of the natural vegetation classes above, the Forest Reserve system is predominantly covered by the „wet“ forest formations: especially Lowland Montane Rainforest, together with virtually all of the country’s Montane Forest, Cloud Montane Rainforest and Elfin Shrublands. The reserves also contain several hundred hectares of plantations of exotic trees (2.4.1), intermingled with the native species. The reserves contain only a few small, but significant, patches of Deciduous Seasonal Forest and Semi-evergreen Seasonal Forest (section 3.2) and none of the other lowland classes.

The majority of forest types shown in **Table 2**, as well as other non-forest vegetation types described by Graveson (2009a), are thus situated outside of the reserves, almost entirely in areas that lack formal protection (section 3.3).

2.2. Plant Diversity

2.2.1. Vascular plants

1,147 native terrestrial vascular plants have been documented on Saint Lucia to date, including 11 new national records in 2009. Most of the native species are forest plants. At least ten species are endemic to Saint Lucia (*Acalypha elizabethiae*, *Bernardia laurentii*, *Cuphea crudiana* [possibly extinct], *Chrysochlamys caribaea*, *Daphnopsis macrocarpa*, *Gonolobus iyanolensis*, *Lobelia santa-luciae*, *Miconia luciana*, *Miconia secunda*, and *Siparuna sanctae-luciae*), and many more have only a restricted range within the Lesser Antilles (Annex I, Table A).

Table 3 The Terrestrial (Non-Marine) Flora and Fauna of Saint Lucia

Not including non-vascular plants, fungi, crustaceans, and many other groups.

	Vascular Plants		Mammals	Vertebrate Animals			Invertebrate Animals			Total known	
	Seed plants	Ferns and their allies		Birds ²	Reptiles	Amphibians	Butterflies and Moths ³	Beetles ⁴	Dragonflies		Flies
Native species	c. 1,009⁵	138	10	132	13	2	84+	793+	26?	134?	2,341
Saint Lucia endemic species	10	0	1	5	7	1	?	c. 154 (49 uncertain)	0	c. 19	197
Saint Lucia endemic subspecies	1+	0	1	13	5	0	?	n/a	0	?	20
Lesser Antilles endemic species	111	7	3	15	10	2	?	c. 204	3	?	355
Caribbean endemic species	200	16	4	23	10	2	?	c.252 (West Indies)	3	?	510
Extinct/ Extirpated (not recorded for decades)	63	0	2	1	2	1	?	n/a	?	?	69
Taxa listed as globally threatened by IUCN (2009)	6 (1xCR, 2xEN, 3xVU)	0	1 (1xEX)	5 (1xCR, 2xEN, 2xVU)	2 (1xEN, 1xVU)	1 (1xCR)	0	0	0	0	15
Taxa qualifying as globally threatened using IUCN criteria	6+	?	1+	5+	10 (7 spp.; 3 subsp.)	1 (1 sp.)	?	?	?	?	23
Alien (non-native) species	282+	7	7	2	6	3	0	39+	0?	?	346
TOTAL SPECIES (native and alien)	1,291	145	17	134	19	5	84+	832	26	c. 134⁶	2,687

² Resident (72 species) and migrant birds only (vagrant records are excluded). Figures include shorebirds and seabirds that feed or breed on the coast.

³ 84 species are presented in Annex I, Table F, but this total does not include all 48 species of butterflies documented by Hunt & Mitchell (1979).

⁴ The number of native beetles and alien beetles are incomplete. Over 1,400 beetles are predicted to be found with further survey effort (M. Ivie, pers. comm.).

⁵ Possibly an overestimate because the indigenous ranges of many neotropical plants are poorly known. Graveson (2009b) reported only 945 indigenous seed-plants (including two seagrasses) and fewer endemic species, but omitted recent (2009) findings and species that had not been collected since the 1930s (Annex).

⁶ 1,200 species of flies (and over 1,400 beetles) are predicted to be found on Saint Lucia with further survey effort (M. Ivie, pers. comm.).

An additional 289 non-native species have also become established in natural habitats (i.e. outside of farmland and residential areas) from plants deliberately or accidentally imported to the island. Graveson (2009b) divided these alien species into „escaped“ (species that have remained close to where they were introduced) and „naturalized“ (more invasive species that have dispersed themselves widely). Some of the most invasive introduced plants in Saint Lucia are the common bamboo (*Bambusa vulgaris*), African tulip tree (*Spathodea campanulata*), water hyacinth (*Eichornia crassipes*) and leucaena (*Leucaena leucocephala*). The majority of alien plants have been observed in degraded forests in lowland areas: it appears that relatively few have been successful at invading the mature rainforests to date.

Currently, only six native plants⁷ (0.5% of native vascular species) are listed as globally threatened by IUCN (2009): Critically Endangered: pencil cedar (*Juniperus barbadensis* var. *barbadensis*); Endangered: lignum vitae or gayak (*Guaiacum officinale*); pennepis (*Pouteria pallida*); Vulnerable: red cedar or acajou (*Cedrela odorata*); arkokwa (*Zanthoxylum flavum*); and contweven (*Pouteria semecarpifolia*). Although *Pouteria semecarpifolia* is recognised as globally threatened (Vulnerable), it is still quite common in lower montane rainforest (R. Graveson, pers. comm.).

Most plant species have not been evaluated against the IUCN criteria, however, and further research is likely to reveal many species are globally and nationally threatened with extinction. Graveson (2009b) revealed more than 60 indigenous plants have not been recorded since the 1930s – which probably means they have either been extirpated or were incorrectly attributed to Saint Lucia in the first place – and a very large number of species are now scarce or highly localized.

Among the species considered to be at risk today are akoma or yellow mastic (*Sideroxylon foetidissimum*); arkokwa (*Zanthoxylum flavum*); balata (*Manilkara bidentata*); bwa kay or bwa wouj (*Carapa guianensis*); lowye kannel (*Aniba ramageana*); lignum vitae (*Guaiacum officinale*); pencil cedar (*Juniperus barbadensis*); and *Bernardia laurentii*. The latter two occur only on the summit of Petit Piton, where they are at risk from fire and invasive ornamentals. Species confined to highest elevation vegetation types are currently well protected, but are likely to be among the first species to be lost to climate change, e.g. the endemic Saint Lucia lobelia (*Lobelia santa-luciae*). The latannyé palm (*Coccothrinax barbadensis*) is currently widely harvested to make brooms and at risk from overexploitation.

2.2.2. Non-vascular plants

While the national checklist of vascular plants is considered largely complete and up to date, the non-vascular plants (bryophytes), including mosses and liverworts, have not been surveyed in recent years. There appear to be no published lists or statistics on these.

⁷ IUCN also list a seventh globally threatened (Vulnerable) plant, the small-leaved mahogany (*Swietenia mahagoni*), as being native to Saint Lucia. Botanist Roger Graveson believes that this tree does not naturally occur, on Saint Lucia, and is present only where it was planted for its timber.

2.3. Animal Diversity

One-hundred-and-fifty-seven native terrestrial vertebrate animals have been confirmed on Saint Lucia, the majority of which are forest birds. Endemicity is impressively high, with 14 species and at least 19 recognised subspecies that naturally occur only on Saint Lucia. The number of alien vertebrate animals is also high and growing, however, and has driven some of the native fauna to extinction. The real diversity, however, is among the invertebrates, with many hundreds of species recorded for the first time in 2009.

2.3.1. Mammals

Nine of the 10 confirmed native mammals are bats, with only one exception, the large endemic Saint Lucia musk rat (*Megalomys luciae*), which has not been formally verified since the 1880s and is probably extinct (attempts to find this species in 2009 were unsuccessful: Clarke, 2009). Although most of the bats are widespread throughout the Lesser Antilles, many species are in decline due to the loss of forest cover, major roost sites and other factors, and Saint Lucia has an important role to play in their conservation. One bat subspecies is endemic, the Saint Lucia little yellow-shouldered bat (*Sturnira lilium luciae*), and another occurs only on Saint Lucia and Saint Vincent (the tree bat *Ardops nichollsi luciae*). Most bat species are present in the rainforests of the Forest Reserves, but there are important foraging and roosting areas in the forests outside of the reserve system (Clarke, 2009). None of the bats are currently protected by law.

The mammal list has become significantly enlarged with the introduction of the southern opossum (*Didelphis marsupialis*), Brazilian agouti (*Dasyprocta leporina*), feral pigs (*Sus scrofa*), rats (*Rattus rattus*, *R. norvegicus*), house mouse (*Mus musculus*) and small Asian mongoose (*Herpestes javanicus*) (Annex I, Table I), most of which pose a very serious threat to native species and have already significantly altered the natural forest ecosystem. Rats have been successfully eradicated from Praslin, Dennery and Rat islands, but most of the alien mammals have spread unchecked, and two of the alien mammals are even protected under the Wildlife Protection Act (the opossum and agouti).

2.3.2. Birds

Of the 132 birds regularly recorded on Saint Lucia (i.e. not vagrants), 72 are year-round residents and the remainder are migrants (Annex I, Table H). Saint Lucia boasts one of the highest levels of bird endemicity in the region, with five endemic species – the Saint Lucia amazon *Amazona versicolor*, Saint Lucia black finch *Melanospiza richardsoni*, Saint Lucia oriole *Icterus laudabilis*, Saint Lucia warbler *Dendroica delicata*, and Semper's warbler *Leucopezza semperi* (possibly extinct) – and 13 endemic subspecies. Five birds, all forest species, are currently listed as globally threatened with extinction (IUCN, 2009) i.e., Critically Endangered: Semper's warbler; Endangered: Saint Lucia black finch and white-breasted thrasher (*Ramphocinclus brachyurus*); and Vulnerable: Saint Lucia amazon and the forest thrush (*Cichlherminia lherminieri*). The Saint Lucia oriole is listed as Near Threatened.

The vulnerable Saint Lucia amazon is recovering strongly thanks to concerted conservation efforts, but a number of other forest birds appear to be in decline, including the Saint Lucia oriole, Saint Lucia nightjar (*Caprimulgus rufus otiosus*), the endemic subspecies of white-breasted thrasher (*R. b. sanctaeluciae*), Saint Lucia wren (*Troglodytes aedon mesoleucus*), and the rarely-seen forest thrush (*C. l. sanctaeluciae*) (Toussaint *et al.*, 2009). The Forest Reserves clearly play a critical role in conserving the species at greatest risk of extinction, with about 19% of the 16 „priority birds“

restricted to these rainforests, and a further 44% also using this habitat. However, 38% of the priority birds identified by Toussaint *et al.* (2009) are almost entirely restricted to habitats outside the Forest Reserve, chiefly the Deciduous Seasonal Forests. An analysis of the areas used by migrant birds also found the majority of records fell outside of the forest reserves (Toussaint *et al.*, 2009)..

2.3.3. Reptiles and amphibians

„The Place Where the Iguana is Found“ (Iouanalao) is also a country of outstanding significance for reptiles, with seven endemic species (53% of indigenous terrestrial species): Saint Lucia anole *Anolis luciae*, Saint Lucia whiptail *Cnemidophorus vanzoi*, Saint Lucia pygmy gecko *Sphaerodactylus microlepis*, Saint Lucia fer-de-lance *Bothrops caribbaeus*, Saint Lucia cribo *Clelia errabunda*, Saint Lucia thread snake *Leptotyphlops breuili*, and Saint Lucia racer *Liophis ornatus*. There are five endemic subspecies, including the Saint Lucia boa *Boa constrictor orophias*. Three full species have become extinct in recent history, however. While only two reptiles are currently shown on the IUCN (2009) Red List as threatened with extinction (Endangered: Saint Lucia racer; Vulnerable: Saint Lucia whiptail), almost all of the endemic taxa are in serious decline and meet IUCN’s criteria as being globally threatened, including the endemic pygmy gecko (both subspecies), thread snake and fer-de-lance (see Daltry, 2009, for assessments of the threat status of every indigenous species and subspecies using IUCN’s criteria).

Six alien reptiles have been documented on Saint Lucia since 1900, of which only three have persisted. Unfortunately, these include an alien green iguana (*Iguana iguana*) which is undoubtedly capable of wiping out the endemic iguana unless it is eradicated. Another alarming discovery of the present survey was that another alien lizard, *Anolis watsi*, previously believed to be harmless, is spreading very rapidly across the island and appears to be capable of displacing the endemic *Anolis luciae* (Daltry, 2009).

The amphibian list is considerably shorter, as is typically the case on oceanic islands, with only two native species documented: the endemic, and very abundant, Johnstone’s whistling frog (*Eleutherodactylus johnstonei*) and the now-extirpated mountain chicken (*Leptodactylus fallax*), a Lesser Antillean endemic. Three alien amphibians have been reported, of which two have continued to flourish, including the notorious cane toad (*Bufo marinus*).

Daltry (2009) found that the forest class with the greatest diversity and abundance of reptiles and amphibians is mature Deciduous Seasonal Forest, closely followed by mature Freshwater Swamp Forest and Semi-Evergreen Seasonal Forest. Forests with low herpetofaunal diversity and abundance were Elfin Shrubland, Lower Montane Rainforest, Fumarole Vegetation and Mangrove. Human degradation of all forest classes was significantly associated with an increased number of alien invasive reptiles and amphibians. These findings tell us that the forest classes that are best represented in the protected area system have the lowest diversity and abundance. The species-rich Deciduous Seasonal Forests and Freshwater Swamp Forests are largely outside of the protected zone and thus at risk. Important exceptions to this rule are the two xeric Maria Islands (approximately 12 hectares in total), which supports seven native species, most of which are scarce or absent from the „mainland“.

2.3.4. Invertebrates

The invertebrate fauna, while greatly outnumbering the vertebrate animals in term of number of species and orders, is only partially known. The 2009 ecological surveys included the first intensive

forest insect survey, especially beetles (Coleoptera – the most diverse order of insects), but also flies (Diptera), dragonflies (Odonata) and other selected insect orders.

Prior to this study, only 182 species (27 families) of beetles had been formally documented in Saint Lucia (plus a further 33 unpublished records). The present survey increased this total to at least 832 species in at least 70 families (Annex I, Table C), of which 739 species were collected in 2009 (M. Ivie, pers. comm.). This is a significantly larger number of species than have been found during longer term beetle inventories on Dominica and Montserrat. The actual number of beetle species present is likely to be well over 1,400 (M. Ivie, pers. comm.). This diversity does include a large number of alien beetles, however, at least three of which were deliberately introduced as biocontrol agents (*Diomus roseicollis*, *Pseudoazya trinitatis* and *Coleophora inaequalis*). Approximately 154 (18%) of the beetle species found to date have been tentatively identified as species endemic to Saint Lucia, but many of them have not been formally named yet (see Annex Table C). Among the few species of beetles previously recorded on Saint Lucia is the very large hercules beetle (*Dynastes hercules reidi*), which is restricted to montane areas.

Table 4 Distribution of beetles across different forest types – a preliminary analysis

Distribution by Forest Type of 503 fully-recorded beetle species (excludes most weevils *sensu lato*, staphylinids and previously recorded species not re-collected). Note that Semi-Evergreen Seasonal Forest had a lower survey effort relative to its area than other types.

Forest Types	No. of species	Saint Lucia endemics (%)	Lesser Antillean endemics (%)	Alien species (%)
Cloud Montane Rainforest	43	c.18 (41.9%)	23 (53.5%)	2 (4.7%)
Lower Montane Rainforest	270	c.70 (25.9%)	106 (39.3%)	13 (4.8%)
Semi-evergreen Seasonal Forest	136	c.32 (23.5%)	48 (35.3%)	8 (5.9%)
Deciduous Seasonal Forest	276	63 (22.8%)	89 (32.3%)	21 (7.6%)
Littoral Evergreen Forest and Shrubland	64	11 (17.2%)	19 (29.7%)	2 (3.1%)
Mangrove	23	1 (4.4%)	5 (21.7%)	2 (8.7%)

The 2009 beetle study found that diversity of species decreases with elevation (but the percentage of endemics rises), so the summits have a limited fauna of mostly native, mostly Saint Lucian endemics (Table 4). At lower elevations, notably in the lower montane rainforests and deciduous seasonal forests, the number of species is very high. Not only do the lowland forests contain a greater diversity (albeit at a lower percentage) of Saint Lucian endemic species, but more alien species as well. The endemics here tend to be scarcer than the more widespread native and invasive species, and it takes more survey effort to locate them. This indicates that the dry forests are greatly underrated in terms of their biodiversity value, and are more threatened by alien invaders than the wetter forests in the Forest Reserves (M. Ivie, pers. comm.).

Flies (Diptera) were equally poorly known, with only 45 species documented prior to 2009, but nearer 1,200 expected (M. Ivie and R. Winton, unpublished data). The 2009 survey of one family, Dolichopodidae, in 2009 yielded a preliminary total of 60 species in 22 genera (see Annex, Table D), 19 of which appear to be new species and are assumed to be single island endemics, but could be

found to be more widespread with more collecting in the region (J. Runyon, unpublished data.). The fact that fourteen of the 60 species are represented by a single individual specimen indicates a large number of species yet to be discovered. Two-thirds of the species were in the wetter forests in the Forest Reserves, and one-third were in drier forests (chiefly Deciduous Seasonal Forest) outside of the reserves.

Among the smaller insect groups (in terms of number of species) are the dragonflies (Odonata), of which 26 species have been recorded from Saint Lucia to date. Most of these known dragonflies have a wide distribution, but three are endemic Lesser Antilles (Annex, Table E).

Forest crustaceans (not shown on **Table 3**) include at least two species of forest-living crabs identified by Morton (2009a) as bak, or the forest crab, *Guinotia dentata*, and kwab or coastal crab, *Cardisoma guanhumi*. Morton's study revealed that a high percentage of Saint Lucians consume forest-living crabs, and collection pressure is evidently intense, especially in coastal areas. There are insufficient data to determine whether this harvest is sustainable or not. Thirteen species of freshwater shrimps or „crayfish“ have been identified within the rivers that run through the forests. Their numbers are reportedly on the decline, putatively due to pollution of the freshwater systems (Government of Saint Lucia (1998), although these crustaceans are also caught in large numbers for food.

Other major invertebrate groups, such as arachnids (spiders, scorpions, ticks and mites), molluscs (snails and slugs) and annelids (earthworms) were not surveyed in 2009 and there appears to be very little written information on these.

2.4. Functions and Values

2.4.1. Conservation and use of wildlife

The main theme of this report is one of the major benefits that forests bring. More than 2,100 native species have been found to date (**Table 3**), and this number should more than double when other terrestrial plant taxa (notably the bryophytes and algae), other invertebrate taxa and fungi are surveyed. The majority of these organisms are largely or entirely dependent on forest habitats.

As a party or signatory to the Convention on Biological Diversity, the St. George's Declaration on Environmental Sustainability in the OECS, the Protocol Concerning Specially Protected Areas and Wildlife (SPAW Protocol), among others, Saint Lucia has a global responsibility to conserve its indigenous plants, animals and their habitats. Maintaining sizeable, representative areas of the different natural forest types is the single most important action that Saint Lucia can take to achieve this. While plantations of exotic trees can, to some extent, serve as forest surrogates and support a number of native animals and plants (more than arable or livestock farming anyway, or most other land uses), the greatest diversity and abundance of indigenous species are to be found in the natural, mature forests.

This native and alien forest biodiversity also makes a direct contribution to local livelihoods, as Saint Lucians collect, buy and use a remarkably diverse array of forest products, especially plants. Morton (2009b) provides a more detailed account of the use of the native gonmyé (*Dacryodes excelsa*), lansan (*Protium attenuatum*), latannyé (*Coccothrinax barbadensis*), and four species of lyenn: awali (*Clusia major* and *C. plukenetii*), ti kannou (*Asplundia rigida*) and ponm dilyenn (*Passiflora laurifolia*); the native animals bak or forest crab (*Guinotia dentata*), kwab or coastal crab (*Cardisoma guanhumi*),

léza or iguana (*Iguana cf iguana*), tet chyenn or boa (*Boa constrictor*), and the alien mannikou or opossum (*Didelphis marsupialis*), kochon mawon or feral pig (*Sus scrofa*) and agouti (*Dasyprocta leporina*). The harvesting and current management of latannyé and the now-rare mabi or mauby (*Colubrina elliptica*) were examined by van Eynde (2009).

All of the main animal quarry with the exception of crabs are protected by the Wildlife Protection Act (1980), which appears to have been successful in significantly reducing hunting (John, 2001). Traditionally, killing of a variety of birds was commonplace for sport or food, but this practice has largely ceased due to law enforcement and changing attitudes towards wildlife (Adams Toussaint, pers. comm.). Hunters may, however, be able to develop a positive role in helping to control undesirable alien mammals, notably feral pigs (Dornelly & Jno Baptiste, in prep.). Other, less controversial, animal products include bat guano, which is collected as a fertilizer for gardens on a small scale (pers. obs.; R. Pedley, unpublished data).

Wood is, of course, another major forest product, and the focus of attention from other members of the project implementation team. Tennant (2009) provided a quantitative analysis of the current timber reserves on Saint Lucia's forest reserves, while van Eynde (2009) provided further analysis of how this resource is currently being managed and used. Saint Lucia boasts a number of trees that produce high quality, valuable timber, and was a net exporter of timber until the 1940s. Although some of the most sought-after trees, such as arkokwa, have become extremely scarce, many useful native timber species remain in the forests, including gonmyé or gommier, lowye mabwe (*Ocotea leucoxydon*), white cedar (*Tabebuia pallida*), bwa blan (*Simarouba amara*), bwa damand (*Hieronyma caribaea*), red cedar (*Cedrela odorata*), bwa kweyol (*Myrcia deflexa*) bwapen mawon (*Talauma dodecapetata*) and la gli (*Sapium caribaeum*) (van Eynde, 2009). In spite of the presence of these indigenous trees, a number of exotic alternatives have been introduced, chiefly into the Forest Reserves, in an effort to boost timber production, reforest degraded areas and safeguard watersheds. The exotic species include mahogany (*Swietenia macryophylla*), blue mahoe (*Hibiscus elatus*) and Caribbean pine (*Pinus caribaea*), with lesser numbers of gmelina (*Gmelina arborea*), teak (*Tectona grandis*), eucalyptus (*Eucalyptus resinifera*, *E. robusta*, *E. kirtoniana*) and leucaena (*Leucaena leucocephala*). The plantations are scattered and cover a relatively small total area of 505 hectares (van Eynde, 2009). Replacing imported timber with local supplies would be an important strategy for reducing the country's „carbon footprint“, but the use of exotic timber species should probably be discouraged in areas of high conservation value (section 3).

Although demand has generally decreased in recent decades, charcoal continues to be an important source of domestic fuel and income in Saint Lucia: a charcoal maker can earn as much as EC\$1,500 from one “good burn”. Charcoal is produced in covered pits, which can be seen scattered around the country, often utilizing wood from secondary forests outside of the Forest Reserve. Saint Lucia used to export charcoal, and this industry was blamed for extensive deforestation (Towle & Towle, 1991). Since the early 1980s, a number of projects have therefore endeavoured to ensure the nation's charcoal supply is more sustainable, including the introduction of leucaena (*Leucaena leucocephala*) plantations (although yields fell short of expectations) and a community project to manage the 40-hectares of mangroves at Mankòtè, near Vieux Fort (Smith & Berkes, 1993). As fossil fuel alternatives become increasingly rare and expensive, domestic and overseas demand for renewable fuels is likely to skyrocket in the coming decades. While resurgence in charcoal exports could be viewed as a threat, the conservation of Saint Lucia's wood resources is undoubtedly a wise investment to buffer the country against future global energy crises.

2.4.2. Watershed and soil protection

Intact forested land captures rainwater far more efficiently than any other form of land cover, and, like a giant sponge, releases this water steadily, thereby serving to buffer rivers and users downstream from seasonal floods and droughts. This vital regulatory function has long been recognised in Saint Lucia, with the need to protect critical catchment areas being the driving force behind the designation of many Forest Reserves. Indeed, the country's first was Castries Waterworks Reserve, established in 1916 to safeguard the city's water supply.

To clear or degrade any of the existing forest reserve areas would be exceedingly risky. All of the island's major rivers have their headwaters in Forest Reserves, in the island's mountainous interior, where annual rainfall often exceeds 3,000mm. Most of the >12 million m³ of water consumed in Saint Lucia every year is derived from the forested watersheds of seven major rivers: Canelles, Cul de Sac, Fond D'Or, Marquis, Troumassee, Vieux Fort and Roseau, the largest at 49.1km². (Towle & Towle, 1991; Kundall, 2008).

It is, however, simplistic to regard the Forest Reserves as the island's water catchments and all other areas as being irrelevant. The watersheds of all rivers, large or small, also encompass the island's foothills and other land areas downstream - areas with lower rainfall than the mountains, but are cumulatively larger in area and rainfall. The remaining forests outside the reserve thus also make a major contribution to maintaining Saint Lucia's water supply, especially those nearest to ravines and their tributaries.

Forests also serve to anchor soil, especially on land that is sloping, prone to erosion by rivers or on inherently loose soils. Citing research carried out in the late 1980s by the Canadian International Development Agency (CIDA), Towle & Towle (1991) reported 3,462 hectares as being at "extreme and high erosion risk", 578 hectares of which were outside of the existing Forest Reserves at that time. With a very large amount of Saint Lucia's private lands already cleared of their forests for agriculture and settlements (**Figure 1**), soil erosion is a persistent problem in almost all watersheds, leading to landslides, irregular water flow, and increased sedimentation of rivers and coastal reefs. Policies to maintain existing forests and promote regrowth are crucial, especially near watercourse and on steep slopes.

2.4.3. Carbon storage

The forests of Saint Lucia currently represent more than 5.5 million tonnes of stored carbon (which, if destroyed, would release 20,381,496 tonnes CO₂).

Table 5 shows the calculated carbon storage, based on average values published for equivalent types of tropical forest. The potential carbon could be significantly higher, but much of the forest is disturbed or secondary regrowth, which holds less carbon than mature, intact forests. Note that this table does not include the areas shown on **Figure 1** as being mixed farming and forest, an additional total area of 15,000 hectares.

Table 5 Preliminary estimate of carbon in Saint Lucia’s forests and shrublands (above and below ground biomass carbon, plus soil).

These calculations should be redone whenever more accurate measures of forest cover become available. (To calculate the equivalent weight of CO₂, multiply the weight of carbon by 3.67).

Forest category (major classes)	Estimated⁸ tonnes of Carbon/ha	Area (hectares)		Carbon (tonnes)		Total Carbon
		Forest Reserve	Outside Reserve	Forest Reserve	Outside Reserve	
Littoral Evergreen Forest and Shrubland	70	0	1,000	0	70,000	70,000
Mangrove	>300	0	221	0	66,261	66,261
Freshwater Swamp Forest	211	0	66	0	13,920	13,920
Deciduous Seasonal Forest	80 (disturbed) to 143 (intact)	350	11,511	35,000	1,151,077	1,186,077
Deciduous Seasonal Forest and Grasslands	60 (highly degraded)	0	2,527	0	151,596	151,596
Semi-evergreen Seasonal Forest,	200 (disturbed)	300	4,570	60,000	913,964	973,364
Lowland Montane Rainforest	200 (disturbed) to 259 (intact)	8,453	4,921	1,944,190	1,131,869	3,076,059
Montane Rainforest, Cloud Montane Rainforest	140 (disturbed) to 190 (intact)	84	0	14,355	0	14,355
Elfin Shrublands	150	9	0	1,310	0	1,310
		9,196	24,844	2,054,854	3,498,687	5,553,541

In common with many other islands in the Lesser Antilles (Helmer *et al.*, 2008), Saint Lucia’s forest cover has increased significantly since the island’s vegetation was mapped in the 1940s (Beard, 1949). This trend could continue due to declines in traditional arable plantations, enabling Saint Lucia to sequester substantial carbon as its forest regrowth continues. Many of the Deciduous and Semi-evergreen Seasonal Forests are still in their first decades of regrowth, and will assimilate carbon at a faster rate than the old growth forests.

Although the land area is small on a global scale, there may be scope for Saint Lucia to secure funding through various carbon schemes for its contribution towards tackling climate change (see van Eynde, 2009, for options).

2.4.4. Tourism

Saint Lucia’s appeal to tourists owes much to its natural beauty, with the rainforests in particular adding to its „tropical paradise“ label. A large number of tourists visit the forest reserves or hike up Petit Piton every year, and many more experience the forests through driving, birding tours, aerial flights, and horse-back riding.

⁸ Mean carbon content figures are “conservative” calculations for the equivalent forest types in Guyana (Cedergren, 2009) and other forests in tropical South America (Fauna & Flora International’s Arcadia Climate Assessment Project database, based on Eggleston *et al.*, 2006).

Tourists are becoming increasingly knowledgeable and concerned about tropical forests and wildlife. There is more scope to promote the forests and increase their accessibility to visitors in return for more revenue for the Forestry Department or private enterprises. Nature-based tourism is still one of the fastest growing sectors of tourism (Balmford *et al.* 2009) and Saint Lucia is well placed to make use of this opportunity, with birding enthusiasts especially drawn to the island's large number of endemic species.

2.4.5. Scenic and other values

Forests are important for the well-being of residents too: a point that may be fully appreciate only when exposed to West Indian countries that have lost most of their forest cover, such as Barbados and Antigua. Saint Lucians who visit such deforested islands often complain of the lack of shade and poor-tasting, desalinated water. The contribution of forests to the health and well-being of people may go much further than this, however. Experimental research in Japan has demonstrated a significant reduction in blood pressure, diabetes and cancer by walking in old-growth forests (compared to city walking), and people who view forest scenery for 20 minutes have 13% lower blood concentration of the stress hormone cortisol than people viewing urban settings (Park *et al.*, 2007). In 2008, the same team demonstrated that people living in areas with a higher percentage of forest cover had lower mortality rates for cancers of the lung, breast, uterus, prostate, kidney, and colon, compared with people living in areas with lighter forest cover, even after factoring in exercise and socioeconomic status.

For a fuller review of the relationships between forests and human health, see Colfer *et al.* (2006).

3. Priority Forest Biodiversity Areas

3.1. Introduction

Saint Lucia's wild animal and plant species are very unevenly distributed, even within the forested areas. After consultation with many of the biologists that participated in field surveys in 2009, 25 areas were identified and rated as priorities using the Forest Stewardship Council's first three criteria for identifying High Conservation Value (HCV) forests:-

HCV 1: Globally, regionally or nationally significant concentrations of biodiversity values (this includes: protected areas; rare or threatened species; endemic species; and seasonal concentrations of species)

HCV 2: Globally, regionally or nationally significant large landscape-level forests

HCV 3: Forest areas that are in or contain rare, threatened or endangered ecosystems

Together, the 25 areas identified contain virtually all of Saint Lucia's known natural vegetation formations, endemic terrestrial species and globally threatened terrestrial species.

The recommended management activities in zones ranked as Very High or High in importance for biodiversity should be primarily conservation-oriented. While this does not necessarily exclude other activities (e.g. selective logging, harvesting non-timber forest products, tourism), such uses should be strictly controlled to avoid spoiling the outstanding biodiversity values of these areas. In zones ranked as being of Medium or Lower importance, there will be greater scope for other activities, including plantations and even agriculture. The needs of protected and threatened species should be respected, however (e.g. safeguarding parrot nesting trees and large bat roosts in timber extraction areas).

In all zones, it is crucial to avoid introducing of alien invasive species, because these could spread throughout the country. Other crucial functions of the forests - most notably watershed protection - should also be borne in mind, and the Precautionary Principle applied wherever there is uncertainty. Achieving the recommended management objectives below, both inside and outside of the Forest Reserves, will depend on the Forestry Department engaging the cooperation and support of private owners, developers, wildlife consumers, the National Trust, and other forest stakeholders.

3.2. Priority Areas Within the Forest Reserve

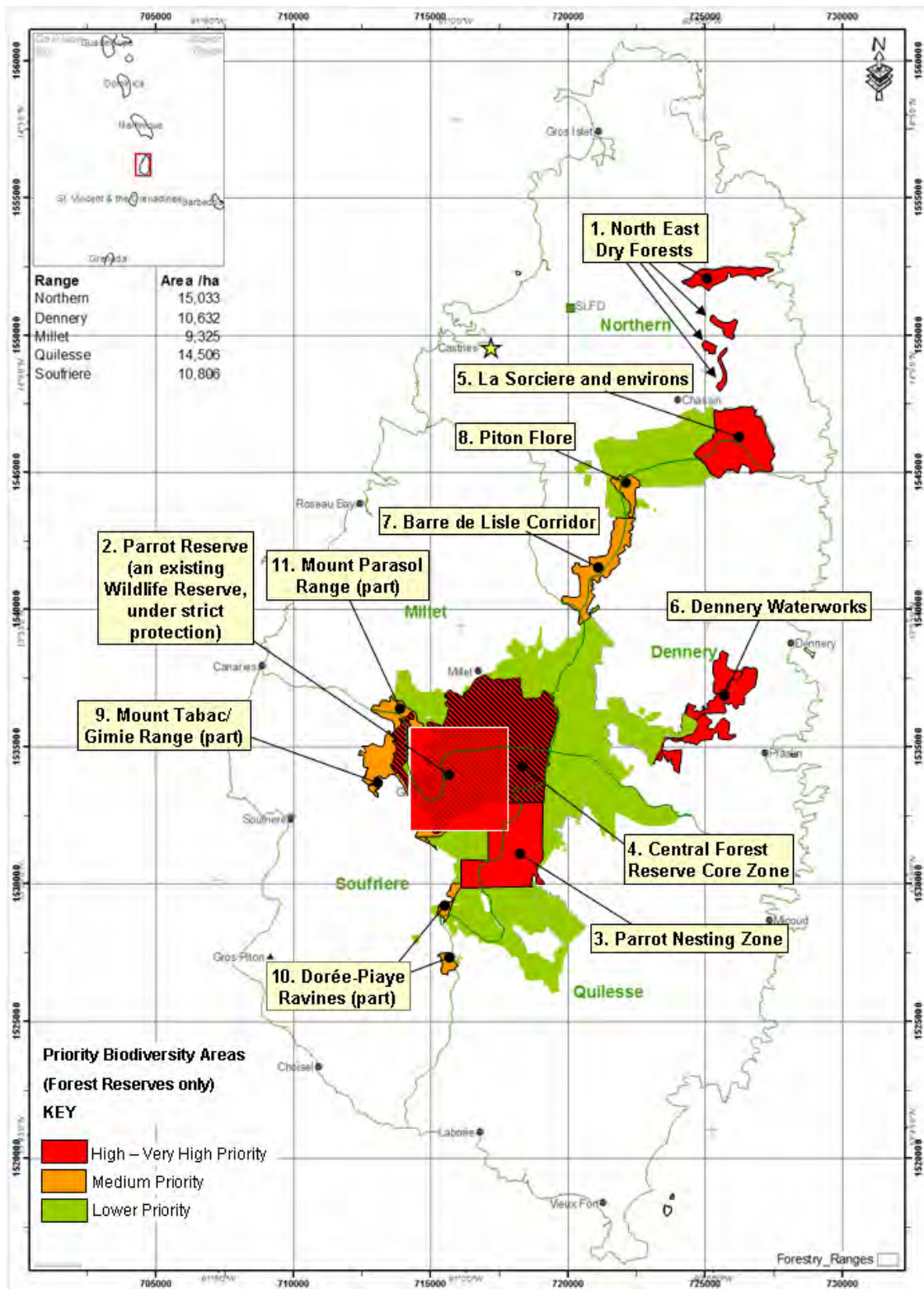
See **Figure 2** for location of zones.

1. North East Dry Forest Reserves

Conservation Importance - Very High

Rationale - Almost the only examples of deciduous seasonal forest designated as Forest Reserves, these four reserves capture a very significant variety of species and habitats that do not occur in the rest of the reserve system. Rare trees, including arkokwa (*Zanthoxylum flavum*) akoumat (*Sideroxylon foetidissimum*) and *Exothea paniculata* are found in the forest reserve strips in the Maquis-Bouguis area. A small number of Saint Lucia iguana (*Iguana cf iguana*) inhabit these areas, but require several adjoining areas outside of the Reserves for nesting. These small reserves form part of the Government

Figure 2 Priority areas for biodiversity conservation within the Forest Reserve
 See text for descriptions.



Forest Reserve Important Bird Area (#LC002), and are directly adjacent to the North East Coast Important Bird Area (#LC001) (see North East Coast Dry Forests below). While most of these forest areas are secondary and degraded, they could recover quickly if given the chance.

Management needs - Enable the recovery and long term conservation of these sites in the context of the wider dry forest landscape. Protect all indigenous wild animals and plants. No hunting (with possible exception of pig hunting as part of a control programme) and any collection of non-timber forest products should be strictly regulated within sustainable limits. All exotic tree plantations and farms (squatters) should be removed to allow native seasonal deciduous forest to replace them. Avoid logging, but localized clearings may help create the low forests favoured by the rare Saint Lucia nightjar (*Caprimulgus rufus otiosus*). Planting of rare trees that naturally occur in this habitat, e.g., arkokwa, akoumat, and gayak (*Guaiacum officinale*), would benefit these forests and the species concerned. Acquire land or form agreements with local private landowners to enlarge the effective area under protection. A top priority is to maintain contiguous forest cover to the iguana's coastal nesting areas. Research and monitor these forests and selected wildlife.

2. Parrot Reserve

Conservation Importance - Very High

Rationale - A Wildlife Reserve established for the conservation of the Saint Lucia amazon (*Amazona versicolor*), covering 3,128 hectares. The western part of this reserve includes Mount Gimie (Saint Lucia's highest mountain) and therefore most of Saint Lucia's elfin shrublands, cloud montane forests and their associated flora. Important populations of endemic and threatened animals and plants are present, including a wide variety of rainforest birds, Saint Lucia boa, Saint Lucia fer-de-lance, and Saint Lucia pygmy gecko. The wildlife reserve forms part of the Government Forest Reserve Important Bird Area (#LC002).

Management needs - Maintain the high conservation value of this area, especially for parrots. Strict protection of all indigenous wild animals and plants within this area, as mandated under the Wildlife Protection Act (this applies to fer-de-lance). No logging or hunting, with the possible exception of pig hunting as part of a feral pig control programme. Collection of non-timber forest products (e.g. lyenn) should be strictly limited to minimise disturbance to nesting parrots. Demarcate boundary in the more accessible parts. Research and monitor parrots and other selected wildlife.

3. Parrot Nesting Zone

Conservation Importance - High

Rationale - Additional to the Parrot Reserve, this is the main area where the Saint Lucia amazon (*Amazona versicolor*) lives and breeds, and is also significant for other endemic rainforest birds, reptiles and plants. It forms part of the Government Forest Reserve Important Bird Area (#LC002).

Management needs - Maintain the high conservation value of this area, especially for parrots. All indigenous wild animals and plants should be protected. Gradually phase out the exotic tree plantations, taking care to leave trees identified as being in active use by feeding or nesting parrots and roosting bats. Allow native vegetation to succeed them. Control feral pigs. Logging, hunting and the collection of non-timber forest products (NTFPs), such as lyenn, should be strictly limited to minimise disturbance to nesting parrots. Low-impact nature-based tourism could be developed here, but the locations of parrot nests should not be revealed. Research and monitor parrots and other selected wildlife.

4. Central Forest Reserve Core Zone

Conservation Importance - High

Rationale - The most remote parts of the Central Forest Reserve, difficult to access and therefore an excellent natural sanctuary for lowland montane rainforest wildlife. Additional and overlapping with the Parrot Reserve and Parrot Nesting Zone above, this zone forms part of the Government Forest Reserve Important Bird Area (#LC002). This remote area has a high density of fer-de-lance and human activity in this area should be minimal to avoid snake-human conflict. This area was also identified by CIDA as a protection zone (see CIDA report for rationale).

Management needs - Minimise human activity in this area, both for the benefit of wildlife and to ensure human safety. All indigenous wild animals and plants should be strictly protected. Feral pig control is required, to conserve this forest and prevent this being a breeding area from which pigs will spread to other areas. No, or minimal, logging, NTFP collection or hunting. Limited research and monitoring of wildlife. Most of this area should be off limits to tourists for safety reasons (the main hiking trail is east of the boundary of this zone).

5. La Sorciere and Environs

Conservation Importance - High

Rationale - An area is noted for the quality of its flora, comprised mainly of lower montane rainforest, with some rare deciduous and semi-evergreen seasonal forests. It forms part of the Government Forest Reserve Important Bird Area (#LC002), with historical reports of the critically endangered Semper's warbler (*Leucopeza semperi*, last recorded here in 1972) and vulnerable forest thrush (*Cichlherminia lherminieri*, last recorded here in 2007). It also adjoins the North East Coast IBA (#LC001). This zone borders crucial deciduous seasonal forests for Saint Lucia iguanas, Saint Lucia nightjars (*Caprimulgus rufus otiosus*), white-breasted thrashers (*Ramphocinclus brachyurus*) and Saint Lucia wrens (*Troglodytes aedon martinicensis*) and is therefore important as a buffer area for any future developments in the North East Dry Forests (see below).

Management needs - Preserve good forests and enable the recovery of degraded areas in the context of the wider forest landscape. Protect indigenous wild animals and plants. Remove exotic tree plantations, starting with Caribbean pines (*Pinus caribbaea*), which are not thriving and pose a fire hazard, and remove farms (squatters), to allow native vegetation to replace them. Limited scope for logging, but small clearings may be beneficial in creating improved nightjar habitat. NTFP collection (lyenn, lansan, etc) should be possible if conducted sustainably. Develop co-management agreements with neighbouring landowners or developers to maintain forest on their properties in order to form a contiguous band along the full wet-mesic-dry gradient down to the coasts (including the key ravines of Louvet, Caille des, and Grand Anse). Research and monitor forest cover and wildlife.

6. Dennery Waterworks

Conservation Importance - High

Rationale - A very important link between the coastal deciduous seasonal forests and the lower montane rainforest, containing some unique deciduous seasonal and semi-evergreen seasonal forest flora (forest types that are generally under-represented in the Forest Reserve system). This reserve forms part of the Government Forest Reserve Important Bird Area (#LC002) and adjoins the Mandelé Dry Forest IBA (#LC004). It supports a small, but important, number of white-breasted thrashers (*Ramphocinclus brachyurus*) and foraging flocks of Saint Lucia amazons (*Amazona versicolor*).

Management needs - Preserve good forests and enable the recovery of degraded areas in the context of the wider forest landscape. Ensure high level protection of all indigenous wild animals and plants.

Logging should be limited, but NTFP collection (e.g. lyenn) would be permissible if conducted sustainably. Endeavour to acquire land or form agreements with local landowners to bring adjoining deciduous seasonal forest areas under protection. Research and monitor the forest cover and wildlife, in particular the white-breasted thrashers.

7. Barre de Lisle Corridor

Conservation Importance - Medium

Rationale - An important link between the northern and southern parts of the Forest Reserve network. As a corridor, this zone can provide contiguous lowland montane rainforest to enable the movement of forest species between the northern and southern reserves (many rainforest species, including many understory birds, are unwilling or unable to cross clearings). This zone also contains important populations of many rainforest species, including probably the highest concentration of lansan trees (*Protium attenuatum*). It also lies at the centre of the Government Forest Reserve Important Bird Area (#LC002), noted for its large number of threatened and endemic rainforest birds.

Management needs - Maintain a continuous natural forest canopy between the northern and southern parts of the Forest Reserve network. Gradually phase out exotic tree plantations, including *Eucalyptus*, and remove farms (squatters) to allow native rainforest vegetation to replace them. Any logging (apart from removal of exotics) should be highly selective and generally best avoided due to steep slopes and high rainfall. Low-impact tourism (e.g. hiking trails) and sustainable NTFP collection (e.g. lansan resin) would be permissible.

8. Piton Flore

Conservation Importance - Medium

Rationale - The summit of Piton Flore has a unique dwarf form of lower montane rainforest species, while the lower slopes are more typical lower montane rainforest. This area forms part of the Government Forest Reserve Important Bird Area (#LC002) and contains important habitat for the Saint Lucia amazon.

Management needs - Maintain this area under natural forest cover for the purposes of biodiversity conservation (and watershed protection). Avoid any logging on the flanks and summit of this piton, and especially ensure large, old trees are preserved for nesting parrots and roosting bats. Low-impact tourism (hiking) and sustainable NTFP collection should be permissible.

9. Mount Tabac/ Gimie Range

Conservation Importance - Medium

Rationale - Range identified for its botanical importance. The summits and joining ridges have a mosaic of cloud montane rainforest and elfin shrublands, containing about 15 plant species not found anywhere else in Saint Lucia. Many of these are Saint Lucian or Lesser Antillean endemics.

Management needs - Maintain this area under natural forest cover and ensure it remains contiguous with the Mount Tabac forested landscape outside of the Forest Reserve. Avoid any logging on the flanks and summits of these mountains and ridges. Especially ensure large, old trees are preserved for nesting parrots and bat roosts. Low-impact tourism (hiking) and sustainable NTFP collection should be permissible.

10. Dorée-Piaye Ravines

Conservation Importance – Lower/Medium

Rationale – Small, but important segments of ravines (the remainder of which extend for 10km outside of the Forest Reserve) with well-developed forests and an exceptionally high diversity of plants. Forms part of the Government Forest Reserve Important Bird Area (#LC002)

Management needs - Maintain under natural forest cover, contiguous with the rest of the Dorée and Piaye ravines that continue downstream outside of the Forest Reserve (see below). Avoid logging (these are very steep ravines). More research should be conducted into the flora and especially fauna of these ravines. Local people could be enabled to develop low-impact tourist hiking trails along the ravines, especially if the rest of the ravines can be maintained downstream.

11. Part of Mount Parasol Range

Conservation Importance – Lower/Medium

Rationale - Range identified for its botanical importance, but also forms part of the Government Forest Reserve Important Bird Area (#LC002).

Management needs - Maintain under as much natural forest cover as possible, both to conserve its native biodiversity and to maintain its watershed functions.

12. Other Forest Reserve

Conservation Importance – Lower

Rationale - All other parts of the Forest Reserve not included in the zones above. Predominantly lowland montane rainforest, these form the rest of the Government Forest Reserve Important Bird Area (#LC002) and contain a rich diversity of animals and plants, with some excellent forest habitats. No species are known to be in this area, however, which do not also occupy at least one of the priority zones above.

Management needs - A multiple use area, but incorporating sound conservation principles to conserve biodiversity and maintain its critical watershed functions. Logging should be low-impact and highly selective, following best practices to avoid soil erosion and landslides. Only exotic and non-endangered native trees should be harvested. Large, old trees can be preserved for nesting parrots and bat roosts. As far as economically viable, tree plantations in this zone should use mixed native species in preference to exotic ones. Exotic *Pinus* and *Eucalyptus* should be phased out as a priority, because they represent a fire hazard, degrade the topsoil and offer least benefits to native wildlife. No new exotic species should be introduced into the Forest Reserve for timber, ornamental or other purposes in case they become invasive. Illegal farms (squatters) should be removed from all forest reserves and replaced with forest or plantations (ideally using native species). Local people can be enabled to benefit from sustainable use of forest products, both animals and plants. Research and monitor wildlife, especially tree species and forest areas targeted by logging.

3.3. Priority Areas Outside the Forest Reserve

See **Figure 3** for location of zones.

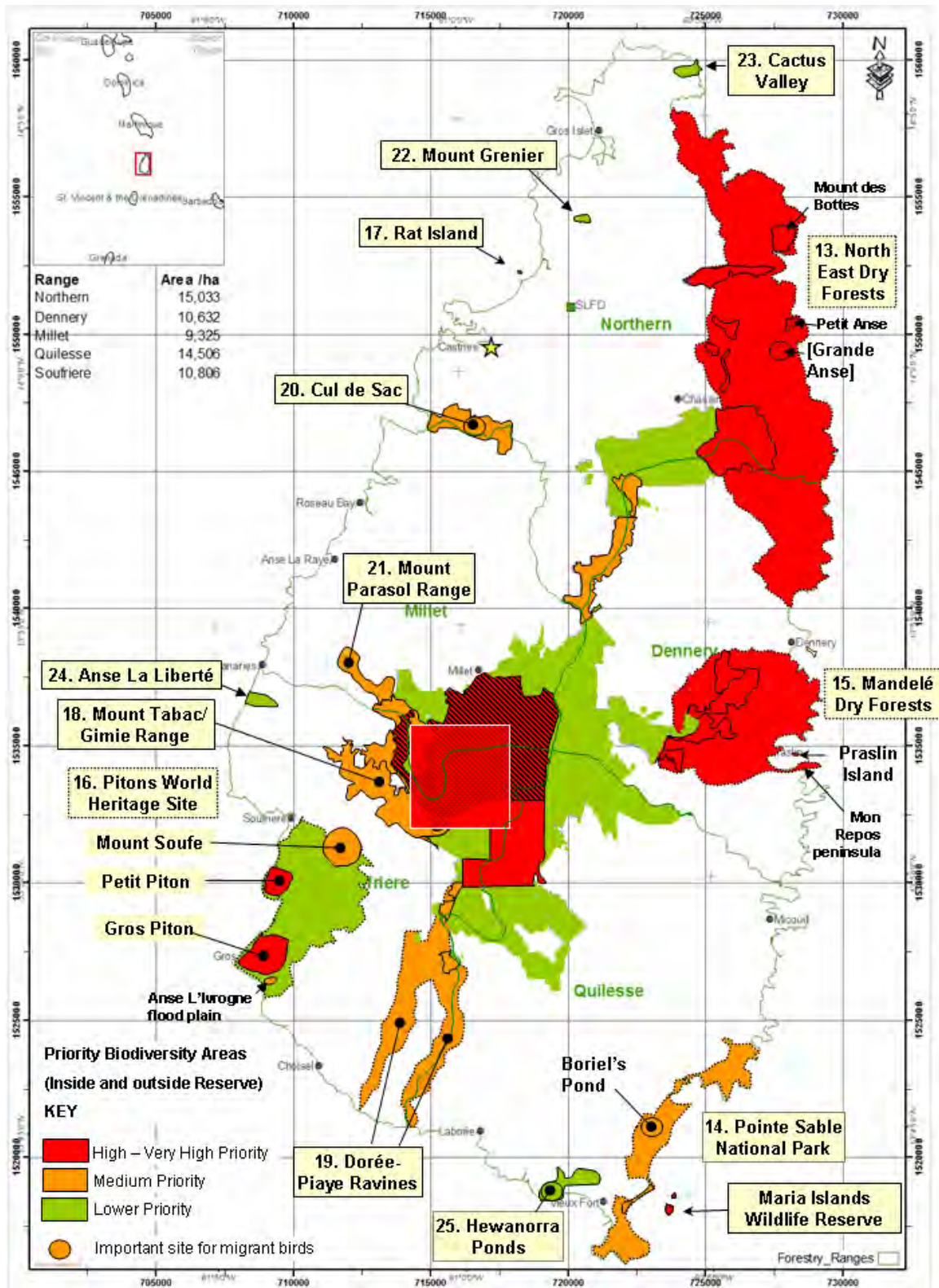
13. North East Dry Forests

Conservation Importance – High/ Very High

Rationale - Outstanding concentration of rare and endemic plants, birds and reptiles in a rolling forested landscape dominated by deciduous seasonal forest and other coastal vegetation classes, with

Figure 3 Priority areas for biodiversity conservation outside the Forest Reserve

See text for details.



some arable and pastoral land. This ecosystem, together with its many unique species, is not adequately represented in the existing Forest Reserve system or other protected areas. Covering approximately 5,000 hectares, this zone is considered large enough to conserve viable populations of many deciduous seasonal forest species. While much of the deciduous seasonal forests are secondary and degraded, they will recover quickly if given the opportunity, and would enable populations of rare species to increase. This zone encompasses the entire North East Coast Important Bird Area (#LC001), immediately adjacent to the Government Forest Reserve IBA (#LC002). It contains an estimated 7.5% of Saint Lucia's endangered white-breasted thrashers (*Ramphocinclus brachyurus*), the endangered Saint Lucia black finch (*Melospiza richardsoni*), most of the world population of Saint Lucia nightjars (*Caprimulgus rufus otiosus*) and other endemic birds. Rare native Saint Lucia iguanas (*Iguana cf iguana*) occupy in this zone, which is also noteworthy for the presence of Saint Lucia boas (*Boa constrictor orophias*) and Saint Lucia fer-de-lance (*Bothrops caribbaeus*). Latann e palms (*Coccothrinax barbadensis*) are naturally present, but over-harvested. Key sites within this zone are:-

North East Dry Forest Reserves: See above.

Grande Anse coast (Very High): Nesting area for Saint Lucia iguanas and three species of sea turtles. Significant population of Saint Lucia pygmy geckos (*Sphaerodactylus microlepis microlepis*) and Saint Lucia worm lizards (*Gymnophthalmus pleii luetkeni*). The northern slopes of Grande Anse have good deciduous seasonal forest with the rare understory tree *Morisonia americana* and the only population of *Eugenia trinitatis*, a rare Lesser Antillean endemic. Very rare vines are found along the river including *Tanaecium crucigerum*. Important site for migratory birds. A pond at Grande Anse forms Saint Lucia's only known breeding site for masked duck (*Nomonyx dominicus*).

Petit Anse: Excellent mature deciduous seasonal forest, and an important population of white-breasted thrashers.

Louvet (Very High): The most important area for nesting iguanas and also important for sea turtles. The globally threatened gayak (*Guaiacum officinale*) has been found on a dry hill at Louvet. Pockets of *Syagra amara*, a Lesser Antillean endemic palm, occupy hills close to the sea between Desbarras and Louvet.

Caille Des / La Chaloupe (Very High): The most important zone for Saint Lucia nightjars and white-breasted thrashers. Also used by iguanas.

Mount de Bottes: Located north of Marquis, with good quality deciduous seasonal forest. Two extremely rare indigenous species are gayak (*Guaiacum officinale*) and mabi (*Colubrina elliptica*).

Management needs – The North East Dry Forests should be a multiple use area, but one that seeks to conserve and enhance the nationally and globally important role of these forests for conserving Saint Lucia's dry forest biodiversity. Enable the recovery/ restoration of native deciduous seasonal and coastal forest vegetation. Endeavour to acquire land or form conservation agreements with landowners and developers to maintain as much natural forest cover as possible. Forest cover should especially be maintained along ravines, along beaches (in the *Coccoloba* fringe where iguanas and hawksbill turtles nest), and along migration corridors for iguanas moving to and from their traditional nesting areas. Exotic tree plantations and squatters on crown land should be phased out. Mixed plantations of native

timber trees that belong in this habitat (e.g. arkokwa) could be a commercially viable alternative and would be more beneficial for wildlife. Logging and other forms of natural resource use should be kept within sustainable limits. Hunting should be prohibited, with possible exception of hunting of feral pigs (without using dogs). Special activities should be conducted (continued) to support the recovery of the Saint Lucia iguana, Saint Lucia nightjar, nesting sea turtles, arkowa, and other rare species: e.g. conduct localised control of opossums, mongooses and other alien invasive predators, enforce rules against sand-mining, plant rare native trees, create forest clearings suitable for nesting iguanas and Saint Lucia nightjars, provide nest boxes for wrens, refugia for pygmy geckos and encourage thick undergrowth for wrens, nightjars and black finches. Explore potential for low-impact, nature-based tourism. Any Crown Land in this area (Mount de Bottes?) should be designated as Forest Reserve or Wildlife Reserve. (See above for additional recommendations for the existing North East Dry Forest Reserves, which form part of this zone).

14. Pointe-Sable National Park Conservation Importance – Medium/ Very High
(incl. Maria Islands Wildlife Reserve)

Rationale - The Pointe Sable National Park contains a mosaic of rare and important coastal forest habitats, including mangroves. It is an Important Bird Area (#LC005) because more than 20,000 seabirds nest here, including sooty terns, bridled terns, roseate terns, royal terns, red-billed tropic birds, and brown noddies.

The Maria Islands (Very High): a Wildlife Reserve, already under strict protection. Because the islands are free of alien mammals, they are critically important for endemic reptiles, including the world's last remaining population of Saint Lucia racer (*Liophis ornatus*), the largest populations of Saint Lucia whiptail (*Cnemidophorus vanzoi*), Saint Lucia thread snake (*Leptotyphlops breuili*) and Antilles leaf-toed gecko (*Hemidactylus palaichthus*), and probably the only populations of the Maria Islands pygmy gecko (*Sphaerodactylus microlepis thomasi*) and Maria Islands worm lizard (*Gymnophthalmus pleii nesydrion*). A very important seabird nesting area: the nesting birds include a regionally important colony of red-billed tropicbirds (*Phaethon aethereus*). The invertebrate fauna is poorly known, but there is a very high probability that the islands support endemic invertebrates that are now rare or absent on mainland Saint Lucia.

Moule a Chique and Anse de Sables beach (Medium): rare coastal flora of sandy dunes.

Savannes Bay and Mankòté mangroves (Medium): Saint Lucia's only two Ramsar sites. These are important for waterbirds and neotropical migrants. Mangroves are also an important source of fuel for local communities.

Boriel's Pond (Medium): important for migratory birds.

Management needs - The mainland part of this park is a multiple use area and many parts are already degraded. What natural vegetation remains should be kept intact, especially mangrove and herbaceous swamp. The Maria Islands are exceptionally pristine and harbour globally important biodiversity, and must be kept as close to their natural state as possible.

Maria Islands: High level protection of all indigenous wild animals and plants. Prevent the invasion of any kind of alien species, and check the island regularly for any alien plants or animals (including maintaining and regularly monitoring the existing bait stations). Alien species should be promptly removed. Restrict visitor numbers and manage access through permitting

only limited trained tour guides to take groups. Uphold the annual closed season when most birds are nesting. Study the status and ecology of the poorly-known endemic reptiles, especially the Saint Lucia racer, whiptail lizard, Maria Islands pygmy gecko, Maria Islands worm lizard, and Saint Lucia worm snake. Monitor bird colonies every year. Continue to implement the whiptail lizard action plan, to conserve the two Maria Islands colonies as part of the wider metapopulation.

Mainland: Tackle pressure from tourism developments, mining and quarrying, and unauthorized harvesting of mangrove for charcoal.

15. Mandelé Dry Forest

Conservation Importance – High

Rationale - Covering approximately 2,000 hectares, including parts of Dennery Waterworks (above). This area contains some of Saint Lucia's most intact and biodiverse deciduous seasonal forests. Most of this area is the Mandelé Dry Forest Important Bird Area (#LC004), noted for containing over 90% of the Saint Lucia white-breasted thrasher (*Ramphocinclus brachyurus*). It also includes an important population of the endangered Saint Lucia black finch (*Melospiza richardsoni*), supports seasonal foraging flocks of Saint Lucia amazon (*Amazona versicolor*), and the endemic subspecies of Lesser Antillean flycatcher (*Myiarchus oberi santaeluciae*). Royal terns (*Sterna maxima*) breed on the coast. Latanyé palms are present, but over-harvested, in this area. Sites within this area include:

Dennery Waterworks: (Forest Reserve) See above.

Praslin Island: Contains an important reintroduced population of whiptail lizards (*Cnemidophorus vanzoi*).

Bordelais Forest: Exceptionally diverse flora, including a mixture of deciduous seasonal forest species and evergreen seasonal forest plants more usually associated with wetter areas. (Conspicuous differences in species composition between this area and the North East Dry Forests, above, may be indicative of different soil types). White-breasted thrasher numbers in this area appear to have increased in response to habit conversion for development in adjacent areas.

Mon Repos Peninsula: Very mature deciduous seasonal forest, and excellent rock/cliff pavement and cactus scrub.

Management needs - Conserve and restore this area's globally important dry forest biodiversity. Promote the recovery and restoration of native deciduous seasonal and coastal forest vegetation. This should include re-establishing vegetation on the southern parts of this area that were recently cleared (whether or not this development continues at a later date) because these barren areas are almost useless for wildlife and exacerbate soil erosion and sedimentation of the adjoining marine ecosystems. Forest regrowth will be extremely slow and may need to be assisted: the clearings are large and much of the top soil has already washed away to expose the rock beneath. It is important to acquire land or form agreements with landowners and developers to maintain and restore as much natural forest cover as possible: white-breasted thrashers are poor at crossing clearings or roads, and require forests with a dense canopy and deep leaf litter. Mixed plantations of native timber trees that belong in this habitat (e.g. arkokwa) would be a more wildlife-friendly alternative to exotic plantations or agriculture, but logging and other forms of natural resource use should be kept within sustainable limits. Special activities should be conducted (continued) to support the recovery of the white-breasted thrasher and other rare species. These should include conducting localised control of opossums, mongooses and other alien invasive predators. (See above for additional recommendations for the Dennery

Waterworks forest reserve, which also forms part of this zone). Research and monitor wildlife, especially the white-breasted thrasher and its threats (mainland) and the whiptail lizard colony (Praslin Island).

Specifically on Praslin Island, prevent the invasion of any kind of alien species, and check the island regularly for any alien plants or animals (including maintaining and regularly monitoring the existing bait stations). Any alien species should be promptly removed. Visitor numbers should be restricted, and fires and overnight camping prohibited. This should be achieved through a formal co-management agreement with the owner (DCG).

Special precautions should be taken to avoid forest fires in this area (e.g. warning signs on highway, prohibit use of campfires on Praslin island). Fires could have a devastating impact on the white-breasted thrashers (mainland) and whiptail lizards (Praslin island).

16. Pitons World Heritage Site Conservation Importance – Medium/ Very High

Rationale - Aside from its aesthetic appeal and iconic status, the pitons landscape is of outstanding importance for biodiversity, especially plants and birds. A World Heritage Site, this area is also recognised as the Pitons Important Bird Area (#LC003) and includes an important population of the endangered Saint Lucia black finch (*Melospiza richardsoni*), the near threatened Saint Lucia oriole (*Icterus laudabilis*), the endemic subspecies of Lesser Antillean flycatcher (*Myiarchus oberi santaeluciae*) and Saint Lucia wren (*Troglodytes aedon martinicensis*). Royal terns (*Sterna maxima*) breed on the coast. A group of very rare shrubs are found only on the Pitons, including *Salvia lamiiifolia*, *Justicia periplocifolia*, *Dicliptera martinicensis* and *Koanophyllon celtidifolia*. Some of the many other rare and unusual plants are indicated below. Maintenance of this forest ecosystem is also important for maintaining the fringing coral reefs (deforestation would increase sedimentation of reefs and reduce fisheries productivity). Key sites are:

Petit Piton (Very High): almost entirely deciduous seasonal forest. Contains many very rare species, including the endemics *Gonolobus iyolensis* and *Bernardia laurentii* (the only known population is on the summit), and world's last remaining population of *Juniperus barbadensis* var. *barbadensis*. *Myrcianthes fragrans*, and *Dodonea elliptica* are also known only from Petit Piton in Saint Lucia. Some endemic birds occur here.

Gros Piton (Very High): covered mainly by deciduous seasonal forest, with the middle and upper slopes more or less intact. The flattish area at the top is an unusual form of semi-evergreen seasonal forest with a few lower montane rainforest species mixed in. Examples of species found only on Gros Piton are *Ilex nitida*, *Sloanea dentata*, *Passiflora cuneata*, *Psidium sartorianum*, *Lantana radula*, *Mikania cordifolia*, and *Galactia rubra*, but there are many others. Its overall floral biodiversity is very significant, with many very rare species. At least 27 bird species have been recorded on Gros Piton, including five endemics.

Mount Souf (Medium): Rare example of sulfarole vegetation by the hot springs, while the other (northern) side has the rare semi-evergreen seasonal forest.

Anse L'Ivrogne flood plain (Medium): Close to the sea, this site contains *Annona montana*, a Lesser Antillean endemic plant not observed elsewhere in Saint Lucia.

Management needs - A multiple use area that should seek to conserve and enhance its nationally and globally important flora and birds. Forest uses should be compatible with the area's international status as a World Heritage Site. Preserve native vegetation across most of this area, especially the key sites indicated on the left. Logging and other forms of natural resource extraction should be kept within sustainable limits. Low-impact tourism can continue. If trampling of rare flora and erosion of trails increases, this may be mitigated by controlling visitor numbers and with correct trail infrastructure. Seek and respond to any reports of alien green iguanas (*Iguana iguana*) in this area. All alien green iguanas should be culled immediately.

Petit Piton and Gros Piton, eradicate any alien invasive plants and prohibit (and enforce) the planting of exotic ornamental species. Raise the awareness of tour guides about the risk of fire to these forests. Monitor the rare wild plants on the pitons, bearing in mind that ranges may shift due to climate change; monitor their threats and pressures; and conduct faunal surveys of the pitons.

Mount Souf: conserve all remaining areas of natural vegetation on the slopes on the far side of the springs and remove the (non-native) coconut palms. The (non-native) Caribbean pines should be gradually removed and not replanted (they are self-seeding in this area, and seedlings should be pulled up).

17. Rat Island

Conservation Importance – High

Rationale - Important for the conservation of the Saint Lucia whiptail lizard (*Cnemidophorus vanzoi*, a newly introduced population) and Saint Lucia worm lizard (*Gymnophthalmus pleii*).

Management needs - Ensure the island retains suitable habitat for these rare native lizards. Prevent the invasion of any alien species, and check the island regularly for any alien animals (including maintaining and regularly monitoring bait stations). The alien plants and any other alien species should be promptly removed. Visitor numbers should be restricted, fires and overnight camping prohibited. Raise national awareness of the importance of this site. Study status and ecology of the endemic reptiles and their prey.

18. Mount Tabac/ Gimie Range

Conservation Importance – Medium

Rationale - Range identified for its botanical importance, part of which (including Mount Gimie) is in the Forest Reserve. The summits and joining ridges have a narrow band of interspersed cloud montane rainforest and elfin shrublands, containing about 15 plant species not found elsewhere, many of which are Lesser Antillean and Caribbean endemics. Mount Tabac ridge has abundant *Podocarpus coriaceus* on its interior half.

Management needs - Maintain under as much natural forest cover as possible, both to conserve biodiversity and maintain its watershed functions. (Most of this area is too steep to be used for almost any other purpose).

19. Dorée-Piaye Ravines

Conservation Importance – Medium

Rationale - More than 1,000 hectares of steep-sided ravines (River Doree and Piaye) containing rare examples of well developed, intact semi-evergreen seasonal forest. Noted for rare riverine vines.

Management needs - A multiple use area which should be maintained under its rich natural forest cover. Avoid logging (steep ravines). More research warranted into flora and fauna. Explore potential

for establishing tourist hiking trails along the ravines (in addition to the natural beauty, there are rare petroglyphs to see). The main areas of ecological importance are fairly inaccessible, but should be protected from pollution from agricultural lands.

20. Cul de Sac

Conservation Importance – Medium

Rationale - An important wetland along the Cul de Sac River: an important site for migratory birds, and contains a rare example of *Pterocarpus officinalis* freshwater swamp forest.

Management needs - Prevent any developments that may alter inflow or drainage of this wetland, or pollute its water supply.

21. Mount Parasol Range

Conservation Importance – Medium

Rationale - Range identified for its botanical importance. Mount Parasol contains good examples of semi-evergreen seasonal forest, while the adjoining areas have pristine semi-evergreen seasonal forest and lower montane rain forest. The Lesser Antillean endemic plant *Calyptranthes elegans* occurs here and nowhere else in Saint Lucia. This area is also noted for its Saint Lucia fer-de-lance (*Bothrops caribbaeus*).

Management needs - Maintain this zone under natural forest cover, ensuring this is contiguous to the Forest Reserve and a large estate to the north, now owned by the National Trust. Replant denuded lower slopes with native vegetation. Control feral pigs and monitor impacts of control efforts.

22. Mount Grenier

Conservation Importance – Lower

Rationale - Good quality deciduous seasonal forest on a steep hill, with extremely rare species (e.g. *Myrciaria floribunda*, *Croton corylifolius*, *Eugenia tapacumensis*, and *Comocladia dodonaea*).

Management needs - Ensure the natural forest cover on this hill is not removed. This will require engagement with the private land owners.

23. Cactus Valley

Conservation Importance – Lower

Rationale - A small site extending to only 3.5 hectares, but considered to be one of the best sites for cacti in Saint Lucia.

Management needs - Conduct survey to confirm continued existence and significance of this area, in light of recent residential developments. If the area is still biologically valuable, develop management guidelines and negotiate with local developers to preserve this small site as a local nature site.

24. Anse La Liberté

Conservation Importance – Lower

Rationale - Recovering deciduous seasonal forest on National Trust land, with potential to be a good reserve for the native biodiversity associated with this under-protected forest type..

Management needs - Facilitate the recovery of natural forest in this National Trust property.

25. Hewanorra Ponds

Conservation Importance – Lower

Rationale - An important man-made site for migratory birds.

Management needs - Maintain current condition and biological values of this small site. Prevent any developments that may alter inflow or drainage of this wetland, or pollute its water supply. Monitor migrant birds and threats and pressures on this habitat.

4. Priority Forest Species for Conservation

All indigenous species are important, but **Table 6** presents a shortlist of species of outstanding importance for people, the significant benefits they bring to the forest ecosystem, and/or high risk of extinction. These not only warrant special attention in Saint Lucia's overall forest management strategy, but some of them could be monitored as indicators of whether the country's conservation policies are working. This list is necessarily very selective, however, because many more species on Saint Lucia are known fit at least one of these criteria. Morton (2009a) provides more extensive information on some of these species (scientific names in bold).

Daltry – Biodiversity Assessment

Table 6 A selection of priority species in need of conservation attention

List compiled by J. Daltry, M. Morton, R. Graveson and M. Ivie. (*) Species known or expected to be inside Forest Reserves. Species in **bold** type are covered in more detail by Morton (2009a).

Scientific name	Common names	Justification	Comments	Management Needs
PLANTS				
(*) <i>Asplundia rigida</i>	Ti kannou, Sidjinn (Lyenn)	Economic importance	Grows in rainforest, chiefly in the Forest Reserve. A palm-like epiphyte. Extremely common.	Conserve forest habitat. Harvesting can continue at current level.
<i>Bernardia laurentii</i>		Qualifies as globally threatened. National endemic	Only on the summit of Petit Piton.	Preserve native vegetation on Petit Piton - prevent fires and halt planting of exotic ornamental species on the piton.
<i>Carapa guianensis</i>	Andiroba, Brazilian mahogany, Bois caille, Bois rouge	Commercial importance Ecological importance Very rare on Saint Lucia	Timber has a wide range of uses (furniture, flooring, etc) Important food plant for amazon parrots and agoutis. This tree has not been seen inside the Forest Reserve.	Potential to be cultivated as a native timber tree in relatively flat semi-evergreen seasonal-wet areas (techniques for cultivation have been developed in other countries). Offers an opportunity for local livelihoods - oil from seeds can be processed into soaps, candles, etc. Should conserve its remaining semi-evergreen seasonal forest habitat around Chassin).
<i>Cedrela odorata</i>	Cigar-box wood, Red cedar, Acajou	Globally threatened (VU). Commercial potential	In great demand for its timber in Saint Lucia, mainly for furniture. Not seen inside the Forest Reserve.	Need to maintain its semi-evergreen seasonal-wet forest in the Soufriere area, and (to a lesser extent) in the Parish of Choiseul (both SW Saint Lucia). Potential to be cultivated in moderately wet areas as a native plantation tree
(*) <i>Clusia major</i> (also called <i>C. rosea</i>) and (*) <i>Clusia plukenetii</i>	Pitch apple, Strangling fig, Awali (Lyenn)	Economic importance Ecological importance	<i>Clusia major</i> is quite widespread in lower rainforests and semi-evergreen forests, inside and outside of the Forest Reserve. <i>Clusia plunkenetii</i> is in deciduous and semi-evergreen seasonal forests mostly outside of the Forest Reserve (but may be inside the Forest Reserve areas with deciduous seasonal forest). Aerial roots of both species are harvested (under license in the Forest Reserve) for basket weaving. Harvesting does not appear to damage the tree. Parrots feed on <i>Clusia</i> fruits. Parrot experts have indicated that collection of these 'lianas' disturbs nesting parrots (but there is little hard evidence to support this).	Conserve deciduous and semi-evergreen seasonal forests. Continue licensing collectors in permitted areas, but ideally not in known parrot nesting areas.
(*) <i>Coccothrinax barbadensis</i>	Latannier palm, Latannyé	Commercial importance Becoming rare in the wild	Used in broom production for local consumption and export. Becoming rare in the wild chiefly due to overexploitation, but SLFD is addressing this through establishing commercial plantations.	Prevent further over-exploitation and, increasingly, conserve deciduous seasonal forest habitat on the Atlantic coast. Further development of commercial

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Scientific name	Common names	Justification	Comments	Management Needs
(*) <i>Dacryodes excelsa</i>	Gommier, Candlewood, Gonmyé.	Ecological importance Commercial importance Regional endemic	Occurs in coastal deciduous seasonal forests. May occur in the Forest Reserves with deciduous seasonal forest. Important component of the Lower Montane Rainforest (in Forest Reserve), Wood good for furniture and general carpentry. Resin collected (but less valuable than Lansan) Food plant (and nesting tree) for Saint Lucia amazon.	plantations on private land could help relieve pressure on wild stocks. Has potential for developing a <i>sustainable</i> resin harvesting industry. Continue to preserve rainforest. In selectively logged areas, always leave large, mature trees undisturbed for parrot nesting.
<i>Guaiacum officinale</i>	Lignum vitae, Gayak	Globally threatened (EN) Very rare on Saint Lucia	Known on deciduous seasonal hill at Louvet and Mount des Bottes (Northeast). Can be cultivated, but very slow-growing (and international trade governed by CITES).	Conserve deciduous seasonal forests in NE Saint Lucia Potential to plant this species to restore deciduous seasonal forests and future commercial use.
<i>Juniperus barbadensis</i> <i>var. barbadensis</i>	Pencil cedar	National endemic subspecies Globally threatened (CR)	World's last population is on Petit Piton.	Conserve native vegetation on Petit Piton: prevent fires and spread of exotic ornamentals. Opportunity to cultivate this species as a native Christmas tree (replace foreign <i>Cupressus lusitanica</i>).
(*) <i>Lobelia santa-luciae</i>	Saint Lucia lobelia	National endemic May qualify as globally threatened A flagship for elfin shrublands	Occurs only in elfin shrublands on Mount Gimie range.	Conserve peaks of Mount Gimie range (inside Forest Reserve)
(*) <i>Passiflora laurifolia</i>	Ponm dilyenn (Lyenn)	Economic importance Ecological importance	Common in deciduous and semi-evergreen seasonal forests Should be in the seasonal forests in the Forest Reserve (not confirmed) Parrots feed in fruits. Lianas harvested for basket weaving. Unknown whether this species is as important, or sustainable, as the other species called 'lyenn'.	Conserve semi-evergreen forest habitat. Investigate use and sustainability of this species as a source of 'lyenn'.
(*) <i>Pouteria pallida</i>	Pennepis	Globally threatened (EN) Ecological importance Regional endemic	Food plant (and nesting tree) for Saint Lucia amazon. Still common on Saint Lucia.	Continue to conserve lower level of lower montane rainforest in the Forest Reserve (up to 600m) and semi-evergreen seasonal forest, especially close to rivers In selectively logged areas, always leave large, old trees standing for parrot nesting.
(*) <i>Pouteria semecarpifolia</i>	Contweven	Globally threatened (VU) Ecological importance Regional endemic	Food plant (and nesting tree) for Saint Lucia amazon .	Continue to conserve lower montane rainforest in the Forest Reserve (up to 600m) Quite rare and should never be logged.
(*) <i>Protium attenuatum</i>	Incense wood, Lansan	Economic importance Ecological importance Globally threatened? (listed DD). Regional endemic	Saint Lucia is probably its last stronghold - still common in Forest Reserve (lower montane rainforest) Food plant for Saint Lucia amazon	Conserve lower montane rainforest, especially the Barre de Lisle strip and semi-evergreen seasonal forest. Opportunity to develop sustainable resin management with tappers to use this

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Scientific name	Common names	Justification	Comments	Management Needs
				resource (and to enlist their assistance to protect it).
(*) <i>Schefflera attenuata</i>	Fijé Di Mon	Regional endemic Ecological importance	Important fruiting tree for birds and bats.	Conserve all cloud montane forest areas on ridges if Mount Gimie range and Piton Esprit.
(*) <i>Sideroxylon foetidissimum</i>	Yellow mastic, Akoma	Ecological importance Rare.	Uncommon in the wild throughout its range. Now very rare in Saint Lucia Fruits edible for humans, and eaten by birds In deciduous seasonal forest (including the Forest Reserve).	Conserve deciduous seasonal forest habitat - including the Forest Reserve parcels in Marquis/ Petite Anse area, on Gros Piton and Grande Anse – to promote the recovery of this rare tree.
(*) <i>Zanthoxylum flavum</i>	Arkokwa	Globally threatened (VU) Valuable timber Rare on Saint Lucia.	Now very rare in Saint Lucia In deciduous seasonal forest (including the Forest Reserve).	Conserve deciduous seasonal forests and enable recovery of this species: naturally occurs from Petit Anse as far south as Mon Repos (including the Forest Reserve parcels in Marquis area) Potential to grow this native tree in plantations in drier areas.
ANIMALS				
Mammals				
(*) <i>Sturnira lilium luciae</i>	Saint Lucia yellow-shouldered bat	National endemic subspecies Ecological importance.	Feed mainly on fruits (role in seed dispersal), also nectar, pollen (role in pollination) and insects. Declines of this species on other islands have been attributed to loss of forest habitat (poor at using agricultural areas).	Requires continued protection of natural rainforest in the Forest Reserve.
(*) <i>Brachyphylla cavernarum cavernarum</i>	Antillean fruit bat	Regional (Antillean) endemic Ecological importance. Socio-economic importance.	A cave-roosting bat – at risk from quarrying and any other impacts on caves. Often most or all of an island’s population may be in a single roost – high vulnerability Also may be association with other native bats Important role in pollinating plants, including commercial fruit crops.	Locate and protect roosting caves. Caves used by this species on Saint Lucia may be especially significant. (NB for all bats, more work is needed to locate, protect and monitor all roosts, especially species that congregate in large numbers. Many of the most important roosts are coastal)
(*) <i>Noctilio leporinus</i>	Greater fishing bat	Rare	Appears uncommon and patchily distributed over the island. May be sensitive to pollution of water. Roost in sea caves and in hollows in mature, large trees (native and non-native, e.g., including silk cottonwood <i>Ceiba pentandra</i> , balata <i>Manilkara bidentata</i> , red mangrove <i>Rhizophora mangle</i> and royal palms <i>Roystonea</i> spp). Suitable roost sites appear to be relatively limited.	Locate and protect roosting caves and trees. Leave large, dead trees standing where possible.
Birds				
(*) <i>Amazona versicolor</i>	Saint Lucia amazon, Saint Lucia parrot, Jako, Jacquot	National endemic species Globally threatened (VU) Flagship species for rainforests Ecological importance	Important in forest tree dispersal. A Parrot Reserve was established in the Central Forest Reserve, but does not include all key nesting areas. Population is increasing rapidly, due to successful conservation programme to tackle hunting (collection for pet trade).	Requires continued protection of natural rainforest in the Forest Reserve: Known nesting areas in the southern Central Forest Reserve should have minimal disturbance. Large old trees should not be logged

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Scientific name	Common names	Justification	Comments	Management Needs
		Attracts tourists	Prefer large old trees for nesting. May depend on trees with deep crevices to avoid egg predation by pearly-eyed thrashers. Diet includes Blue Mahoe (currently grown in plantations) Raid fruit crops outside of the Forest Reserve.	Develop strategy to addressing conflict with farmers (likely to increase with growing parrot population and shift from bananas to other crops).
<i>Caprimulgus rufus otiosus</i>	Saint Lucia nightjar	National endemic subspecies Qualifies as globally threatened Declining	Depends on deciduous seasonal forest outside the Forest Reserve. Very restricted range Threatened by alien mammals (mongooses, cats, pigs, probably opossums) and habitat conversion Uses low shrubby forest.	Localised control of mongooses, pigs and other alien predators could be beneficial. Habitat could be created by clearing patches to form shorter forest growth (a potential side-benefit of selecting logging and of removing alien tree species - see below). Depends on maintenance of natural deciduous seasonal and semi-evergreen seasonal forest outside the Forest Reserve.
<i>Cichlherminia lherminieri sanctaeluciae</i>	Forest thrush	National endemic subspecies Globally threatened (VU) Very rare	Inhabits deciduous seasonal and semi-evergreen seasonal forests – both under threat in Saint Lucia.	Depends on maintenance of natural deciduous seasonal and semi-evergreen seasonal forest outside the Forest Reserve.
(*) <i>Icterus laudabilis</i>	Saint Lucia oriole	National endemic species Globally near-threatened (NT)	Quite adaptable - occupies a variety of forest types. Appears to be declining, but causes are unknown. (Nest parasitism and secondary poisoning with insecticides are two hypotheses).	Depends on continued protection of high quality natural forest in the Forest Reserve. Identify cause of decline.
(*) <i>Leucopeza semperi</i>	Semper's warbler	National endemic species Globally threatened (CR) - feared extinct	Reason for decline unknown – probably alien invasive predators.	If still exists, this bird will depend on continued protection of natural rainforest in the Forest Reserve.
(*) <i>Melanospiza richardsoni</i>	Saint Lucia black finch	National endemic species Globally threatened (EN)	Needs forests (deciduous seasonal, semi-evergreen seasonal or wet) with dense undergrowth Patchy distribution and declining on Saint Lucia, putatively due to loss of suitable forest habitat (and competition with the bullfinch in more degraded areas).	Depends on continued protection of high quality natural forest, especially deciduous seasonal forest, both in and outside the Forest Reserve. Identify habitat factors or other factors that explain its patchy distribution (e.g. MSc project)
(*) <i>Ramphocinclus brachyurus sanctaeluciae</i>	White-breasted thrasher	National endemic subspecies Globally threatened (EN) Flagship species for deciduous seasonal forests Decreasing	Two main populations in Northeast and (especially) Eastern deciduous seasonal forests. Few are in the current Forest Reserve system (eastern end of Dennery Waterworks). Need mature deciduous seasonal forest with large trees. Intolerant of forest fragmentation and poor at crossing roads. Also threatened by alien mammals (mongooses, cats, probably opossums).	FD advised to acquire or otherwise help ensure protection and restoration of deciduous seasonal forest areas especially Mandele area (East) and Povert to La Ti Tanse (Northeast). Localised control of mongooses and other alien predators could be beneficial.
(*) <i>Troglodytes aedon mesoleucus</i>	Saint Lucia wren	National endemic subspecies Declining	Entirely in deciduous seasonal forests	Depends on preservation of deciduous seasonal forest mostly outside the Forest Reserve.
Reptiles				
* <i>Boa constrictor ophiias</i>	Saint Lucia boa, Tet chyenn	National endemic subspecies Ecological importance Globally threatened	The natural forest 'top predator' Some economic value for snake oil industry (to treat rheumatism), but the practice of taking fat from live snakes is inhumane and there are better alternative cures.	Stop issuing licences to harvest snake oil, unless this can be demonstrated to be done in a sustainable and humane way.

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Scientific name	Common names	Justification	Comments	Management Needs
(*) <i>Bothrops caribbaeus</i>	Saint Lucia fer de lance or pitviper, Sepan	(qualifies as VU) Economic importance National endemic Globally threatened (qualifies as VU) Declining Ecological importance Economic potential Medical importance	Some indications that this species is declining. Protected by law. May have beneficial role in controlling mongooses (which endanger other wildlife) Potentially dangerous to humans (including forest workers and tourists on trails), but very few bites per year. The best way to minimise human-snake conflict is to keep the two spatially separated as much as possible. Venom products may be commercially valuable.	To prevent extinction, recommend setting aside (remote) areas where people do not need to go and these snakes will not be persecuted Forest workers should be given training and appropriate clothing to reduce injuries (to them and the snakes).
<i>Cnemidophorus vanzoi</i>	Saint Lucia whiptail lizard, Zandoli tè	National endemic Globally threatened (VU – qualifies as EN) Ecological importance Flagship for the offshore islands.	Probably used to occur throughout Saint Lucia, but disappeared from the mainland due to alien mammals (e.g. mongooses). Now survive only on offshore islands, including Maria islands (wildlife reserve). Prey species for the Saint Lucia racer, <i>Liophis ornatus</i> .	Must prevent the Maria Islands, Praslin and Rat Islands from being invaded by any alien species (animals and plants).
(*) <i>Iguana cf iguana</i>	Saint Lucia iguana, Gwo zandoli, Leza	National endemic Globally threatened (qualifies as CR) A flagship species for deciduous seasonal forests Tourism potential	None/ very few in current Forest Reserve system (and even these need the nesting areas outside of the reserve). Favour mature deciduous seasonal forest with large trees, and ravines. Threatened by alien green iguanas (below), dogs and feral pigs. Need to maintain contiguous forest cover to the nesting areas - iguanas are more vulnerable to dogs and other predators when they are on the ground.	Localised alien mammal control may help, especially in nesting areas (e.g. Grande Anse, Louvet). FD's reserves in NE should be well conserved to set a good example to neighbouring landowners. FD to acquire or otherwise help ensure (e.g. through co-management agreements with local owners and developers) protection of deciduous seasonal forest areas in NE Saint Lucia. Migration corridors should be kept forested for iguanas to reach the (limited) nesting sites.
<i>Liophis ornatus</i>	Saint Lucia racer, Saint Lucia grass snake, Kouwès	National endemic Globally threatened (EN, but qualifies as CR)	Entire world population is on Maria Major (wildlife reserve). Probably used to occur throughout Saint Lucia, but disappeared from the mainland due to alien mammals (e.g. mongooses). The current population is probably too small to be viable.	Crucial to preserve Maria Major and prevent it from being invaded by alien species that may kill the racers or disrupt the island ecosystem. Develop in situ or ex-situ programmes to increase the population (e.g., reintroduction to other predator-free islands).
(*) <i>Sphaerodactylus microlepis</i>	Saint Lucia pygmy gecko	National endemic Globally threatened (qualifies as VU)	Population fragmented and probably declining due to alien invasive animals.	Ensure offshore islands are kept free of alien invasive mammals, especially the Maria Islands. Localised control of alien predators (e.g., mongooses) could be very beneficial. Identify habitat factors or other factors that explain its patchy distribution (an MSc project)

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Scientific name	Common names	Justification	Comments	Management Needs
Insects				
(*) <i>Ateuchus luciae</i> and <i>Pseudocanthon iuanalaoi</i>	Dung beetles	National Endemic species	Important in disposing of faeces. Possibly under threat from invasive African dung beetle <i>Onthophagus gazellae</i> .	
(*) <i>Chloronia antillensis</i>	Dobsonfly	Only Antillean species of its Order. Known only from Dominica and Saint Lucia.	Larvae inhabit high elevation streams and are sensitive to water quality.	
(*) <i>Dynastes hercules reidi</i>	Saint Lucia hercules beetle, Siye Bois	Local endemic subspecies (shared with Martinique). Economic potential.	Saint Lucia population needs re-evaluation (may be upgraded to a full species). Owing to its large size, collectors are interested in buying live or preserved specimens. Could be sold to tourists. Conservation status unknown – none were found during 2009 entomological survey, but adults reported to emerge in December. Larvae feed on rotten wood and take a year or more to develop. Reported to be associated with Bwa Dou tree	Allow rotten stumps and trees (standing or fallen) to remain. Potential livelihood opportunity (selling beetles to tourists and overseas collectors), if managed sustainably. Evaluate taxonomic status of the Saint Lucia population
<i>Megastylulus pivai</i> and <i>Stylulus isabelae</i>	Ground beetles	National endemic at generic (<i>Megastylulus pivai</i>) or species (<i>S. isabelae</i>) level	Eyeless soil dwellers known only from Ravine Chabot, not recovered in 2009	Biology unknown
(*) <i>Paraclymntemnestra lineata</i>	Longhorn beetle	National endemic at generic level	Large and very rare species Wet Forests Wood borer	
<i>Phyllophaga lackwelderi</i>	May beetle, white grub	National Endemic species	Soil dwelling larvae feed on roots Abundant on eastern coast in deciduous seasonal forest Adults fly to lights. Biomass may exceed that of any native vertebrate species	Larvae may be a pest in sugar cane and even banana, requires study Adults probably important to insectivores during emergences

5. Threats to Forest Biodiversity

5.1. Forest Threat Analysis

Numerous threats to Saint Lucia's forests and their biodiversity were identified during the present project (e.g. Clarke, 2009; Daltry, 2009; Graveson, 2009a, 2009b; Morton, 2009a, 2009b; Toussaint *et al.*, 2009); many of which echoed concerns raised by previous studies (e.g. Towle & Towle, 1991).

To construct a clearer overview of the current factors that threaten forests, and their relative importance, the author facilitated a workshop at the Forestry Department on 15 October 2009 to gather the expert opinions of senior Forestry Department personnel and other experts from the environmental sector. To ensure no major threats were overlooked, a list of all possible threat categories were taken from IUCN's Conservation Measures Partnership (see www.conservationmeasures.org for full descriptions with examples).

The participants were divided into three groups and each group was asked to discuss a cluster of threats to determine whether they were applicable to Saint Lucia's forests and to describe some examples. The following simple scoring system was devised to help the participants rank the threats in terms of their importance:

Scores for assessing each threat

- 0 Not a threat.
- 1 Minor threat (requiring monitoring, but not specific management).
- 2 Moderate threat (requiring specific management actions to address it).
- 3 Major threat (requiring immediate and intensive management).

Every group was then asked to present their findings to the rest of the workshop participants, which resulted in some revisions based on audience feedback. **Table 7** shows the main findings of this process.

What is most striking from this assessment is the relatively low number of major threats (subcategories scoring 3) affecting forests in the Forest Reserves compared with forested areas on private land. This tells us that the Forest Reserve is working remarkably well to achieve its purpose of protecting forests, and areas within this network are reasonably secure. This exercise has been conducted for protected areas worldwide, and such a low number of major threats is unusual in an area of this size and proximity to many settlements. This finding is to the credit of the Forestry Department and demonstrates the value of ongoing management efforts in the Forest Reserve.

Table 7 suggests that forested areas outside of the Forest Reserves are at approximately four times more risk from major threats, a significant and alarming difference. Preserving forests and forest resources on private land now warrants as much if not more attention than the Forest Reserves to avoid catastrophic losses.

Nevertheless, any threats that scored two or three in either location are, according to the workshop participants, very serious and demand more concerted attention than is currently being given. Some of the most critical, immediate threats are explored further below the table.

Table 7 General Assessment of Threats to Saint Lucia’s Forested Areas

Assessment conducted by: Adams Toussaint, Alfred Prospere, Rebecca Rock, Timotheus Jn Baptiste, Alwin Dornelly, Michael Andrew, Anita James, Pius Haines, Lyndon John, Odetta James, Nerius Mitchell, Roger Graveson, Karla van Eynde, Matthew Morton, David (Stylo) Lewis, Caroline Eugene, and Jenny Daltry.

CATEGORY/ Subcategory	Score	
	Forest Reserves	Outside Forest Reserves
1. RESIDENTIAL AND COMMERCIAL DEVELOPMENT		
Housing and Urban Areas	0	3 Urban development plans in North East quarter (deciduous seasonal forests).
Commercial and Industrial Areas	0	2 Cul de Sac (important wetland and freshwater swamp forest) at risk. Landfill in Deux Glo.
Tourism and Recreation Areas	1	3 Le Paradis development, marinas, high-footprint developments planned at Louvet and Grande Anse.
2. AGRICULTURE & AQUACULTURE		
Annual and Perennial Non-Timber Crops	2 Marijuana gardens in secondary forest in Forest Reserves.	3 Conversion of mid-level forests [lowland montane rainforest and semi-evergreen seasonal deciduous forest] to gardens.
Wood and Pulp Plantations	1 Selective and well-managed.	0
Livestock Farming and Ranching	1 Some problems in Northern Range.	3 Free-ranging cattle and pigs are a major problem in places such as Grande Anse.
Marine and Freshwater Aquaculture	0	0
3. ENERGY PRODUCTION AND MINING		
Oil and Gas Drilling	0	1 Proposed oil refinery.
Mining and Extraction	1 Soil mining.	2 Quarries, soil mining and, on beaches, sand mining (affecting turtle nesting beaches e.g. Grande Anse.
Renewable energy	0	1 Geothermal exploration in Sulphur Springs.
4. TRANSPORTATION AND SERVICE CORRIDORS		
Roads and Railroads	3 Proposed tunnel at Barre de Lisle.	3 Ravine poison disaster during road construction in 1965.
Utility Lines	1 (monitored)	1 (monitored)
Shipping Lanes	0	0
Flight Paths	2 Helicopter tours over island disturb parrots during breeding season.	1 Helicopter tours disturb parrots.
5. BIOLOGICAL RESOURCE USE		
Hunting and Collecting	2	2
Terrestrial Animals	Species targeted included protected species e.g. agouti (non-native), opossum (non-native) and birds. The full extent and intensity is not known.	As left.

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CATEGORY/ Subcategory	Score	
	Forest Reserves	Outside Forest Reserves
Gathering Terrestrial Plants and Plant Products	2 - 3 Collection of gum resin (<i>Dacryodes excelsa</i>), vines, bamboo, poles (for making brooms), and latanné palm leaves (to make brooms). Score of 3 specifically given to collection of L'encens, <i>Protium attenuatum</i> resin, which can kill the tree.	2 Collection of gum resin (<i>Dacryodes excelsa</i>), vines, bamboo, poles (for making brooms), and latanné palm leaves (to make brooms).
Logging	1 Some harvesting of poles.	3 Harvesting of mangroves e.g. Mankòtè (Pointe-Sable National Park)
Fishing and Aquatic Resource Harvesting	2 Use of toxins to poison water sources to catch crayfish and fish.	2 Use of toxins to poison water sources to catch crayfish and fish.
6. HUMAN INTRUSIONS AND DISTURBANCE		
Recreational Activities	1 Risks from fires	2 e.g. cooking fires on offshore islands and beaches presents a risk of forest fires.
Work and Other Activities	2 Eradication of marijuana fields.	2
War, Civil Unrest and Military Exercises	0	0
7. NATURAL SYSTEM MODIFICATIONS		
Fire & Fire Suppression	1 As right, but less frequent.	3 Linked to recreation and agriculture. Some deliberate burning in specific areas
Dams & Water Management/Use	1	3 e.g. for golf courses. Private lands with their own water sources are at a high premium.
Other Ecosystem Modifications	0	3 Diversion and desilting of rivers, drainage of swampy areas impacting on bird life. Hotel developments; quarrying – all impacting on wildlife. [NB some duplication with categories above]
8. INVASIVE AND OTHER PROBLEMATIC SPECIES AND GENES		
Alien Invasive Species – animals	3 Feral pigs, mongooses, feral cats, rats. Also alien anole lizard (<i>Anolis watsi</i>) displacing native anole lizard (<i>Anolis luciae</i>).	3 Feral pigs, mongooses, feral cats, rats. Also alien lizard (<i>Anolis watsi</i>) replacing native lizard. Alien green iguana (<i>Iguana iguana</i>) threatens native iguana. Feral monkeys?
Alien Invasive Species – plants	1 Bamboo	3 e.g. <i>Coccinia grandis</i> and the glue tree <i>Cordia obliqua</i> .
Problematic Native Species	0	2 Saint Lucia amazon parrot raids fruit farms. Bats are a nuisance in houses. Shiny cowbird impacts other birds.
Introduced Genetic Material	0	0
Species Hybridization		0 - 3 (Score of 3 specifically given to alien green iguana, which has potential to hybridize with the endemic iguana)
9. POLLUTION		
Household Sewage and Urban Waste Water	0	3 Affects mangroves and rivers, harming aquatic life.
Industrial and Military Effluents	0	1 Pumice mining and minor industrial chemical waste

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CATEGORY/ Subcategory	Score	
	Forest Reserves	Outside Forest Reserves
Agricultural & Forestry Effluents	1	3 Agrochemicals, especially on banana plantations. Effluent from pig and poultry farms.
Garbage & Solid Waste	2	3 Block drains and causes flooding. Associated with rodents.
Airborne Pollutants	0	0
Excess Energy (heat, light, noise etc)	0	1 [Participants cited helicopter noise, but this was covered under category 4]
10. GEOLOGICAL EVENTS		
Volcanoes	1 Potentially massive threat, but unlikely/ infrequent.	1 Potentially massive threat, but unlikely/ infrequent.
Earthquakes and Tsunamis	0 Potentially big threat, but unlikely/ infrequent.	0 Potentially big threat, but unlikely/ infrequent.
Landslides and Avalanches	1 Natural hazard	2 Exacerbated by human activities.
11. CLIMATE CHANGE AND SEVERE WEATHER		
Habitat Shifting and Alteration	3 Climate Change could/will lead to changes in habitats and hence species composition, including loss of montane habitats (and their species).	3 Climate Change could/will lead to changes in habitats and hence species composition, including loss of montane habitats (and their species).
Climate Variability	2 Causes change in species composition.	2 Causes change in species composition.
<hr/>		
No. of subcategories classed as Major Threats	4	16
<hr/>		
No. of subcategories classed as Moderate Threats	7	10

5.2. Discussion of Two Major Threats to Saint Lucia's Forests

5.2.1. Development on private land

At least half of Saint Lucia's forests are under private ownership, and participants of the threat analysis workshop drew particular attention to the mounting threats to forests in the North East and East (see the uppermost priority areas in sections 3.2 and 3.3 and on **Figures 2** and **3**). These areas constitute at least half of Saint Lucia's non-crown land forests, very large parcels of which have already been sold or promised to developers. Importantly, these are Deciduous Seasonal Forests, a forest type that is severely under-represented in the current protected area system.

Experience from Saint Lucia and other islands suggests that most modern developers will, if permitted to do so, clear most of the natural forest from the plots and construct large scale tourists resorts, holiday homes or luxury housing, with a number of recreational amenities such as golf courses and marinas. Native vegetation cover is typically removed and replaced with exotic ornamentals, propagated in local nurseries or imported from overseas. Such developments are often promoted as a way of making jobs or adding to national prestige.

Several possible approaches to ensuring that at least some of these forests will be preserved are summarised below, and these could be mixed and matched according to the landowner and the situation. Participants of the Threat Analysis workshop highlighted the need for more consultation, awareness-raising and direct lobbying of landowners and government decision makers to drive these changes. While they recognised that the Forestry Department needs to be more proactive in mitigating threats to important forests and species on private land, an outspoken, advocacy role may be best carried out by a completely independent non-governmental organisation (see **Box 1**).

Regulation

Regulation is the most widely used tool for retaining native vegetation on private land in developed countries. This is cost effective when assets and values are seriously under threat and any further damage may result in irreversible losses, and when preventing these losses has considerable benefits. Regulations may include, for example, prohibiting the felling of trees above a certain girth without a permit from the Forestry Department, requiring owners of large plots to retain a minimum percentage under natural vegetation cover, or preventing forests from being cleared within a specific distance from a ravine. Many excellent regulations already exist under the current Forestry, Soil and Water Conservation Act, but are applicable to Crown Land only: Could these be extended to include private land, under a revised Act?

Such regulations are commonly used in other developed and developing countries. The introduction of new restrictions can cause ill feeling among landholders when they are perceived to impinge on property rights, however. Furthermore, national governments in the West Indies commonly give developers considerable free rein to avoid losing them to other countries competing for investment.

Biodiversity offsets

This is a powerful approach that requires landowners or developers to make a direct, positive contribution to conservation to compensate for the negative impacts of their actions. Using this tactic, Government permission to develop an area would be contingent on the owner paying for or setting aside an equivalent area for the purposes of nature conservation. For a country where the main development pressures come from the relatively wealthy owners and developers of large estates, this should be a feasible compromise. The Forestry Department could take an important role in assessing and proposing suitable offset areas that would be conserved.

Land purchase

Land purchase effectively adds land to the public reserve system, which according to the Threat Analysis above (**Table 7**), would automatically give the forests four times greater protection. If the government needs complete control of the land (certainty), if the land offered is large in area and next to existing reserves, and if the land has a high ecological value, then this may be the best option. Land should ideally be purchased with government funding, but money to buy land on behalf of the nation could be raised from the private sector, or from special land purchase schemes such as The Nature Conservancy (www.nature.org), World Land Trust (www.worldlandtrust.org) and Arcadia Land Trust (<http://www.fauna-flora.org/arcadia.php>).

One obstacle to this approach is that Saint Lucia's land prices are very high, especially in the much sought-after dry forest zone near the coast, and it would be difficult for either the government or other sponsors to out-bid what a developer would offer. In 2009, for example, 500 acres (202 hectares) of Marquis Estate was advertised for US\$10 million, or \$20,000 per hectare. The same price tag would

buy 50,000 hectares of Amazonian rainforest (\$200 per hectare) with a considerably higher diversity of species per unit area. International donors may therefore regard Saint Lucia as a relatively poor investment for its conservation return. The cost of managing the area in perpetuity, whether by the government or a designated trust, also needs to be factored into the equation. Land purchases may therefore be limited to relatively small plots with exceptionally high conservation value. This is further complicated by the fact that many forested areas in Saint Lucia take the form of large estates that are commonly sold in large blocks.

Conservation easements

Voluntary agreements can be effective at conserving biodiversity on land where owners are conservation-minded. Often these landholders do not consider other forms of development as the main use of their land, and they are not driven primarily by economic incentives. A number of landowners in Saint Lucia have bequeathed lands to the National Trust to run, rather than sell them to developers, which suggests that there is already a philanthropic culture among at least some residents.

Private nature reserve

Private land owners, particularly those with an interest in tourism, could be encouraged and assisted to actively manage part of the land for nature-based tourism. This could be practiced in any of the forest types on Saint Lucia, as all forest types support interesting and attractive wildlife (especially birds).

Conservation incentives

For landowners that want or need the land to generate revenue, other innovative mechanisms can be developed to make the forests a competitive land use option for the landowner and the country. Some of the approaches used in other developing and developed countries are summarized below and could be mixed and matched according to the situation. While most of these do not involve a direct financial transaction to the landowner, there may need to be an investment in educating and training the owner on how to manage the forests.

Payment for Environmental Services: Owners of forests are financially paid for the environmental benefits that the forests bring to society at large or to specific industries. This has been successfully practiced in Costa Rica under the Forestry Law of 1996, where the program is financially supported by taxes on fossil fuels. New proposals have also been developed involving the private sector, such as paying for drinking and irrigation water (SCBD, 2001). Payments can be scaled according to the forestry land use type:

Table 8 Example of Payment for Environmental Services – Costa Rica

Amount paid for environmental services and commitment period for each forestry land use type in the Costa Rica government's Payment of Environmental Services scheme (SCBD, 2001).

Forest Land use type	Total amount paid over a five year period (US\$ per ha)	Annual payments as percentage of total for years 1-5 (years)					Period of commitment (years)
		1	2	3	4	5	
Reforestation	565	50%	20%	15%	10%	5%	15
Natural Forest Management	344	50%	20%	10%	10%	10%	5
Natural Forest Preservation or Regeneration	211	20%	20%	20%	20%	20%	10

REDD and other forms of carbon-linked revenue: van Eynde (2009) presented an excellent analysis of various options suitable for Saint Lucia, which could be applied to private land as well as crown land.

Timber and NTFP production: Saint Lucia’s forests contain a high diversity of timber and non-timber species, but this diversity comes at the price of the low abundance and patchy distribution of most species. For this reason, the sustainable management of mixed tropical forests for timber purposes alone yields generally low financial returns. For small scale, private operations, the best financial returns come from harvesting both timber *and* non-timber forest products, either by the owners themselves, or through concessions granted to other users (SCBD, 2001).

Tax incentives: Tax incentives target those landholders with large tax bills, with a percentage of their taxes waived in reward for an agreement to retain land under natural forest cover. While there is clearly a cost to the country from reduced revenue from certain individuals, this approach tends to be more appealing and affordable to governments than a direct land purchase.

Box 1 Other suggested ways of strengthening the conservation of deciduous dipterocarp forest. As suggested by participants of the Threat Analysis workshop during a brainstorming session.

- Develop a National Land Use Plan to guide government decisions over which developments to approve or reject.
- Obtain baseline information on biodiversity sites (including data from the present project).
- Map and disseminate the biodiversity hotspots through radio, tv, CYEN (Caribbean Youth Environment Network) website, National Report to Convention on Biological Diversity, popular theatre.
- Establish more conservation areas through purchases of negotiation with owners (see possible mechanisms above)
- Educate politicians, using baseline data and showing relevance to National Land Use Plan.
- Educate the general public, including school children, about the importance of dry forests. Use television.
- Market greener alternatives to the „golf course/ marina/ luxury housing“ model.
- Strengthen enforcement by Forestry Department and Planning, and improve communication and exchange of information between the two.
- Evaluate jobs created by current developments – have they delivered the economic benefits they promised?
- Support the development of an NGO advocacy group that can speak out against harmful developments. This may be built up from the Saint Lucia Chapter of CYEN (Caribbean Youth Environment Network).
- Influence constitutional reform process, and halt the power of veto.

5.2.2. Alien invasive species

Alien species are life forms occurring in natural or semi-natural ecosystems outside of their natural range, having been brought there by deliberate introduction, accidental introduction or man-assisted colonisation. Invasive animals and plants are a „major threat, requiring immediate and intensive management“ in forests throughout Saint Lucia (**Table 7**). All of the biological reports from the present project also singled out alien species as one of the greatest threats to the island’s indigenous forest wildlife. Indeed, IUCN has long regarded alien invasive species as the leading threat to island biodiversity, more important even than habitat loss.

Some alarming examples of exotic species that have already gained a foothold in Saint Lucia are included on **Table 9**, some of which were discovered for the first time in 2009. In fact at least 346 alien species have been recorded in Saint Lucia’s forests to date, including a large number of ornamental plants that have encroached on forest lands (Annex 1, Table A). Many of these aliens are implicated in the decline and extinction of native species on Saint Lucia, with the mongoose being singled out as the worst offender (Clarke, 2009; Daltry, 2009; Toussaint *et al.*, 2009). Their cumulative impact can be best seen by comparing forests on the Saint Lucian mainland to forested areas with significantly fewer alien species, such as the Maria Islands, Dominica or Guana Island (British Virgin Islands). The latter suggest that the Saint Lucia would have had a much greater diversity and abundance of birds and reptiles in the past.

Some species on **Table 7**, including many of the exotic plantation trees, do not appear to have become very invasive yet, and have largely remained where they were introduced. This does not mean they will never spread, however. One of the more disturbing discoveries from the 2009 herpetological survey was that after thirty years of being confined to the Castries area and dismissed as harmless, Watts’ anole (*Anolis watsi*) has suddenly dispersed outwards, and can now be found in most parts of the island, seemingly at the expense of the endemic anole (*Anolis luciae*).

Eradication and control of alien species

Eradication is the complete removal of the alien invasive species. Control is the long term reduction in their abundance or density. Eradication is obviously preferable and usually more cost effective than long-term control, but may be difficult in large areas. The methods for eradicating and controlling unwelcome alien invaders are as varied as the species themselves, and it is sometimes necessary to use several different techniques simultaneously. Key principles to follow are:

- Prioritise sites where a new invasion has occurred before the species becomes well established.
- Choose eradication methods that specifically affect the alien species. Some incidental losses to non-target species may be inevitable, however, and should be balanced against the long-term benefits to native biodiversity. It is good practice to conduct a risk assessment before embarking on any control programme to systematically review all possible impacts on other species.
- Control or eradicate groups of alien species where present (if there is a risk that removing one will lead to increases in another).
- Methods for removing animals should be as ethical and humane as possible, but consistent with the aim of permanently eliminating the alien invasive species concerned.
- Conservation of native species must always takes priority over non-native animals and plants, even feral animals or plants that might have cultural or genetic value.

Table 9 A selection of alien invasive species established on Saint Lucia

List compiled by J. Daltry, M. Morton, R. Graveson and M. Ivie. (*) Species known or expected to be inside Forest Reserves.

Scientific name	Common names	Cause for concern	Comments	Management Needs
PLANTS				
(*) <i>Bambusa vulgaris</i>	Common bamboo	Highly invasive Economic importance. Negative impact on forests	Widespread in forests both inside and outside of Forest Reserve (so well established that most people are unaware it is not native) Used in construction Protected in Saint Lucia - license required to collect it. Probably helpful in stabilizing steep slopes.	Control, though very difficult, may be warranted in key sites to restore natural forest composition. More data are needed. Research into impacts on native wildlife and factors determining its abundance and spread.
<i>Casuarina equisetifolia</i>	Casuarina, Australian pine	Potentially invasive	Leaf litter possibly toxic to native detritivores, rendering sections of beaches almost sterile. Usually planted in coastal areas. Studies in Florida have shown sharp drop in native mammals and reptiles, including fewer turtle nests, in areas invaded by this species.	Avoid planting in priority biodiversity conservation areas, especially near the coast.
(*) <i>Eucalyptus spp. (resinifera, robusta, kirtoniana)</i>	Eucalyptus	Not very invasive, but has a very negative impact on forests	Grown in plantations for timber Limited value for native wildlife: no native insects feed on it. Highly damaging to soil and leaf litter invertebrates where leaves and bark accumulate Highly flammable: should never be grown in areas prone to fires.	This species should be phased out from all forest areas.
(*) <i>Hibiscus elatus</i>	Blue mahoe	Quite invasive	Grown in plantations for timber Can spread into various forest types. May be a useful food plant for the Saint Lucia amazon.	Replace with native alternatives in areas of high conservation importance (not urgent)
(*) <i>Leucaena leucocephala</i>	Leucaena, White leadtree	Invasive in degraded deciduous seasonal forests.	Grown for timber and used for fuel wood and fodder. Invasive pioneer - spreads into degraded deciduous seasonal forests at the expense of native trees. It probably occurs in the deciduous seasonal forest parts of the Forest Reserve. Few plants can grow in its understory. The first leucaena were probably introduced by Amerindians. The original form is common only in	If the forests are allowed to recover, however, native species will eventually out-compete leucaena. This succession process could be accelerated by selectively removing and replacing leucaena with native species in areas of high conservation importance. (priority for deciduous seasonal forests of high conservation value e.g. Anse Louvet, NE, and Anse Chastanet, W). Cut stumps should be treated with

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Scientific name	Common names	Cause for concern	Comments	Management Needs
			very disturbed, dry areas and may help prevent the formation of savannah. It does not invade good quality forest. A more robust form of leucaena was introduced more recently, but does not appear to be spreading.	herbicide due to ability to coppice (and survive fire).
(*) <i>Pinus caribbaea</i>	Caribbean pine	Potentially invasive. Grown in plantations for timber, Negative impact on forest ecosystem.	Limited value for native wildlife – few, if any, native insects can feed on it, and its leaf litter takes a very long time to decay. Oil-rich leaf litter creates a more flammable environment (a fire hazard) and has a lasting impact on the quality of soil. Few plants can grow in its understory, thus reducing native biodiversity. Seeding itself in Saint Lucia, albeit on a localized scale. It is more competitive on areas with poor soils.	Remove and replace with native species in areas of high conservation importance (urgent, especially in the Forest Reserves that would naturally have deciduous seasonal forest).
<i>Spathodea campanulata</i>	African tulip tree	Highly invasive. Imported and planted for ornamental purposes	Timber is of no use. Will spread into a variety of forest types at the expense of native trees. Many other countries have established control programmes for this harmful species.	Control the spread of this tree on forest estate: Young trees can be dug out or hand pulled when the soil is moist. Due to their ability to sucker, stumps of felled trees need to be treated with herbicide.
(*) <i>Swietenia macrophylla</i>	Honduras mahogany, Large-leaved mahogany)	Potentially invasive.	Grown in plantations for timber Faster growing than <i>S. mahogani</i> . International trade governed by CITES: globally threatened (VU) in its native range. Not yet shown to be invasive. A fruit tree for parrots?	Phase out from areas of high conservation importance (not urgent). Replace with native fruit trees, suitable for parrots.
ANIMALS				
Mammals				
(*) <i>Sus scrofa</i>	Pig (feral), Kochon mawon	Highly invasive Negative impact on forests	Increasingly widespread and common Damage to forests reported. Threatens ground plants, ground-nesting birds, and the eggs of iguanas, turtles, soil-living insects and other wildlife. Some plants may benefit from pigs rooting and thereby creating beds for germination. Health hazard to humans.	Pig control program urgently required, using combination of methods. Hunting of feral pig should be permitted and even encouraged, but closely regulated Domestic pigs should be marked and kept in enclosures at all times. Research impacts on native wildlife and factors determining its abundance and spread.
(*) <i>Herpestes</i>	Small Asian	Highly invasive.	Arguably the most dangerous alien species on Saint	Localized control may significantly improve survival of

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Scientific name	Common names	Cause for concern	Comments	Management Needs
<i>javanicus</i> (often called <i>Herpestes auropunctatus</i>)	mongoose	Negative impact on forests	Lucia – blamed for the decline of many native reptiles and low-nesting birds on the main island Island wide eradication of mongoose is not feasible using current technology, Sometimes viewed as a beneficial species that helps 'control' fer de lance population - but there is no evidence to support this. Mongooses transmit a number of diseases that can affect humans, including leishmaniasis.	rare species (e.g., nesting areas for iguanas, sea turtles and nightjars in NE and E coastal deciduous seasonal forests). As with other species on this table, forest workers need to be educated that this species is non-native and is a serious threat to many native wildlife.
(*) <i>Rattus rattus</i>	Black rat, Ship rat	Highly invasive. Negative impact on forests	Widespread and common. Especially harmful on offshore islands, where rat populations can devastate native plants and animals, including lizards and nesting turtles.	Permanently protect all offshore islands from being (re)invaded by rats (Maria Islands, Praslin, Rat, and Dennery). Control rats (and cats) in any areas where mongoose control is practice (above).
(*) <i>Didelphis marsupialis</i>	Opossum/ Mannikou	Highly invasive. Negative impact on forests Socio-economic importance	Widespread and common, especially in deciduous seasonal forest areas (so well established that most people are unaware it is not native) Hunted for bushmeat (albeit illegally – it is fully protected by law) Widespread and common Omnivore, capable of severe impact on native plants and animals, e.g. preys on juvenile Saint Lucia iguana and bird eggs.	Lift hunting ban on mannikou Experimental with localized extermination/ exclusion of opossums, and monitor impacts on native biodiversity. Research factors determining its abundance and spread.
(*) <i>Dasyprocta leporina</i> (sometimes falsely called <i>D. agouti</i>)	Agouti	Ecological importance Economic importance	Mainly in Forest Reserve. Not very invasive. Raids farmer's crops Hunted for bushmeat (albeit illegally – it is fully protected by law) Whether the agouti has a net beneficial or harmful impact is unknown: it could have some beneficial role in dispersal of some trees e.g. koubawi (<i>Hymenaea courbaril</i>).	Hunting ban should be lifted, at least outside of the Forest Reserve (Some conservationists would recommend eliminating all agouti, because it is not native and may have a negative impact on the natural forest ecosystem). Potential for local farmers to 'ranch' wild agoutis in captivity, using wild stock, but a feasibility study (including evaluating demand for agouti meat and cost-effective methods of production) should be developed first.
Reptiles				
(*?) <i>Iguana iguana</i>	Green/Common/ South American	Highly invasive. Negative impact on	Major threat to the native iguana through both competition and hybridization.	Must be eradicated promptly, using guns, nooses or other methods, both inside and outside of Forest

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Scientific name	Common names	Cause for concern	Comments	Management Needs
	iguana, Léza	forests		Reserve, before the population spreads (currently in wet forests near Soufriere). Prevent the keeping and transportation of green iguanas on Saint Lucia, identify nesting sites, raise awareness, and monitor DNA of native iguanas for evidence of hybridization.
(*) <i>Anolis wattsi</i>	Watts' anole	Highly invasive. Negative impact on forests	Spreading rapidly across disturbed forest and urban areas, but still rare in the Forest Reserve. Spread is seemingly at the expense of the native, endemic Saint Lucia anole (<i>Anolis luciae</i>). Could also have severe impact on invertebrates, especially diurnal species that it hunts on the ground. This species, accidentally introduced from Antigua on ornamental plants, illustrates the danger of importing exotic plants without thorough checks.	Should be monitored, but there is currently no safe and effective way to selectively eradicate this fast-breeding lizard. Research into impacts on native wildlife and factors determining its abundance and spread.
Amphibians				
<i>Bufo marinus</i>	Cane toad, Marine toad	Highly invasive	Impacts not studied, but expected to be high Sustained by predation on native invertebrates and probably small native vertebrates (e.g. pygmy geckos) Can kill birds, reptiles, fish, mammals and other wildlife that attempt to eat the toad or tadpoles.	Research into impacts on native wildlife, and factors affecting its abundance and spread.
Insects				
(*) <i>Glyptolenus chalybaeus</i>	Ground beetle	Highly invasive, impacts unknown.	Widespread and very common in forests	Research into status, distribution, impacts on native wildlife and factors determining its spread.
(*) <i>Calleida amethystine</i>	Ground beetle	Somewhat invasive, impacts unknown.	Widespread in forests	Research into status, distribution, impacts on native wildlife and factors determining its spread.
<i>Paratachys (Eotachys) bleoides</i>	Ground beetle	African native, impacts unknown.	Widespread in dry forests	Research into status, distribution, impacts on native wildlife and factors determining its spread.
<i>Omorgus suberosus</i>	Skin beetle	Invasive in drier forests and farms	Impacts limited to human dominated habitats. Usually feeds on dry carcasses of introduced mammals.	Research into status, distribution, impacts on native wildlife and factors determining its spread.
<i>Onthophagus</i>	Dung beetle	Highly invasive	Widespread where cattle, horse, donkey, pig and	Research into status, distribution, impacts on native

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Scientific name	Common names	Cause for concern	Comments	Management Needs
<i>gazellae</i>			human faeces occur. Impacts on native dung beetles may be important	wildlife and factors determining its spread.
<i>Aphanisticus cochinchinae</i>		Invasive, impacts unknown	Beach and dry forest habitats May be host-limited to introduced plants.	Research into status, distribution, impacts on native wildlife and factors determining its spread.
(*) <i>Zophobas sp.</i>	Darkling beetle	Invasive, impacts unknown	Most common in bat guano, may displace native species.	Research into status, distribution, impacts on native wildlife and factors determining its spread.
<i>Trachyscleis aphodiodes</i>	Darkling beetle	Invasive, impacts unknown	Common beach detritovore, may displace native species.	Research into status, distribution, impacts on native wildlife and factors determining its spread.
<i>[Sternochetus mangiferae]</i>	[Mango seed weevil]	[Invasive]	Recorded from Saint Lucia, but this is not supported by vouchers. Impact limited.	This species causes quarantine restrictions on Saint Lucian produce. Its presence should be verified or the record dropped.
<i>Maconellicoccus hirsutus</i>	Pink hibiscus mealybug	Highly invasive.	Dry and mesic forests. Severe impacts on wide range of native and cultivated plants, including some used by vertebrate wildlife.	Subject to biological control efforts, which should be continued and strengthened
<i>Tyrtaeus rufus</i>	Darkling beetle	Invasive.	Impacts unknown. Associated in with dead mangroves. Moves inland on some islands	Research into status, distribution, impacts on native wildlife and factors determining its spread.
<i>Coleophora inaequalis</i>	Ladybird beetle	Introduced for biological control	Representative of several generalist ladybird beetles introduced for biological control, impacts on native species unstudied.	Research into status, distribution, impacts on native wildlife and factors determining its spread.

- Discuss the eradication or control procedure with local stakeholders, and try to win their support and cooperation before the operation begins.
- Prioritise species that are known to be harmful, e.g. predatory mammals.
- Seek expert advice on techniques. Specific questions can be emailed to the IUCN/SSC Invasive Species Specialist Group at <Aliens-1@indaba.iucn.org>
- Monitor the results: the response in the species, habitat, ecosystem or landscape that the control aims to benefit, rather merely counting the number of individuals killed.

Box 2 Activities to control feral pigs on Saint Lucia

As suggested by participants of the Threat Analysis workshop during a brainstorming session.

- Establish a dedicated alien invasive species unit with sufficient personnel and funding to address feral pigs and other problem species. Saint Lucia may be able to access GEF funding for this purpose from the new 5-year multi-country alien invasive species project.
- Obtain data on the ecology, population dynamics and movements of feral pigs, and their impact on wildlife. Impact could be examined by conducting excluding pigs with fences from certain areas (e.g. within the iguana's range in North East Saint Lucia) to measure forest regeneration and wildlife populations in their absence.
- Liaise with and learn from the new pig control project on Montserrat (workshop planned in early 2010).
- Develop a written action plan (already in progress).
- Use a sustained combination of methods. Options include:-
 - Hunting with dogs and guns – issue permits to allow hunters inside forest reserves.
 - Snares and traps – field staff or hunters will require training.
 - Poisoning – risky.
 - Oral contraceptives – under development in UK and other countries.
 - Exclusion fences, e.g., using solar-powered electric wire fences.
 - Aerial shooting – impractical for forested areas.
 - Radiotag or satellite-tag a „Judas pig“ to locate groups.
- Ensure control activities do not endanger threatened native species (e.g., hunting dogs may kill or harass iguanas and other native wildlife).
- Elevate the problem of feral pigs in the national agenda to gain sufficient resources. Build public awareness through television, radio, etc.
- Monitor pig kills by hunters, and monitor gun ownership.
- Control free-ranging domestic pigs.

Common methods of eradicating and controlling alien invasive species include:

- **Physical removal**: hand-weeding is often the most effective option for clearing areas of alien invasive plants, but not those that can re-sprout from the stems or roots left in the ground. The ground left bare could be full of its seeds. Some animals may be trapped using snares or live traps (non-target animals should be released alive and unharmed).
- **Chemical control**: e.g. selective poisoning using brodifacoum to eradicate rats from islands. The chemical used should be as specific as possible, non-persistent, and non-accumulative in the food chain: persistent organic pollutants, including organochlorine compounds should not be used.
- **Shooting**: Used for medium-to-large mammals and birds, sometimes enlisting the voluntary help of sport-hunters. Shooting is the usual method for eradicating herbivores - wide ranging herds may be located with the aid of a released, radio-collared „Judas“ animal.
- **Biological control**: The use of other species to control the pest plant or animal. Because biological control involves the deliberate introduction of another alien species, the same care and procedures should be used as with other intentional introductions. Integrated pest management (IPM) uses biological control agents as well as physical and/or chemical means.
- **Habitat management**: e.g., grazing or prescribed burning to make the area less suitable for the pest species, or to boost numbers of native predators or competitors.
- **Exclusion or containment**: Where full-scale control or eradication is not possible, it may at least be possible to exclude (or contain) the invasive species from (or within) special sites. For example, marine turtle and iguana nests may be „caged“ with wire mesh to exclude predators such as rats or mongooses, and rare plants enclosed with fences to exclude feral herbivores.

Prevention and surveillance of alien species

Preventing the introduction of alien species is usually much cheaper and more effective than eradication. Important principles to follow are:

- Identify the risks and develop a clear strategy for preventing, detecting and controlling invasive species on Saint Lucia. Consider: Where and how might invasive species enter (e.g. alien seeds may be inadvertently imported on earth-moving machinery; exotic plants and pet animals are deliberately brought into the country; rats can stowaway on boats visiting offshore islands)? What types of animals or plants should you especially watch out for? What should your staff do if they discover an exotic animal or plant? Which people and organisations need to be aware of the risks and educated or trained accordingly?
- All Forestry staff and other relevant agencies (e.g. customs, port authority, police) should be vigilant and immediately report any sightings of new, potentially invasive species. Ideally, incoming boats, vehicles and cargo should be checked for stowaways. Some forward-thinking countries require all visitors to be screened and their boots cleaned before entering to prevent seeds and other organisms being carried in. Any species found, including seeds and larvae, should be killed and incinerated immediately.

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- Raise awareness of the agencies responsible for port control; in agencies issuing licences for importing organisms, and among the general public, especially pet traders and garden centres. Invasive species can endanger wildlife, agriculture and human health.
- Do not permit any new non-native animals or plants to be brought to Saint Lucia and especially the offshore islands. Even imported stock of familiar domestic breeds could inadvertently introduce alien invasive species, including pathogens. Beware that soil brought in with plants can contain the seeds of invasive plants, invasive insects and other animals.
- Act quickly. If an alien invasive species is detected in your area, the longer the delay in taking action, the more it will increase. Lack of certainty about the whether the species is genuinely harmful should not be used as a reason to delay.
- Regard all non-native species as a potential threat until proven otherwise.

Regular surveillance is needed to detect alien species, including those thought to have been eradicated. An example is the network of rat bait stations on Saint Lucia's offshore islands that are monitored as an early warning system to detect re-invasion of the islands by rats.

6. Management Recommendations

This section will focus on a shortlist of the most important actions that Saint Lucia can take to conserve its forest biodiversity. For further specific advice, please refer to the recommendations detailed in the taxonomic reports by Clarke (2009), Daltry (2009), Graveson (2009b), Morton (2009a) and Toussaint *et al.* (2009). Morton (2009b) and van Eynde (2009) also provide specific advice on a small number of exploited forest species.

6.1. FOREST RESERVE AND PROTECTED AREA MANAGEMENT

Objective 1: Within the Forest Reserves and existing protected areas, establish and implement site management plans that integrate biodiversity conservation with other forest uses and services

6.1.1. Using a participatory process, develop integrated site plans for every management unit in the Forest Reserves

- a) **The Forest Reserve should be divided into coherent management units within each administrative range** (as recommended by van Eynde, 2009) and the objective(s) of each unit clearly defined e.g. timber production, tourism, watershed protection, nature conservation, and carbon sequestration. Most units are likely to have multiple uses. **Figure 2** and Section 3.2 of this report should be used as a guide for determining priority areas and actions for conservation, but these may be adjusted if new information becomes available.
- b) **The development of each site management plan should be a participatory process**, facilitated by an expert in forest management, but designed in collaboration with the staff who will implement the plan. Their involvement is essential to ensure the plan benefits from their local knowledge of the site and to ensure they fully understand the final plan. Plans do not need to be long or complicated, but all plans should include measurable targets and indicators (including biodiversity indicators), which the Forestry Department staff can use to monitor their progress. Robinson *et al.* (2009) provide very clear instructions on how to develop a simple forest management plan (to Forest Stewardship Council certification standards).
- c) **For management uses other than strict protection, biodiversity conservation principles should be set and incorporated wherever possible.** In areas where silviculture is practiced, for example, impacts on biodiversity can be mitigated by applying the guidelines of the Forest Stewardship Council, refined with advice from the Forestry Department's Wildlife Unit and other biodiversity experts. Example conservation principles include: Halting the conversion of diverse natural forests to monotypic or reduced-species plantations; Controlling invasive species and reducing reliance on non-native tree crop species; Changing the planned order of cutting to leave an important area until after the breeding season; Leaving a greater number of seed trees to promote more regeneration of a particular species; Leaving large trees and snags standing to provide habitat for parrots and bats.

6.1.2. Advise on and support the development of management plans for all protected areas in Saint Lucia

- a) **All protected areas that contain forests or shrublands should have clear objectives and a management plan.** While they may also have cultural, historical and other objectives, many of the land areas that are under the management of the National Trust and other bodies offer a valuable opportunity to strengthen the protection of forests, especially deciduous and semi-evergreen seasonal forests and other vulnerable coastal forests and shrublands. The Forestry Department should be proactive role in encouraging, advising and supporting the preservation of forests and forest biodiversity on these lands, including facilitating baseline biological surveys and monitoring of these areas. The specific management needs of each site will vary, e.g. there is a clear need for a fire prevention and management strategy for Petit Piton. See section 3.2 and 3.2 for specific site management needs.

6.1.3. Build the capacity of the site management personnel to implement the plans.

- a) **Assess the capacity of the Forestry Department staff, National Trust employees and other relevant personnel to implement and monitor the site management plans** and identify essential training, equipment and other needs (see section 6.9.1).
- b) **Improve the collection and exchange of biodiversity information between the Forestry Department’s range offices and Union.** See section 6.9.2. All site-based staff should have a role in monitoring the state of the forest and its biodiversity (see Recommendation 6.6.3).

6.2. FORESTS ON PRIVATE LANDS

Objective 2: Make a concerted effort to safeguard important forests outside of the current Forest Reserves, with particular attention to deciduous and semi-evergreen seasonal forests

6.2.1. Develop a clear strategy for maintaining and improving forest cover on private lands, with particular attention to areas of high conservation value

- a) **The strategy should explore all possible mechanisms for ensuring forest cover is maintained and biodiversity conserved,** including: Regulation (legislation); Biodiversity offsets; Land purchase; Conservation easements; and Conservation incentives (e.g. Payment for Environmental Services, REDD and carbon-related revenue; Timber and NTFP production; Tax incentives). The Forestry Department may need to source legal advices and other external expertise for any mechanisms it lacks prior experience in. Special attention should be paid to the forest areas of especially high importance to biodiversity conservation, identified in **Figure 3** of this report.
- b) **As part of the strategy, a concerted effort should be made to establish at least one permanent nature reserve to protect deciduous seasonal forest biodiversity** in the North East Corridor and Mandelé area. Priority should be given to sites with well developed

- deciduous seasonal forests, preferably with ravines; sites known to contain Saint Lucia iguanas, Saint Lucia nightjar, white-breasted thrasher and other priority species; large sites rather than small or fragmented sites; sites contiguous with existing forest reserves; and sites that serve parallel strategic uses for SLFD e.g. protection of watersheds.
- c) **The regeneration and conservation of Semi-Evergreen Seasonal Forests should be actively encouraged** as part of the forest strategy. Plantations and other sites in the mesic zone (approximately 100 to 200 metres above sea level) should be identified where farming appears to have ceased or which are inherently poorly suited for farming (e.g. very steep slopes, close to ravines, poor access). Current owners should be contacted to determine their plans for these sites and to urge and support them to enable these areas to revert to forests to conserve wildlife and safeguard the watershed. Semi-evergreen Seasonal Forests can be allowed to regenerate naturally or, resources permitting, native saplings planted and non-native trees felled.
 - d) **All forest sites should have a basic site management plan**, whether they are government-owned or managed under agreement by private owners, to prescribe their objectives and determine how these will be achieved and monitored. It is important to consider the management of alien invasive species and what human activities can be permitted in the area (e.g. recreational uses). Private forest owners should be offered technical training and other assistance to develop site plans and to manage and monitor their forests for biodiversity conservation.
 - e) **The Forestry Department should encourage and facilitate the creation of a National Land Use Plan**, which would aid the Development Control Authority and other decision-makers involved in the planning process to decide which proposed developments to approve and where.
 - f) **The above should be underpinned with increasing the awareness of landowners, decision makers and the general public** of the national and global importance of Saint Lucia's drier forests (the significance of the rainforests appears to be already widely understood): see Recommendation 6.7.1.

6.3. NATIONAL LEGISLATION

Objective 3: Revise and amend the national legislation to reflect the current status and needs of Saint Lucia's forest biodiversity

6.3.1. *Revise the next edition of the Wildlife Protection Act*

- a) **Ensure the Act is brought closer into line with the main threats facing Saint Lucia's wildlife, and clarifies the status of all major animals of concern.** Key points to consider during the revision are: Ensure all species common names, Creole names, and scientific names are up to date and include synonyms where appropriate. Species to be Protected should be species threatened by human activities *and species that could be easily mistaken for them* (e.g. it would be sensible to protect all bats because most people are unable to distinguish

between the most common and the most threatened species). Native species thought to be extinct in Saint Lucia should be listed as Protected as a precaution in case they are rediscovered (e.g. Saint Lucia cribo and Saint Lucia musk rat). Native species that are known to be very widespread, abundant and/or adaptable do not need specific protection. The Saint Lucia fer-de-lance should be removed from the Unprotected list (Schedule 3) because it is now globally threatened, but permission could be given for the snakes to be killed in, or preferably relocated from, areas where the snake presents a danger to people (e.g. in villages and plantations). The clause that requires permits for the import and export of wildlife should be expanded to make clear that the importation of alien invasive species is prohibited under any but the most exceptional circumstances. All alien species should be Unprotected *unless they closely resemble a protected species*. Investigate whether the essential breeding sites and dens of species that are protected or partially protected can also be afforded protection, irrespective of whether they are on state or private land. Investigate whether plants can be listed, in addition to animals, to enhance the protection of threatened native flora.

6.3.2. Establish and enhance regulations to support the preservation of forests on private lands

- a) **With reference to section 6.2, new regulatory mechanisms to conserve forests on non-Crown Land must be underpinned with amendments to national legislation.** The Forest, Soil and Water Conservation Act is probably the best tool to support the retention of forests on private land. The definition of Forest could be legitimately expanded to include wooded areas nationwide (not only the “Forest Reserve, Protected Forest or Prohibited Area”). Regulations that could be usefully and justifiably applied to all forest areas including prohibiting the felling of trees above a certain girth without a permit from the Forestry Department, requiring owners of large estates to retain a minimum percentage under natural vegetation cover, and/or prohibit forests being cleared within a specific distance of a ravine.
- b) **Legislation governing the approval and construction of developments on forested land should also be reviewed and improved** with Forestry Department guidance. Developers should be legally bound to implement the mitigation measures demanded by the government, on the basis of expert environmental impact assessments and the Forestry Department’s recommendations.
- c) **Individuals or companies in breach of the rules should be prosecuted** and held up as a warning to others.

6.4. ALIEN INVASIVE SPECIES

Objective 4: Control the introduction and spread of alien invasive species that seriously endanger Saint Lucia’s forests and their biodiversity

Article 8 of the Convention on Biological Diversity requires every Contracting Party, as far as possible and as appropriate to “...Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species”. Also see Recommendation 6.6.2.

6.4.1. Control the most harmful alien invasive species from priority sites on the main island

- a) **Eradicate, as a matter of greatest urgency, the feral population of alien green iguanas** to prevent them from decimating the endemic Saint Lucia iguana population (see Morton, 2008). The importation, movement and keeping of fertile green iguanas in captivity should be prohibited and rigorously enforced. While a Green Iguana Action Plan is warranted, there should be no delay on seeking out and culling all green iguanas immediately.
- b) **Experimentally reduce the density of mongooses, opossums and other mammal predators in priority biodiversity sites** in the “the North East Corridor” (the core of which consists of Grande Anse, Caille Des, La Chaloupe and Louvet) and the Government Forest Reserves. Clarke (2009) and Toussaint *et al.* (2009) outline suitable methodologies. Determine the impact of the control programme on the alien species and on the survival and reproduction of threatened species, and use this information to decide whether to modify the control programme and/or roll it out to other areas. Keep careful records of the numbers of animals caught and their stomach contents (see Recommendation 6.6.2).
- c) **Prohibit the planting of exotic ornamental plants on crown land and in protected areas**, especially including Petit Piton and Gros Piton which support native plants that are extremely rare on both a national and global scale. Invasive ornamental plants should be removed from these areas immediately.
- d) **Develop and implement a Feral Pig Action Plan** to reduce the population of feral and free-ranging pigs on Saint Lucia. Because pigs breed very rapidly and are difficult to eradicate in forested areas, this will require a major and ongoing operation to have a measurable and lasting impact. The considerable experience and advice of other countries (e.g., Australia, USA, New Zealand, Galapagos, and more recently Montserrat) in controlling feral or wild pigs in similar habitats should be sought (see http://www.issg.org/database/species/management_info.asp?si=73&fr=1&sts=sss&lang=EN). Box 2 (section 5.2.2) in this report outline some approaches to consider. It is advisable to monitor the impact of the control programme on the pig populations (suitable methods for monitoring wild pigs have been well documented and tested in many other countries) and on biodiversity indicators (e.g. regeneration of forest trees) to decide whether the control programme is effective or needs adjustment.

6.4.2. Ensure the offshore islands are free of alien invasive animals and plants

- a) **Develop and implement an Invasive Species Strategy for the Maria Islands, Praslin, Dennery and Rat island** to prevent the (re)invasion of rats, opossums, mongooses, Watts’ anoles (*Anolis wattsi*), and other alien animals and plants. This strategy should be integrated into site management plans for every island. Sensible precautions include: Educate boat users on why and how to check their boats and any baggage for stowaways before they leave the mainland, and ensure no food or litter is left on the island; Visiting researchers in particular should ensure their clothes, boots, research equipment and camping equipment are thoroughly cleaned, preferably disinfected, before landing on the island; Trained staff should visually monitor the islands at least once every six weeks, and especially after major storms, for signs of rat activity (use permanent bait stations or similar methods to assist detection) and other

alien animals; Develop a contingency plan and ensure resources (trained staff, rodenticide) are ready at all times to eradicate any rats or other animals that are detected; Where possible, regulate the number of boats that are permitted to land on these islands and prohibit overnight camping without authorization.

- b) **Remove goats from Dennery island** to improve the quality of habitat, and hence the island's capacity to support native biodiversity. The first step towards this should be a feasibility study to identify the best options for removing the goats, and to seek the consent of the owner or owners. The necessary human resources should then be mobilized to catch or cull the island's entire goat population.

6.4.3. Reduce the probability of harmful non-native species invading Saint Lucia

- a) **Prohibit the importation and keeping of alien species that present a risk to native wildlife.** Employ the Wildlife Protection Act and relevant trade or health legislation to prevent the deliberate importation of, in particular, non-native reptiles, amphibians, exotic forest plants and non-agricultural mammals. No new permits should be issued to allow residents to keep animals perceived to be a threat to native wildlife if they escape. The list of potentially destructive alien species includes green iguanas (*Iguana iguana*) and other lizards, boa constrictors and other large snakes, raccoons and monkeys. Kairo *et al.* (2003) provides other examples of alien species identified as harmful to Caribbean biodiversity, albeit an incomplete list. If such animals are already in captivity, they should be euthanized or, if that is not an option, be castrated or spayed to prevent them from breeding should they escape.
- b) **Develop a list of attractive and easily cultivated native alternatives to exotic ornamental plants,** and promote their use among home owners and developers. Suitable native species should be propagated in nurseries and healthy specimens made readily available to buyers. Resident botanist Roger Graveson could be appointed to advise on the list of suitable native species to use.
- c) **Prevent alien species from being introduced through construction and landscaping projects.** Advise the Development Control Authority (DCA) on the hazards of importing alien species. Develop guidelines for mitigating these risks and ensure they are incorporated into DCA planning permissions.
- d) **Review and enhance the current capacity of customs and port authority staff to screen incoming baggage and cargo for wildlife.** Provide training and resources as required. Nominate at least one Forestry officer to liaise with the authorities at Vigie, Castries docks, Hewannora, Rodney Bay Marina and other important ports of entry, and provide prompt technical advice should any alien animals or plants be detected. Illegally imported alien wildlife should be destroyed immediately.
- e) **Offenders who illegally import alien species or keep alien animals without authorization should be prosecuted** and held up as an example to others.

6.5. THREATENED AND EXPLOITED SPECIES

Objective 5: Develop species management plans for threatened and exploited species, and update their Red List status.

6.5.1. Provide IUCN with supporting data to assign the correct categories of threat to native Saint Lucia animals and plants on the international Red List

- a) **All native species should be ascribed an IUCN category of threat**, starting with all vertebrate animals and higher plants for which sufficient distribution, abundance and other data are already available. A number of species were evaluated as part of the present project (most reptiles: Daltry, 2009; some plants: Morton, 2009a) and a small working group could evaluate many more in a matter of days. Helpful instructions on the criteria and how to apply them are available at <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>, and IUCN also offers training courses for facilitators around the world. IUCN should be asked to provide contact details of the specialist groups and other organisations currently responsible for the listing of Caribbean plants and animals (different taxa are handled by different groups) and urge them to assist with uploading Saint Lucia flora and fauna to the Red List (contact: IUCN Red List Unit, IUCN UK Office, 219c Huntingdon Road, Cambridge CB3 0DL, United Kingdom, email redlist@iucn.org). The correct listing of species on the IUCN Red List can be a valuable tool for fundraising and advocacy, and would help to highlight the importance of Saint Lucia's efforts to conserve its globally threatened species.

6.5.2. Devise and implement Species Conservation Action Plans for Saint Lucia's most threatened species

- a) **Develop simple, costed Species Conservation Action Plans for all indigenous species that are globally threatened and/or nationally threatened with extinction** (i.e., listed in categories Vulnerable, Endangered or Critically Endangered using IUCN criteria). Focus first on species that are in most urgent need of attention i.e. those that qualify as Critically Endangered or Endangered e.g. Saint Lucia racer (*Liophis ornatus*). A small working group should be responsible for preparing each species plan, using a standardized template. This planning process should entail researching published and unpublished information concerning the status, distribution, ecological needs and likely threat(s) to the species and, if necessary, conduct rapid surveys to fill critical information gaps. Based on a reasonable understanding of the species' needs and threats, identify the management options to halt and even reverse the species' decline. The may range from „do nothing“ to restoring habitats and even conducting reintroductions: Annex II shows a decision-making matrix designed to guide the choice of appropriate recovery actions. The most successful conservation action plans are those that are developed through a process of consultation with local experts and other stakeholders, especially the individuals who will be expected to implement the plan.
- b) **Monitor the target wildlife population and threats to evaluate whether the management actions are succeeding and adjust the conservation action plan as necessary.**

Conservation action plans should be working documents, revised and updated every few years as more information and experience accumulates.

6.5.3. Devise and implement Species Sustainable Use Plans for exploited forest wildlife

- a) **Develop and implement basic Species Sustainable Use Plans for all forest species that may be used harvested sustainably**, incorporating both in situ and ex situ components where appropriate. These could apply to alien species that the Saint Lucia wishes to retain, e.g. agouti (for which ranching may be a commercially viable option if there is sufficient consumer demand: Clarke, 2009; Morton, 2009b) and indigenous species e.g. lansan (*Protium attenuatum*), latannyé (*Coccothrinax barbadensis*) and land crabs. A small working group should be given the task of preparing each management plan, using standardized methods and format. The planning process should entail researching published and unpublished information concerning the status, distribution, ecological needs, markets, harvesting pressures, and other likely threat(s) to the species, and consultation with the collectors, traders and consumers of the species. Additional rapid surveys may be conducted to fill critical information gaps. Management options to support sustainable use should be tailor-made to suit each species, and considerations may include establishing permits and conservative quotas, prescribing harvesting regulations (e.g., minimum sizes of plants or animals to be collected, low-impact methods of tapping trees), training collectors and educating consumers. Routine monitoring of collection/hunting pressure and the status of the wild populations should be mandatory to ensure the use is genuinely sustainable. See Morton (2009b) for specific management recommendations for some of the most heavily utilized plants and animals on Saint Lucia.
- b) **Monitor the target wildlife population and threats to evaluate whether the management actions are succeeding and adjust the conservation action plan as necessary.** Conservation action plans should be working documents that are revised and updated every few years as more information and experience are accumulated.

6.6. APPLIED RESEARCH AND MONITORING

Objective 6: Conduct applied research to inform and monitor the management of Saint Lucia's forest biodiversity
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Short term and long term research and monitoring may be carried out by Forestry Department staff, university staff, Masters students and/or biologists from other collaborating institutions. The list of potentially useful studies is very long, so the following is a shortlist of the top eight themes that would go a very long way to informing effective conservation management of Saint Lucia forests and their wildlife.

6.6.1. Assess the status and ecological needs of, and threats to, the least-known species

- a) **Field research of poorly-known species on the Maria Islands.** Evaluate the approximate population size, habitat associations, and diet of the following: Saint Lucia racer (*Liophis ornatus*): A population census and ecological study would take at least three months, with skilled researchers based on the island. Safe methods of trapping may increase the chances of detecting these elusive snakes (see Daltry, 2009, for further details and citation therein); Saint Lucia thread snake (*Leptotyphlops breuili*): Surveys for the Saint Lucia thread snake should include digging enclosed quadrats to accurately assess population densities both on Maria Major and selected sites on the mainland. Maria Major rough-scaled worm lizard (*Gymnophthalmus pleii nesydrion*) and Maria Islands Saint Lucia pygmy gecko (*Sphaerodactylus microlepis thomasi*): Survey methods for these lizards could entail distance sampling or mark-recapture for one or two weeks on Maria Major, with a comparative study of *G. p. luetkeni* and Saint Lucia pygmy gecko *S. m. microlepis* in selected sites on the mainland. Invertebrate inventory: A baseline inventory should be carried out, focusing on species that are endemic, threatened or alien invasive. The findings of these studies should be used to inform Species Conservation Action Plans for the threatened taxa (Recommendation 6.5.2) and the site management plan for the Maria Islands (Recommendation 6.1.2).
- b) **Advanced research on selected species of the deciduous seasonal forests.** Saint Lucia iguana (*Iguana cf iguana*): Resolve the taxonomic status of the Saint Lucia iguana by examining the morphology and/or genetics of the *Iguana iguana* complex throughout their New World distribution range. Determine the relationship between iguana distribution and the quality and composition of Deciduous Seasonal Forest. Monitor the nuclear DNA of Saint Lucia iguanas for evidence of hybridization with alien iguanas. Saint Lucia nightjar (*Caprimulgus rufus otiosus*): Identify the preferred habitats of Saint Lucia nightjar and experimentally test whether the nightjars will use artificial clearings.
- c) **Facilitate baseline inventories of poorly-known major taxonomic groups.** The major sectors of Saint Lucian forest biodiversity for which very little or no information currently exists include lower plants (mosses, algae), fungi, and most invertebrates (scorpions, spiders, snails, worms, etc.). These studies will require specialist (likely external) advisers to identify the species accurately: the invertebrate surveys in particular are likely to discover species that are new to science. All inventories should attempt to determine which species are indigenous (and which of these are endemic and threatened) and which are alien.

6.6.2. Elucidate the impacts of alien invasive animals on native biodiversity and identify suitable control methods

- a) **Study the impact of selected invasive species on native flora and fauna.** Of particular concern are the cane toad *Bufo marinus* (impact on invertebrates and small reptiles), small Asian mongoose *Herpestes javanicus* (impact on low-nesting birds and reptiles), feral pigs *Sus scrofa* (impacts on forest regeneration, ground nesting birds, reptiles), opossum *Didelphys marsupialis* (impacts on invertebrates, birds, reptiles, plants), cane toad *Bufo marinus* (impact on invertebrates and small reptiles), and Watts' anole *Anolis watsi* (impact on invertebrates and native Saint Lucia anole). Other potentially harmful alien species of interest, including

plants and invertebrates, are shown on **Table 9**. These studies should ideally use an experimental design whereby the abundance, health and survival of indigenous species are compared between sites where the alien species is present and „control“ sites where the alien has been excluded or significantly reduced (see also Recommendation 6.4.1). The stomach contents and any observed feeding behaviours of alien species should also be documented where possible. The findings of these studies should be used to prioritise and guide alien species control strategies (section 6.4) and to raise awareness of the harm that alien species cause (Recommendation 6.7.2). Linked to this research, the distribution and habitat associations of the alien species should be investigated to pinpoint the factors that explain why they are more abundant in some areas than others. [*This recommendation can be carried out simultaneously with Recommendation 6.6.2.(b) below, to test effective methods of eradicating or excluding alien species*].

- b) **Research and test methods of controlling selected invasive species.** Known priorities include the feral pig and mongoose (Recommendation 6.4.1), for which the best methods of control remain unclear. Control strategies and methodologies used on the same or similar species in other parts of the world should be researched (see the Global Invasive Species Database at <http://www.issg.org/database/welcome/>; specific enquiries can be sent to the IUCN/SSC Invasive Species Specialist Group at <Aliens-I@indaba.iucn.org>), bearing in mind that methods must to be tailored to suit the local situation. Methods should be tested on a local scale before being rolled out nationwide, and should be carefully documented and monitored to determine their impact on both the target alien species and native biodiversity. [*This recommendation can be carried out simultaneously with Recommendation 6.6.2.(a) above, because areas where an alien species has been removed or suppressed would provide an excellent „experimental control“ for understanding the impact of aliens on native species*].
- c) **Research and test techniques for reforestation and enhancement planting of natural forests.** Research the methods used by existing forest restoration projects, particularly those elsewhere within the Caribbean for Deciduous Seasonal Forests (e.g. at USDA Forest Service’s International Institute of Tropical Forestry in Puerto Rico), Semi-evergreen Seasonal Forests and Mangroves. Identify pilot areas that lack forest cover (reforestation) or have young secondary forest with reduced diversity (enhancement planting), propagate or translocate seedlings for the desired site, and monitor the survival of the indigenous trees and other native plants afterwards.

6.6.3. Monitor selected populations and forest habitats to evaluate and guide management decisions

Monitoring is the long-term systematic repetition of a specific resource survey and analysis to predict or detect natural and human-induced changes in resource conditions and to determine if management objectives are being met. It differs from other surveys by emphasising repeated and replicable measurements over a long period, and focuses on rates and magnitudes of change. The value of monitoring increases with number of samples and with time, and monitoring over many years or decades is especially important to distinguish major trends and changes from unimportant short-term fluctuations. Saint Lucia is obliged to monitor its biodiversity, especially species of conservation concern or species with potential for sustainable use, under Article 7 (Identification and Monitoring) of the Convention of Biological Diversity.

1. **Incorporate monitoring into all forest and wildlife management actions**, including the protection and recovery of threatened species (monitor target native species and threats), management of species that are harvested (monitor wild population, offtake and the compliance of collectors and hunters with regulations), invasive species control (monitor changes in populations of target aliens and on native species), silviculture (monitor population of target trees and forest regeneration), and education and awareness (monitor the attitudes, knowledge and behaviour of the target audience). Monitoring need not be complicated or time-consuming, but must be carried out in a careful and consistent manner. The methods should be written up and the data filed centrally. A recommended approach to monitoring is the Pressure-State-Response framework which records not only the condition of biodiversity (State), but also the threats to it (Pressure) and action taken to counter negative effects (Responses). For example, in the management of lansen resin, the Pressure indicators could include the number of people that harvest the resin on the Forest Reserve and the quantity collected and sold every year; the State indicators could include the health and population size of the lansen trees (*Protium attenuatum*) in harvested areas, and the Response indicators could include the number of permits issued, the frequency of patrols, and extension activities with resin tappers.
2. **Monitor forest cover and condition nationwide using appropriate indicators.** A coherent monitoring strategy should be developed and incorporated into the forest site management plans proposed under section 6. As an absolute minimum, Saint Lucia Forestry Department should endeavour to: Monitor national forest cover at least every five years: the vegetation map shown in **Figure 1** should be completed before the end of 2009 and revised every five years to measure net changes in each major vegetation class. Particular attention should be paid to documenting net changes in forest cover in the Forest Reserves and other protected areas, the areas of Elfin Shrublands and Cloud Montane Forests (which are vulnerable to climate change), possible losses of Deciduous Seasonal Forests and other coastal forests to development, and the regeneration of Semi-evergreen Seasonal Forests on abandoned farmland. Satellite images can be a useful tool to measure large scale changes in forest cover, with the caveat that the most recent images tend to be the most expensive to purchase. Identify and develop monitoring programmes for selected indicator species: A small number of species or, preferably, groups of species should be systematically monitored as indicators of forest ecosystem health. Staff and visiting scientists may prefer their pet subjects, but the best indicators are sensitive to moderate changes in forest condition and can be studied easily, systematically and replicably. Among the most commonly used „indicator groups“ in forests are birds, whose diversity and relative abundance can be monitored relatively easily e.g. using point counts by skilled observers in a fixed number of sites every year. (The point count methods and sites used by Toussaint *et al.* 2009 could be used as the basis for this). Tennent (2009) recommends replicating the timber inventory every five years, which would be a very thorough, if labour-intensive, means of monitoring native and alien trees in the Forest Reserve. Decide whether to establish permanent forest monitoring plots. Many monitoring programmes in tropical forests have established permanent vegetation plots, whereby all trees above a certain size are identified to species and measured regularly, usually every five or ten years. This can generate accurate and useful data, but it can take decades to detect important changes, and the management team may itself change or lose interest during that time. Consequently, most such long-term monitoring schemes become abandoned after only a few repeats. If the Forestry Department is seriously interested in establishing permanent plots, the Center for Tropical Forest Science (www.ctfs.si.edu) operates a global scheme for standardized,

long-term, large-scale forest monitoring plots known as “Forest Dynamics Plots”, in which all trees greater than 1cm at diameter breast height are measured, tagged, identified, and monitored through time over a large area (typically 50 hectares). Data from Saint Lucia could then feed directly into the Center’s important global study of forest changes.

6.7. EDUCATION AND AWARENESS

Objective 7: Strengthen local and national understanding and support for forest biodiversity conservation, with special attention to the lesser-known forest types

Below are a small number of suggestions. Education and raising awareness will be critical to the success of many of the recommendations above, however, and the target audience, key messages and the best means of communication should be carefully considered according to each management action being taken. For example, private land owners and developers ought to be notified of any changes in the regulations concerning forests on private land (Recommendation 6.3.2.), while operations to eradicate alien species should be openly discussed with local communities to ensure they understand and support the action (Recommendation 6.4.1). Many of the other technical reports produced by this project have identified species and themes for which greater awareness needs to be raised.

6.7.1. Increase public interest in and awareness of Saint Lucia’s forest diversity, especially under-appreciated forest types

- a) **Develop an awareness programme to increase public knowledge of the diversity and services of Saint Lucia’s forests**, with particular attention to threatened and underrated forest types. This programme need not entail an expensive campaign, but can make opportunistic use of existing resources (e.g. Union Zoo, hiking trails) and connections to the media. To support this: Build up a toolkit of information, images and other materials that Forestry staff, collaborating organisations and the media can use to obtain and pass on information about Saint Lucia’s forest types and their biodiversity. This toolkit should include illustrated fact sheets on each forest type (see Graveson 2009a) and key species (the species profiles in Morton 2009a, Daltry, 2009, Graveson, 2009b, and other reports could be a basis for these), powerpoints, photographs and video images. Encourage local media to run features on forests, focusing especially on the Deciduous Seasonal Forests and species that are threatened and endemic. Work with the Ministry of Tourism and other stakeholders to address the natural curiosity of many tourists in Saint Lucia’s wildlife, including labelled images of native species on brochures and promotional materials, and establishing hiking trails in different forest types. Engage local students and other members of the public in research activities wherever possible, including interviews, population surveys and monitoring. Encourage the Ministry of Education to incorporate forest habitats and forest wildlife into the school curriculum, and support forest fieldtrips for schools and student projects. Supplying storyline content to OECS regional radio and possibly television) soap opera on environmental issues (contact: Alleyne Regis, Population Media Center).

6.7.2. Heighten understanding of the impact of alien invasive species upon forests and forest biodiversity

- a) **Educate the public and decision-makers about alien invasive species and the impacts they have**, drawing on examples from Saint Lucia and similar island nations. This theme could be incorporated into environmental education in schools, as well as through media articles, posters, public talks, etc. Particular attention should be paid to educating customs officials, port authority personnel (who form the frontline in controlling alien introductions) and landscape gardeners (who may be inclined to introduce invasive ornamentals).

6.7.3. Develop identification guides to Saint Lucian animals and plants

- a) **Produce a series of published and/or online identification guides to native and alien animals and plants**, to enable Department staff, EIA consultancy staff, students, tourists and other interested groups to identify them more accurately. Excellent guides to Saint Lucia's birds already exist (e.g. Raffaele *et al.* 1998; Toussaint, 2009), but there is an obvious gap for more accessible (illustrated) guides to Saint Lucia's flora, mammals, reptiles and amphibians, and butterflies and other major invertebrates (Hunt & Mitchell, 1979, is relevant but out of print). The production of good guides should be encouraged and facilitated by the Forestry Department as part of its education remit, but may require the input of external academics or amateur naturalists with the knowledge, time and resources to devote to this task.

6.8. CIVIL SOCIETY

Objective 8: Foster the development of a civil society organisation(s) as a tool for lobbying for and enhancing the conservation of forests and their biodiversity

6.8.1. Facilitate the creation of a Saint Lucian Non-Governmental Organisation for naturalists and environmentalists

- a) **Actively encourage and support interested individuals to form at least one group dedicated to environmental conservation.** The precise remit, nature, size and structure of the group will depend on the individuals concerned, but the most urgent niche is for a politically independent advocacy body that can lobby vigorously against destructive developments of Saint Lucia's forests. While the Saint Lucia Forestry Department cannot formally establish a civilian organisation, its staff could play a key role in identifying suitable founders and members, and provide information and advice. For guidance on setting up and running a non-governmental organisation, see www.ngomanager.org

6.9. CAPACITY BUILDING

Objective 9: Ensure the Saint Lucia Forestry Department and other groups responsible for forest management have the necessary skills, resources and information to manage forest biodiversity effectively

6.9.1. Identify and deliver the training and resource needs of the groups and individuals responsible

- a) **All site and species management or action plans should list the resources required to implement them effectively**, including the number of personnel and the specific skills they will need, equipment, operational funding, and any assistance required from other departments or agencies. It is important to be realistic about the resources that are likely to be available, and prioritise activities that are feasible and will have the greatest positive impact.
- b) **Conduct a skills audit and training needs analysis every two years to pinpoint which personnel require skills in which fields.** A standard form for assessing skills is shown in **Annex III**, but this can be tailored to include more specific tasks. This audit should be carried out in the context of the individual's job description because some members of the Forestry Department have more responsibility for biodiversity research and management than others. If this skills assessment is repeated at regular intervals, it can be used to monitor the progress of each staff member and the department as a whole in acquiring new skills. Other agencies involved in environmental management on Saint Lucia, e.g. the National Trust, may also find this approach useful for identifying and monitoring their staff training needs.
- c) **Provide training, mentoring and materials according to the needs identified.** The cost of additional materials or vocational training should be incorporated into the institutional budget or may need to be obtained through external funding proposals, e.g. Rufford Small Grants for Nature Conservation (www.ruffordsmallgrants.org). An excellent source of free equipment for conservation activities is IdeaWild (www.ideawild.org).

Training should be directed at the people who both need it and will be able to apply it as part of their work. The Wildlife Unit staff are the obvious focus for both giving and receiving advanced training on wildlife management and probably ought to be expanded to handle the large and growing number of demands on their time (including alien invasive species control). However, *all* field personnel should acquire at least the basic skills to assist the unit with certain wildlife management activities, especially gathering monitoring data and recording unusual observations. Even the most illiterate range workers can contribute towards basic monitoring if they are coached in the use of standardized forms that use pictures and symbols rather than text. Outside of the Forestry Department, other groups likely to require training and support include the customs officials and port authority (these forming frontline in alien species control), Development Control Authority, police (law enforcement), the National Trust, hunters and harvesters or forest animals and plants, Environmental Impact Assessment companies, and certain private land owners and developers.

For training needs that cannot be addressed internally (i.e. by more experienced staff training their less experienced colleagues), a number of international organisations may also be able to

arrange free or subsidized training on Saint Lucia or overseas, including Durrell Wildlife Conservation Trust (contact Matthew Morton, matthew.morton[AT]durrell.org), Fauna & Flora International (contact the author, jenny.daltry[AT]fauna-flora.org), The Nature Conservancy, and US Fish and Wildlife Service.

6.9.2 Improve the flow and management of information to support decision-making

- a) **Enhance the flow and management of information between Union and the range offices and other stakeholders.** Staff in the range offices, visiting researchers, hunters and other field-based stakeholders represent an enormous number of eyes and ears to monitor the status and threats to Saint Lucia's forest biodiversity and, importantly, detect unexpected changes (e.g. the appearance of new alien species). The Wildlife Unit should serve as the clearing house for submitted information, but ought to provide clear guidelines on what information is required, work with the GIS unit to develop databases and maps to manage incoming data, and provide feedback to contributors to encourage them to continue submitting important observations. This would greatly enhance Saint Lucia's ability to plan and monitor its management of forest biodiversity.

7. References

Below are the main references cited in this report. Much of the information in this report has been extracted from other technical reports produced by this project (notably Clarke, 2009; Daltry, 2009; van Eynde, 2009; Morton, 2009a, 2009b; Graveson, 2009a, 2009b; Toussaint et al., 2009; and Tennent, 2009), however. Readers are strongly advised to look at these for further useful references.

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Annex I Species Checklists

Table A Seed Plants (Angiosperms and Gymnosperms) of Saint Lucia

Table B Ferns and their allies (Pteridophytes) of Saint Lucia

Table C Beetles of Saint Lucia

Table D Flies of Saint Lucia

Table E Dragonflies of Saint Lucia

Table G Reptiles and Amphibians of Saint Lucia

Table H Birds of Saint Lucia (excluding vagrant records)

Table I Mammals of Saint Lucia

Explanation of Status

In the columns headed „Status“, the species (or subspecies) have been assigned to one of the following categories according to their status in Saint Lucia:-

- Alien: not native to Saint Lucia i.e. introduced by humans through direct or indirect means.
- Saint Lucia endemic: a native species naturally occurring only on Saint Lucia.
- Lesser Antillean endemic: a native species naturally occurring only in the Lesser Antilles. It should be taken as read that the Saint Lucia endemics also belong to this category.
- Caribbean endemic: a native species naturally occurring only in the West Indies. The Lesser Antillean and Saint Lucia endemics also belong to this category.
- Wide range: the species is known or suspected to have a very large distribution range that extends into North or South America, often including many other Caribbean islands. It is presumed to be native to Saint Lucia. (Note that „wide range“ does not necessarily mean the species is common or widely distributed within Saint Lucia itself).
- ?: Natural range unknown. This category chiefly applies to species that have not been fully identified yet.

Table A Seed Plants (Angiosperms and Gymnosperms) of Saint Lucia

* Species not collected since 1930s. Data from Graveson (2009a).

Scientific name	Common names	Status	Scientific name	Common names	Status
Acanthaceae			<i>Celosia argentea</i>	Cockscomb.	Alien
<i>Asystasia gangetica</i>	Chinese Violet.	Alien	<i>Celosia argentea</i>		Alien
<i>Avicennia germinans</i>	Manng Salé. Black Mangrove.	Wide range	<i>Cyathula prostrata</i>		Alien
<i>Avicennia schaueriana</i>	Manng Salé. Black Mangrove.	Wide range	<i>Dysphania ambrosioides</i>	Semen Contwé.	Alien
<i>Barleria lupulina</i>	Hophead Philippine Violet.	Alien	<i>Gomphrena serrata</i>		Wide range
<i>Blechum pyramidatum</i>	Zo Nwè. Fonn San.	Wide range	<i>*Iresine angustifolia</i>		Wide range
<i>Dicliptera martinicensis</i>		Caribbean endemic	<i>Iresine diffusa</i>		Wide range
<i>Hemigraphis alternata</i>	Red Flame Ivy.	Wide range	<i>Lithophila muscoides</i>		Wide range
<i>Justicia pectoralis</i>	Chapantyé.	Wide range	<i>Microtea debilis</i>	Alatoukay.	Wide range
<i>Justicia periplocifolia</i>		Caribbean endemic	Amaryllidaceae		
<i>Justicia secunda</i>	St. John's Bush.	Wide range	<i>Crinum asiaticum</i>	Poison Bulb.	Alien
<i>*Justicia carthaginensis</i>		Wide range	<i>Crinum bulbispermum</i>		Alien
<i>Odontonema cuspidatum</i>	Firespike.	Alien	<i>Crinum zeylanicum</i>		Alien
<i>Odontonema nitidum</i>	Chapantyé Gwan Bwa.	Caribbean endemic	<i>Eucharis amazonica</i>		Alien
<i>Ruellia tuberosa</i>	Ti Patat.	Wide range	<i>Hippeastrum puniceum</i>	Easter Lily.	Alien
<i>Ruellia tweediana</i>	Mexican Petunia.	Alien	<i>Hymenocallis caribaea</i>	Lonyon Gli. Spider Lily.	Caribbean endemic
<i>Teliostachya alopecuroidea</i>		Wide range	<i>Zephyranthes citrina</i>	Rain Lily.	Alien
<i>Thunbergia alata</i>	Black-Eyed Susan Vine.	Alien	Anacardiaceae		
<i>Thunbergia fragrans</i>		Alien	<i>Anacardium occidentale</i>	Pomn Acajou. Nwa. Cashew.	Alien
<i>Thunbergia grandiflora</i>	Trumpet Vine.	Alien	<i>Comocladia dodonaea</i>	Bwa Di Hou.	Caribbean endemic
Agavaceae			<i>Mangifera indica</i>	Mango.	Alien
<i>Agave caribaicola</i>	Lang Béf. Lapit Century Plant.	Less. Ant. endemic	<i>Spondias mombin</i>	Mouben. Hog Plum.	Alien
<i>Furcraea tuberosa</i>		Caribbean endemic	Annonaceae		
<i>Yucca aloifolia</i>	Spanish Bayonet.	Alien	<i>Annona glabra</i>	Fey) Manmà. Kajouka. Manjé Kwab.	Wide range
Aizoaceae			<i>Annona montana</i>	Kachiman.	Wide range
<i>Sesuvium portulacastrum</i>		Wide range	<i>Annona muricata</i>	Kòsòl. Soursop.	Alien
<i>Trianthema portulacastrum</i>		Wide range	<i>Annona reticulata</i>	Kachiman Blan. Custard Apple.	Alien
Amaranthaceae			<i>Annona squamosa</i>	Pomn Kannél. Sugar Apple.	Alien
<i>Achyranthes aspera</i>	Man-Better-Man.	Wide range	<i>Cananga odorata</i>	Ylang-Ylang.	Alien
<i>Alternanthera brasiliiana</i>		Alien	<i>Guatteria caribaea</i>	Kòsòl Mawon. Ti Kachiman Bwa.	Caribbean endemic
<i>Alternanthera flavescens</i>		Alien	<i>Oxandra laurifolia</i>		Caribbean endemic
<i>Alternanthera olivacea</i>		Caribbean endemic	Apiaceae		
<i>Alternanthera paronychioides</i>		Wide range	<i>Eryngium foetidum</i>	Chadon Beni.	Wide range
<i>Alternanthera sessilis</i>		Wide range	<i>Hydrocotyle verticillata</i>	Pawasol Djab. Pawasol Demou.	Wide range
<i>Alternanthera tenella</i>		Wide range	Apocynaceae		
<i>Amaranthus blitum</i>		Alien	<i>Allamanda cathartica</i>	Yellow Allamanda.	Alien
<i>Amaranthus cruentus</i>	(Red, Purple) Amaranth.	Alien	<i>Asclepias curassavica</i>	Kòtòn Kadwiv. Milk Weed.	Alien
<i>Amaranthus dubius</i>	Zèpina Blan.	Wide range	<i>Catharanthus roseus</i>	Kaka Poul. Periwinkle.	Alien
<i>Amaranthus hybridus</i>	Zèpina.	Alien	<i>Cryptostegia madagascariensis</i>	Lèt Makak. Zong Makak.	Alien
<i>Amaranthus spinosus</i>		Wide range	<i>Gonolobus iyanolensis</i>		St. Lucia endemic
<i>Amaranthus viridis</i>		Wide range	<i>Marsdenia macrophylla</i>		Wide range
<i>Blutaparon vermiculare</i>		Wide range	<i>Matelea maritima</i>		Wide range

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Scientific name	Common names	Status	Scientific name	Common names	Status
<i>Metastelma parviflorum</i>			<i>Geonoma interrupta</i>	Goglèt.	Less. Ant. endemic
<i>Nerium oleander</i>	Lowyé Wouj. Oleander.	Alien	<i>Prestoea acuminata</i>	Palmis.	Caribbean endemic
<i>Plumeria alba</i>	Frangipani.	Caribbean endemic	<i>Ptychosperma macarthurii</i>	Macarthur Palm.	Alien
<i>Rauvolfia viridis</i>	Bwa Let.	Wide range	<i>Roystonea oleracea</i>	Royal Palm.	Alien
<i>Rhabdadenia biflora</i>		Wide range	<i>Sabal causiarum</i>	Puerta Rican Hat Palm.	Alien
<i>Tabernaemontana citrifolia</i>	Bwa Let.	Wide range	<i>Sabal mauritiiformis</i>		Alien
<i>Thevetia peruviana</i>	Yellow Oleander.	Alien	<i>Syagrus amara</i>	Gwou-Gwou.	Less. Ant. endemic
<i>Ilex macfadyenii</i>		Caribbean endemic	Aristolochiaceae		
<i>Ilex nitida</i>		Wide range	<i>Aristolochia trilobata</i>	Twef.	Wide range
<i>Ilex sideroxyloides</i>	Ti Siton.	Caribbean endemic	Asteraceae		
Araceae			<i>Acmella uliginosa</i>		Wide range
<i>Alocasia cucullata</i>	'Pot Plant'.	Alien	<i>Ageratum conyzoides</i>	Zèb A Mouton. Labonn Fanm. Latifi.	Wide range
<i>Alocasia macrorrhizos</i>	Malanga. Giant (Upright) Tayo.	Alien	<i>Ambrosia hispida</i>		Alien
<i>Anthurium cordatum</i>	Sidjinn.	Caribbean endemic	<i>Baccharis pedunculata</i>		Wide range
<i>Anthurium cordatum x hookeri</i>	Sidjinn.	Wide range	<i>Bidens alba</i>		Wide range
<i>Anthurium grandifolium</i>	Sidjinn.	Caribbean endemic	<i>Bidens cynapiifolia</i>	Zèb A Zédjwi.	Wide range
<i>Anthurium guildingii</i>	Sidjinn.	Less. Ant. endemic	<i>Bidens pilosa</i>	Zèb A Zédjwi.	Wide range
<i>Anthurium hookeri</i>	Sidjinn.	Wide range	<i>Bidens reptans</i>		Wide range
<i>Anthurium palmatum</i>	Sidjinn.	Less. Ant. endemic	<i>Centratherum punctatum</i>	Magéwit.	Wide range
<i>Anthurium willdenowii</i>		No recent collection	<i>Chaptalia nutans</i>	Fèy Do Blan.	Wide range
<i>Caladium bicolor</i>	Koko Shak.	Alien	<i>Chromolaena trigonocarpa</i>		Less. Ant. endemic
<i>Colocasia esculenta</i>	Dasheen. Dasheen Chou. Dasheen Wouj. Dasheen Blan Danma. Kalalou.	Alien	<i>Chromolaena odorata</i>		Wide range
			<i>Clibadium erosum</i>		Wide range
<i>Dieffenbachia seguine</i>	Kann Wivyé. Kann Bwilé. Dumbcane.	Wide range	<i>Condylidium iresinoides</i>		Wide range
			<i>Conyza bonariensis</i>		Wide range
<i>Epipremnum pinnatum</i>	Golden Pothos.	Alien	<i>Conyza canadensis</i>		Alien
<i>Landoltia punctata</i>	Duckweed.	Wide range	<i>Conyza laevigata</i>		Wide range
<i>Monstera adansonii</i>		Wide range	<i>Cosmos sulphureus</i>		Alien
<i>Montrichardia arborescens</i>		Wide range	<i>Critonia macropoda</i>		Less. Ant. endemic
<i>Philodendron consanguineum</i>		Wide range	<i>Eclipta prostrata</i>	Konngolala.	Wide range
<i>Philodendron lingulatum</i>		Alien	<i>Egletes commixta</i>		Wide range
<i>Philodendron scandens</i>		Caribbean endemic	<i>Egletes prostrata</i>		Wide range
<i>Pistia stratiotes</i>	Chapo Ma. Water Lettuce.	Alien	<i>Elephantopus mollis</i>	Tèt Nèg.	Wide range
<i>Syngonium podophyllum</i>	Arrowhead Vine.	Alien	<i>Eleutheranthera ruderalis</i>		Wide range
<i>Typhonium trilobatum</i>		Alien	<i>Emilia fosbergii</i>		Wide range
<i>Xanthosoma sagittifolium</i>	Tayo. Tannia.	Alien	<i>Emilia sonchifolia</i>		Alien
<i>Xanthosoma violaceum</i>	Chou Jamaik. Chou Blan. Chou Bouton. Purple-Stem Tannia.	Alien	<i>Epaltes brasiliensis</i>	Kamami.	Wide range
			<i>Erechtites hieraciifolius</i>		Wide range
Araliaceae			<i>Erigeron karvinskianus</i>		Alien
<i>Oreopanax capitatus</i>	Fijé Sek.	Wide range	<i>Fleischmannia microstemon</i>		Wide range
<i>Schefflera attenuata</i>	Fijé Di Mòn.	Less. Ant. endemic	<i>Hebeclinium macrophyllum</i>		Wide range
Arecaceae			<i>Koanophyllon celtidifolia</i>	Bwa Flambo.	Wide range
<i>Acrocomia aculeata</i>	Ti Koko.	Wide range	<i>Lagascea mollis</i>		Wide range
<i>Aiphanes minima</i>	Gwigwi.	Caribbean endemic	<i>Melanthera nivea</i>		Wide range
<i>Coccothrinax barbadensis</i>	Latanyé.	Caribbean endemic	<i>Mikania cordifolia</i>		Wide range
<i>Cocos nucifera</i>	Koko. Coconut.	Wide range	<i>Mikania micrantha</i>	Kacho.	Wide range
			<i>Mikania latifolia</i>		Less. Ant. endemic

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Scientific name	Common names	Status	Scientific name	Common names	Status
<i>Neurolaena lobata</i>	Zèb A Pik.	Wide range	Boraginaceae		
<i>Parthenium hysterophorus</i>	Matnitjen.	Wide range	<i>Bourreria succulenta</i>		Wide range
<i>Pectis ciliaris</i>		Wide range	<i>Cordia alliodora</i>	Sip.	Wide range
<i>Pectis elongata</i>	Sitonnèl.	Wide range	<i>Cordia collococca</i>	Sip.	Wide range
<i>Pectis humifusa</i>		Caribbean endemic	<i>Cordia curassavica</i>	Maho Nwè.	Wide range
<i>Pluchea carolinensis</i>	Tabak Djab.	Wide range	* <i>Cordia globosa</i>		Wide range
* <i>Pluchea odorata</i>		Wide range	<i>Cordia martinicensis</i>	Maho Nwè.	Less. Ant. endemic
<i>Porophyllum ruderale</i>		Wide range	<i>Cordia nesophila</i>	Maho Nwè.	Less. Ant. endemic
<i>Pseudelephantopus spicatus</i>	Tèt Nèg.	Wide range	<i>Cordia obliqua</i>	Glue.	Alien
<i>Pseudelephantopus spiralis</i>	Tèt Nèg.	Wide range	* <i>Cordia polycephala</i>		
<i>Rolandra fruticosa</i>	Tèt Nèg.	Wide range	<i>Cordia reticulata</i>	Sip.	Less. Ant. endemic
<i>Sonchus oleraceus</i>		Alien	<i>Cordia sebestena</i>		Alien
<i>Sphagneticola trilobata</i>	Venvenn Kawayib.	Wide range	<i>Cordia sulcata</i>	Sip Blan.	Wide range
<i>Spilanthes urens</i>		Wide range	<i>Heliotropium angiospermum</i>	Kwèp Kodenn.	Wide range
<i>Struchium sparganophorum</i>		Wide range	<i>Heliotropium curassavicum</i>		Wide range
<i>Synedrella nodiflora</i>		Wide range	<i>Heliotropium indicum</i>		Wide range
<i>Tithonia diversifolia</i>		Alien	<i>Heliotropium ternatum</i>		Wide range
<i>Tithonia rotundifolia</i>		Alien	<i>Tournefortia bicolor</i>		Wide range
<i>Tridax procumbens</i>		Wide range	<i>Tournefortia filiflora</i>		Caribbean endemic
<i>Verbesina gigantea</i>		Wide range	<i>Tournefortia volubilis</i>		Wide range
<i>Vernonia arborescens</i>		Wide range	Brassicaceae		
<i>Vernonia cinerea</i>		Alien	<i>Cardamine flexuosa</i>		Alien
<i>Wedelia calycina</i>	Bwa Sousouwi. Bwa Sòlèy.	Wide range	<i>Lepidium virginicum</i>		Alien
* <i>Wulffia baccata</i>		Wide range	<i>Nasturtium officinale</i>	Kouso. Water Cress.	Alien
<i>Zinnia elegans</i>		Alien	Bromeliaceae		
Balanophoraceae			<i>Aechmea lingulata</i>	Kawata.	Wide range
<i>Helosis cayennensis</i>		Wide range	<i>Aechmea smithiorum</i>	Kawata.	Less. Ant. endemic
Balsaminaceae			<i>Billbergia pyramidalis</i>		Alien
<i>Impatiens balsamina</i>	Busy Lizzie.	Alien	<i>Bromelia karatas</i>	Kawata.	
<i>Impatiens walleriana</i>	Busy Lizzie.	Alien	<i>Catopsis floribunda</i>	Kawata.	Wide range
Basellaceae			<i>Guzmania lingulata</i>	Kawata.	Wide range
<i>Anredera leptostachys</i>	Djéwi Tout.	Wide range	<i>Guzmania megastachya</i>	Kawata.	Caribbean endemic
<i>Basella alba</i>	Zèpina. Spinach.	Alien	<i>Guzmania plumieri</i>	Kawata.	Less. Ant. endemic
Begoniaceae			<i>Pitcairnia angustifolia</i>	Kawata.	Caribbean endemic
<i>Begonia humilis</i>		Wide range	<i>Tillandsia fasciculata</i>	Kawata.	Wide range
<i>Begonia vincentiana</i>	Bread and Cheese.	Less. Ant. endemic	<i>Tillandsia polystachya</i>	Kawata.	Wide range
Bignoniaceae			<i>Tillandsia recurvata</i>		Wide range
<i>Amphilophium paniculatum</i>		Wide range	<i>Tillandsia tenuifolia</i>		Wide range
<i>Crescentia cujete</i>	Kalbas.	Wide range	<i>Tillandsia usneoides</i>		Wide range
<i>Cydista aequinoctialis</i>		Wide range	<i>Tillandsia utriculata</i>	Kawata.	Wide range
<i>Macfadyena uncata</i>		Wide range	<i>Vriesea antillana</i>		Less. Ant. endemic
<i>Macfadyena unguis-cati</i>		Wide range	<i>Werauhia ringens</i>	Kawata.	Wide range
<i>Spathodea campanulata</i>	African Tulip Tree.	Alien	Burmanniaceae		
<i>Tabebuia heterophylla</i>	Pòwyé. White Cedar.	Wide range	<i>Gymnosiphon niveus</i>		Caribbean endemic
<i>Tabebuia pallida</i>	Pòwyé. White Cedar.	Less. Ant. endemic	Burseraceae		
<i>Tanaecium crucigerum</i>		Wide range	<i>Bursera simaruba</i>	Gonmyé Modi.	Wide range
<i>Tecoma stans</i>		Alien	<i>Dacryodes excelsa</i>	Gonmyé.	Caribbean endemic

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<i>Protium attenuatum</i>	Lansan.	Less. Ant. endemic	<i>Licania leucosepala</i>		Wide range
Cactaceae			<i>Licania ternatensis</i>	Bwa Dimas.	Less. Ant. endemic
<i>Acanthocereus tetragonus</i>	Tèt Anglés.	Wide range	Cleomaceae		
<i>Melocactus intortus</i>		Caribbean endemic	<i>Cleome aculeata</i>		Alien
<i>Opuntia dillenii</i>	Watjèt.	Wide range	<i>Cleome gynandra</i>		Alien
<i>Opuntia triacanthos</i>		Caribbean endemic	<i>Cleome rutidosperma</i>		Alien
<i>Pereskia aculeata</i>	Barbados Gooseberry.	Wide range	<i>Cleome spinosa</i>	Tamadoz Mawon.	Wide range
<i>Pilosocereus royenii</i>		Wide range	<i>Cleome viscosa</i>		Alien
<i>Rhipsalis baccifera</i>		Wide range	<i>Cleome aculeata</i>		Wide range
Campanulaceae			Clusiaceae		
<i>Centropogon berterianus</i>		Less. Ant. endemic	<i>Calophyllum antillanum</i>	Galba.	Caribbean endemic
<i>Hippobroma longiflora</i>		Alien	<i>Chrysochlamys caribaea</i>	Bwa Mang. Palitivyé Wouj.	St. Lucia endemic
<i>Lobelia cirsiifolia</i>		Less. Ant. endemic	<i>Clusia major</i>	Awali.	Less. Ant. endemic
<i>Lobelia cliffortiana</i>		Wide range	<i>Clusia plukenettii</i>	Awali.	Less. Ant. endemic
<i>Lobelia santa-Luciae</i>		St. Lucia endemic	<i>Marila racemosa</i>	Bwa Pwa.	Less. Ant. endemic
Canellaceae			<i>*Symphonia globulifera</i>		Wide range
<i>Canella winterana</i>	Bwa Kannèl.	Wide range	<i>Tovomita plumieri</i>	Palitivyé Jòn.	Less. Ant. endemic
Cannaceae			Colchicaceae		
<i>Canna indica</i>	Toloman.	Alien	<i>Gloriosa superba</i>		Alien
<i>Canna glauca</i>		Wide range	Combretaceae		
Capparaceae			<i>Buchenavia tetraphylla</i>	Zolivyé.	Wide range
<i>Capparis baducca</i>		Wide range	<i>Conocarpus erectus</i>	Paltivyé Wouj.	Wide range
<i>Capparis cynophallophora</i>	Black Willow.	Wide range	<i>Laguncularia racemosa</i>	Manng Blan. Paltivyé.	Wide range
<i>Capparis flexuosa</i>		Wide range	<i>Quisqualis indica</i>		Alien
<i>Capparis hastata</i>		Wide range	<i>Terminalia catappa</i>	Zamann. Almond.	Alien
<i>Capparis indica</i>	Bwa Puant.	Wide range	Commelinaceae		
<i>*Capparis odoratissima</i>		Less. Ant. endemic	<i>Callisia filiformis</i>		Wide range
<i>Morisonia americana</i>		Wide range	<i>Callisia fragrans</i>		Alien
Caricaceae			<i>Callisia repens</i>		Wide range
<i>Carica papaya</i>	Papay. Papaya.	Alien	<i>Commelina diffusa</i>	Zèb Gwa.	Wide range
Caryophyllaceae			<i>Commelina erecta</i>	Zèb Gwa.	Wide range
<i>Drymaria cordata</i>		Wide range	<i>Cyanotis cristata</i>		Alien
Celastraceae			<i>Gibasis geniculata</i>		Wide range
<i>Crossopetalum rhacoma</i>		Wide range	<i>Tradescantia pallida</i>		Alien
<i>Elaeodendron xylocarpum</i>		Wide range	<i>Tradescantia spathacea</i>	Moses-in-the-Cradle.	Alien
<i>Gyminda latifolia</i>		Wide range	<i>Tradescantia zebrina</i>		Alien
<i>Hippocratea volubilis</i>		Wide range	<i>Tripogandra serrulata</i>		Wide range
<i>Maytenus guyanensis</i>		Wide range	Connaraceae		
<i>Maytenus laevigata</i>		Caribbean endemic	<i>Rourea surinamensis</i>		Wide range
<i>Schaefferia frutescens</i>		Wide range	Convolvulaceae		
Chloranthaceae			<i>*Convolvulus nodiflorus</i>		Wide range
<i>Hedyosmum arborescens</i>		Wide range	<i>Cuscuta americana</i>	Lyenn San Pyè.	Wide range
Chrysobalanaceae			<i>Evolvulus antillanus</i>		Caribbean endemic
<i>Chrysobalanus cuspidatus</i>	Kaka Wat.	Less. Ant. endemic	<i>Evolvulus convolvuloides</i>		Wide range
<i>Chrysobalanus icaco</i>	Ponm Zikak. Fatpòk.	Wide range	<i>Evolvulus nummularius</i>		Wide range
<i>Hirtella pendula</i>	Pann Zòwèy. Zikak Fwans.	Less. Ant. endemic	<i>Ipomoea asarifolia</i>		Alien
<i>Hirtella triandra</i>		Wide range	<i>Ipomoea batatas</i>		Alien

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<i>Ipomoea cairica</i>		Alien	Cupressaceae		
<i>Ipomoea carnea</i>		Alien	<i>Juniperus barbadensis</i>	Pencil Cedar.	Less. Ant. endemic
<i>Ipomoea hederifolia</i>		Wide range	Cyclanthaceae		
<i>Ipomoea imperati</i>		Wide range	<i>Asplundia insignis</i>		Less. Ant. endemic
<i>Ipomoea nil</i>		Wide range	<i>Asplundia rigida</i>	Sidjinn.	Less. Ant. endemic
<i>Ipomoea obscura</i>		Wide range	<i>Cyclanthus bipartitus</i>		Wide range
<i>Ipomoea ochracea</i>		Alien	Cymodoceaceae		
<i>Ipomoea pes-caprae</i>	Patat Bòd Lanmè.	Wide range	<i>Syringodium filiforme</i>	Manatee Grass.	Wide range
<i>Ipomoea quamoclit</i>		Alien	Cyperaceae		
<i>Ipomoea repanda</i>		Caribbean endemic	<i>Abildgaardia ovata</i>		Wide range
<i>Ipomoea setifera</i>	Patat Mawon.	Wide range	<i>Bulbostylis antillana</i>		Caribbean endemic
<i>Ipomoea tiliacea</i>	Lyenn Dous.	Wide range	<i>Carex polystachya</i>		Wide range
* <i>Ipomoea triloba</i>		Caribbean endemic	* <i>Cladium jamaicense</i>		Wide range
<i>Ipomoea violacea</i>		Wide range	<i>Cyperus alopecuroides</i>		Wide range
<i>Ipomoea philomega</i>		Wide range	<i>Cyperus articulatus</i>	Gwenn Djiné.	Wide range
<i>Jacquemontia pentanthos</i>		Wide range	<i>Cyperus compressus</i>		Wide range
<i>Jacquemontia solanifolia</i>		Caribbean endemic	<i>Cyperus digitatus</i>		Wide range
<i>Merremia aegyptia</i>		Wide range	<i>Cyperus elegans</i>		Wide range
<i>Merremia dissecta</i>	Noyò.	Wide range	<i>Cyperus esculentus</i>		Wide range
<i>Merremia quinquefolia</i>		Wide range	* <i>Cyperus hermaphroditus</i>		Wide range
<i>Merremia tuberosa</i>		Alien	<i>Cyperus involucratus</i>		Alien
<i>Merremia umbellata</i>		Wide range	<i>Cyperus iria</i>		Alien
<i>Operculina hamiltonii</i>		Wide range	<i>Cyperus laxus</i>		Wide range
<i>Poranopsis paniculata</i>		Alien	<i>Cyperus ligularis</i>		Wide range
<i>Stictocardia tiliifolia</i>		Alien	<i>Cyperus luzulae</i>		Wide range
<i>Turbina corymbosa</i>		Alien	<i>Cyperus odoratus</i>		Wide range
Costaceae			<i>Cyperus planifolius</i>		Wide range
<i>Costus arabicus</i>		Wide range	<i>Cyperus polystachyos</i>		Wide range
<i>Costus scaber</i>		Alien	<i>Cyperus rotundus</i>		Wide range
<i>Costus speciosus</i>		Alien	<i>Cyperus sphacelatus</i>		Wide range
<i>Costus spicatus</i>		Alien	<i>Cyperus surinamensis</i>		Wide range
Crassulaceae			<i>Cyperus aggregatus</i>		Wide range
<i>Bryophyllum pinnatum</i>	Kawakté Lézòm. Leaf-Of-Life.	Alien	<i>Eleocharis flavescens</i>		Wide range
Cucurbitaceae			<i>Eleocharis geniculata</i>		Wide range
<i>Cayaponia americana</i>		Caribbean endemic	<i>Eleocharis interstincta</i>		Wide range
<i>Coccinia grandis</i>		Alien	<i>Eleocharis mutata</i>		Wide range
<i>Cucumis melo</i>	Ti Konkonm.	Alien	<i>Eleocharis retroflexa</i>		Wide range
<i>Cucumis anguria</i>	Ti Konkonm.	Alien	<i>Fimbristylis complanata</i>		Wide range
<i>Cucurbita moschata</i>	Jonmou. Pumpkin.	Alien	<i>Fimbristylis cymosa</i>		Wide range
<i>Lagenaria siceraria</i>	Gouj. Squash.	Alien	<i>Fimbristylis dichotoma</i>		Wide range
<i>Luffa aegyptiaca</i>	Tochon.	Alien	<i>Fimbristylis ferruginea</i>		Wide range
<i>Melothria pendula</i>	Konmonm Kouli.	Wide range	<i>Fimbristylis littoralis</i>		Alien
<i>Momordica charantia</i>	Konmonm Kouli.	Alien	<i>Fimbristylis quinqueangularis</i>		Alien
<i>Psiguria umbrosa</i>		Wide range	<i>Fuirena umbellata</i>		Wide range
<i>Sicydium tannifolium</i>		Wide range	<i>Kyllinga brevifolia</i>		Wide range
Cunoniaceae			<i>Kyllinga polyphylla</i>		Alien
<i>Weinmannia pinnata</i>	Tanmawen Montan.	Wide range	<i>Kyllinga pumila</i>		Wide range

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<i>Machaerina restioides</i>		Caribbean endemic	<i>Croton flavens</i>	Ti Bonm Koupayou.	Wide range
<i>Rhynchospora ciliata</i>		Wide range	<i>Croton guildingii</i>	Ti Bonm Wouj.	Wide range
<i>Rhynchospora contracta</i>		Wide range	<i>Croton hircinus</i>	Ti Bonm Lélé.	Wide range
<i>Rhynchospora holoschoenoides</i>		Wide range	* <i>Croton hirtus</i>		Wide range
<i>Rhynchospora longifolia</i>		Wide range	<i>Croton lobatus</i>		Wide range
<i>Rhynchospora marisculus</i>		Wide range	<i>Croton niveus</i>		Wide range
<i>Rhynchospora polyphylla</i>		Wide range	<i>Dalechampia scandens</i>		Wide range
<i>Rhynchospora radicans</i>		Wide range	<i>Euphorbia articulata</i>		Caribbean endemic
<i>Rhynchospora tenerrima</i>		Wide range	<i>Euphorbia cyathophora</i>		Alien
<i>Rhynchospora tenuis</i>		Wide range	<i>Euphorbia dussii</i>		Less. Ant. endemic
<i>Scleria latifolia</i>	Zèb A Kouto.	Wide range	<i>Euphorbia graminea</i>		Alien
<i>Scleria lithosperma</i>		Wide range	<i>Euphorbia heterophylla</i>		Wide range
<i>Scleria melaleuca</i>	Zèb A Kouto.	Wide range	<i>Euphorbia hirta</i>	Zeb Malnonmen.	Wide range
<i>Scleria microcarpa</i>	Zèb A Kouto.	Wide range	<i>Euphorbia hypericifolia</i>		Wide range
<i>Scleria mitis</i>	Zèb A Kouto.	Wide range	<i>Euphorbia hyssopifolia</i>		Wide range
<i>Scleria scindens</i>	Zèb A Kouto.	Wide range	<i>Euphorbia lasiocarpa</i>		Wide range
<i>Scleria secans</i>	Zèb A Kouto.	Wide range	<i>Euphorbia mesembrianthemifolia</i>		Wide range
Dichapetalaceae			<i>Euphorbia oerstediana</i>		Wide range
<i>Tapura latifolia</i>	Bwa Kôt Wouj.	Less. Ant. endemic	<i>Euphorbia ophthalmica</i>		Wide range
Dilleniaceae			<i>Euphorbia prostrata</i>		Wide range
<i>Pinzona coriacea</i>	Lyenn Chasè.	Wide range	<i>Euphorbia serpens</i>		Wide range
Dioscoraceae			<i>Euphorbia thymifolia</i>		Wide range
<i>Dioscorea alata</i>	Bandja.	Alien	<i>Euphorbia tithymaloides</i>		Alien
<i>Dioscorea altissima</i>		Wide range	<i>Gymnanthes hypoleuca</i>	Bwa Sadin.	Wide range
<i>Dioscorea polygonoides</i>	Yanm Matwiten Djab.	Wide range	<i>Hevea brasiliensis</i>	Rubber Tree.	Alien
Ebenaceae			<i>Hippomane mancinella</i>	Medsinnnyé Modi.	Wide range
<i>Diospyros revoluta</i>	Babawa.	Caribbean endemic	<i>Hura crepitans</i>		Alien
Elaeocarpaceae			<i>Jatropha gossypifolia</i>	Zèb Zòtòlan.	Wide range
<i>Sloanea dentata</i>		Less. Ant. endemic	<i>Jatropha integerrima</i>		Alien
<i>Sloanea caribaea</i>	Chatannyé.	Wide range	<i>Jatropha multifida</i>		Alien
Erythroxylaceae			<i>Plukenetia volubilis</i>		Wide range
<i>Erythroxylum havanense</i>	Bwa Vinet.	Wide range	* <i>Richeria grandis</i>		Caribbean endemic
<i>Erythroxylum squamatum</i>	Bwa Gwiv.	Wide range	<i>Ricinus communis</i>		Alien
Euphorbiaceae			<i>Sapium caribaeum</i>	Lagli.	Less. Ant. endemic
<i>Acalypha alopecuroides</i>		Wide range	<i>Tragia volubilis</i>		Wide range
<i>Acalypha arvensis</i>		Wide range	Fabaceae-Caesalpinioideae		
<i>Acalypha elizabethiae</i>		St. Lucia endemic	<i>Bauhinia monandra</i>		Alien
<i>Acalypha indica</i>		Alien	<i>Bauhinia multinervia</i>		Alien
<i>Acalypha poiretii</i>		Alien	<i>Caesalpinia bonduc</i>	Kannik.	Wide range
* <i>Actinostemon caribaeus</i>		Caribbean endemic	<i>Caesalpinia pulcherrima</i>	Flè Makata.	Alien
<i>Argythamnia polygama</i>		Wide range	<i>Chamaecrista glandulosa</i>	Ti Tanmawen.	Caribbean endemic
<i>Bernardia corensis</i>		Wide range	<i>Chamaecrista nictitans</i>		Wide range
<i>Bernardia laurentii</i>		St. Lucia endemic	* <i>Chamaecrista obcordata</i>		Caribbean endemic
<i>Caperonia palustris</i>		Wide range	* <i>Crudia glaberrima</i>		Wide range
* <i>Cnidocolus urens</i>		Wide range	<i>Delonix regia</i>	Flanboyan.	Alien
<i>Croton bixoides</i>	Ti Bonm Blan. Gwo Bonm.	Caribbean endemic	<i>Haematoxylum campechianum</i>	Kanpèch.	Wide range
<i>Croton corylifolius</i>		Wide range	<i>Hymenaea courbaril</i>	Koubawi. Stinking Toe Tree.	Wide range

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<i>Peltophorum pterocarpum</i>		Alien	<i>Desmodium tortuosum</i>		Wide range
<i>Senna alata</i>	Kasialata.	Alien	<i>Desmodium triflorum</i>		Wide range
<i>Senna bicapsularis</i>	Kaka Bétjé. Soumatjé.	Wide range	<i>Desmodium velutinum</i>		Alien
<i>Senna hirsuta</i>		Wide range	<i>Dussia martinicensis</i>	Ponmyé. Bwa Gamel.	Wide range
<i>Senna obtusifolia</i>	Soumatjé.	Wide range	<i>Erythrina fusca</i>	Mòtèl.	Alien
<i>Senna occidentalis</i>	Kafé Zèpyant.	Wide range	<i>Erythrina poeppigiana</i>	Mòtèl.	Alien
<i>Senna siamea</i>		Alien	<i>Erythrina corallodendron</i>	Mòtèl.	Wide range
<i>Senna sophera</i>		Wide range	<i>Flemingia strobilifera</i>	Zèb Sèk.	Alien
<i>Swartzia caribaea</i>	Kas. Miskad Mawon.	Less. Ant. endemic	<i>Galactia longiflora</i>		Less. Ant. endemic
<i>Tamarindus indica</i>	Tamarind.Tanmawen.	Alien	<i>Galactia rubra</i>		Less. Ant. endemic
Fabaceae-Faboideae			<i>Gliricidia sepium</i>	Glory Cedar.	Alien
<i>Abrus precatorius</i>	Gwenn Légliz.	Alien	<i>Indigofera hirsuta</i>		Alien
<i>Aeschynomene americana</i>		Wide range	<i>Indigofera suffruticosa</i>	La Indigo.	Wide range
<i>Aeschynomene evenia</i>		Wide range	<i>Indigofera tinctoria</i>	La Indigo.	Alien
<i>Aeschynomene sensitiva</i>		Wide range	<i>*Indigofera spicata</i>		Alien
<i>Aeschynomene viscidula</i>		Wide range	<i>Lablab purpureus</i>	Pwa Boukousou. Pwa Senm.	Alien
<i>Alysicarpus vaginalis</i>		Alien	<i>Lonchocarpus heptaphyllus</i>	Savonnèt Gwan Fey.	Wide range
<i>Andira sapindoides</i>		Less. Ant. endemic	<i>Lonchocarpus punctatus</i>	Ti Savonnèt.	Wide range
<i>Cajanus cajan</i>	Pwa Angòl. Pigeon Pea.	Alien	<i>Machaerium lunatum</i>		Wide range
<i>Calopogonium caeruleum</i>		Wide range	<i>Macroptilium atropurpureum</i>		Wide range
<i>Calopogonium mucunoides</i>	Pwa Blé.	Wide range	<i>Macroptilium lathyroides</i>		Wide range
<i>Canavalia campylocarpa</i>	Pwa Agoul.	Wide range	<i>Mucuna pruriens</i>	Pwa Gwaté. Gwenn Zyé Bouwik.	Alien
<i>Canavalia rosea</i>	Sea Bean.	Wide range	<i>Mucuna pruriens</i>	Kafé Gwo Bouwo. Kafé Mal Kochon.	Alien
<i>Centrosema plumieri</i>		Wide range	<i>Mucuna sloanei</i>	Pwa Gwat. Gwenn Zyé Bouwik.	Wide range
<i>Centrosema virginianum</i>		Wide range	<i>Mucuna urens</i>	Pwa Gwat. Gwenn Zyé Bouwik.	Wide range
<i>Centrosema pubescens</i>		Wide range	<i>Neonotonia wightii</i>		Alien
<i>Chaetocalyx scandens</i>		Wide range	<i>Ormosia monosperma</i>	Dédéfouden. Pwa Bwa Wawi.	Wide range
<i>Clitoria falcata</i>		Wide range		Gwenn Zyé Bouwik.	
<i>Clitoria ternatea</i>		Alien	<i>Pachyrhizus erosus</i>	Yam Bean.	Wide range
<i>Coursetia caribaea</i>		Wide range	<i>Phaseolus lunatus</i>	Pwa Chous. Pwa Senm. Lima Bean.	Alien
<i>Crotalaria incana</i>	Chakchak.	Wide range	<i>Piscidia carthagenensis</i>	Bwa Gulo.	Wide range
<i>Crotalaria lotifolia</i>	Chakchak.	Wide range	<i>Pterocarpus officinalis</i>	Swamp Redwood.	Wide range
<i>Crotalaria pallida</i>	Chakchak.	Alien	<i>Pueraria phaseoloides</i>	Kudzu.	Alien
<i>Crotalaria retusa</i>	Chakchak.	Wide range	<i>Rhynchosia minima</i>		Wide range
<i>Crotalaria spectabilis</i>	Chakchak.	Alien	<i>Rhynchosia phaseoloides</i>		Wide range
<i>*Crotalaria stipularia</i>		Wide range	<i>Sesbania sericea</i>		Alien
<i>Crotalaria zanzibarica</i>		Alien	<i>Sophora tomentosa</i>		Wide range
<i>Crotalaria verrucosa</i>		Alien	<i>Stylosanthes guianensis</i>		Alien
<i>Dalbergia ecastaphyllum</i>		Wide range	<i>Stylosanthes hamata</i>		Wide range
<i>Dalbergia monetaria</i>		Wide range	<i>Tephrosia cinerea</i>		Wide range
<i>Desmodium adscendens</i>		Wide range	<i>Tephrosia noctiflora</i>		Alien
<i>Desmodium axillare</i>		Wide range	<i>*Tephrosia candida</i>		Alien
<i>Desmodium barbatum</i>	Pistach Mawon.	Wide range	<i>Tephrosia senna</i>		Wide range
<i>Desmodium incanum</i>	Sweethearts.	Wide range	<i>Teramnus labialis</i>		Wide range
<i>Desmodium incanum</i>		Wide range	<i>Vigna hosei</i>	Ti Pwa Jòn.	Alien
<i>Desmodium procumbens</i>		Wide range	<i>Vigna luteola</i>	Pwa Zombi.	Wide range
<i>Desmodium scorpiurus</i>		Wide range	<i>Vigna unguiculata</i>		Alien

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<i>Zornia microphylla</i>		Caribbean endemic	<i>Limnobium laevigatum</i>		Wide range
Fabaceae-Mimosoideae			<i>Thalassia testudinum</i>	Turtle Grass.	Wide range
<i>Acacia nilotica</i>	Zakasya.	Alien	Hydrocharitaceae		
<i>Adenantha pavonina</i>	Dalmawi.	Alien	<i>Curculigo scorzonifolia</i>		Wide range
<i>Calliandra calothyrsus</i>		Alien	<i>Hypoxis decumbens</i>		Wide range
<i>Calliandra slaneae</i>	Minizyé. Myann Fwans.	Less. Ant. endemic	Iridaceae		
<i>Calliandra tergemina</i>	Bwa Patat. Bwa (Lyenn) Myan.	Wide range	<i>Eleutherine bulbosa</i>		Wide range
<i>*Calliandra purpurea</i>		(dubious id)	<i>Trimezia martinicensis</i>	Koko Chat.	Wide range
<i>Desmanthus virgatus</i>		Wide range	Lamiaceae		
<i>Entada polystachya</i>	Manyòk Chapèl.	Wide range	<i>Clerodendrum aculeatum</i>		Wide range
<i>Inga ingoides</i>	Kakoli.	Wide range	<i>Clerodendrum chinense</i>		Alien
<i>Inga laurina</i>	Pwa Dou.	Wide range	<i>Clerodendrum indicum</i>	Zèb A Lonng Kou.	Alien
<i>Leucaena leucocephala</i>		Alien	<i>Clerodendrum paniculatum</i>		Alien
<i>Mimosa camporum</i>		Wide range	<i>Clerodendrum x speciosum</i>		Alien
<i>Mimosa casta</i>	Kwòk Chyen.	Wide range	<i>Gmelina philippensis</i>		Alien
<i>Mimosa ceratonia</i>	Kwòk Chyen.	Wide range	<i>Hyptis atrorubens</i>		Wide range
<i>Mimosa debilis</i>		Wide range	<i>Hyptis capitata</i>		Wide range
<i>Mimosa pigra</i>		Alien	<i>Hyptis mutabilis</i>		Wide range
<i>Mimosa pudica</i>	Mari Hont. Ti Mari.	Wide range	<i>Hyptis pectinata</i>		Wide range
<i>Mimosa quadrivalvis</i>	Schrankia Leptocarpa De Candolle.	Wide range	<i>Hyptis suaveolens</i>		Wide range
<i>Neptunia plena</i>		Wide range	<i>Hyptis verticillata</i>		Wide range
<i>Pithecellobium jupunba</i>	Dalmawi.	Wide range	<i>Leonotis nepetifolia</i>	Gwo Ponpon.	Alien
<i>Pithecellobium unguis-cati</i>	Bebel.	Wide range	<i>Leonurus japonicus</i>		Alien
<i>Samanea saman</i>	Masav. Saman.	Alien	<i>*Leucas martinicensis</i>		Wide range
<i>Senegalia riparia</i>	Zanmouwèt.	Wide range	<i>Marsypianthes chamaedrys</i>	Konmonmi Mawon.	Wide range
<i>Senegalia tamarindifolia</i>		Wide range	<i>Ocimum basilicum</i>	Bazilik.	Alien
<i>Vachellia farnesiana</i>	Zakasya.	Wide range	<i>Ocimum campechianum</i>	Fonbwazen.	Wide range
<i>Vachellia macracantha</i>	Zakasya.	Wide range	<i>Ocimum gratissimum</i>	Bwa Gazon. (Mal) Fonbwazen.	Alien
Gentianaceae			<i>Plectranthus amboinicus</i>	Gwo Dite.	Wide range
<i>Enicostema verticillatum</i>	Lanng Poul.	Wide range	<i>Pogostemon cablin</i>	Patchouli.	Alien
<i>Voyria aphylla</i>		Wide range	<i>Salvia lamiifolia</i>		Less. Ant. endemic
<i>Voyria tenella</i>		Wide range	<i>Salvia micrantha</i>		Wide range
Gesneriaceae			<i>Salvia occidentalis</i>	Zo Kayal.	Wide range
<i>Alloplectus cristatus</i>		Wide range	<i>Scutellaria purpurascens</i>		Wide range
<i>Besleria filipes</i>		Less. Ant. endemic	<i>Solenostemon scutellarioides</i>	Coleus.	Alien
<i>Besleria lutea</i>		Caribbean endemic	Lauraceae		
<i>Columnea scandens</i>		Wide range	<i>Aniba bracteata</i>	Lowyé Jòn.	Wide range
<i>Gesneria ventricosa</i>		Caribbean endemic	<i>Aniba ramageana</i>	Lowyé Kannèl.	Less. Ant. endemic
<i>Nautilocalyx melittifolius</i>		Caribbean endemic	<i>Beilschmiedia pendula</i>	Lowyé Wouj.	Wide range
<i>Seemania sylvatica</i>		Alien	<i>Cassytha filiformis</i>	Lyenn San Pyè.	Wide range
Heliconiaceae			<i>Cinnamomum elongatum</i>		Caribbean endemic
<i>Heliconia bihai</i>	Balizyé.	Wide range	<i>Cinnamomum verum</i>	Kannèl. Cinnamon.	Alien
<i>Heliconia caribaea</i>	Balizyé.	Caribbean endemic	<i>Endlicheria sericea</i>	Lowyé Fè.	Wide range
<i>Heliconia psittacorum</i>	Bird-Of-Paradise.	Alien	<i>Licaria sericea</i>		Less. Ant. endemic
<i>Heliconia wagneriana</i>		Alien	<i>Nectandra coriacea</i>	Lowyé Gwi.	Wide range
Hydrocharitaceae			<i>Nectandra membranacea</i>	Lowyé Sann. Lowyé Gwan Fey.	Caribbean endemic
<i>Egeria densa</i>		Alien	<i>Nectandra patens</i>		Caribbean endemic

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<i>Ocotea cernua</i>	Lowyé Gwo Gwenn. Lowyé Ti Fèy.	Wide range	<i>Gossypium hirsutum</i> × <i>barbadense</i>	Kòtòn. Kòtòn Wouj. Cotton.	Alien
<i>Ocotea eggersiana</i>	Lowyé Ti Fèy.	Less. Ant. endemic	<i>complex</i>		
<i>Ocotea falcata</i>		Less. Ant. endemic	<i>Guazuma ulmifolia</i>	Bwa Lonm.	Wide range
<i>Ocotea imrayana</i>		Less. Ant. endemic	<i>Herissantia crispa</i>		Wide range
<i>Ocotea jacquini</i>	Lowyé Gwo Gwenn.	Less. Ant. endemic	<i>Malachra alceifolia</i>		Wide range
<i>Ocotea leucoxyloides</i>	Lowyé Mabwé.	Wide range	<i>*Malachra capitata</i>		Wide range
<i>Persea urbaniana</i>	Lowyé Zabòka.	Caribbean endemic	<i>Malachra fasciata</i>		Wide range
Lentibulariaceae			<i>Malvastrum americanum</i>		Wide range
<i>Utricularia alpina</i>		Wide range	<i>Malvastrum coromandelianum</i>		Wide range
Linderniaceae			<i>Malvaviscus penduliflorus</i>		Alien
<i>Lindernia crustacea</i>		Alien	<i>Melochia nodiflora</i>		Wide range
<i>Lindernia diffusa</i>		Wide range	<i>*Melochia pyramidata</i>		Wide range
Loganiaceae			<i>Melochia tomentosa</i>		Wide range
<i>Spigelia anthelmia</i>	Zèb A Vè.	Wide range	<i>Ochroma pyramidale</i>	Bwa Flo.	Wide range
Loranthaceae			<i>Pavonia paludicola</i>		Wide range
<i>Dendropemon caribaeus</i>	Anho Bwa.	Caribbean endemic	<i>Pavonia spinifex</i>		Wide range
<i>Psittacanthus americanus</i>	Anho Bwa.	Wide range	<i>Pseudoabutilon umbellatum</i>		Wide range
<i>Psittacanthus martinicensis</i>	Anho Bwa.	Less. Ant. endemic	<i>Quararibea turbinata</i>	Bwa Lélé. Swizzlestick Tree.	Caribbean endemic
Lythraceae			<i>Sida acuta</i>	Balyé Wonzè.	Wide range
<i>Ammannia baccifera</i>		Alien	<i>Sida ciliaris</i>		Wide range
<i>Ammannia latifolia</i>		Wide range	<i>Sida cordifolia</i>		Wide range
<i>Cuphea carthagenensis</i>		Wide range	<i>Sida glomerata</i>		Wide range
<i>*Cuphea crudyana</i>		St. Lucia endemic	<i>Sida jamaicensis</i>		Wide range
<i>*Cuphea micrantha</i>		Wide range	<i>Sida rhombifolia</i>	Balyé Wonzè.	Wide range
Magnoliaceae			<i>Sida spinosa</i>		Wide range
<i>Talauma dodecapetala</i>	Bwapen Mawon.	Less. Ant. endemic	<i>Sida urens</i>		Wide range
<i>Bunchosia polystachia</i>		Wide range	<i>Sterculia caribaea</i>	Maho Kochon.	Less. Ant. endemic
<i>Byrsonima spicata</i>	Bwa Tan (Si).	Wide range	<i>Talipariti elatum</i>	Blue Mahoe.	Alien
<i>Byrsonima trinitensis</i>	Bwa Tan Wouj.	Less. Ant. endemic	<i>Talipariti tiliaceum</i>	Maho Mang. Maho Gonbo.	Alien
<i>Heteropterys platyptera</i>	Lyenn Tè.	Less. Ant. endemic	<i>Thespesia populnea</i>	Maho Bòd Lanmè.	Wide range
<i>Heteropterys purpurea</i>		Wide range	<i>Triumfetta lappula</i>	Tèt Nèg.	Wide range
<i>Malpighia coccigera</i>	Ti Minizyé.	Caribbean endemic	<i>Triumfetta rhomboidea</i>		Wide range
<i>Malpighia emarginata</i>	Siwiz. Cherry.	Wide range	<i>Triumfetta semitriloba</i>	Tèt Nèg.	Wide range
<i>*Malpighia linearis</i>		Wide range	<i>Urena lobata</i>	Pikan Kouzen.	Wide range
<i>Stigmaphyllon bannisterioides</i>		Wide range	<i>Urena sinuata</i>	Pikan Kouzen.	Wide range
<i>Stigmaphyllon convolvulifolium</i>		Wide range	<i>Waltheria indica</i>		Wide range
<i>*Stigmaphyllon emarginatum</i>		Caribbean endemic	<i>*Wercklea tulipiflora</i>		Less. Ant. endemic
<i>Stigmaphyllon puberum</i>		Wide range	<i>*Wissadula contracta</i>		Wide range
Malvaceae			Marantaceae		
<i>Abelmoschus moschatus</i>	Gonbo Modi.	Alien	<i>Calathea allouia</i>	Topi Tanbou. Koko Tanbou.	Wide range
<i>Bastardia viscosa</i>		Wide range	<i>Calathea lutea</i>		Alien
<i>Ceiba pentandra</i>	Fwonmajé.	Wide range	<i>Maranta arundinacea</i>	Mouchas Babad. Djitan. Arrowroot.	Alien
<i>Corchorus aestuans</i>		Wide range	Marcgraviaceae		
<i>Corchorus hirsutus</i>		Wide range	<i>Marcgravia lineolata</i>		Less. Ant. endemic
<i>Corchorus hirtus</i>		Wide range	<i>Marcgravia trinitatis</i>		Wide range
<i>Corchorus siliquosus</i>		Wide range	<i>Marcgravia umbellata</i>		Less. Ant. endemic
			Melastomataceae		

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<i>Aciotis aequatorialis</i>		Wide range	<i>Maclura tinctoria</i>	Bwa Dowanj.	Wide range
<i>Charianthus alpinus</i>		Less. Ant. endemic	Musaceae		
<i>Clidemia hirta</i>	Kaka Mèl.	Wide range	<i>Musa textilis</i>	Manila Hemp. Abaca.	Alien
<i>Clidemia umbrosa</i>		Caribbean endemic	Myrsinaceae		
<i>Conostegia icosandra</i>		Wide range	<i>Ardisia elliptica</i>	Poggun Tree.	Alien
* <i>Henriettea lateriflora</i>		Alien	<i>Ardisia obovata</i>		Caribbean endemic
<i>Henriettia triflora</i>		Less. Ant. endemic	<i>Cybianthus antillanus</i>	Bwa Diwi.	Less. Ant. endemic
<i>Heterotis rotundifolia</i>		Alien	<i>Cybianthus parasiticus</i>		Less. Ant. endemic
<i>Miconia cornifolia</i>	Bwa Kòt. Bwa Savann.	Less. Ant. endemic	<i>Cybianthus rostratus</i>	Bwa Diwi.	Less. Ant. endemic
<i>Miconia furfuracea</i>	Bwa Senn.	Less. Ant. endemic	<i>Myrsine coriacea</i>	Bwa Diwi.	Wide range
<i>Miconia globulifera</i>		Less. Ant. endemic	<i>Stylogyne lateriflora</i>	Zabwiko Mawon.	Caribbean endemic
<i>Miconia laevigata</i>		Less. Ant. endemic	<i>Stylogyne canaliculata</i>		Dubious taxon
<i>Miconia luciana</i>	Bwa Senn.	St. Lucia endemic	Myrtaceae		
<i>Miconia mirabilis</i>	Bwa Kòt.	Wide range	<i>Calyptanthes forsteri</i>	Bwa Di Blas Blan. Bwa Di Fer.	Wide range
<i>Miconia racemosa</i>		Wide range	<i>Calyptanthes elegans</i>		Less. Ant. endemic
<i>Miconia secunda</i>	Bwa Senn.	St. Lucia endemic	<i>Eugenia biflora</i>		Wide range
* <i>Miconia striata</i>		Less. Ant. endemic	<i>Eugenia confusa</i>	Bwa Heti.	Wide range
* <i>Miconia trichotoma</i>		Caribbean endemic	<i>Eugenia cordata</i>		Wide range
<i>Nepsera aquatica</i>		Wide range	<i>Eugenia greggii</i>		Less. Ant. endemic
<i>Pterolepis glomerata</i>		Wide range	<i>Eugenia lambertiana</i>		Wide range
<i>Tetrazygia angustifolia</i>		Caribbean endemic	<i>Eugenia ligustrina</i>	Bwa Heti.	Wide range
<i>Tetrazygia discolor</i>		Less. Ant. endemic	<i>Eugenia monticola</i>	Bwa (Di Bas) Ti Fèy.	Wide range
<i>Tibouchina chamaecistus</i>		Less. Ant. endemic	<i>Eugenia pseudopsidium</i>		Wide range
<i>Tibouchina pilosa</i>		Alien	<i>Eugenia tapacumensis</i>		Wide range
Meliaceae			<i>Eugenia trinitatis</i>		Less. Ant. endemic
<i>Azadirachta indica</i>	Neem.	Alien	<i>Eugenia coffeifolia</i>		Wide range
<i>Carapa guianensis</i>		Wide range	<i>Eugenia duchassaingiana</i>		Less. Ant. endemic
<i>Cedrela odorata</i>	Acajou. Red Cedar.	Wide range	<i>Eugenia oerstediana</i>	Bwa Di Bas Gwi.	Wide range
<i>Guarea glabra</i>	Acajou Gwan Bwa.	Wide range	<i>Marlierea guildingiana</i>		Wide range
<i>Guarea kunthiana</i>		Wide range	<i>Myrcia antillana</i>	Bwa Di Bas Wouj.	Less. Ant. endemic
<i>Guarea macrophylla</i>	Bwa Di Woz.	Wide range	<i>Myrcia citrifolia</i>	Bwa Gwiyé . Blackberry.	Wide range
<i>Melia azedarach</i>	Chinaberry.	Alien	<i>Myrcia deflexa</i>	Bwa Kwéyòl.	Wide range
<i>Trichilia pallida</i>		Wide range	<i>Myrcia fallax</i>	Bwadfè.	Wide range
Menispermaceae			<i>Myrcia leptoclada</i>		Wide range
<i>Cissampelos pareira</i>	Aymanyad.	Wide range	<i>Myrcia platyclada</i>		Wide range
<i>Hyperbaena domingensis</i>		Wide range	<i>Myrcia ramageana</i>		Less. Ant. endemic
Molluginaceae			<i>Myrcia splendens</i>	Bwa (Di Bas) Ti Fèy.	Wide range
<i>Mollugo nudicaulis</i>		Alien	<i>Myrcianthes fragrans</i>		Wide range
<i>Siparuna sanctae-luciae</i>	Bwa Kaka.	St. Lucia endemic	<i>Myrciaria floribunda</i>		Wide range
Moraceae			<i>Pimenta racemosa</i>	Bwaden. Bay Leaf.	Wide range
<i>Castilla elastica</i>	Kaochou. Rubber Tree.	Alien	<i>Plinia pinnata</i>		Wide range
<i>Ficus americana</i>	Fijé Ti Fèy.	Wide range	<i>Psidium guajava</i>	Gwiyav. Guava.	Wide range
<i>Ficus citrifolia</i>	Fijé.	Wide range	<i>Psidium sartorianum</i>		Wide range
<i>Ficus insipida</i>	Fijé.	Wide range	<i>Siphoneugena densiflora</i>		Wide range
<i>Ficus nymphaeifolia</i>	Fijé.	Wide range	<i>Syzygium cumini</i>	Java Plum.	Alien
<i>Ficus pumila</i>		Alien	<i>Syzygium jambos</i>	Ponm Woz.	Alien
<i>Ficus trigonata</i>	Fijé.	Wide range	Nyctaginaceae		

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<i>Boerhavia coccinea</i>	Patagon.	Wide range	<i>Habenaria alata</i>		Wide range
<i>Boerhavia diffusa</i>	Patagon.	Wide range	<i>Habenaria monorrhiza</i>		Wide range
* <i>Boerhavia erecta</i>		Wide range	<i>Ionopsis utricularioides</i>		Wide range
<i>Guapira fragrans</i>	Mapou.	Wide range	<i>Isochilus linearis</i>		Wide range
<i>Guapira suborbiculata</i>	Ti Mapou.	Less. Ant. endemic	<i>Jacquiiniella globosa</i>		Wide range
<i>Mirabilis jalapa</i>	Four o'Clock.	Alien	<i>Leochilus puertoricensis</i>		Caribbean endemic
<i>Pisonia aculeata</i>		Wide range	* <i>Lepanthes dussii</i>		Wide range
Nymphaceae			<i>Liparis nervosa</i>		Wide range
<i>Nymphaea amazonum</i>	Chapo Dlo. Water Lily.	Wide range	<i>Malaxis massonii</i>		Wide range
<i>Nymphaea ampla</i>	Chapo Dlo. Water Lily.	Wide range	<i>Maxillaria coccinea</i>		Caribbean endemic
Ochnaceae			<i>Microchilus hirtellus</i>		Caribbean endemic
<i>Ouratea guildingii</i>		Wide range	<i>Microchilus plantagineus</i>		Caribbean endemic
<i>Sauvagesia erecta</i>		Wide range	<i>Octomeria graminifolia</i>		Caribbean endemic
Olaceaceae			<i>Oeceoclades maculata</i>		Alien
<i>Ximenia americana</i>		Wide range	<i>Oncidium altissimum</i>		Caribbean endemic
Oleaceae			<i>Pelexia adnata</i>		Wide range
<i>Chionanthus compactus</i>	Bwadfè.	Wide range	<i>Pleurothallis pruinosa</i>		Wide range
<i>Forestiera rhamnifolia</i>	Kaka Wavèt.	Wide range	<i>Pleurothallis ruscifolia</i>		Wide range
<i>Jasminum fluminense</i>		Alien	<i>Pleurothallis sieberi</i>		Less. Ant. endemic
<i>Jasminum laurifolium</i>		Alien	* <i>Pleurothallis testifolia</i>		Wide range
<i>Ligustrum japonicum</i>		Alien	<i>Polystachya concreta</i>		Wide range
Onagraceae			<i>Ponthieva petiolata</i>		Caribbean endemic
<i>Ludwigia erecta</i>	Jiwòf Glo.	Wide range	<i>Prescottia oligantha</i>		Wide range
<i>Ludwigia hyssopifolia</i>	Jiwòf Glo.	Wide range	<i>Prescottia stachyodes</i>		Wide range
<i>Ludwigia octovalvis</i>	Jiwòf Glo.	Wide range	* <i>Psilochilus macrophyllus</i>		Wide range
* <i>Ludwigia leptocarpa</i>		Wide range	<i>Sacoila lanceolata</i>		Wide range
Orchidaceae			<i>Scaphyglottis modesta</i>		Wide range
<i>Bletia patula</i>		Alien	<i>Scaphyglottis punctulata</i>		Wide range
<i>Brachionidium sherringii</i>		Caribbean endemic	<i>Scaphyglottis dunstervillei</i>		Wide range
<i>Cranichis muscosa</i>		Wide range	<i>Spathoglottis plicata</i>		Alien
<i>Cranichis ovata</i>		Caribbean endemic	<i>Specklinia aristata</i>		Wide range
<i>Cyclopogon cranichoides</i>		Wide range	<i>Spiranthes torta</i>		Wide range
<i>Cyclopogon elatus</i>		Wide range	<i>Stelis scabrada</i>		Less. Ant. endemic
<i>Epidendrum anceps</i>		Wide range	<i>Trichocentrum cebolleta</i>		Wide range
<i>Epidendrum antillanum</i>		Caribbean endemic	<i>Trichocentrum luridum</i>		Wide range
<i>Epidendrum boricuarum</i>		Caribbean endemic	<i>Trichosalpinx dura</i>		Wide range
<i>Epidendrum carpophorum</i>		Wide range	<i>Triphora surinamensis</i>		Wide range
<i>Epidendrum ciliare</i>	Eye-Lash Orchid.	Wide range	<i>Vanilla mexicana</i>		Wide range
<i>Epidendrum nocturnum</i>		Wide range	<i>Vanilla planifolia</i>	Vanni. Vanilla.	Alien
<i>Epidendrum pallidiflorum</i>		Less. Ant. endemic	<i>Wulfschlaegelia calcarata</i>		Wide range
<i>Epidendrum ramosum</i>		Wide range	Orobanchaceae		
<i>Epidendrum rigidum</i>		Wide range	<i>Alectra aspera</i>		Wide range
<i>Epidendrum rubroticum</i>		Less. Ant. endemic	Oxalidaceae		
<i>Epidendrum strobiliferum</i>		Wide range	<i>Oxalis barrelieri</i>		Wide range
* <i>Epidendrum miserrimum</i>		Wide range	<i>Oxalis corniculata</i>	Ti Siwèt.	Wide range
<i>Epidendrum revertianum</i>		Less. Ant. endemic	<i>Oxalis debilis</i>		Wide range
<i>Eulophia alta</i>	Lonyon Djab.	Wide range	<i>Oxalis frutescens</i>		Wide range

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Papaveraceae			<i>Piper glabrescens</i>		Wide range
<i>Argemone mexicana</i>		Wide range	<i>Piper peltatum</i>	Chapo Glo.	Wide range
* <i>Bocconia frutescens</i>		Wide range	Plantaginaceae		
Passifloraceae			<i>Bacopa monnieri</i>	Kwinin Pavé.	Wide range
<i>Passiflora andersonii</i>		Less. Ant. endemic	<i>Mecardonia procumbens</i>		Wide range
<i>Passiflora cuneata</i>		Wide range	<i>Micranthemum umbratum</i>		Wide range
<i>Passiflora edulis</i>	Passion Fruit.	Alien	<i>Plantago major</i>	Planten.	Alien
<i>Passiflora foetida</i>	Kòkian.	Wide range	<i>Russelia equisetiformis</i>		Alien
<i>Passiflora laurifolia</i>	Ponm Di Lyenn.	Wide range	<i>Scoparia dulcis</i>	Balyé Dou.	Wide range
<i>Passiflora pallida</i>		Wide range	Plumbaginaceae		
<i>Passiflora quadrangularis</i>	Babadin.	Alien	<i>Plumbago scandens</i>		Wide range
<i>Passiflora rubra</i>		Wide range	Poaceae		
<i>Passiflora serratodigitata</i>		Wide range	<i>Andropogon bicornis</i>		Wide range
<i>Passiflora suberosa</i>		Wide range	<i>Andropogon glomeratus</i>		Wide range
Phyllanthaceae			<i>Antheophora hermaphrodita</i>		Wide range
<i>Hieronyma caribaea</i>	Bwa Damand.	Wide range	<i>Arthrostylidium venezuelae</i>		Wide range
<i>Margaritaria nobilis</i>	Bwa Mil Bwanch. Bwa Zo Bèf.	Wide range	* <i>Arundo donax</i>		Alien
<i>Phyllanthus amarus</i>	Gwenn Anba Fèy Blan.	Wide range	<i>Axonopus compressus</i>		Wide range
<i>Phyllanthus caroliniensis</i>		Wide range	<i>Bambusa vulgaris</i>		Alien
<i>Phyllanthus niruri</i>		Wide range	<i>Bothriochloa bladhii</i>		Alien
<i>Phyllanthus urinaria</i>	Gwenn Anba Fèy Blan.	Alien	<i>Bothriochloa pertusa</i>		Alien
Phytolaccaceae			<i>Bouteloua americana</i>		Wide range
<i>Petiveria alliacea</i>	Fèy Douvan. Mawi Pouwi.	Wide range	* <i>Cenchrus brownii</i>		(dubious id)
<i>Phytolacca rivinoides</i>	Lanng Bèf. Agouman (Gwan Bwa).	Wide range	<i>Cenchrus echinatus</i>		Wide range
<i>Rivina humilis</i>		Wide range	* <i>Cenchrus incertus</i>	Zèb Kolan.	(dubious id)
<i>Trichostigma octandrum</i>		Wide range	<i>Chloris barbata</i>	Zèb A Bab.	Wide range
Pinaceae			<i>Chloris radiata</i>		Wide range
<i>Pinus caribaea</i>	Caribbean Pine.	Alien	* <i>Chloris ciliata</i>		Wide range
Piperaceae			<i>Chrysopogon zizanioides</i>	Voytivé.	Alien
<i>Peperomia emarginella</i>		Wide range	<i>Coix lacryma-jobi</i>	Job's Tears.	Alien
<i>Peperomia hernandiifolia</i>		Wide range	<i>Cymbopogon citratus</i>	Sitonnèl. Lemon Grass.	Alien
* <i>Peperomia hirtella</i>		Less. Ant. endemic	<i>Cynodon dactylon</i>		Alien
<i>Peperomia magnoliifolia</i>		Wide range	<i>Dactyloctenium aegyptium</i>		Alien
<i>Peperomia myrtifolia</i>		Caribbean endemic	<i>Dichanthium annulatum</i>		Alien
<i>Peperomia nigropunctata</i>		Wide range	<i>Diectomis fastigiata</i>		Wide range
<i>Peperomia obtusifolia</i>		Wide range	<i>Digitaria insularis</i>		Wide range
<i>Peperomia pellucida</i>	Zèb Akouwès.	Wide range	<i>Digitaria setigera</i>		Alien
<i>Peperomia rotundifolia</i>	Ti Kako.	Wide range	* <i>Digitaria bicornis</i>		Wide range
* <i>Peperomia serpens</i>		Wide range	* <i>Digitaria longiflora</i>		Alien
<i>Peperomia smithiana</i>		Less. Ant. endemic	<i>Echinochloa colona</i>		Wide range
<i>Peperomia tenella</i>		Wide range	<i>Echinochloa polystachya</i>		Wide range
<i>Peperomia trifolia</i>		Wide range	* <i>Echinochloa guadeloupensis</i>		Caribbean endemic
<i>Peperomia urocarpa</i>		Wide range	<i>Eleusine indica</i>		Alien
<i>Piper aequale</i>		Wide range	<i>Eragrostis amabilis</i>		Alien
<i>Piper amalago</i>	Bwa Mal Lèstomak.	Wide range	<i>Eragrostis cilianensis</i>		Alien
<i>Piper dilatatum</i>	Malenbé. Bwa Mal Lèstomak.	Wide range	<i>Eragrostis ciliaris</i>		Alien
<i>Piper dussii</i>		Less. Ant. endemic	<i>Eragrostis pilosa</i>		Alien

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<i>*Eragrostis proliifera</i>		Wide range	<i>Pennisetum setaceum</i>		Alien
<i>Eriochloa aristata</i>		Wide range	<i>*Pennisetum polystachion</i>		Alien
<i>Gynerium sagittatum</i>	Wozo.	Wide range	<i>Pharus lappulaceus</i>		Wide range
<i>Hymnachne amplexicaulis</i>		Wide range	<i>Phragmites australis</i>		Alien
<i>Hyparrhenia rufa</i>		Alien	<i>Rottboellia cochinchinensis</i>		Alien
<i>Ichnanthus nemorosus</i>		Wide range	<i>Schizachyrium brevifolium</i>		Wide range
<i>Ichnanthus pallens</i>		Wide range	<i>Schizachyrium microstachyum</i>		Wide range
<i>Isachne disperma</i>		Caribbean endemic	<i>Schizachyrium salzmannii</i>		Wide range
<i>Ischaemum rugosum</i>		Alien	<i>Setaria barbata</i>		Alien
<i>Ischaemum timorense</i>		Alien	<i>Setaria parviflora</i>		Wide range
<i>Lasiacis divaricata</i>	Ti Banbou. Banbou Fwans.	Wide range	<i>Setaria setosa</i>		Wide range
<i>Lasiacis sorghoidea</i>	Ti Banbou. Banbou Fwans.	Wide range	<i>*Setaria paniculifera</i>		Wide range
<i>Leptochloa fusca</i>		Wide range	<i>Sorghum halepense</i>		Alien
<i>Leptochloa panicea</i>		Wide range	<i>Spartina patens</i>		Alien
<i>Leptochloa virgata</i>		Wide range	<i>Sporobolus indicus</i>		Wide range
<i>Lithachne pauciflora</i>		Wide range	<i>Sporobolus jacquemontii</i>		Wide range
<i>Megathyrsus maximus</i>	Zèb Djiné. Guinea Grass.	Alien	<i>Sporobolus tenuissimus</i>		Wide range
<i>Melinis repens</i>		Alien	<i>Sporobolus virginicus</i>		Wide range
<i>Olyra latifolia</i>		Wide range	<i>Stenotaphrum secundatum</i>		Wide range
<i>Oplismenus hirtellus</i>		Wide range	<i>Thysanolaena maxima</i>		Alien
<i>Oplismenus hirtellus</i>		Wide range	<i>Tripsacum andersonii</i>		Alien
<i>Orthoclada laxa</i>		Wide range	<i>*Urochloa adspersa</i>		Wide range
<i>*Panicum hirsutum</i>		Wide range	<i>Urochloa distachya</i>		Wide range
<i>Panicum laxum</i>		Wide range	<i>Urochloa fusca</i>		Wide range
<i>Panicum pilosum</i>		Wide range	<i>Urochloa mutica</i>		Alien
<i>Panicum trichanthum</i>		Wide range	<i>Urochloa plantaginea</i>		Wide range
<i>Panicum trichoides</i>		Wide range	<i>Urochloa reptans</i>		Alien
<i>Paspalidium geminatum</i>		Wide range	Podocarpaceae		
<i>Paspalum arundinaceum</i>		Wide range	<i>Podocarpus coriaceus</i>	Lowyé Woz.	Wide range
<i>Paspalum conjugatum</i>		Wide range	Polygalaceae		
<i>Paspalum distichum</i>		Wide range	<i>Polygala paniculata</i>	Diten Manyòk.	Wide range
<i>*Paspalum fasciculatum</i>		Wide range	<i>Securidaca diversifolia</i>	Lyenn Pak.	Wide range
<i>Paspalum fimbriatum</i>		Wide range	<i>Antigonon leptopus</i>		Alien
<i>Paspalum laxum</i>		Wide range	<i>Coccoloba ascendens</i>		Wide range
<i>Paspalum millegrana</i>		Wide range	<i>Coccoloba dussii</i>		Caribbean endemic
<i>Paspalum nesiotes</i>		Less. Ant. endemic	<i>Coccoloba pubescens</i>	Bwa Gwan Fèy.	Caribbean endemic
<i>*Paspalum notatum</i>		Wide range	<i>Coccoloba swartzii</i>	Bwa Lanmowi. Wézinyé.	Wide range
<i>Paspalum nutans</i>		Wide range	<i>Coccoloba uvifera</i>	Wézen. Siwiz. Sea Grape.	Wide range
<i>Paspalum orbiculatum</i>		Wide range	<i>Coccoloba venosa</i>		Wide range
<i>Paspalum paniculatum</i>		Wide range	<i>Persicaria glabra</i>		Wide range
<i>Paspalum plicatulum</i>		Wide range	<i>Persicaria punctata</i>		Wide range
<i>Paspalum saccharoides</i>		Wide range	<i>Triplaris americana</i>		Alien
<i>*Paspalum setaceum</i>		Wide range	Pontederiaceae		
<i>Paspalum urvillei</i>		Alien	<i>Eichhornia crassipes</i>	Water Hyacinth.	Alien
<i>Paspalum vaginatum</i>		Wide range	Portulacaceae		
<i>Paspalum virgatum</i>		Wide range	<i>Portulaca halimoides</i>		Wide range
<i>Pennisetum purpureum</i>	Elephant Grass.	Alien	<i>Portulaca oleracea</i>	Koupyé.	Wide range

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<i>Portulaca pilosa</i>	Chouvalyé Wonzé.	Wide range	<i>Psychotria pleeana</i>		Less. Ant. endemic
<i>Portulaca quadrifida</i>		Alien	<i>Randia aculeata</i>	Bwa Lans.	Wide range
<i>Talinum fruticosum</i>		Wide range	<i>Randia nitida</i>		Wide range
<i>Talinum paniculatum</i>		Wide range	<i>Richardia scabra</i>		Wide range
<i>Drypetes glauca</i>		Caribbean endemic	<i>Rondeletia parviflora</i>		Less. Ant. endemic
Rhamnaceae			<i>Rosenbergiodendron formosum</i>		Alien
<i>Colubrina elliptica</i>	Mabi.	Wide range	<i>Rudgea citrifolia</i>	Bwa Lay.	Less. Ant. endemic
<i>Gouania lupuloides</i>	Lyenn Savon.	Wide range	<i>Schradera exotica</i>		Caribbean endemic
<i>Krugiodendron ferreum</i>	Bwa Di Fè.	Wide range	<i>Spermacoce confusa</i>		Wide range
<i>Ziziphus mauritiana</i>	Koko Kouli. Dunks.	Alien	<i>Spermacoce tetraquetra</i>		Wide range
Rhizophoraceae			<i>Spermacoce densiflora</i>	Ti Makònèt.	Wide range
<i>Cassipourea guianensis</i>	Bwa Di Fè. Bwa Lay.	Wide range	<i>Spermacoce ocymifolia</i>		Wide range
<i>Rhizophora mangle</i>	Manng Wouj. Red Mangrove.	Wide range	<i>Spermacoce ovalifolia</i>	Ti Makònèt.	Wide range
Rosaceae			<i>Spermacoce prostrata</i>		Wide range
<i>Rubus rosifolius</i>	Fonbwèz.	Alien	<i>Spermacoce remota</i>	Ti Makònèt.	Wide range
Rubiaceae			<i>Spermacoce verticillata</i>	Ti Makònèt.	Wide range
<i>Chimarrhis cymosa</i>	Bwa Wivyé.	Wide range	<i>Vangueria madagascariensis</i>	Tanmawen Dezenn.	Alien
<i>Chiococca alba</i>	Kalkan. Kikado.	Wide range	Ruppiaceae		
<i>Chione venosa</i>	Manba.	Wide range	<i>Ruppia maritima</i>		Wide range
<i>Chomelia fasciculata</i>		Less. Ant. endemic	Ruscaceae		
<i>Diodia virginiana</i>		Wide range	<i>Sansevieria hyacinthoides</i>	(Both species) Lanng Bèlmè.	Alien
<i>Erithalis fruticosa</i>	Bwa Flanbo.	Wide range	<i>Sansevieria trifasciata</i>	Mother-In-Law's Tongue	Alien
<i>*Exostema caribaeum</i>		Wide range	Rutaceae		
<i>Exostema sanctae-Luciae</i>	China.	Less. Ant. endemic	<i>Amyris elemifera</i>		Wide range
<i>Faramea occidentalis</i>	Ti Kafé.	Wide range	<i>Citrus aurantiifolia</i>	Siton. Lime.	Alien
<i>Genipa americana</i>	Jénipa.	Wide range	<i>Triphasia trifolia</i>	Sitonèl. Sweet Lime.	Alien
<i>Geophila repens</i>		Wide range	<i>Zanthoxylum caribaeum</i>	Lépiné Wouj.	Wide range
<i>Gonzalagunia spicata</i>		Wide range	<i>Zanthoxylum flavum</i>	Arkokwa.	Wide range
<i>Guettarda crispiflora</i>		Wide range	<i>*Zanthoxylum martinicense</i>		Wide range
<i>Guettarda odorata</i>	Bwa Djèt.	Wide range	<i>Zanthoxylum microcarpum</i>	Lépiné.	Wide range
<i>Guettarda scabra</i>	Bwa Madanm.	Wide range	<i>Zanthoxylum monophyllum</i>	Lépiné.	Wide range
<i>Hillia parasitica</i>	Jasmen Bwa.	Wide range	<i>Zanthoxylum punctatum</i>		Caribbean endemic
<i>Ixora ferrea</i>	Bwa Dlo Savann Ti Kafé Mawon.	Wide range	<i>Zanthoxylum spinifex</i>	Bwa Bandé.	Wide range
<i>Ixora finlaysoniana</i>		Alien	Sabiaceae		
<i>Malanea macrophylla</i>		Wide range	<i>Meliosma herbertii</i>		Wide range
<i>Margaritopsis microdon</i>	Bwa Genton.	Wide range	<i>Casearia decandra</i>	Bwa Koko Kawèt.	Wide range
<i>Mitracarpus hirtus</i>		Wide range	<i>*Casearia guianensis</i>		Wide range
<i>Morinda citrifolia</i>	Kòsòl Chyenn. Noni.	Alien	<i>*Casearia sylvestris</i>		Wide range
<i>Notopleura guadalupensis</i>		Wide range	<i>Prockia crucis</i>		Wide range
<i>Notopleura uliginosa</i>		Wide range	Santalaceae		
<i>Oldenlandia corymbosa</i>		Alien	<i>Dendrophthora macrostachya</i>	Anho Bwa.	Less. Ant. endemic
<i>Oldenlandia lancifolia</i>		Alien	<i>Phoradendron anceps</i>	Anho Bwa.	Wide range
<i>Palicourea crocea</i>	Bwa Kilibwi.	Wide range	<i>*Phoradendron hexastichum</i>		Wide range
<i>Psychotria berteriana</i>		Wide range	<i>*Phoradendron martinicense</i>		Wide range
<i>Psychotria mapourioides</i>		Wide range	<i>Phoradendron piperoides</i>	Anho Bwa.	Wide range
<i>Psychotria muscosa</i>		Less. Ant. endemic	<i>Phoradendron quadrangulare</i>	Anho Bwa.	Wide range
<i>Psychotria nervosa</i>	Ti Kafé Mawon.	Wide range	<i>Phoradendron trinervium</i>	Anho Bwa.	Wide range

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<i>Phoradendron chrysocladon</i>	Anho Bwa.	Wide range	<i>Datura innoxia</i>		Wide range
<i>Phoradendron tetrapterum</i>	Anho Bwa.	Wide range	<i>Datura stramonium</i>	Joy Juice.	Alien
Sapindaceae			<i>Lycianthes pauciflora</i>		Wide range
<i>Allophylus racemosus</i>		Wide range	<i>Physalis angulata</i>	Pok Pok.	Wide range
* <i>Cardiospermum corindum</i>		Wide range	<i>Physalis pubescens</i>		Wide range
<i>Cardiospermum microcarpum</i>		Wide range	<i>Solanum americanum</i>	Agouman.	Wide range
<i>Cupania triquetra</i>		Wide range	<i>Solanum capsicoides</i>	Ponm Pwézon.	Wide range
<i>Cupania americana</i>		Wide range	<i>Solanum jamaicense</i>		Wide range
<i>Dodonaea viscosa</i>		Wide range	<i>Solanum lanceifolium</i>		Wide range
<i>Dodonaea angustifolia</i>		Wide range	<i>Solanum racemosum</i>		Wide range
<i>Exothea paniculata</i>		Wide range	<i>Solanum torvum</i>	Béléjenn Djab.	Wide range
<i>Paullinia cururu</i>	Lyenn Pèsi.	Wide range	Staphyleaceae		
<i>Paullinia pinnata</i>	Lyenn Pèsi.	Wide range	<i>Turpinia occidentalis</i>	Bwa Lat.	Wide range
<i>Paullinia vespertilio</i>		Less. Ant. endemic	Styracaceae		
Sapotaceae			<i>Styrax glabrus</i>	Sip Zowanj.	Wide range
<i>Chrysophyllum argenteum</i>	Bwi. Bwi Kayamit.	Wide range	Symplocaceae		
<i>Manilkara bidentata</i>	Balata.	Wide range	<i>Symplocos martinicensis</i>	Bwa Blé. Zolivyé.	Wide range
<i>Micropholis crotonoides</i>	Balata.	Wide range	Theaceae		
<i>Micropholis guyanensis</i>	Fèy Dowé.	Wide range	<i>Freziera undulata</i>		Less. Ant. endemic
<i>Pouteria multiflora</i>	Pennépis.	Wide range	<i>Ternstroemia oligostemon</i>	Miwiz.	Caribbean endemic
<i>Pouteria pallida</i>	Balata Chyen.	Less. Ant. endemic	<i>Ternstroemia peduncularis</i>	Zabwiko Pwanti. Zabwiko Blan.	Caribbean endemic
<i>Pouteria semecarpifolia</i>	Kontwévan.	Less. Ant. endemic	Theophrastaceae		
<i>Sideroxylon foetidissimum</i>	Akoma.	Wide range	<i>Jacquinia arborea</i>	Flanbo Blan.	Caribbean endemic
<i>Sideroxylon obovatum</i>		Wide range	Thymelaeaceae		
Schlegeliaceae			<i>Daphnopsis americana</i>	Maho Pimen.	Wide range
<i>Schlegelia axillaris</i>		Caribbean endemic	<i>Daphnopsis macrocarpa</i>	Maho Pimen Gwan Bwa.	St. Lucia endemic
Schoepfiaceae			Turneraceae		
<i>Schoepfia schreberi</i>		Wide range	<i>Piriqueta cistoides</i>		Wide range
Scrophulariaceae			<i>Turnera subulata</i>	Politician's Plant.	Alien
<i>Bontia daphnoides</i>	Sea Olive.	Wide range	<i>Turnera ulmifolia</i>		Alien
<i>Capraria biflora</i>	Dité Péyi.	Wide range	Ulmaceae		
Simaroubaceae			<i>Celtis iguanaea</i>		Wide range
<i>Picramnia pentandra</i>	Bwa Moudong.	Wide range	<i>Trema lamarckiana</i>		Wide range
<i>Picrasma excelsa</i>	Sip Amé.	Wide range	<i>Trema micranthum</i>		Wide range
<i>Simarouba amara</i>	Bwa Blan.	Wide range	<i>Boehmeria ramiflora</i>		Wide range
Smilacaceae			<i>Boehmeria nivea</i>	Koko Bel Mennwit. China Grass.	Alien
<i>Smilax guianensis</i>	Boyo Djab.	Less. Ant. endemic	<i>Cecropia schreberiana</i>	Bwa Kannon.	Caribbean endemic
<i>Smilax oblongata</i>	Boyo Djab.	Less. Ant. endemic	<i>Laportea aestuans</i>		Wide range
Solanaceae			<i>Phenax sonneratii</i>	Zoti.	Alien
<i>Acnistus arborescens</i>	Bwa Mou Limou.	Wide range	<i>Pilea caribaea</i>	Zoti Blan.	Less. Ant. endemic
<i>Browallia americana</i>		Wide range	<i>Pilea inaequalis</i>		Caribbean endemic
<i>Capsicum annuum</i>		Wide range	<i>Pilea involucrata</i>		Wide range
<i>Capsicum frutescens</i>	Piman Gwiv. Bird Pepper.	Alien	<i>Pilea microphylla</i>		Wide range
<i>Cestrum alternifolium</i>		Wide range	<i>Pilea nummulariifolia</i>		Wide range
<i>Cestrum latifolium</i>		Wide range	<i>Pilea semidentata</i>		Caribbean endemic
<i>Cestrum laurifolium</i>		Wide range	<i>Pilea parietaria</i>		Wide range
<i>Cestrum megalophyllum</i>		Wide range	* <i>Urera caracasana</i>		Wide range

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Scientific name	Common names	Status	Scientific name	Common names	Status
Verbenaceae			<i>Cissus obovata</i>	Godmò.	Caribbean endemic
<i>Aegiphila martinicensis</i>	Bwa Kabwit.	Wide range	<i>Cissus verticillata</i>	Godmò.	Alien
<i>Citharexylum spinosum</i>	Bwa Kòtlèt.	Wide range	<i>Vitis tiliifolia</i>		Alien
<i>Cornutia pyramidata</i>	Bwa Kasav.	Wide range	Zingiberaceae		
<i>Duranta stenostachya</i>		Wide range	<i>Alpinia zerumbet</i>	Shell Ginger.	Alien
<i>Lantana arubensis</i>	Ti Bonbon.	Wide range	<i>Curcuma longa</i>	Tjitima. Turmeric.	Alien
* <i>Lantana involucrata</i>		(dubious id)	<i>Curcuma xanthorrhiza</i>	Jenjanm Dou. Kashibou.	Alien
<i>Lantana strigocamara</i>	Jiwòf Flè. Bwa Wa Tou. Pis A Bed.	Wide range	<i>Hedychium coronarium</i>	Lavann. Lavender.	Alien
<i>Lantana radula</i>		Wide range	<i>Renealmia alpinia</i>		Wide range
<i>Lippia alba</i>	Twa Tas.	Wide range	<i>Renealmia pyramidalis</i>		Less. Ant. endemic
<i>Petrea volubilis</i>	Lyenn Wid.	Caribbean endemic	* <i>Renealmia occidentalis</i>		Wide range
<i>Phyla fruticosa</i>		Wide range	<i>Zingiber zerumbet</i>	Bitter Ginger.	Alien
<i>Priva lappulacea</i>	Ti Dayi.	Wide range	Zygophyllaceae		
<i>Stachytarpheta cayennensis</i>	Vèvenn Latjé Wat.	Wide range	<i>Guaiaacum officinale</i>	Gayak.	Wide range
<i>Stachytarpheta jamaicensis</i>	Vèvenn Latjé Wat.	Wide range	<i>Kallstroemia maxima</i>		Wide range
<i>Stachytarpheta urticifolia</i>	Vèvenn Latjé Wat.	Alien	<i>Kallstroemia pubescens</i>		Wide range
<i>Tectona grandis</i>	Teck. Teak.	Alien			
<i>Vitex divaricata</i>	Bwa Léza.	Wide range			
Vitaceae					

Table B Ferns and Their Allies (Pteridophytes) of Saint Lucia

Data from Graveson (2009b)

Family/ Scientific name	Status	Family/ Scientific name	Status	Family/ Scientific name	Status
Anemiaceae		<i>Blechnum serrulatum</i>	Wide range	<i>Elaphoglossum crinitum</i>	Wide range
<i>Anemia adiantifolia</i>	Wide range	<i>Salpichlaena volubilis</i>	Wide range	<i>Elaphoglossum herminieri</i>	Wide range
Aspleniaceae		Cyatheaaceae		<i>Elaphoglossum latifolium</i>	Wide range
<i>Asplenium auritum</i>	Wide range	<i>Alsophila imrayana</i>	Wide range	<i>Elaphoglossum martinicense</i>	Caribbean endemic
<i>Asplenium cristatum</i>	Wide range	<i>Alsophila muricata</i>	Less. Ant. endemic	<i>Elaphoglossum petiolatum</i>	Wide range
<i>Asplenium cuneatum</i>	Wide range	<i>Cyathea arborea</i>	Wide range	<i>Elaphoglossum plumieri</i>	Caribbean endemic
<i>Asplenium obtusifolium</i>	Wide range	<i>Cyathea grandifolia</i>	Wide range	<i>Megalastrum subincisum</i>	Wide range
<i>Asplenium pumilum</i>	Wide range	<i>Cyathea tenera</i>	Wide range	<i>Olfersia cervina</i>	Wide range
<i>Asplenium salicifolium</i>	Wide range	Dennstaedtiaceae	Wide range	<i>Polysichopsis muscosa</i>	Wide range
<i>Asplenium serra</i>	Wide range	<i>Dennstaedtia dissecta</i>	Wide range	<i>Stigmatopteris rotundata</i>	Wide range
<i>Asplenium serratum</i>	Wide range	Dennstaedtiaceae		Gleicheniaceae	
Blechnaceae		<i>Hypolepis repens</i>	Wide range	<i>Dicranopteris flexuosa</i>	Less. Ant. endemic
<i>Blechnum fragile</i>	Wide range	<i>Pteridium arachnoideum</i>	Wide range	<i>Gleichenella pectinata</i>	Wide range
<i>Blechnum occidentale</i>	Wide range	Dryopteridaceae		<i>Sticherus bifidus</i>	Wide range
<i>Blechnum ryanii</i>	Less. Ant. endemic	<i>Elaphoglossum apodum</i>	Wide range	Hymenophyllaceae	

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Family/ Scientific name	Status
<i>Hymenophyllum fucoides</i>	Wide range
<i>Hymenophyllum hirsutum</i>	Wide range
<i>Hymenophyllum lanatum</i>	Wide range
<i>Hymenophyllum polyanthos</i>	Wide range
<i>Trichomanes alatum</i>	Caribbean endemic
<i>Trichomanes angustifrons</i>	Wide range
<i>Trichomanes crispum</i>	Wide range
<i>Trichomanes hymenoides</i>	Wide range
<i>Trichomanes hymenophylloides</i>	Wide range
<i>Trichomanes krausii</i>	Wide range
<i>Trichomanes lineolatum</i>	Wide range
<i>Trichomanes membranaceum</i>	Wide range
<i>Trichomanes osmundoides</i>	Wide range
<i>Trichomanes pinnatum</i>	Wide range
<i>Trichomanes polypodioides</i>	Wide range
<i>Trichomanes punctatum</i>	Wide range
<i>Trichomanes rigidum</i>	Wide range
<i>Trichomanes trigonum</i>	Less. Ant. endemic
Lindsaeaceae	
<i>Lindsaea lancea</i>	Wide range
<i>Lindsaea quadrangularis</i>	Wide range
<i>Lonchitis hirsuta</i>	Wide range
Lomariopsidaceae	
<i>Lomariopsis sorbifolia</i>	Caribbean endemic
<i>Nephrolepis biserrata</i>	Wide range
<i>Nephrolepis brownii</i>	Alien
<i>Nephrolepis rivularis</i>	Wide range
Lycopodiaceae	
<i>Huperzia acerosa</i>	Wide range
<i>Huperzia aqualupiana</i>	Wide range
<i>Huperzia dichotoma</i>	Wide range
<i>Huperzia linifolia</i>	Wide range
<i>Huperzia taxifolia</i>	Wide range
<i>Huperzia wilsonii</i>	Wide range
<i>Lycopodiella cernua</i>	Wide range
Marattiaceae	
<i>Danaea alata</i>	Caribbean endemic
<i>Danaea antillensis</i>	Less. Ant. endemic
Oleandraceae	
<i>Oleandra articulata</i>	Wide range
Ophioglossaceae	
<i>Ophioglossum harrisii</i>	Wide range

Family/ Scientific name	Status
Polypodiaceae	
<i>Campyloneurum brevifolium</i>	Wide range
<i>Campyloneurum cf. angustifolium</i>	Wide range
<i>Campyloneurum phyllitidis</i>	Wide range
<i>Campyloneurum repens</i>	Wide range
<i>Cochlidium seminudum</i>	Wide range
<i>Cochlidium serrulatum</i>	Wide range
<i>Lellingeria suspensa</i>	Wide range
<i>Microgramma lycopodioides</i>	Wide range
<i>Microgramma piloselloides</i>	Wide range
<i>Micropolypodium taenifolium</i>	Caribbean endemic
<i>Neurodium lanceolatum</i>	Wide range
<i>Niphidium crassifolium</i>	Wide range
<i>Pecluma pectinata</i>	Wide range
<i>Phlebodium aureum</i>	Wide range
<i>Pleopeltis astrolepis</i>	Wide range
<i>Pleopeltis polypodioides</i>	Wide range
<i>Serpocaulon dissimile</i>	Wide range
<i>Serpocaulon loriceum</i>	Wide range
<i>Serpocaulon triseriale</i>	Wide range
<i>Terpsichore aspleniifolia</i>	Wide range
Psilotaceae	
<i>Psilotum nudum</i>	Wide range
Pteridaceae	
<i>Acrostichum aureum</i>	Wide range
<i>Acrostichum danaeifolium</i>	Wide range
<i>Adiantopsis radiata</i>	Wide range
<i>Adiantum fragile</i>	Caribbean endemic
<i>Adiantum latifolium</i>	Wide range
<i>Adiantum obliquum</i>	Wide range
<i>Adiantum tetraphyllum</i>	Wide range
<i>Adiantum villosum</i>	Wide range
<i>Ananthacorus angustifolius</i>	Wide range
<i>Anetium citrifolium</i>	Wide range
<i>Hemionitis palmata</i>	Wide range
<i>Pityrogramma calomelanos</i>	Wide range
<i>Pityrogramma chrysophylla</i>	Caribbean endemic
<i>Polytaenium dussianum</i>	Wide range
<i>Polytaenium feei</i>	Wide range
<i>Pteris arborea</i>	Wide range
<i>Pteris longifolia</i>	Wide range
<i>Pteris tripartita</i>	Alien

Family/ Scientific name	Status
<i>Pteris vittata</i>	Alien
<i>Vittaria lineata</i>	Wide range
Saccolomataceae	Wide range
<i>Saccoloma inaequale</i>	Wide range
Schizaeaceae	
<i>Anemia adiantifolia</i>	Wide range
Selaginellaceae	
<i>Selaginella flabellata</i>	Wide range
<i>Selaginella plana</i>	Alien
<i>Selaginella rotundifolia</i>	Less. Ant. endemic
<i>Selaginella substipitata</i>	Wide range
<i>Selaginella tenella</i>	Wide range
Tectariaceae	
<i>Tectaria heracleifolia</i>	Wide range
<i>Tectaria incisa</i>	Wide range
<i>Tectaria plantaginea</i>	Wide range
<i>Tectaria trifoliata</i>	Wide range
Thelypteridaceae	
<i>Macrothelypteris torresiana</i>	Alien
<i>Thelypteris balbisii</i>	Wide range
<i>Thelypteris clypeolutata</i>	Less. Ant. endemic
<i>Thelypteris decussata</i>	Wide range
<i>Thelypteris dentata</i>	Alien
<i>Thelypteris extensa</i>	Alien
<i>Thelypteris germaniana</i>	Wide range
<i>Thelypteris glandulosa</i>	Wide range
<i>Thelypteris hispidula</i>	Caribbean endemic
<i>Thelypteris nephrodioides</i>	Wide range
<i>Thelypteris opposita</i>	Wide range
<i>Thelypteris pennata</i>	Wide range
<i>Thelypteris poiteana</i>	Wide range
<i>Thelypteris reticulata</i>	Wide range
<i>Thelypteris sancta</i>	Wide range
<i>Thelypteris tetragona</i>	Wide range
Woodsiaceae	
<i>Diplazium cristatum</i>	Wide range
<i>Diplazium limbatum</i>	Wide range
<i>Diplazium striatum</i>	Wide range
<i>Hemidictyum marginatum</i>	Wide range

Table C Beetles (Coleoptera) of Saint Lucia

Unpublished data from M. Ivie

Scientific name	Status	Scientific name	Status	Scientific name	Status
Carabidae					
<i>Aspidoglossa schach</i> (Fabricius)	Wide range	<i>Selenophorus discopunctatus</i> Dejean	Wide range	<i>Notomicrus</i> sp.	?
<i>Aspidoglossa cribrata</i> Putzeys	Wide range	<i>Selenophorus sinuatus</i> Gyllenhal	Caribbean endemic	Rhysodidae	
<i>Clivina</i> (<i>Paraclivina</i>) <i>marginipennis</i> Putzeys	Alien	<i>Selenophorus lator</i> Darlington	Caribbean endemic	<i>Clinidium</i> n. sp.	Saint Lucia endemic
<i>Clivina</i> (<i>Paraclivina</i>) <i>tuberculata</i> Putzeys	Alien	<i>Selenophorus striatopunctatus</i> Putzeys	Wide range	Hydrophilidae	
<i>Clivina</i> (<i>Semiclivina</i>) <i>oblita</i> Putzeys	Wide range	<i>Selenophorus parvus</i> Darlington	Caribbean endemic	<i>Berosus stribalis</i> d'Orchymont	Caribbean endemic
<i>Halocoryza arenaria</i> (Darlington)	Wide range	<i>Selenophorus chalybeus</i> Dejean	Caribbean endemic	<i>Enochrus bartlettii</i> Short	Caribbean endemic
<i>Micratopus</i> n. sp.	Wide range?	<i>Selenophorus</i> n.sp. <i>nonseriatus</i>	Saint Lucia endemic?	<i>Hydrophilus intermedius</i> Jac.DuVal	Wide range
<i>Megastylulus piva</i> Giachino & Sciaky	Saint Lucia endemic	<i>Loxandrus</i> sp. #1 <i>bicolored</i>	?	<i>Hydrobiomorpha phallica</i> (d'Orchymont)	Wide range
<i>Stylulus isabelae</i> Giachino & Sciaky	Saint Lucia endemic	<i>Loxandrus</i> n.sp. #2 <i>black flightless</i>	Saint Lucia endemic	<i>Helochares abbreviatus</i>	Wide range
<i>Pentagonica maculicornis</i> Bates	Wide range	<i>Paratachys</i> (<i>Eotachys</i>) <i>bleoides</i> (Jennel)	Alien	<i>Enochrus aequalis</i> (Sharp)	Wide range
<i>Pentagonica flavipes</i> LeConte	Wide range	<i>Paratachys</i> sp. 1	Wide range?	<i>Dactylosternum abdominalis</i> (Fabricius)	Wide range
<i>Dyscolus luciae</i> (Liebherr)	Saint Lucia endemic	<i>Paratachys</i> sp. 2	Wide range?	<i>Phaenonotum exstriatum</i> (LeConte)	Wide range
<i>Glyptolenus chalybaeus</i> (Dejean)	Alien	<i>Paratachys</i> sp. 3	Wide range?	<i>Ceryon variegatus</i> Sharp	Wide range
<i>Anchonoderus humeralis</i> Bates	Wide range	<i>Paratachys</i> sp. 4	Wide range?	<i>Paracymus delatus</i> Wooldridge	Caribbean endemic
<i>Calleida amethystine</i> (Fabricius)	Alien	<i>Paratachys</i> sp. 5	Wide range?	<i>Pelosoma</i> sp.	?
<i>Colliuris</i> sp.	Wide range?	<i>Paratachys</i> sp. 6	Wide range?	<i>Aculomicrus</i> n.sp.	Saint Lucia endemic?
<i>Pachyteles</i> sp.	Wide range?	<i>Mioptachys</i> n. sp.	Saint Lucia endemic?	<i>Omicrus palmarum</i> (Schwarz)	Caribbean endemic
<i>Cicindella suturalis</i> Fabricius	Wide range	Halipidae		<i>Hydrophidid</i> genus?	Wide range?
<i>Brasiella argentata</i> (Fabricius)	Wide range	<i>Halipus gravidus</i> Aubé	Wide range	<i>Oosternus costatum</i> Sharp	Wide range
<i>Lebia marginicollis</i> Dejean	Wide range	Dytiscidae		<i>Tropisternus lateralis</i> (Fabricius)	Wide range
<i>Lebia</i> sp.		<i>Copelatus posticatus</i> Fabricius	Wide range	<i>Tropisternus</i> sp.	Wide range?
<i>Apenes marginalis</i> Dejean	Wide range	<i>Copelatus</i> sp.		<i>Paracymus confusus</i> Wooldridge	Wide range
<i>Apenes variegata</i> Dejean	Wide range	<i>Laccophilus proximus</i> Say	Wide range	Histeridae	
<i>Apenes</i> n. sp. <i>Ball and Shpley</i>	Saint Lucia endemic	<i>Laccophilus</i> sp. <i>not proximus</i>	Wide range	<i>Peromalus</i> sp.	?
<i>Thalpius</i> sp.	Wide range?	<i>Hydrovatus pustulatus</i> Melsheimer	Wide range	<i>Omalodes</i> sp.	?
<i>Perileptus dentifer</i> Darlington	Caribbean endemic	<i>Megadytes fraternus</i> Sharp	Wide range	<i>Euspilotus</i> sp. #1	?
<i>Phloeoxena</i> n. sp.	Saint Lucia endemic?	<i>Thermonectes basilaris</i> (Harris)	Wide range	<i>Euspilotus</i> sp. #2	?
<i>Athroctictus paganus</i> Dejean	Wide range	<i>Celina</i> sp.	?	<i>Bacanius</i> sp. #1	?
<i>Selenophorus alternans</i>	Wide range	Noteridae		<i>Bacanius?</i> sp. #2	?
		<i>Suphisellus binotatus</i> (Fleutiaux & Sallé)	Caribbean endemic	<i>Bacanius?</i> sp. #3	?
		<i>Mesonoterus?</i> Sp.	?		

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Scientific name	Status
<i>Bacanius? sp. #4</i>	?
<i>Bacanius? sp. #5</i>	?
<i>Aeletes sp.</i>	?
<i>Teretriosoma sp.</i>	?
<i>Hololepta sp.</i>	?
<i>Hister servus</i> Erichson	Wide range
Hydraenidae	
<i>Hydraena guadelupensis d'Orchymont</i>	Wide range
Ptiliidae	
<i>Ptiliid # 1+</i>	Wide range?
<i>Ptiliid # 2</i>	Wide range?
<i>Ptiliid # 3</i>	Wide range?
<i>Ptiliid # 4</i>	Wide range?
Leiodidae	
<i>Zeadolopus sp. #1 smooth striae</i>	Saint Lucia endemic?
<i>Zeadolopus sp. #2 impressed striae</i>	Saint Lucia endemic?
<i>Zeadolopus sp. #3 no striae</i>	Saint Lucia endemic?
<i>Aglyptinus sp. #1 small black</i>	Saint Lucia endemic?
<i>Aglyptinus sp. #2 large brown</i>	Saint Lucia endemic?
<i>Aglyptinus sp. #3 brown w/ setae on elytra</i>	Saint Lucia endemic?
<i>Aglyptinus sp. #4 metallic</i>	Saint Lucia endemic?
<i>Dissochaetus sp.</i>	Saint Lucia endemic?
<i>Creagrophorus sp.</i>	Saint Lucia endemic?
Scydmaenidae	
<i>Scydmaenus sp.</i>	Saint Lucia endemic?
<i>Microscydms sp.</i>	Saint Lucia endemic?
<i>Euconnus sp. 1</i>	Saint Lucia endemic?
<i>Euconnus sp. 2</i>	Saint Lucia endemic?
<i>Euconnus sp. 3</i>	Saint Lucia endemic?
<i>Euconnus sp. 4</i>	Saint Lucia endemic?
<i>Euconnus sp. 5</i>	Saint Lucia endemic?
<i>Euconnus sp. 6</i>	Saint Lucia endemic?
Staphylinidae	
<i>Adinopsis myllaenoides</i> Kraatz	Wide range

Scientific name	Status
<i>Atheta conformis</i> Erichson	Wide range
<i>Atheta (Datomicra) egesta</i> Pace	Saint Lucia endemic
<i>Atheta lurida</i> (Erichson)	Wide range
<i>Aleochara (Coprochara) notula</i> Erichson	Wide range
<i>Gyrophaena (Agaricomorpha) angulifera</i> Pace	Saint Lucia endemic
<i>Gnyptosoma basalis</i> Cam.	Wide range
<i>Gyrophaena (Phanerota) fasciata</i> (Say)	Wide range
<i>Gyrophaena (Agaricomorpha) ferrariae</i> Pace	Saint Lucia endemic
<i>Gyrophaena (Gyrophaena) luciensis</i> Pace	Saint Lucia endemic
<i>Gyrophaena (Agaricochara) mahunkai</i> Pace	Saint Lucia endemic
<i>Gyrophaena oblita</i> Shp.	Wide range
<i>Gyrophaena (Agaricomorpha) pivai</i> Pace	Saint Lucia endemic
<i>Gnyptosoma sanctae-luciae</i> Cam.	Saint Lucia endemic
<i>Gyrophaena (Eumicrota) semisocia</i> Pace	Saint Lucia endemic
<i>Heterostiba pivaiana</i> Pace	Saint Lucia endemic
<i>Hypocyphus ferrariae</i> Pace	Saint Lucia endemic
<i>Macrogerodonia pivai</i> Pace	Saint Lucia endemic
<i>Myllaena fragilis</i> Shp.	Wide range
<i>Myllaena indefatigabilis</i> Cam.	Saint Lucia endemic
<i>Myllaena potawatomi</i> Klimaszewski	Caribbean endemic
<i>Stethusa lurida</i> Erichson	Wide range
<i>Pseudespeson crassulus</i> (Fauvel)	Less. Antill. endemic
<i>Espeson moratus</i> Schauf.	Wide range
<i>Falagria (Leptagria) perexilis</i> (Casey)	Wide range
<i>Lispinus catena</i> Sharp	Wide range
<i>Clavilispinus megacephalus</i> (Fauvel)	Wide range
<i>Clavilispinus exiguus</i> (Erichson)	Wide range
<i>Clavilispinus politus</i> (Sharp)	Wide range
<i>Tannea tenellus</i> (Erichson)	Wide range
<i>Nacaeus nigrifrons</i> (Chevrolat and Fauvel)	Wide range
<i>Thoracophorus exilis</i> (Erichson)	Caribbean endemic

Scientific name	Status
<i>Thoracophorus guadelupensis</i> Cameron	Wide range
<i>Thoracophorus simplex</i> Wendeler	Caribbean endemic
<i>Anotylus insignitus</i> (Gravenhorst)	Wide range
<i>Carpelimus beattyi</i> Blackwelder	Caribbean endemic
<i>Carpelimus correctus</i> Blackwelder	Wide range
<i>Carpelimus flavipes</i> Erichson	Wide range
<i>Oligota (Holobus) centralis</i> Sharp	Alien?
<i>Oxytelus incisus</i> Motschulsky	Wide range
<i>Platystethus spiculus</i> Erichson	Wide range
<i>Trogactus (Carpelimus) cornucopius</i> Blackwelder	Caribbean endemic
<i>Astenus cinctiventris</i> Shp.	Wide range
<i>Lithocharis dorsalis</i> Er.	Wide range
<i>Lithocharis limbata</i> Erichson	Wide range
<i>Lithocharis secunda</i> Blackwelder	Caribbean endemic
<i>Lithocharis sororcula</i> Kr.	Caribbean endemic
<i>Lathrobium nitidum</i> Erichson	Wide range
<i>Medon johni</i> Blackwelder	Caribbean endemic
<i>Scopaeus antennalis</i> Cam.	Caribbean endemic
<i>Scopaeus arena</i> Blackwelder	Saint Lucia endemic
<i>Scopaeus boxi</i> Blackwelder	Saint Lucia endemic
<i>Scopaeus potamus</i> Blackwelder	Saint Lucia endemic
<i>Scopaeus pygmaeus</i> Erichson	Caribbean endemic
<i>Scopobium anthracinum</i> Cam.	Less. Antill. endemic
<i>Stilomedon connexum</i> (Sharp)	Wide range
<i>Sunius debilicornis</i> Woll.	Wide range
<i>Sunius oblitus</i> Erichson	Wide range
<i>Thiniocharis exilis</i> (Erichson)	Wide range
<i>Thiniocharis smithi</i> Cameron	Less. Antill. endemic
<i>Piestus erythropus</i> Erichson	Wide range
<i>Piestus penicillatus</i> Dalman	Wide range
<i>Piestus pygmaeus</i> Laporte	Wide range
<i>Piestus sulcatus</i> Gravenhorst	Wide range
<i>Belonuchus amplus</i> Blackwelder	Saint Lucia endemic
<i>Belonuchus mundus</i> Erichson	Less. Antill. endemic

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Scientific name	Status
<i>Cafius bistrriatus</i> (Erichson)	Wide range
<i>Diochus nanus</i> Erichson	Wide range
<i>Neobisnius funerulus</i> Cameron	Less. Antill. endemic
<i>Holisus debilis</i> Erichson	Caribbean endemic
<i>Holisus guildingi</i> Erichson	Caribbean endemic
<i>Neobisnius ludicrus</i> Erichson	Wide range
<i>Neohypnus</i> (<i>Xantholinus</i>) <i>illucens</i> Erichson	Wide range
<i>Philonthus ventralis</i> (Gravenhorst)	Wide range
<i>Coproporus cacao</i> Blackwelder	Wide range
<i>Coproporus ebonus</i> Blackwelder	Caribbean endemic
<i>Coproporus pulchellus</i> (Erichson)	Wide range
<i>Coproporus sharpi</i> Cam.	Less. Antill. endemic
Passalidae	
<i>Passalus unicornis</i> Lepeltier and Audinet-Serville	Wide range
<i>Spasalus crenatus</i> (Macleay)	Wide range
Trogidae	
<i>Omorgus suberosus</i> (Fabricius)	Alien
Hybosoridae	
<i>Germarostes rufopiceus</i> (Arrow)	Less. Antill. endemic
<i>Ceratocanthus</i> n.sp.	Saint Lucia endemic
Geotrupidae	
<i>Neoathyreus ?lanei</i> Martínez	Wide range
Scarabaeidae	
<i>Aphodius cuniculus</i>	Alien
<i>Nialaphodius nigrinus</i>	Alien
<i>Ataenius luteomargo</i>	Alien?
<i>Ataenius attenuator</i>	Alien?
<i>Ataenius liogaster</i>	Alien?
<i>Ataenius morator</i>	Alien?
<i>Ataenius strigicauda</i>	Alien?
<i>Ataenius scutellaris</i>	Alien?
<i>Ataenius</i> sp? <i>beattyi-camenis</i> group	Saint Lucia endemic?
<i>Ataenius carinator</i> Harold	Wide range or Alien
<i>Iguazua blackwelderi</i> (Chapin)	Wide range

Scientific name	Status
<i>Saprosites exaratus</i> Fleutiaux & Sallé	Less. Antill. endemic
<i>Ateuchus luciae</i> Matthews	Saint Lucia endemic
<i>Pseudocanthon iuanalaoi</i> Matthews	Saint Lucia endemic
<i>Onthophagus gazellae</i> (F.)	Alien
<i>Chalepides barbatus</i> (F.)	Wide range
<i>Dynastes hercules reidi</i> Chalumeau	Less. Antill. endemic
<i>Cyclocephala tridentata</i> (F.)	Wide range
<i>Cyclocephala melanocephala</i> (F.)	Wide range
<i>Tomarus ebenus</i> DeGeer	Wide range
<i>Tomarus cuniculus</i> (F.)	Wide range
<i>Phileurus valgus</i> (Linneaus)	Wide range
<i>Phileurus didymus</i> (Linneaus)	Wide range
<i>Rutela striata antiqua</i> Ohaus	Less. Antill. endemic
<i>Anomala luciae</i> Blanchard	Less. Antill. endemic
<i>Leucothyreus luciae</i> B33	Saint Lucia endemic
<i>Paragymnetis rudolphi</i> Frölich	Saint Lucia endemic
<i>Phyllophaga blackwelderi</i> Saylor	Saint Lucia endemic
<i>Phyllophaga</i> n. sp.	Saint Lucia endemic
Scirtidae	
<i>Cyphon</i> sp. 1	Wide range?
<i>Cyphon</i> sp. 2	Wide range?
<i>Ora</i> sp.1	Wide range?
<i>Ora</i> sp.2	Wide range?
<i>Ora</i> sp.3	Wide range?
<i>Ora</i> sp.4	Wide range?
<i>Scirtes</i> sp.1	Wide range?
Buprestidae	
<i>Neotrachys fennahi</i> Théry	Less. Antill. endemic
<i>Acmaeodera villiersi</i> Descarpentiers	Less. Antill. endemic
<i>Polycesta depressa</i> Linn.	Caribbean endemic
<i>Chrysobothris</i> n.sp.	Saint Lucia endemic
<i>Aphanisticus cochinchinae</i>	Alien
<i>Spectralia</i> n.sp.	Saint Lucia endemic?
" <i>Micrasta</i> " <i>uniformis</i>	Caribbean endemic
Elmidae	

Scientific name	Status
<i>Hexanchorus caraibus</i> Coquerel	Less. Antill. endemic
<i>Hexacylloepus smithi</i> (?) Grouvelle	Less. Antill. endemic
<i>Hexacylloepus</i> n. sp.	Saint Lucia endemic
Limnichidae	
<i>Corrinea</i> n.sp.	Saint Lucia endemic?
Heteroceridae	
<i>Tropicus</i> sp.	Wide range?
Cneoglossidae	
<i>Cneoglossa</i> n.sp.	Saint Lucia endemic
Ptilodactylidae	
<i>Lachnodactyla</i> sp.	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #1	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #2	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #3	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #4	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #5	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #6	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #7	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #8	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #9	Saint Lucia endemic?
<i>Ptilodactyla</i> sp. #10	Saint Lucia endemic?
Chelonariidae	
<i>Chelonarium</i> sp.	Wide range?
Callirhipidae	
<i>Callirhipis Iherminieri</i> LaPorte	Less. Antill. endemic
Elateridae	
<i>Chalcolepidius validus</i> Candèze	Less. Antill. endemic
<i>Lygelater ignitus</i> Fabricius	Wide range
<i>Ignelater luminosus</i> Illiger	Caribbean endemic
<i>Pyrophorus mellifluus</i> Costa	Caribbean endemic?
<i>Pyrophorus mellitus</i> Costa	Saint Lucia endemic?
<i>Lissomus</i> sp.	Wide range?
<i>Dicrepidius</i> sp. #1	Wide range?
<i>Dicrepidius</i> sp. #2	Wide range?
<i>Elaterid</i> #1	Wide range?

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Scientific name	Status
<i>Elaterid #2</i>	Wide range?
<i>Elaterid #4</i>	Wide range?
<i>Elaterid #3</i>	Wide range?
<i>Elaterid #5</i>	Wide range?
<i>Elaterid #6</i>	Wide range?
<i>Elaterid #7</i>	Wide range?
<i>Elaterid #8</i>	Wide range?
Eucnemidae	
<i>Eucnemid #1</i>	Wide range?
<i>Eucnemid #2</i>	Wide range?
<i>Eucnemid #3</i>	Wide range?
<i>Eucnemid #4</i>	Wide range?
<i>Eucnemid #5</i>	Wide range?
<i>Eucnemid #6</i>	Wide range?
Lampyridae	
<i>Aspisoma insperatum</i> E. Olivier	?
<i>Photinus santaelucia</i> McDermott	Saint Lucia endemic
<i>Aspisoma ignium</i> (L.)	Alien
<i>Lucidota</i> sp.	Saint Lucia endemic
<i>Photuris</i> (? Diurnal)	Saint Lucia endemic
<i>Photinus</i> sp. #1	Saint Lucia endemic
<i>Rhobopus</i> sp.	Saint Lucia endemic
Lycidae	
<i>Mesopteron sulphureum</i> (Kleine)	Saint Lucia endemic
Cantharidae	
<i>Tylocerus</i> sp.	Saint Lucia endemic
<i>Tytthonyx</i> sp. #1	Saint Lucia endemic
<i>Tytthonyx</i> sp. #2	Saint Lucia endemic
<i>Tytthonyx</i> sp. #3	Saint Lucia endemic
Dermestidae	
<i>Attagenus</i> sp.	Wide range?
Bostrichidae	
<i>Amphicerus cornutus</i> (Pallas)	Alien
<i>Xylomeira tridens</i> (Fabricius)	Alien
<i>Tetrapriocera longicornis</i> (Olivier)	Alien

Scientific name	Status
<i>Melalgus caribeanus</i> Lesne	Less. Antill. endemic
<i>Lyctus caribea</i> Lesne	Caribbean endemic
<i>Lyctus</i> sp.	Alien
<i>Dinoderus</i> sp.	Alien
Anobiidae	
<i>Ptinus</i> sp.	Wide range?
<i>Lasioderma</i> sp.	Wide range?
<i>Protheca</i> sp.	Wide range?
<i>Tricorynus</i> sp. 1	Wide range?
<i>Tricorynus</i> sp. 2	Wide range?
<i>Tricorynus</i> sp. 3	Wide range?
<i>Petalium</i> sp.	Wide range?
<i>Cryptoramorphus</i> ? sp.	Wide range?
<i>Cryptorama</i> sp. 1	Wide range?
<i>Cryptorama</i> sp. 2	Wide range?
<i>Cryptorama</i> sp. 3	Wide range?
<i>Calymmaderus</i> sp.	Wide range?
Cleridae	
<i>Neorthopleura murina</i> (Klug)	Wide range
<i>Clerid</i> sp.	Saint Lucia endemic?
Trogositidae	
<i>Temnochila obscura</i> Reitter	Less. Antill. endemic
<i>Tenebroides</i> sp. #1	Wide range?
<i>Tenebroides</i> sp. #2	Wide range?
<i>Colydobius</i> sp.	Wide range?
Melyridae	
<i>Ablechrus</i> sp. #1	Wide range?
<i>Ablechrus</i> sp. #2	Wide range?
<i>Ablechrus</i> sp. nr. <i>Nigrocoeruleus</i>	Less. Antill. endemic?
<i>Melyrodes</i> n. sp.	Saint Lucia endemic?
Lymexylidae	
<i>Atractocerus brasiliensis</i> Lepeletier & Audinet Ser.	Wide range
Smicripidae	
<i>Smicrips</i> sp.	Wide range?

Scientific name	Status
Monotomidae	
<i>Monotoma</i> sp.	Alien
<i>Europs</i> sp. 1	Wide range?
<i>Europs</i> sp. 2	Wide range?
Nitidulidae	
<i>Carpophilus</i> sp. 1	Wide range?
<i>Carpophilus</i> sp. 2	Wide range?
<i>Carpophilus</i> sp. 3	Wide range?
<i>Euparea luteolus</i> (Fabricius)	Alien
<i>Lobiopa insularis</i> (Castelnau)	Wide range
<i>Stelidota</i> sp. 1	Wide range?
<i>Stelidota</i> sp. 2	Wide range?
<i>Colopterus</i> sp. 1	Wide range?
<i>Colopterus</i> sp. 2	Wide range?
<i>Conotelus</i> sp.	Wide range?
Silvanidae	
<i>Cathartosilvanus</i> sp.	Wide range?
<i>Telephanus</i> sp. 1	Saint Lucia endemic
<i>Telephanus</i> sp. 2	Saint Lucia endemic
<i>Cathartus</i> sp.	Wide range?
<i>Ahasverus</i> sp.	Wide range?
Laemophloeidae	
<i>Laemophloeus</i> sp. 1	Wide range?
<i>Laemophloeus</i> sp. 2	Wide range?
<i>Laemophloeus</i> sp. 3	Wide range?
<i>Phloeolaemus</i> sp. 1	Wide range?
<i>Phloeolaemus</i> sp. 2	Wide range?
<i>Placonotus</i> sp.	Wide range?
<i>Dysmerus</i> sp.	Wide range?
<i>Lepidophloeus</i> sp.	Wide range?
<i>Cryptolestes</i> sp.	Wide range?
<i>Laemo?</i> Sp.	Wide range?
Phalacridae	
<i>Acylopus</i> sp. 1	Wide range?
<i>Acylopus</i> sp. 2	Wide range?

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Scientific name	Status
<i>Acylomus sp. 3</i>	Wide range?
<i>Xanthacomus sp.</i>	Wide range?
Bothrideridae	
<i>Sosylus sp.</i>	Wide range?
<i>Bothrideres sp.</i>	Wide range?
Endomychidae	
<i>Eiodereus sp.</i>	Alien
" <i>Micropsephodes</i> " <i>sp.</i>	Saint Lucia endemic?
<i>Adamia n. sp. or n. genus</i>	Saint Lucia endemic
Erotyliidae	
<i>Ischyrus quadripunctatus (Olivier)</i>	Wide range
<i>Hapalips sp.</i>	Wide range?
<i>Loberus sp. #1</i>	Wide range?
<i>Toramus sp. #1</i>	Wide range?
<i>Toramus sp. #2</i>	Wide range?
<i>Platoberus dufauai Grouvelle</i>	Less. Antill. endemic
Coccinellidae	
<i>Diomus roseicollis (Mulsant)</i>	Alien
<i>Diomus sp. 1</i>	Wide range?
<i>Diomus sp. 2</i>	Wide range?
<i>Diomus sp.3</i>	Wide range?
<i>Diomus sp. 4</i>	Wide range?
<i>Diomus sp. 5</i>	Wide range?
<i>Cladis nitidula (Fabricius)</i>	Caribbean endemic
<i>Nephaspis equuleus Gordon</i>	Less. Antill. endemic?
<i>Nephaspis sp. 1</i>	Wide range?
<i>Nephaspis sp. 2</i>	Wide range?
<i>Stethorus caribus Gordon & Chapin</i>	Caribbean endemic
<i>Pseudoazya trinitatis Marshall</i>	Alien
<i>Cycloneda sanguinea</i>	Wide range
<i>Coleophora inaequalis (Fabricius)</i>	Alien
<i>Chilocorus cacti (Linneaus)</i>	Wide range
<i>Coleomegilla sp.</i>	Wide range?
<i>Exochomus sp.</i>	?

Scientific name	Status
<i>Exoplectra sp.</i>	?
<i>Hyperaspis sp.</i>	Wide range?
<i>Psyllobora parvinotata Casey</i>	?
<i>Delphastus n.sp. nr. nebulosus</i>	Saint Lucia endemic
<i>Delphastus sp.</i>	Saint Lucia endemic?
<i>Decadiomus sp. 1</i>	Wide range?
<i>Scotoscymnus sp. 1</i>	Wide range?
<i>Nephus sp. 1</i>	Wide range?
<i>Orthoperus sp.</i>	Wide range?
<i>Arthrolips sp. 1</i>	Wide range?
<i>Arthrolips sp. 2</i>	Wide range?
<i>Holopsis sp.</i>	Wide range?
<i>Sericoderus sp.</i>	Wide range?
<i>Genus 1? sp.</i>	Wide range?
<i>Genus 2? sp.</i>	Wide range?
Cerylonidae	
<i>Philothermus sp.</i>	Wide range?
<i>Botrodus sp.</i>	Wide range?
<i>Metacerylon sp.</i>	Wide range?
<i>Mychocerus sp. 1</i>	Wide range?
<i>Mychocerus sp. 2</i>	Wide range?
Latridiidae	
<i>Latridiid sp. #1</i>	?
<i>Caserus sp.</i>	?
Ciidae	
<i>Ceracis furcatus</i>	Wide range
<i>Ceracis pullulus Casey</i>	Wide range
<i>Ceracis sp. #1</i>	Wide range?
<i>Cis mellei Cockerel</i>	Wide range
<i>Cis cerberrimus Mellié</i>	Wide range
<i>Cis sp. #1</i>	Wide range?
<i>Cis sp. #2</i>	Wide range?
<i>Cis sp. #3</i>	Wide range?
<i>Cis sp. #4</i>	Wide range?
<i>Cis sp. #5</i>	Wide range?

Scientific name	Status
<i>Cis sp. #6</i>	Wide range?
<i>Cis sp. #7</i>	Wide range?
<i>Cis sp. #8</i>	Wide range?
<i>Scolytocis cariborum Lopes-Andrade</i>	Less. Antill. endemic
Mycetophagidae	
<i>Litargus sp. 1</i>	Wide range?
<i>Litargus sp. 2</i>	Wide range?
Meloidae	
<i>Pseudozonitis marginata (Fabricius)</i>	Caribbean endemic
<i>Pseudozonitis obscuricornis (Chevrolat)</i>	Caribbean endemic
Salpingidae	
<i>Inopeplus assitans Blackwelder</i>	Saint Lucia endemic
<i>Inopeplus smooth head dark antennomeres</i>	Saint Lucia endemic
<i>Serrotibia iviei Escalona</i>	Saint Lucia endemic
<i>nr. Sosthenes</i>	Saint Lucia endemic?
<i>Prostomininae sp. #1</i>	Saint Lucia endemic?
<i>Prostomininae sp. #2</i>	Saint Lucia endemic?
<i>Prostomininae sp. #3</i>	Saint Lucia endemic?
Oedemeridae	
<i>Oxycopsis sp. 1</i>	Wide range?
<i>Oxycopsis nr. quadrilineata</i>	Saint Lucia endemic
<i>Hypasclera sp. 1</i>	Wide range?
<i>Paroxacis sp.</i>	Wide range?
<i>Ascalera sp. 1</i>	Saint Lucia endemic
<i>Ascalera sp. 2</i>	Saint Lucia endemic
<i>Ascalera sp. 3</i>	Saint Lucia endemic
Mordellidae	
<i>Gliptostenoda sp.1</i>	Wide range?
<i>Mordellistena sp.1</i>	Wide range?
<i>Falsomordellistena sp.1 ?</i>	Wide range?
<i>Gliptostenoda sp.2</i>	Wide range?
<i>Tolidomordella sp. 1</i>	Wide range?
<i>Falsomordellistena sp.2 ?</i>	Wide range?
<i>Falsomordellistena sp. 3 ?</i>	Wide range?

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Scientific name	Status
Rhipiphoridae	
<i>Macrosiagon sp.1</i>	Wide range?
<i>Macrosiagon sp.2</i>	Wide range?
Colydiidae	
<i>Synchita sp.</i>	Wide range?
<i>Lasconotus sp.</i>	Wide range?
<i>Monoedus sp.</i>	Wide range?
<i>Nematidium sp.</i>	Wide range?
<i>Eucicones sp.</i>	Wide range?
<i>Paha sp.</i>	Wide range?
<i>Bitoma sp.</i>	Wide range?
<i>Eulachus sp.</i>	Wide range?
<i>Plagiopie sp.</i>	Saint Lucia endemic?
Zopheridae	
<i>Pycnomerus n. sp.</i>	Saint Lucia endemic
<i>Pycnomerus infimus (Grouvelle)</i>	Less. Antill. endemic
<i>Pycnomerus uniformis Ivie & Slipinski</i>	Less. Antill. endemic
<i>Pycnomerus biimpressus Reitter</i>	Wide range
Tenebrionidae	
<i>Alegoria dilatata</i>	Alien
<i>Ammodonus ciliatus Champion</i>	Wide range
<i>Opatrinus (O.) clathratus</i>	Wide range
<i>Phaleria fulva Fleutiaux & Salle</i>	Wide range
<i>Phaleria testacea Say</i>	Wide range
<i>Uloma parvula Champion</i>	Less. Antill. endemic
<i>Uloma retusa (Fabricius)</i>	Wide range
<i>Palembus ocularis ?</i>	Alien
<i>Cymatothes tristis LaPorte</i>	Alien
<i>Cyrtosoma n.sp.</i>	Saint Lucia endemic
<i>Zypoetes ?</i>	?
<i>Dioedus sp. w/2 seg club</i>	Wide range?
<i>Dioedus sp. w/3 seg club</i>	Wide range?
<i>Archeoglenes n. sp.</i>	Saint Lucia endemic
<i>Talanus sp.#1</i>	Saint Lucia endemic?
<i>Talanus sp.#2</i>	Saint Lucia endemic?

Scientific name	Status
<i>Ortheolus sp. nr. antillarum (Champion)</i>	Wide range
<i>Patydema s. prob. apicenotatum Champion</i>	Less. Antill. endemic?
<i>Diaperis maculata Olivier</i>	Wide range
<i>Gondwanocrypticus prob. undatus (Champion)</i>	Less. Antill. endemic?
<i>Blapstinus (Diastolinus) n.sp.</i>	Saint Lucia endemic
<i>Lorelus sp.</i>	Wide range?
<i>Lorelopsis sp.</i>	Wide range?
<i>Lorelus sp. small eyes</i>	Saint Lucia endemic
<i>Tyrtaeus rufus</i>	Alien
<i>Corticeus sp.</i>	Wide range?
<i>Alphitobius laevigatus (Fabricius)</i>	Alien
<i>Rhipidandrus cornutus (Arrow)</i>	Wide range
<i>Zophobas sp.</i>	Alien
<i>Lystronychus n. sp.</i>	Saint Lucia endemic
<i>Lobopoda n. sp.#1</i>	Saint Lucia endemic
<i>Lobopoda n. sp.#2</i>	Saint Lucia endemic
<i>Statria n. sp.</i>	Saint Lucia endemic
<i>Adelina sp.</i>	Wide range?
<i>Cryptozoon n.sp.</i>	Saint Lucia endemic
<i>Gnatocerus sp.</i>	Alien
<i>Trachyscleis aphodiodes Latreille</i>	Alien
<i>Hesiotes n. sp.</i>	Saint Lucia endemic
Anthicidae	
<i>Anthicinae sp.</i>	?
<i>Mecynotarsus prob. shenklingi Pic</i>	Wide range
Aderidae	
<i>Zonanthes sp.</i>	Wide range?
<i>Ganascus sp. 1</i>	Wide range?
<i>Ganascus sp. 2</i>	Wide range?
<i>Ganascus sp. 3</i>	Wide range?
<i>Pseudariotes sp. 1</i>	Wide range?
<i>Pseudariotes sp. 2</i>	Wide range?
Cerambycidae	

Scientific name	Status
<i>Hesperandra glabra (DeGeer)</i>	Wide range
<i>Mallodon spinibarbis (Linnaeus)</i>	Wide range
<i>Solenoptera luciae (Lameere)</i>	Saint Lucia endemic
<i>Solenoptera canaliculata (Fabricius)</i>	Less. Antill. endemic
<i>Strongylapsis corticarius (Erichson)</i>	Wide range
<i>Chlorida festiva Linnaeus</i>	Alien
<i>Achryson surinamum (Linnaeus)</i>	Alien
<i>Methia necydalea (Fabricius)</i>	Wide range
<i>Bonfilsia n. sp.</i>	Saint Lucia endemic
<i>Nesanoplium dalensi Chalumeau & Tourout n. gen. n. sp.</i>	Saint Lucia endemic
<i>Curtomerus flavus Fabricius</i>	Alien
<i>Caribbomerus nr. attenuatus</i>	Wide range
<i>Neocompsa cylindricollis (F.)</i>	Wide range
<i>Mionochroma elegans (Olivier)</i>	Less. Antill. endemic
<i>Mionochroma rufescens</i>	Caribbean endemic
<i>Eburia n. sp.</i>	Saint Lucia endemic
<i>Eburia insulana Gahan</i>	Less. Antill. endemic
<i>Eburia inermis (Fleutiaux & Sallé)</i>	Less. Antill. endemic
<i>Stizocera daudini Chalumeau & Tourout</i>	Less. Antill. endemic
<i>Elaphidion glabratum</i>	Caribbean endemic
<i>Ochrus ornatus</i>	Wide range
<i>Taniotes leucogrammus Thompson</i>	Less. Antill. endemic
<i>Paraclymntemnestra lineata (Fisher)</i>	Saint Lucia endemic
<i>Oncideres amputator (F.)</i>	Caribbean endemic
<i>Carnedes n. sp.</i>	Saint Lucia endemic
<i>Mimestoloides bernardi Breuning</i>	Less. Antill. endemic
<i>Drycothea guadeloupensis Fleutiaux & Sallé</i>	Less. Antill. endemic
<i>Trestonia fulgerata Buquet</i>	Less. Antill. endemic
<i>Cacostola ornata Feutiaux & Sallé</i>	Less. Antill. endemic
<i>Ecyrus hirtipes (Gahan)</i>	Caribbean endemic
<i>Adetus Iherminieri (Fleutiaux & Sallé)</i>	Less. Antill. endemic
<i>Descarthis stephenii Hope</i>	Less. Antill. endemic

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Scientific name	Status
<i>Mesestola guadeloupensis</i> Breuning	Less. Antill. endemic
<i>Desmiphora hirticollis</i> (Olivier)	Wide range
<i>Bisaltes?</i> Reared from <i>Capsicum</i>	Wide range
<i>Steirastoma breve</i> (Sulzer)	Alien
<i>Oreodera glauca</i> (L.)	Alien
<i>Lagochierus araeiformis</i> (L.)	Wide range
<i>Oedopeza fleutiauxi</i> (Villiers)	Less. Antill. endemic
<i>Trypanidium spilmani</i> Villiers	Less. Antill. endemic
<i>Styloleptus posticalus</i>	Less. Antill. endemic
<i>Amniscus assimilis</i> (Gahan)	Less. Antill. endemic
<i>Amniscus similis</i> (Gahan)	Caribbean endemic
<i>Leptostylopsis martinicensis</i> Villiers	Less. Antill. endemic
<i>Urgleptes guadeloupensis</i> (Fleutiaux & Sallé)	Wide range
<i>Hypsoma grisea</i> (Fleutiaux & Sallé)	Less. Antill. endemic
Chrysomelidae	
<i>Bruchinae</i> #1	Wide range?
<i>Bruchinae</i> #2	Wide range?
<i>Chalepus</i> prob. n. sp.	Saint Lucia endemic
<i>Chalepus sangunicollis</i> (Linnaeus)	Wide range
<i>Charidotella</i> prob. n. sp.	Saint Lucia endemic
<i>Charidotella sexpunctata sexpunctata</i> (Fabricius)	Wide range
<i>Chelymorpha cribraria</i> (Fabricius)	Wide range
<i>Deloyala guttata</i> (Olivier)	Wide range
<i>Hilarocassis exclamationis</i> (Linnaeus)	Wide range
<i>Lema ? hamata</i> Lacordaire	Wide range
<i>Lema ? n. sp.</i>	Saint Lucia endemic
<i>Lema ? vittatipennis</i> Baley	Wide range
<i>Neolema dorsalis</i> (Olivier)	Wide range
<i>Oulema obscura</i> (Fabricius)	Wide range
<i>Cryptocephalus ? ovatus</i> Fleuteaux	Less. Antill. endemic
<i>Cryptocephalus</i> prob. n. sp. #1 (near <i>perspicax</i>)	Saint Lucia endemic
<i>Exema</i> prob. n. sp.	Saint Lucia endemic
<i>Griburius</i> prob. n. sp.	Saint Lucia endemic

Scientific name	Status
<i>Pachybrachis ? n. sp. 1</i>	Saint Lucia endemic
<i>Pachybrachis ? n. sp. 2</i>	Saint Lucia endemic
<i>Pachybrachis scabripennis</i> Jacoby	Less. Antill. endemic
<i>Triachus</i> n. sp.	Saint Lucia endemic
" <i>Alethaxius</i> " <i>dominiccae</i> Blake	Less. Antill. endemic
? <i>Tymnes</i> prob. n. sp.	Saint Lucia endemic
<i>Colaspis luciae</i> Blake	Saint Lucia endemic
<i>Metachroma</i> n. sp.	Saint Lucia endemic
<i>Rhabdopterus grenadensis</i> Bowditch	Less. Antill. endemic
" <i>Aphthona</i> " <i>insularis</i> Blake	Less. Antill. endemic
" <i>Aphthona</i> " <i>maculipennis</i> Jacoby	Wide range
? <i>Guadeloupena</i> n. sp.	Saint Lucia endemic
<i>Acalymma innubum</i> (Fabricius)	Wide range
<i>Aedemon</i> prob. n. sp. 1	Saint Lucia endemic
<i>Aedmon</i> prob. n. sp. 2	Saint Lucia endemic
<i>Altica</i> sp. near <i>occidentalis</i> (Suffrian)	Wide range
<i>Cerotoma ruficornis ruficornis</i> (Olivier)	Wide range
<i>Chaetocnema perplexa</i> Blake	Caribbean endemic
<i>Diabrotica luciana</i> Blake	Saint Lucia endemic
<i>Diabrotica sinuata</i> (Olivier)	Wide range
<i>Epitrix fasciata</i> Blatchley	Wide range
<i>Heikertingerella</i> prob. n. sp.	Saint Lucia endemic
<i>Leptophysa therminieri</i> (Bryant)	Less. Antill. endemic
<i>Megistops</i> n. sp.	Saint Lucia endemic
<i>Metrogaleruca obscura</i> (Degeer)	Wide range
<i>Monomacra blakea</i> (Bechyne)	Saint Lucia endemic
<i>Monotalla</i> prob. n. sp.	Saint Lucia endemic
<i>Neolochmaea oblitterata</i> (Olivier)	Wide range
<i>Omophoita albicollis</i> (Fabricius)	Caribbean endemic
<i>Syphrea ? smithiana</i> (Csiki)	Less. Antill. endemic
<i>Systema s-littera</i> Linnaeus)	Wide range
<i>Yingaresca</i> prob. n. sp.	Saint Lucia endemic
<i>Oomorplus</i> prob. n. sp.	Saint Lucia endemic
Brentidae	
<i>Cylas formicarius</i> (F.)	Alien

Scientific name	Status
<i>Apion s.l. n.sp.1</i>	Saint Lucia endemic?
<i>Apion</i> n.sp. 2	Wide range?
<i>Stereoderma ?exilis</i> Suffrian	Caribbean endemic
<i>Brentid</i> sp. 1	Wide range?
<i>Brentid</i> sp. 2	Wide range?
Attelabidae	
<i>Auletobius</i> sp.	Wide range?
Anthribidae	
<i>Ormiscus lineicollis</i> Chevrolat	Less. Antill. endemic
<i>Ormiscus</i> sp. 1	Wide range?
<i>Homocloeus</i> sp.	Wide range?
<i>Acaromimus</i> sp.	Wide range?
<i>Euxenus</i> sp.	Wide range?
<i>Araecrini</i> genus? sp.	Wide range?
Curculionidae	
<i>Anthonomus nanus</i> Gyllenhal	Wide range
<i>Anthonomus macromalus</i> Gyllenhal	Wide range
<i>Cyrtionyx piperis</i> Marshall	Saint Lucia endemic
<i>Euscepes postfasciatus</i> Fairmaire	Wide range
<i>Diaprepes abbreviatus</i> Linnaeus	Alien
<i>Diaprepes boxi</i> Marshall	Saint Lucia endemic
<i>Metamasius hemipterus</i> (Linnaeus)	Alien
<i>Sternochetus mangiferae</i>	Alien
<i>Macromerus lanipes</i> (Olivier)	Wide range
<i>Cholus martiniquensis</i> Marshall	Less. Antill. endemic
<i>Cosmopolites sordidus</i>	Alien
<i>Eustylus hybridus</i> (Rosenschoeld)	Less. Antill. endemic
Scolytidae	
<i>Cnemomyx ficus</i> Schwarz	Caribbean endemic
<i>Cnemomyx vagabundus</i> Wood	Caribbean endemic
<i>Bothrosternus isolatus</i> Bright	Caribbean endemic
<i>Cnesinus badius</i> sp. nov.	Saint Lucia endemic
<i>Chramesus maieri</i> sp. nov.	Saint Lucia endemic
<i>Chramesus rotundatus</i> (Chapuis)	Caribbean endemic
<i>Pycnarthrum squamosum</i> sp. nov.	Saint Lucia endemic

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Scientific name	Status
<i>Pycnarthrum hispidum</i> (Ferrari)	Wide range
<i>Scolytodes nitidissimus</i> (Eggers)	Less. Antill. endemic
<i>Scolytodes atlanticus</i> Bright & Torres	Caribbean endemic
<i>Scolytodes notatus</i> (Eggers)	Caribbean endemic
<i>Stevewoodia minutum</i> sp. nov.	Saint Lucia endemic
<i>Pseudothysanoes magnispinatus</i> Bright & Torres	Caribbean endemic
<i>Cryptocarenus seriatus</i> Eggers	Wide range
<i>Cryptocarenus heveae</i> Hagedorn	Alien?
<i>Hypothenemus atomus</i> Hopkins	Wide range
<i>Hypothenemus collinus</i> sp. nov.	Saint Lucia endemic
<i>Hypothenemus</i> sp. nov #22	?
<i>Hypothenemus columbi</i> Hopkins	Wide range
<i>Hypothenemus crudiae</i> (Panzer)	Wide range
<i>Hypothenemus birmanus</i> (Eichhoff)	Wide range
<i>Hypothenemus erectus</i>	Wide range
<i>Hypothenemus brunneus</i> (Hopkins)	Wide range
<i>Hypothenemus pubescens</i>	Wide range
<i>Hypothenemus squamosus</i> (Hopkins)	Wide range
<i>Hypothenemus eruditus</i> Westwood	Wide range
<i>Hypocryphalus mangiferae</i> (Stebbing)	Wide range
<i>Xyleborinus buscki</i> (Hopkins)	Less. Antill. endemic

Scientific name	Status
<i>Dryocoetoides capucinus</i> (Eichhoff)	Wide range
<i>Dryocoetoides cristatus</i> (Fabricius)	Wide range
<i>Coptoborus vespatorius</i> (Schedl)	Wide range
<i>Coptoborus exilis</i> (Schedl)	Wide range
<i>Theoborus theobromae</i> Hopkins	Wide range
<i>Xyleborus affinis</i> Eichhoff	Wide range
<i>Xyleborus ferrugineus</i> Fabricius	Wide range
<i>Xyleborus caraibicus</i> Eggers	Wide range
<i>Xyleborus spinulosus</i> Blandford	Wide range
<i>Xyleborus volvulus</i> (Fabricius)	Wide range
<i>Xylosandrus compactus</i> (Eichhoff)	Wide range
<i>Ambrosiodmus obliquus</i> (LeConte)	Wide range
<i>Sphenocerus antillicus</i> sp. nov.	Saint Lucia endemic
<i>Araptus hymenaeae</i> (Eggers)	Wide range
<i>Araptus squamosus</i> sp. nov.	Saint Lucia endemic
<i>Araptus elegans</i> sp. nov.	Saint Lucia endemic
<i>Araptus</i> sp. 1	Wide range?
<i>Pityophthorus silvaticus</i> sp. nov.	Saint Lucia endemic
<i>Pityophthorus woodruffi</i> sp. nov.	Saint Lucia endemic
<i>Pityophthorus pudens</i> (Blackman)	Caribbean endemic
<i>Pityophthorus</i> sp. 1	Wide range?
<i>Pityophthorus</i> sp. 2	Wide range?

Scientific name	Status
<i>Corthylus</i> sp. 1	Wide range?
<i>Corthylus</i> sp. 2	Wide range?
<i>Monarthrum ferrugineum</i> sp. nov.	Saint Lucia endemic
<i>Microcorthylus</i> sp.	Wide range?
<i>Coccotrypes advena</i> Blandford	Alien
<i>Coccotrypes cyperi</i> (Beeson)	Alien
<i>Pagiocerus frontalis</i> (Fabricius)	Wide range
<i>Premnobius cavipennis</i> Eichhoff	or Alien
<i>Monarthrum praeustum</i> (Eggers)	Caribbean endemic
<i>Hylocurus</i> sp. 1	Wide range?
<i>Cnesinus guadeloupensis</i> Eggers	Less. Antill. endemic
<i>Cnesinus strigicollis</i> LeConte	Caribbean endemic
<i>Xyleborus posticus</i> Eichhoff	Wide range
<i>Hylocurus</i> sp. 2	Wide range?
Platypodidae	
<i>Euplatypus parallelus</i> (Fabricius)	Wide range
<i>Euplatypus pulicarius</i> (Chapuis)	Wide range
<i>Teloplatus ustulatus</i> (Chapuis)	Wide range

Table D Flies (Diptera) of Saint Lucia

Unpublished data from M. Ivie, R. Winton, J. Runyon and Stephen D. Gaimari.

Scientific name	Status	Scientific name	Status	Scientific name	Status
Agromyzidae		<i>Culex (Melanoconion) atratus</i>	?	<i>Paraclius dominicensis</i> Robinson	Less. Antill. endemic
<i>Liriomyza sativae</i>	?	<i>Culex (Melanoconion) idottus</i>	?	<i>Paraclius filifer</i> Aldrich	Wide range
<i>Calycomyza opaca</i>	?	<i>Culex (Melanoconion) madininensis</i>	?	<i>Paraclius quadrinotatus</i> Aldrich	Wide range
Asilidae		<i>Mansonia (Mansonia) titillans</i>	?	<i>Paraclius n.sp. nr. discifer</i>	Saint Lucia endemic?
<i>Efferia nigrimystaceus</i>	?	<i>Psorophora (Janthinosoma) ferox</i>	?	<i>Paraclius n.sp. nr. bellus</i>	Saint Lucia endemic?
<i>Ommatius dimidiatus</i>	?	<i>Uranotaenia (Uranotaenia) lowii</i>	?	<i>Paraclius n.sp. nr. sarcionoides</i>	Saint Lucia endemic?
Cecidomyiidae		<i>Wyeomyia (Wyeomyia) grayii</i>	?	<i>Tachytrechus n.sp. nr. perornatus</i>	Saint Lucia endemic?
<i>Contarinia lycopersici</i>	?	<i>Wyeomyia (Wyeomyia) pertinans</i>	?	<i>Enlinia bredini</i> Robinson	Less. Antill. endemic
Ceratopogonidae		Dolichopodidae		<i>Enlinia patellitarsis</i> Robinson	Less. Antill. endemic
<i>Culicoides pusillus</i>	?	<i>Thrypticus minutus</i>	?	<i>Enlinia n.sp. nr. larondei</i>	Saint Lucia endemic?
<i>Culicoides trilineatus</i>	?	<i>Xanthina acuticornis</i> Robinson	Less. Antill. endemic?	<i>Enlinia n.sp. nr. sordida</i>	Saint Lucia endemic?
Chamaemyiidae		<i>Achradochera apicalis</i> (Aldrich)	Caribbean endemic	<i>Enlinia n.sp. nr. larondei</i> #2	Saint Lucia endemic?
<i>Toropamecia caribbea</i> Cogan	?	<i>Asyndetus bredini</i> Robinson	Less. Antill. endemic	<i>Enlinia n.sp.</i>	Saint Lucia endemic?
<i>Leucopis bella</i> Loew	?	<i>Asyndetus syntormoides</i> Wheeler	Wide range	<i>Enlinia n.sp. nr. panamensis</i>	Saint Lucia endemic?
<i>Leucopis n.sp.C</i>	?	<i>Asyndetus n.sp. nr. fratellus</i>	Saint Lucia endemic?	<i>Harmstonia n.sp.</i>	Saint Lucia endemic?
<i>Melaleucopis simmondsi</i> Sabrosky	?	<i>Asyndetus nr. interruptus</i> (Loew)	Saint Lucia endemic?	<i>Cymatopus bredini</i> Robinson	Less. Antill. endemic
Chironomidae		<i>Chrysotus n.sp. nr. callichromus</i>	Saint Lucia endemic?	<i>Thinophilus ochrifacies</i> Van Duzee	Wide range
<i>Diplosmittia harrisoni</i>	?	<i>Chrysotus excisis</i> Robinson	Wide range	<i>Cryptopygiella musaphila</i> Robinson	Less. Antill. endemic
<i>Pseudosmittia digitata</i>	?	<i>Chrysotus hirsutus</i> Aldrich	Wide range	<i>Medetera n.sp. nr. crassicauda</i>	Saint Lucia endemic?
Chloropidae		<i>Chrysotus lamellicaudatus</i> Robinson	Less. Antill. endemic	<i>Medetera pseudonigripes</i> Robinson	Less. Antill. endemic
<i>Goniaspis lucia</i>	?	<i>Chrysotus mediocaudatus</i> Robinson	Less. Antill. endemic	<i>Medetera archboldi/steyskali</i> (female)	Less. Antill. endemic
Clusiidae		<i>Chrysotus mexinanus</i> Robinson	Wide range	<i>Thrypticus delicatus</i> Robinson	Less. Antill. endemic
<i>Sobarocephala</i> sp.		<i>Chrysotus minus</i> Robinson	Less. Antill. endemic	<i>Thrypticus minutus</i> Parent	Wide range
Culicidae		<i>Chrysotus orichalceus</i> Gossaries (=niger Aldrich)	Less. Antill. endemic	<i>Dactylomyia decora</i> (Aldrich)	Wide range
<i>Aedes (Ochlerotatus) taeniorhynchus</i>	?	<i>Chrysotus proximus</i> Robinson	Less. Antill. endemic	<i>Neurigona n.sp.</i>	. Saint Lucia endemic?
<i>Aedes (Ochlerotatus) tortilis</i>	?	<i>Chrysotus pseudoniger</i> Robinson	Less. Antill. endemic	<i>Nanomomyia n.sp. nr. barbata?</i>	Saint Lucia endemic?
<i>Aedes (Stegomyia) aegypti</i>	?	<i>Chrysotus xiphostoma</i> Robinson	Less. Antill. endemic	<i>Micromorpus albipes</i> (Zetterstedt)	Wide range
<i>Anopheles (Nyssorhynchus) aquasalis</i>	?	<i>Diaphorus angustifrons</i> Robinson	Less. Antill. endemic	<i>Peloroceodes n.sp. nr. debilis</i>	Saint Lucia endemic?
<i>Anopheles (Nyssorhynchus) argyritarsis</i>	?	<i>Diaphorus contiguus</i> Aldrich	Wide range	<i>Peloroceodes n.sp. nr. similis</i>	Saint Lucia endemic?
<i>Culex (Culex) nigripalpus</i>	?	<i>Diaphorus flavipes</i> Aldrich	Wide range	<i>Peloroceodes dominicensis</i>	Less. Antill. endemic
<i>Culex (Culex) quinquefasciatus</i>	?	<i>Diaphorus parvulus</i> Aldrich	Caribbean endemic	<i>Peloroceodes frater</i> (Aldrich)	Less. Antill. endemic

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Scientific name	Status
<i>Amblypsilopus luteus</i> Robinson	Less. Antill. endemic
<i>Amblypsilopus n.sp. nr. luteus</i>	Saint Lucia endemic?
<i>Amblypsilopus unifasciatus</i> (Say)	Wide range
<i>Condylostylus graenicheri</i> (Van Duzee)	Wide range
<i>Condylostylus longicornis</i> (Fabricius)	Wide range
<i>Condylostylus similis</i> (Aldrich)	Wide range
<i>Sympycnus n.sp. nr. dominicensis</i>	Saint Lucia endemic?
Drosophilidae	
<i>Zygothrica vitticlara</i>	?
<i>Drosophila antillea</i>	?
<i>Drosophila insularis</i>	?
Ephydriidae	
<i>Philygria</i> (<i>Nostima</i>) <i>negruczka</i>	?
<i>Philygria</i> (<i>Nostima</i>) <i>simuliflavida</i>	?
Lauxaniidae	
<i>Physoclypeus hendeli</i>	?
<i>Deceia</i> cf. <i>crevecoueri</i> (Coquillett)	?
<i>Poecilominettia n.sp. (zebroides-grp)</i>	?
<i>Sapromyza octopuncta</i> Wiedemann	?
<i>Marmarodeceia marmorata</i> (Malloch)	?
<i>Poecilominettia n.sp.1 (grata-grp)</i>	?
<i>Poecilominettia n.sp.2 (grata-grp)</i>	?

Scientific name	Status
<i>Melanomyza</i> (<i>Melanomyza</i>) <i>n.sp.</i>	?
<i>Trisapromyza</i> cf. <i>vittigera</i> (Coquillett)	?
<i>Sapromyza sororia</i> Williston	?
<i>Sapromyza n.sp. (sororia-grp)</i>	?
<i>Xenochaetina n.sp.</i>	?
Micropezidae	
<i>Grallipeza sp.</i>	?
Phoridae	
<i>Dorhniphora cornuta</i>	?
<i>Dorhniphora divaricata</i>	?
Pipunculidae	
<i>Tomasvaryella tuberculata</i>	?
Sphaeroceridae	
<i>Robustagramma luciense</i>	?
<i>Rachispoda luciana</i>	?
Stratiomyidae	
<i>Brachycara slossonae</i> (Johnson)	?
<i>Cyphomyia dominicana</i> James	?
<i>Hermetia illucens</i> (Linnaeus)	?
<i>Merosargus sp.</i>	?
<i>Pachygaster sp.1</i>	?
<i>Pachygaster sp.2</i>	?

Scientific name	Status
<i>Sargus sp. nr. fasciatus</i> Fabricius	?
Syrphidae	
<i>Pseudodorus clavatus</i>	?
<i>Ocyptamus dimidiatus</i>	?
<i>Ocyptamus sp.nov.?</i>	?
<i>Toxomerus floralis</i>	?
<i>Toxomerus pictus</i>	?
<i>Toxomerus arcifer</i> (Loew)	?
<i>Toxomerus dispar</i> (Fabricius)	?
<i>Ornida obesa</i>	?
<i>Palpada vinetorum</i>	?
<i>Eristalis agrorum</i>	?
<i>Anastrepha obliqua</i>	?
Tanypezidae	
<i>Neotanypeza flavicalx</i> Enderlein	?
Tephritidae	
<i>Tomoplagia incompleta</i> (Williston)	?

Table E Dragonflies (Odonata) of Saint Lucia

Unpublished data from F. Sibley

Scientific name	Status	Scientific name	Status	Scientific name	Status
Lestidae		Aeshnidae		<i>Erythrodiplax umbrata</i> (Linnaeus 1758)	
<i>Lestes forficula</i> Rambur 1842	Wide range	<i>Gynacantha nervosa</i> Rambur 1842	Wide range	<i>Miathyria marcella</i> (Selys 1857)	Wide range
<i>Lestes tenuatus</i> Rambur 1842	Wide range	<i>Triacanthagyna caribbea</i> Williamson 1923	Wide range	<i>Micrathyria aequalis</i> (Hagen 1861)	Wide range
Protoneuridae		<i>Triacanthagyna septima</i> (Selys 1857)	Wide range	<i>Micrathyria didyma</i> (Selys 1857)	Wide range
<i>Protoneura ailsa</i> Donnelly 1961	Less. Antill. endemic	<i>Triacanthagyna trifida</i> (Rambur, 1842)	Wide range	<i>Orthemis macrostigma</i> (Rambur 1842)	Less. Antill. endemic
Coenagrionidae		Libellulidae		<i>Pantala flavescens</i> (Fabricius 1798)	Wide range
<i>Argia concinna</i> (Rambur 1842)	Less. Antill. endemic	<i>Brachymesia furcata</i> (Hagen 1861)	Wide range	<i>Tholymis citrina</i> Hagen 1867	Wide range
<i>Enallagma coecum</i> (Hagen 1861)	Wide range	<i>Brachymesia herbida</i> (Gundlach 1889)	Wide range	<i>Tramea abdominalis</i> (Rambur 1842)	Wide range
<i>Ischnura capreolus</i> (Hagen 1861)	Wide range	<i>Dythemis sterilis</i> Hagen 1861	Wide range	<i>Tramea insularis</i> Hagen 1861	Wide range
<i>Ischnura ramburii</i> (Selys 1850)	Wide range	<i>Erythemis vesiculosa</i> (Fabricius 1775)	Wide range		
<i>Telebasis corallina</i> (Selys 1876)	Wide range	<i>Erythrodiplax berenice</i> (Drury 1773)	Wide range		

Table F Butterflies and moths of Saint Lucia (preliminary list).

Data courtesy of Mike Ivie. This table does not include all 48 species of butterflies documented by Hunt & Mitchell (1979).

Scientific name	Scientific name	Scientific name	Scientific name	Scientific name	Scientific name
Cossidae	<i>Paectes obrotunda</i>	<i>Erinnyis lassauxii</i>	Tortricidae	<i>Chlorostrymon simaethis</i>	Papilionidae
<i>Givira pulverosa</i>	<i>Panula inconstans</i>	<i>Erinnyis obscura</i>	<i>Strepsicrates smithiana</i>	<i>Hemiargus hanno</i>	<i>Battus polydamas</i>
<i>Voousia punctifer</i>	<i>Syllectra erycata</i>	<i>Phryxus caicus</i>	RHOPALOCERA (Butterflies)	<i>Leptotes cassius</i>	<i>Papilio androgeus</i>
Noctuidae	<i>Zale steipes</i>	<i>Madoryx oiclus</i>	Danaidae	<i>Strymon rufofusca</i>	Pieridae
<i>Anicla infecta</i>	Sphingidae	<i>Perigonia lefebvrei</i>	<i>Danaeus eresimus</i>	Nymphalidae	<i>Appias drusilla</i>
<i>Antiblemma brevipennis</i>	<i>Agrius cingulatus</i>	<i>Perigonia lusca</i>	<i>Danaeus gilippus</i>	<i>Anartia amathea</i>	<i>Ascia monuste</i>
<i>Antiblemma rufinans</i>	<i>Cocytius antaeus</i>	<i>Aellopos tantulus</i>	<i>Danaeus plexippus</i>	<i>Antaria jatrophae</i>	<i>Eurema leuce</i>
<i>Bagisara repanda</i>	<i>Cocytius duponchel</i>	<i>Enyo lugubris</i>	<i>Lycorea cleaobaea</i>	<i>Biblis hyperia</i>	<i>Eurema lisa</i>
<i>Bleptina acastusalis</i>	<i>Neococytius cluentius</i>	<i>Enyo ocypete</i>	Heliconiidae	<i>Hamadryas feronia</i>	<i>Ganyra menciae</i>
<i>Concana mundissima</i>	<i>Manduca rustica</i>	<i>Eumorpha fasciata</i>	<i>Agraulis vanillae</i>	<i>Historis odius</i>	<i>Phoebis argante</i>
<i>Condica cupentia</i>	<i>Manduca sexta</i>	<i>Eumorpha vitis</i>	<i>Dione juno</i>	<i>Hypolimnus misippus</i>	<i>Phoebis sennae</i>
<i>Cynosia nobilitella</i>	<i>Amplipterus gannascus</i>	<i>Eumorpha labruscae</i>	<i>Dryas iucia lucia</i>	<i>Junonia evarete</i>	
<i>Epidromia poaphiloides</i>	<i>Protambulyx strigilis</i>	<i>Eumorpha satellitia</i>	Hesperidae	<i>Junonia genoveva</i>	
<i>Eublemma cinnamomea</i>	<i>Pseudosphinx tetrio</i>	<i>Xylophanes chiron</i>	<i>Calpodus ethlius</i>	<i>Marpesia petreus</i>	
<i>Lesmone formularis</i>	<i>Erinnyis alope</i>	<i>Xylophanes pluto</i>	<i>Urbanus proteus</i>	<i>Memphis dominicana</i>	
<i>Letis mycerina</i>	<i>Erinnyis ello</i>	<i>Xylophanes tersa</i>	Lycaeniidae	<i>Mestra cana</i>	
<i>Mocis latipes</i>	<i>Erinnyis crameri</i>	<i>Hyles lineata</i>	<i>Allosmaitia piplea</i>	<i>Siproeta stelenes</i>	

Table G Reptiles and Amphibians of Saint Lucia

* Species not seen since 1960 or earlier. Data from Daltry (2009).

Scientific Name	Common Names	Status
AMPHIBIA		
<i>Bufo marinus</i>	Cane toad, Kwapo	Alien
<i>Eleutherodactylus johnstonei</i>	Johnstone's whistling frog, Ti tolin	Saint Lucia endemic
* <i>Eleutherodactylus martinicensis</i>	Martinique whistling frog, Gounouy	Alien/ Lesser Antillean endemic
<i>Scinax ruber</i>	Red-snouted tree frog	Alien
* <i>Leptodactylus fallax</i>	Mountain chicken, Kwapo	Lesser Antillean endemic
REPTILIA		
<i>Caretta caretta</i>	Loggerhead	(pantropical, marine)
<i>Chelonia mydas</i>	Green turtle, Toti blan, Toti vè	(pantropical, marine)
<i>Dermochelys coriacea</i>	Leatherback turtle, Toti cerkeil	(pantropical, marine)
<i>Eretmochelys imbricata</i>	Hawksbill turtle, Toti karet	(pantropical, marine)
<i>Anolis extremus</i>	Barbados anole, Zanndoli	Alien/ Lesser Antillean endemic
<i>Anolis luciae</i>	Saint Lucia anole, Zanndoli	Saint Lucia endemic
<i>Anolis wattsi wattsi</i>	Watts' anole, Zanndoli	Alien/ Lesser Antillean endemic
<i>Cnemidophorus vanzoi</i>	Saint Lucia whiptail, Zando	Saint Lucia endemic
<i>Gymnophthalmus pleii</i>	Rough-scaled worm lizard, Zanndoli	Lesser Antillean endemic
<i>G. p. luetkeni</i>	Saint Lucia worm lizard	Saint Lucia endemic
<i>G. p. nesydrion</i>	Maria Islands worm lizard	Saint Lucia endemic
<i>Hemidactylus mabouya</i>	House gecko, Mabouya	Alien?
<i>Hemidactylus palaichthus</i>	Antilles leaf-toed gecko, Rock gecko	Wide range
<i>Iguana cf iguana</i>	Saint Lucia iguana, Léza	Saint Lucia endemic
<i>Iguana iguana</i>	Green iguana, Léza	Alien
* <i>Mabuya mabouya</i>	Southern Antillean skink, Mabouya	Lesser Antillean endemic
* <i>Sphaerodactylus elegantulus</i>	Antiguan pygmy gecko	Lesser Antillean endemic
<i>Sphaerodactylus microlepis</i>	Saint Lucia pygmy gecko	Saint Lucia endemic
<i>S. m. microlepis</i>	Saint Lucia pygmy gecko	Saint Lucia endemic
<i>S. m. thomasi</i>	Maria Islands pygmy gecko	Saint Lucia endemic
* <i>Sphaerodactylus vincenti</i>	Central Lesser Antillean pygmy gecko	Alien/ Lesser Antillean endemic
<i>Thecadactylus rapicaudus</i>	Forest gecko	Wide range
<i>Boa constrictor orophias</i>	Boa constrictor	Wide range
<i>B. c. orophias</i>	Saint Lucia boa, Tet chyenn	Saint Lucia endemic
<i>Bothrops caribbaeus</i>	Saint Lucia fer-de-lance, Sepan	Saint Lucia endemic
* <i>Clelia errabunda</i>	Saint Lucia cribo, Cribo	Saint Lucia endemic
<i>Leptotyphlops breuili</i>	Saint Lucia thread snake	Saint Lucia endemic
<i>Liophis ornatus</i>	Saint Lucia racer, Kouwès	Saint Lucia endemic

Table H Birds of Saint Lucia (excluding vagrant records)* Species not seen since 1970 or earlier. M = Migrant, R= Resident. Data from Toussaint *et al.* (2009).

Scientific name	Common name	Status	Residency	Scientific name	Common name	Status	Residency
<i>Pluvialis dominica</i>	American Golden-Plover	Wide range	M	<i>Quiscalus lugubris</i>	Caribbean coot	Wide range	M
<i>Falco sparverius</i>	American Kestrel	Wide range	R	<i>Elaenia martinica</i>	Caribbean Elaenia	Caribbean endemic	R
<i>Haematopus palliatus</i>	American Oystercatcher	Wide range	R	<i>Progne dominicensis</i>	Caribbean Martin	Caribbean endemic	R
<i>Setophaga ruticilla</i>	American Redstart	Wide range	M	<i>Bubulcus ibis</i>	Cattle Egret	Wide range	R
<i>Anas americana</i>	American Wigeon	Wide range	M	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	Wide range	M
<i>Orthorhyncus cristatus</i>	Antillean Crested Hummingbird	Caribbean endemic	R	<i>Columbina passerina</i>	Common Ground-dove	Wide range	R
<i>Euphonia musica</i>	Antillean Euphonia	Caribbean endemic	R	<i>Gallinula chloropus</i>	Common Moorhen	Wide range	R
<i>Puffinus lherminieri</i>	Audubon's Shearwater	Wide range	R	<i>Chordeiles minor</i>	Common Nighthawk	Wide range	R
<i>Calidris bairdii</i>	Baird's Sandpiper	Wide range	M	<i>Sterna hirundo hirundo</i>	Common Tern	Wide range	M
<i>Coereba flaveola</i>	Bananaquit	Wide range	R	<i>Zenaida auriculata</i>	Eared Dove	Wide range	R
<i>Riparia riparia</i>	Bank Swallow	Wide range	M	<i>Streptopelia decaocto</i>	Eurasian Collared-Dove	Alien	R
<i>Turdus nudigenis</i>	Bare-eyed Thrush	Wide range	R	<i>Cichlherminia lherminieri</i>	Forest Thrush	Less. Ant. endemic	
<i>Hirundo rustica</i>	Barn Swallow	Wide range	M	<i>C. l. sanctaeluciae</i>		Saint Lucia endemic	R
<i>Megaceryle alcyon</i>	Belted Kingfisher	Wide range	R	<i>Sicalis luteola</i>	Grassland Yellow-Finch	Wide range	R
<i>Cypseloides niger</i>	Black Swift	Wide range	M	<i>Ardea herodias</i>	Great Blue Heron	Wide range	M
<i>Mniotilta varia</i>	Black-and-white Warbler	Wide range	M	<i>Casmerodius albus</i>	Great Egret	Wide range	R and M
<i>Pluvialis squatarola</i>	Black-bellied Plover	Wide range	M	<i>Puffinus gravis</i>	Greater Shearwater	Wide range	M
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	Wide range	R	<i>Tringa melanoleuca</i>	Greater Yellowlegs	Wide range	M
<i>Tiaris bicolor</i>	Black-faced Grassquit	Wide range	R	<i>Butorides virescens</i>	Green Heron	Wide range	R
<i>Rissa tridactyla</i>	Black-legged Kittiwake	Wide range	M	<i>Eulampis holosericeus</i>	Green-throated Carib	Caribbean endemic	R
<i>Himantopus mexicanus</i>	Black-necked Stilt	Wide range	M	<i>Tyrannus dominicensis</i>	Grey Kingbird	Wide range	R
<i>Dendroica striata</i>	Blackpoll Warbler	Wide range	M	<i>Cinlocerthia gutturalis</i>	Grey Trembler	Less. Ant. endemic	R
<i>Vireo altiloquus</i>	Black-whiskered Vireo	Wide range	R	<i>C. g. macrorhyncha</i>		Saint Lucia endemic	
<i>Anas discors</i>	Blue-winged Teal	Wide range	M	<i>*Gelocheilidon nilotica</i>	Gull-billed Tern	Wide range	M
<i>Dolichonyx oryzivorus</i>	Bobolink	Wide range	M	<i>Limosa haemastica</i>	Hudsonian Godwit	Wide range	M
<i>Geotrygon mystacea</i>	Bridled Quail-dove	Wide range	R	<i>Charadrius vociferous</i>	Killdeer	Wide range	M
<i>Onychoprion anaethetus</i>	Bridled Tern	Wide range	M	<i>Larus atricilla</i>	Laughing Gull	Wide range	M
<i>Buteo platypterus</i>	Broad-winged Hawk	Wide range	R	<i>Calidris minutilla</i>	Least Sandpiper	Wide range	M
<i>Sula leucogaster</i>	Brown Booby	Wide range	R	<i>*Sternula antillarum</i>	Least Tern	Wide range	M
<i>Anous stolidus</i>	Brown Noddy	Wide range	R	<i>Contopus latirostris</i>	Lesser Antillean Pewee	Less. Ant. endemic	
<i>Pelecanus occidentalis</i>	Brown Pelican	Wide range	R	<i>C. l. oberi</i>	Saint Lucia Pewee	Saint Lucia endemic	R
<i>*Tryngites subruficollis</i>	Buff-breasted Sandpiper	Wide range	M	<i>Loxigilla noctis</i>	Lesser Antillean Bullfinch	Less. Ant. endemic	
<i>Dendroica tigrina</i>	Cape May Warbler	Wide range	M	<i>L. n. sclateri</i>		Saint Lucia endemic	R
<i>Fulica caribaea</i>	Carib Grackle	Wide range		<i>Myiarchus oberi</i>	Lesser Antillean Flycatcher	Less. Ant. endemic	
<i>F. c. inflexirostris</i>		Saint Lucia endemic	R	<i>M. o. sanctaeluciae</i>		Saint Lucia endemic	R

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Scientific name	Common name	Status	Residency	Scientific name	Common name	Status	Residency
<i>Saltator albicollis</i>	Lesser Antillean Saltator	Less. Ant. endemic	R	<i>Dendroica delicata</i>	Saint Lucia Warbler	Saint Lucia endemic	R
<i>Chaetura martinica</i>	Lesser Antillean Swift	Less. Ant. endemic	R	<i>Troglodytes aedon</i>	House Wren	Wide range	
<i>Aythya affinis</i>	Lesser Scaup	Wide range	M	<i>T. a. mesoleucus</i>	Saint Lucia Wren	Saint Lucia endemic	R
<i>Tringa flavipes</i>	Lesser Yellowlegs	Wide range	M	<i>Calidris alba</i>	Sanderling	Wide range	M
<i>Egretta caerulea</i>	Little Blue Heron	Wide range	R	<i>Thalasseus sandvicensis</i>	Sandwich Tern	Wide range	M
<i>Egretta garzetta</i>	Little Egret	Wide range	M	<i>Margarops fuscus</i>	Scaly-breasted Thrasher	Less. Ant. endemic	
<i>Fregata magnificens</i>	Magnificent Frigatebird	Wide range	R	<i>M. f. schwartzi</i>		Saint Lucia endemic	R
<i>Coccyzus minor</i>	Mangrove Cuckoo	Wide range	R	<i>Patagioenas squamosa</i>	Scaly-naped Pigeon	Caribbean endemic	R
<i>Sula dactylatra</i>	Masked Booby	Wide range	R	<i>Charadrius semipalmatus</i>	Semipalmated Plover	Wide range	M
<i>Nomonyx dominicus</i>	Masked Duck	Wide range	R	<i>Calidris pusilla</i>	Semipalmated Sandpiper	Wide range	M
<i>Falco columbarius</i>	Merlin	Wide range	M	<i>*Leucopeza semperi</i>	Semper's Warbler	Saint Lucia endemic	R
<i>Parula americana</i>	Northern Parula	Wide range	M	<i>Molothrus bonariensis</i>	Shiny Cowbird	Wide range	R
<i>Anas acuta</i>	Northern Pintail	Wide range	M	<i>Limnodromus griseus</i>	Short-billed Dowitcher	Wide range	M
<i>Anas clypeata</i>	Northern Shoveler	Wide range	M	<i>Crotophaga ani</i>	Smooth-billed Ani *	Wide range	R
<i>Seiurus noveboracensis</i>	Northern Waterthrush	Wide range	M	<i>Egretta thula</i>	Snowy Egret	Wide range	R
<i>Pandion haliaetus</i>	Osprey	Wide range	R and M	<i>Tringa solitaria</i>	Solitary Sandpiper	Wide range	M
<i>Seiurus aurocapilla</i>	Ovenbird	Wide range	M	<i>Puffinus griseus</i>	Sooty Shearwater	Wide range	M
<i>Margarops fuscatus</i>	Pearly-eyed Thrasher	Caribbean endemic		<i>Sterna fuscata</i>	Sooty Tern	Wide range	M
<i>M. f. klinikowski</i>		Saint Lucia endemic	R	<i>Porzana carolina</i>	Sora	Wide range	R
<i>Calidris melanotos</i>	Pectoral Sandpiper	Wide range	M	<i>Actitis macularius</i>	Spotted Sandpiper	Wide range	M
<i>Falco peregrinus</i>	Peregrine Falcon	Wide range	M	<i>Calidris himantopus</i>	Stilt Sandpiper	Wide range	M
<i>Podilymbus podiceps</i>	Pied-billed Grebe	Wide range	M	<i>Egretta tricolor</i>	Tricoloured Heron	Wide range	R
<i>Protonotaria citrea</i>	Prothonotary Warbler	Wide range	M	<i>Mimus gilvus</i>	Tropical Mockingbird	Wide range	R
<i>Porphyrio martinica</i>	Purple Gallinule	Wide range	R	<i>Calidris mauri</i>	Western Sandpiper	Wide range	M
<i>Eulampis jugularis</i>	Purple-throated Carib	Less. Ant. endemic	R	<i>Numenius phaeopus</i>	Whimbrel	Wide range	M
<i>Phaethon aethereus</i>	Red-billed Tropicbird	Wide range	R	<i>Ramphocinclus brachyurus</i>	White-breasted Thrasher	Less. Ant. endemic	
<i>Sula sula</i>	Red-footed Booby	Wide range	R	<i>R. b. sanctaeluciae</i>		Saint Lucia endemic	R
<i>Larus delawarensis</i>	Ring-billed Gull	Wide range	R	<i>Calidris fuscicollis</i>	White-rumped Sandpiper	Wide range	M
<i>Columba livia</i>	Rock Pigeon	Alien	R	<i>Phaethon lepturus</i>	White-tailed Tropicbird	Wide range	R
<i>Sterna dougallii dougallii</i>	Roseate Tern	Wide range	M	<i>Tringa semipalmata</i>	Willet	Wide range	M
<i>Thalasseus maximus</i>	Royal Tern	Wide range	M	<i>Dendroica petechia</i>	Yellow Warbler	Wide range	
<i>Geotrygon montana</i>	Ruddy Quail-dove	Wide range	R	<i>D. p. babad</i>		Saint Lucia endemic	R
<i>Arenaria interpres</i>	Ruddy Turnstone	Wide range	M	<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	Wide range	M
<i>Caprimulgus rufus</i>	Rufous Nightjar	Wide range		<i>Nyctanassa violace</i>	Yellow-crowned Night-heron	Wide range	R
<i>C. r. otiosus</i>	Saint Lucia Nightjar	Saint Lucia endemic	R	<i>Dendroica coronata</i>	Yellow-rumped Warbler (Myrtle)	Wide range	M
<i>Myadestes genibarbis</i>	Rufous-throated Solitaire	Caribbean endemic		<i>Vireo flavifrons</i>	Yellow-throated Vireo	Wide range	M
<i>M. g. sanctaeluciae</i>		Saint Lucia endemic	R	<i>Zenaida aurita</i>	Zenaida Dove	Wide range	R
<i>Amazona versicolor</i>	Saint Lucia Amazon	Saint Lucia endemic	R				
<i>Melanospiza richardsoni</i>	Saint Lucia Black Finch	Saint Lucia endemic	R				
<i>Icterus laudabilis</i>	Saint Lucia Oriole	Saint Lucia endemic	R				

Table I Mammals of Saint Lucia

* Species not seen since 1881 or earlier. Data from Clarke (2009). This list is confined to terrestrial wild species and feral species that are confirmed to have established breeding populations in the wild. It does not include domestic mammals, though some may be free-ranging. There have been unverified reports of feral monkeys (species not determined).

Scientific Name	Common Names	Status
<i>Didelphis marsupialis</i>	Southern opossum	Alien
<i>Noctilio leporinus</i>	Greater fishing bat	Wide range
<i>Pteronotus davyi</i>	Davy's naked-backed bat	Wide range
<i>Ardops nicholli</i>	Tree bat	Lesser Antillean endemic
<i>A. n. luciae</i>		Lesser Antillean endemic
<i>Artibeus jamaicensis</i>	Jamaican fruit bat	Wide range
<i>A. j. jamaicensis</i>		Caribbean endemic
<i>Brachyphylla cavernarum</i>	Antillean fruit bat	Caribbean endemic
<i>B.c. cavernarum</i>		Lesser Antillean endemic
<i>Monophyllus plethodon</i>	Insular long-tongued bat	Wide range
<i>M. p. luciae</i>		Lesser Antillean endemic
<i>Sturnira lilium</i>	Little yellow-shouldered bat	Lesser Antillean endemic
<i>S. l. luciae</i>	Saint Lucia yellow-shouldered bat	Saint Lucia endemic
<i>Tadarida brasiliensis</i>	Brazilian free-tailed bat	Wide range
<i>Molossus molossus</i>	Common free-tailed bat	Wide range
<i>M. m. molossus</i>		Lesser Antillean endemic
<i>Dasyprocta leporina</i>	Brazilian agouti	Alien
<i>Herpestes javanicus</i>	Small asian mongoose	Alien
<i>Sus scrofa</i>	Pig	Alien
<i>Rattus rattus</i>	Black rat	Alien
<i>Rattus norvegicus</i>	Brown rat	Alien
<i>Mus musculus</i>	House mouse	Alien
* <i>Megalomys luciae</i>	Saint Lucian giant rice rat	Saint Lucia endemic

Annex II Decision Matrix for Species Recovery Planning

After Appleton & Daltry (in prep.).

Current Situation		Recovery Management Actions																
		Mostly In Situ							Mostly Ex Situ									
		Baseline field surveys to identify cause(s)	Monitoring of wild population	Monitoring of known and or probable threats in the area	Targeted protection and enforcement	Habitat improvement or expansion	Artificial habitat enhancement/ supplementary feeding	Alien invasive / feral species control	Control other native species.	Horticultural/ veterinary care to treat disease or injuries	Population re-inforcement or Translocation	Re-introduction	Awareness and education to improve human behaviour	Head-starting	Fostering (for species that lay multiple clutches of eggs)	Captive breeding/ propagation	Seed banks and cryopreservation	Benign introduction (outside natural range)
Status critical, but cause uncertain	Population locally extinct	●	n/a	○	n/a	•	•	•	•	n/a	n/a	●	○	n/a	n/a	○	•	○
	Population shows: <i>Severely reduced population size</i>	●	●	○	○	•	•	•	•	•	○	n/a	•	•	•	•	•	n/a
	<i>Slow rate of reproduction or regeneration</i>	●	●	○	○	•	•	•	•	•	○	n/a	•	•	●	•	•	n/a
	<i>High juvenile mortality</i>	●	●	○	•	•	•	•	•	•	○	n/a	•	●	○	•	•	n/a
	<i>Severely reduced genetic variation or gene flow between groups</i>	●	●	○	•	•	•	•	•	•	○	n/a	•	●	○	•	•	n/a
Threat(s) is known	'Habitat loss' (reduced area, fragmented area, degraded quality)	•	●	●	○	●	○	•	•	•	•		○	•	•	•	•	
	Competition/ predation/ hybridization with alien species	•	●	●	•	•	•	●	•	•	•		○	•	•	○	•	
	Competition, predation, hybridization with feral or domestic animals or plants	•	●	●	●	•	•	●	•	•	•		●	•	•	○	•	
	Abnormal imbalance with other native species	•	●	●	•	•	•	○	○	•	•		•	•	•	○	•	
	Pathogenic disease (native)	•	●	●	•	•	•	•	○	●	•		•	•	•	○	•	
	Pathogenic disease (introduced)	•	●	●	•	•	•	●	•	●	•		•	•	•	○	•	
	Intentional killing/ collection by humans	•	●	●	●	•	•	•	•	•	•		●	•	•	○	•	
	Unintentional killing/ collection by humans	•	●	●	○	•	•	•	•	•	•		●	•	•	○	•	
	Direct contamination from pollutants	•	●	●	●	○	•	•	•	•	•		●	•	•	○	•	
	Inbreeding depression (small population size)	•	●	•	•	•	•	•	•	•	●		•	•	○	○	•	

● Probably essential; ○ Probably useful; • May be useful; n/a Not applicable or appropriate.

Annex III Skills Assessment Form

This form can be used and adapted for evaluating the current skills of staff to identify their current strengths as well as weaknesses that need to be addressed through training or mentoring. This form covers virtually all areas of expertise that the Forestry Department may require to manage Saint Lucia's forests, but different personnel will require different skills according to their job. The areas most relevant to personnel involved in the management of wildlife and natural resources are: FIELD CRAFT (FLD), NATURAL RESOURCES ASSESSMENT (NAT), CONSERVATION MANAGEMENT (CON) and SOCIO-ECONOMIC AND CULTURAL ASSESSMENT (SOC). This form can be filled out by the staff themselves, but should be checked by their line manager. For further information, see Appleton *et al.* (2003).

0 = Not required for this job

1 = Little or no competence: extensive training and development needed

2 = Some competence: advanced training and development needed

3 = Good competence: updating only needed.

4 = High competence: could train and instruct others in this task/skill

	Name ----- Job Title -----	Assessment against recommended standards for job (0, 1,2,3 or 4)
GEN	GENERAL WORK SKILLS	
GEN	UNIVERSAL SKILLS	
GEN 1	Demonstrate a positive and confident personal attitude to work.	
GEN 2	Maintain good relations with others and work as a team.	
GEN 3	Communicate with colleagues simply and effectively.	
GEN 4	Work in compliance with instructions, briefings, regulations and procedures.	
GEN 5	Follow good security, safety and environmental practice in the work place.	
GEN 6	Maintain confidentiality of sensitive information.	
GEN 7	Identify and report dishonest practices.	
GEN 8	Demonstrate cultural and ethnic and gender sensitivity.	
GEN 9	Maintain good standards of personal appearance.	
GEN 10	Manage and reduce personal stress.	
GEN 11	Provide CPR and First Aid using accepted techniques.	
FIN	FINANCIAL AND RESOURCES MANAGEMENT	
FIN	LEVEL 2	
FIN 2.1	Collect and present evidence of expenditure.	
FIN 2.2	Keep accurate and orderly records.	
FIN 2.3	Manage stores of equipment and supplies.	
FIN	LEVEL 3	
FIN 3.1	Prepare budgets and plan and monitor resource use.	
FIN 3.2	Apply high environmental standards to use of resources.	
FIN 3.3	<i>Manage equipment, supplies and property.</i>	
FIN 3.4	<i>Oversee procurement and purchase and payments.</i>	
FIN 3.5	<i>Keep books and accounts.</i>	
FIN 3.6	<i>Issue and supervise contracts and agreements.</i>	
FIN 3.7	<i>Manage official documentation and reporting.</i>	

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FIN	LEVEL 4	
FIN 4.1	Develop and monitor financial plans.	
FIN 4.2	Negotiate formal contracts.	
FIN 4.3	Analyse management accounts and plan budget and resource control.	
HRM	HUMAN RESOURCES MANAGEMENT	
HRM	LEVEL 2	
HRM 2.1	Lead and motivate work teams.	
HRM	LEVEL 3	
HRM 3.1	Brief, supervise and motivate individuals and teams.	
HRM 3.2	Monitor and evaluate staff performance and provide feedback.	
HRM 3.3	Determine causes of poor performance and counsel staff on performance related issues.	
HRM 3.4	Initiate formal disciplinary and grievance procedures.	
HRM 3.5	Resolve workplace conflicts.	
HRM	LEVEL 4	
HRM4.1	Identify staffing needs and structures and assign roles and responsibilities.	
HRM4.2	Recruit and promote staff using fair and transparent processes.	
HRM4.3	Plan for and ensure the welfare of staff.	
HRM4.4	Design and implement incentive and reward schemes for staff.	
HRM4.5	Set staff performance standards.	
HRM4.6	Implement formal grievance and disciplinary procedures.	
TRA	STAFF DEVELOPMENT AND TRAINING	
TRA	LEVEL 2	
TRA 2.1	Instruct in and assess work skills.	
TRA	LEVEL 3	
TRA 3.1	Prepare, deliver and assess vocational training.	
TRA 3.2	Prepare and deliver formal lectures.	
TRA 3.3	Promote and enable workplace learning.	
TRA 3.4	Plan and facilitate training events.	
TRA	LEVEL 4	
TRA 4.1	Lead training and development needs analysis.	
TRA 4.2	Plan, design, supervise and evaluate staff capacity development programmes.	
COM	COMMUNICATION	
COM	LEVEL 2	
COM 2.1	Make effective oral presentations.	
COM 2.2	Prepare written accounts of work activities.	
COM 2.3	<i>Communicate in other languages and/or dialects.</i>	
COM	LEVEL 3	
COM 3.1	Organize and chair formal meetings.	
COM 3.2	Give technical presentations.	
COM 3.3	Write technical reports/papers.	
COM 3.4	Analyse and communicate complex issues.	
COM 3.5	Represent the protected area at public events.	
COM	LEVEL 4	
COM 4.1	Negotiate agreements and resolve disputes and conflicts.	
COM 4.2	Enabling staff feedback on and input to activities, decisions, and planning.	
COM 4.3	Institute mechanisms for public consultations and communication over decisions, policies & plans.	
COM	LEVEL 5	
COM5.1	Represent the country at formal negotiations and conferences.	
TEC	TECHNOLOGY AND INFORMATION	

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TEC	LEVEL 1	
TEC 1.1	Operate basic office equipment.	
TEC	LEVEL 2	
TEC 2.1	Operate and maintain computer for basic functions	
TEC 2.2	Operate audiovisual equipment.	
TEC	LEVEL 3	
TEC3.1	Create and administer web pages and sites.	
TEC3.2	Maintain computers.	
TEC3.3	Operate and maintain computer for advanced functions.	
TEC3.4	Operate GIS systems.	
TEC3.5	<i>Manage library, archives and other information resources.</i>	
PRO	PROJECT DEVELOPMENT AND MANAGEMENT	
PRO	LEVEL 3	
PRO 3.1	Develop operational plans.	
PRO 3.2	Manage staff, contractors and collaborators implementing work plans.	
PRO 3.3	Record and monitor project results.	
PRO 3.4	Prepare plans for implementation of technical	
PRO	LEVEL 4	
PRO 4.1	Prepare and negotiate proposals for resources and support.	
PRO 4.2	Develop structured project plans and proposals.	
PRO 4.3	Develop business plans, fund raising and revenue generating schemes.	
PRO 4.4	Develop collaborative partnerships, plans and programmes with other agencies.	
PRO 4.5	Direct managers and team leaders in project implementation.	
PRO 4.6	Lead formal project reviews and evaluations.	
PRO	LEVEL 5	
PRO5.1	Lead the development of strategic and policy plans and reviews.	
PRO5.2	Lead development and implementation of national and international level programmes and plans.	
FLD	FIELD CRAFT	
FLD	LEVEL 1	
FLD 1.1	Follow good environmental practice in the field.	
FLD 1.2	Identify, prevent and/or provide primary treatment in the field for illness, diseases and bites.	
FLD 1.3	Undertake field work safely and effectively.	
FLD	LEVEL 2	
FLD 2.1	Care for, check and maintain basic field and camping equipment.	
FLD 2.2	Organise camp sites.	
FLD 2.3	Use compass and chart or map for navigation and orientation.	
FLD 2.4	Use and care for basic field equipment.	
FLD 2.5	Use GPS for georeferencing locations and for navigation and orientation.	
FLD 2.6	Draw sketch maps from field data.	
FLD 2.7	Move safely across the terrain.	
FLD 2.8	<i>Use and maintain radio handset for field communication.</i>	
FLD 2.9	<i>Field craft in mountain areas.</i>	
FLD 2.10	<i>Watercraft.</i>	
FLD	LEVEL 3	
FLD3.1	Plan and organise logistics for field trips, surveys and patrols.	
FLD3.2	Organise and lead search and rescue operations in the field.	
FLD3.3	<i>Operate and use base station radio and communication equipment.</i>	
NAT	NATURAL RESOURCES ASSESSMENT	
NAT	LEVEL 1	

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NAT 1.1	Recognise common and typical vegetation and habitat types, plant and animal species.	
NAT 1.2	Accurately record and report wildlife observations.	
NAT 1.3	Assist in census, monitoring and other field survey work.	
NAT 1.4	<i>Recognise tracks and signs of key animals.</i>	
NAT	LEVEL 2	
NAT 2.1	Conduct supervised surveys of wildlife, habitats, natural resources and physical landscape features.	
NAT 2.2	Collect, prepare and care for field specimens of flora and fauna.	
NAT 2.3	Record and report survey and monitoring data.	
NAT 2.4	Use identification aids to identify plants and animals.	
NAT 2.5	Use and care for scientific instruments.	
NAT	LEVEL 3	
NAT 3.1	Organize and lead biophysical survey and monitoring activities.	
NAT 3.2	Operate specialised survey equipment.	
NAT 3.3	Analyse, and present interpret survey and monitoring data.	
NAT 3.4	<i>Lead specialised taxonomic, habitat and ecosystem surveys (according to individual expertise and experience).</i>	
NAT 3.5	<i>Curate collections.</i>	
NAT 3.6	<i>Interpret air photographs and remote sensing information.</i>	
NAT	LEVEL 4	
NAT4.1	Design biophysical research, survey, research and monitoring methods and programmes.	
NAT4.2	Determine the value of ecological/environmental services.	
CON	CONSERVATION MANAGEMENT	
CON	LEVEL 1	
CON 1.1	Control/remove vegetation.	
CON 1.2	Propagate, plant and care for trees and shrubs.	
CON 1.3	<i>Check and replenish feeding stations for wild animals.</i>	
CON 1.4	<i>Care for captured / captive animals.</i>	
CON	LEVEL 2	
CON 2.1	Supervise practical habitat creation, restoration, management and manipulation work.	
CON 2.2	<i>Control invasive animals (excluding shooting).</i>	
CON 2.3	<i>Assist in the capture / immobilisation, handling and transportation of animals.</i>	
CON 2.4	<i>Maintain and operate equipment for animal capture and containment.</i>	
CON 2.5	<i>Cull animals using firearms.</i>	
CON	LEVEL 3	
CON 3.1	Specify management requirements for and direct the management of habitats and ecosystems.	
CON 3.2	Specify, and evaluate sustainable quotas for natural resource use.	
CON 3.3	Specify special measures for assisting protection, survival or recovery of key species.	
CON 3.4	<i>Plan evaluate and supervise management of invasive and problem animals and human wildlife conflict.</i>	
CON 3.5	<i>Plan and supervise animal capture, transport, care and management.</i>	
CON 3.6	<i>Plan, specify, and evaluate sustainable quotas for sport hunting/fishing.</i>	
CON	LEVEL 4	
CON4.1	Plan, manage and evaluate species and habitat conservation and recovery projects.	
CON4.2	Design indicator based biophysical monitoring programmes.	

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CON4.3	Plan, manage and evaluate species reestablishment or reintroductions.	
CON4.4	Plan, manage and evaluate animal translocation, eradication and control projects.	
CON4.5	<i>Plan, manage and evaluate ex-situ animal conservation and breeding projects.</i>	
CON4.6	<i>Plan, manage and evaluate ex-situ plant conservation projects.</i>	
SOC	SOCIO-ECONOMIC AND CULTURAL ASSESSMENT	
SOC	LEVEL 2	
SOC 2.1	Conduct supervised community based socio economic, cultural and resource use and surveys in the field using basic techniques.	
SOC	LEVEL 3	
SOC 3.1	Conduct stakeholder analysis.	
SOC 3.2	Plan and supervise and facilitate socio economic and livelihood information gathering activities.	
SOC 3.3	Analyse and present survey data.	
SOC 3.4	<i>Lead ethnographic and cultural heritage assessments and monitoring programmes.</i>	
SOC	LEVEL 4	
SOC4.1	Develop socio economic and cultural research and monitoring programmes.	
SOC4.2	Develop socio economic, livelihood and cultural survey methodologies.	
SOC4.3	Carry out economic analyses.	
DEV	SUSTAINABLE DEVELOPMENT AND COMMUNITIES	
DEV	LEVEL 2	
DEV 2.1	Liase with community groups.	
DEV 2.2	Arrange local meetings, events and presentations.	
DEV 2.3	Provide information, guidance and assistance for community-based conservation and sustainable use.	
DEV 2.4	Monitor compliance with agreements in the field.	
DEV	LEVEL 3	
DEV 3.1	Enable community inputs to planning, decision-making and management.	
DEV 3.2	Negotiate community conservation and management agreements.	
DEV 3.3	Plan, coordinate and facilitate community capacity development activities.	
DEV 3.4	Promote development of local networks and organizations.	
DEV 3.5	Provide advice on sustainable community based natural resource use and management.	
DEV 3.6	Provide advice/guidance on community funding.	
DEV 3.7	Work with religious/cultural leaders to promote conservation and sustainable use.	
DEV 3.8	<i>Provide specialised advice/guidance to communities (according to individual expertise and experience).</i>	
DEV	LEVEL 4	
DEV4.1	Design and negotiate community components of integrated conservation and development projects.	
DEV4.2	Develop agreements, for resource access and use.	
DEV4.3	Resolve land claims and formalise land allocations.	
DEV4.4	Resolve conflicts concerning protected areas, communities and other stakeholders.	
DEV4.5	Identify and mobilise external sources of assistance, support and finance for local communities.	
PAM	PROTECTED AREA POLICY AND PLANNING	
PAM	LEVEL 3	
PAM 3.1	Understand and interpret relevant legislation.	

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PAM 3.2	Implement, monitor, review and update Protected Area management plan objectives and actions.	
PAM	LEVEL 4	
PAM 4.1	Coordinate design of protected area zoning systems to meet conservation and other objectives	
PAM 4.2	Lead the development of a protected area conservation management plan.	
PAM 4.3	Negotiate local agreements to support management of the protected area.	
PAM 4.4	Lead development of contingency plans for potential disasters.	
PAM 4.5	Contribute information and recommendations to plans, policies and assessments.	
PAM 4.6	Monitor management effectiveness of the protected area.	
PAM	LEVEL 5	
PAM5.1	Lead national and international policy development for biodiversity conservation and protected area management.	
PAM5.2	Lead the design of protected areas, networks, systems and strategies.	
PAM5.3	Plan and negotiate trans boundary protected area and conservation initiatives.	
PAM5.4	Develop and implement alternative protected area management systems.	
PAM5.5	Manage the process of protected area boundary formalisation, rationalisation, gazettment.	
PAM5.6	Contribute to the development and updating of legislation related to protected areas.	
SIT	SITE MANAGEMENT	
SIT	LEVEL 1	
SIT 1.1	Fight fires.	
SIT 1.2	Safely use and care for tools and equipment.	
SIT 1.3	Maintain site tidiness and cleanliness.	
SIT	LEVEL 2	
SIT 2.1	Inspect and report on condition of site infrastructure.	
SIT 2.2	Construct and repair structures, paths and trails.	
SIT 2.3	Maintain and operate waste disposal systems.	
SIT 2.4	Maintain and repair utility supply (electrical and water).	
SIT 2.5	Maintain motor vehicles and engines.	
SIT 2.6	<i>Drive motor vehicles.</i>	
SIT 2.7	<i>Safely operate and maintain small boats.</i>	
SIT	LEVEL 3	
SIT 3.1	Draw up plans and specifications for small works and basic site infrastructure for staff and contractors.	
SIT 3.2	Supervise work by contractors and external maintenance workers.	
SIT 3.3	Inspect and specify maintenance and repair requirements and schedules.	
SIT 3.4	Locate, mark and inspect boundaries in the field.	
SIT 3.5	Identify and assess fire risks and hazards and plan fire prevention and control.	
SIT 3.6	Plan, supervise and evaluate management of physical landscape.	
SIT 3.7	<i>Produce technical drawings and maps.</i>	
SIT	LEVEL 4	
SIT4.1	Contribute to specification and design of major infrastructure projects.	
SIT4.2	Plan and produce specifications for appropriate on-site accommodation.	
SIT4.3	Plan and produce specifications for parking and traffic flow facilities.	
ENF	ENFORCEMENT	
ENF	LEVEL 1	
ENF 1.1	Recognise and identify signs and evidence of illegal or restricted activities in the field.	

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ENF 1.2	Issue informal warnings and guidance for future conduct to minor offenders.	
ENF 1.3	Provide testimony in court.	
ENF 1.4	Treat members of the public with respect and understanding during patrol and enforcement activities.	
ENF 1.5	<i>Participate in patrol activities safely, effectively and with discipline.</i>	
ENF 1.6	<i>Deal effectively with hostile situations and defend oneself against physical attack.</i>	
ENF	LEVEL 2	
ENF 2.1	Apprehend and detain suspects correctly and legally.	
ENF 2.2	Conduct covert surveillance, track violators and conduct searches, spot checks and inspections.	
ENF 2.3	Correctly secure, manage and process a crime scene.	
ENF 2.4	Report on patrol activities and observations.	
ENF 2.5	<i>Care for and use firearms correctly and safely.</i>	
ENF 2.6	<i>Participate in tactical enforcement operations.</i>	
ENF 2.7	<i>Provide enforcement security.</i>	
ENF	LEVEL 3	
ENF 3.1	Conduct tactical and operational planning for enforcement operations.	
ENF 3.2	Lead patrol and enforcement activities in the field.	
ENF 3.3	Liaise with local communities to resist and prevent illegal activities.	
ENF 3.4	Follow correct procedure for dealing with violations seized or confiscated evidence.	
ENF 3.5	Coordinate activities with law enforcement and regulating agencies.	
ENF 3.6	<i>Lead an investigation.</i>	
ENF 3.7	<i>Develop and manage informant networks.</i>	
ENF	LEVEL 4	
ENF4.1	Plan patrol and enforcement activities and programmes.	
ENF4.2	Identify legal requirements and instruments for improving or extending protection and contribute to the development of protected area regulations.	
ENF4.3	Liaise with other agencies to investigate wildlife trade links and other illegal activities and markets affecting the protected area.	
ENF4.4	Organize amnesties and collection of illegal equipment and materials.	
REC	RECREATION AND TOURISM	
REC	LEVEL 2	
REC 2.1	Guide, assist and regulate visitors on site.	
REC 2.2	Respond to emergencies and accidents to visitors.	
REC 2.3	Operate ticketing and sales points.	
REC 2.4	Collect information about visitors and activities.	
REC 2.5	<i>Guide visitors safely on specialised/hazardous activities.</i>	
REC	LEVEL 3	
REC 3.1	Identify recreation opportunities and appropriate recreation activities.	
REC 3.2	Identify information needs about visitors and plan recreation surveys.	
REC 3.3	Identify potential recreation impacts and design impact monitoring and mitigation systems.	
REC 3.4	Specify measures for prevention/ reduction/mitigation of visitor impact.	
REC 3.5	Supervise safety and security of visitors and other users.	
REC 3.6	Monitor and supervise concessionaires, traders and commercial operations.	
REC 3.7	<i>Monitor and supervise sport hunting/ fishing activities.</i>	
REC	LEVEL 4	
REC4.1	Lead development of recreation and tourism strategies and plans.	
REC4.2	Analyse tourism information and trends and identify implications of recreation	

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	at the protected area.	
REC4.3	Identify potential tourism and recreation 'products' for the protected area.	
REC4.4	Define recreation zones and locations based on appropriateness and compatibility of activities.	
REC4.5	Design ticketing, permit and fee systems for recreation services and activities.	
REC4.6	Establish safety standards and codes of conduct for protected area users.	
REC4.7	Define contractual terms and conditions for tourism and recreation franchises, concessions and partnerships.	
REC4.8	Develop tourism packages with partners.	
AEP	AWARENESS, EDUCATION AND PUBLIC RELATIONS	
AEP	LEVEL 1	
AEP 1.1	Provide basic information to stakeholders and visitors.	
AEP	LEVEL 2	
AEP 2.1	Inform visitors, community members and the public.	
AEP 2.2	Deliver formal and informal interpretive/ awareness/ educational presentations.	
AEP 2.3	Deliver structured adult/community awareness programmes.	
AEP 2.4	Lead guided interpretive activities.	
AEP	LEVEL 3	
AEP 3.1	Plan awareness and education activities.	
AEP 3.2	Research, plan, write and design awareness/ education publications.	
AEP 3.3	Research, plan and design interpretive trails.	
AEP 3.4	Organize special events for the public.	
AEP 3.5	Research, plan and design interpretive or information exhibits/signs.	
AEP 3.6	Research, plan and design curriculum based schools education programmes.	
AEP 3.7	<i>Collate, verify and distribute news information.</i>	
AEP 3.8	<i>Provide information for the media.</i>	
AEP	LEVEL 4	
AEP 4.1	Lead the development of interpretation, awareness and education strategies and action plans.	
AEP 4.2	Research and plan an interpretive/tourist/visitor centre.	
AEP 4.3	Evaluate impact of Education and Awareness plans and programmes.	
AEP 4.4	Plan and manage media/PR/marketing activities.	