

VASCULAR FLORA OF THE GUÁNICA DRY FOREST, PUERTO RICO

by

Omar A. Monsegur Rivera

A thesis submitted in partial fulfillment
of the requirement for the degree of

MASTER OF SCIENCE

in

BIOLOGY

UNIVERSITY OF PUERTO RICO
MAYAGÜEZ CAMPUS

2009

Approved by:

Duane A. Kolterman, PhD
Member, Graduate Committee

Date

Jesús D. Chinaea, PhD
Member, Graduate Committee

Date

Gary J. Breckon, PhD
President, Graduate Committee

Date

Nilda E. Aponte, PhD
Representative of Graduate Studies

Date

Nanette Difffoot Carlo, PhD
Chairperson of the Department

Date

Abstract

The systematic review of the Guánica Forest Reserve flora indicates that it consist of 460 accepted species, plus another 258 species that require confirmation. The number of unconfirmed records is greater than that of other dry forest areas in Puerto Rico, suggesting that further fieldwork and herbaria work is needed. A total of 102 new record are included as part of this work, including *Sansevieria concinna* as a new record for the island of Puerto Rico and the Caribbean. The Guánica Forest is a major depository of the Puerto Rican and Caribbean dry forest plant diversity. Three of the endemics are restricted to the Forest and do not occur elsewhere in the world. *Reynosia vivesiana* and *Zephyranthes proctorii* are identified as species that should be considered to be listed as endangered species. In general the number of exotics and naturalized species is relatively low. Nevertheless, *Haematoxylon campechianum* and *Sansevieria concinna* are examples of the species that deserve further study as potential invasive species within the Forest.

Resumen

La evaluación sistemática de la flora de la Reserva Forestal de Guánica indica que está consiste de 460 especies aceptadas, con otras 258 especies que requieren ser confirmadas. El número de reportes sin confirmar es mayor que otras áreas en Puerto Rico, sugiriendo que se requiere de más trabajo de campo y herbario. Un total de 102 nuevos reportes son incluidos como parte de este trabajo, incluyendo *Sansevieria concinna* como un nuevo registro para la isla de Puerto Rico y el Caribe. El Bosque de Guánica es un depositario principal de la diversidad de plantas de bosque seco de Puerto Rico y el Caribe. Tres de las especies endémicas están restringidas al Bosque y no se encuentran en ningún otro lugar del planeta. Se identifica a *Reynosia vivesiana* y *Zephyranthes proctorii* como especies que deben considerarse para ser listadas como especies en peligro de extinción. En general el número de especies naturalizadas y exóticas es relativamente bajo. Sin embargo, *Haematoxylon campechianum* y *Sansevieria concinna* son ejemplos de especies que merecen más estudio por su potencial como especies invasoras dentro del Bosque.

Copyright 2009 by Omar A. Monsegur Rivera

I grant the University of Puerto Rico the non-exclusive right to use this work for the University's own purposes and to make single copies of this work available to the public on a not-for-profit if copies are otherwise unavailable.

Acknowledgments

I want to thank all the members of my graduate committee and the botany professors of the University of Puerto Rico at Mayagüez. All of them have contributed to what I have learned during all these years. I specially recognize Dr. Gary J. Breckon for his trust and patience.

I must mention the support of Pedro Acevedo from the Smithsonian Institution. His assistance was critical during my visit to the US herbarium. He also made accessible all the data of his collections from Guánica. Mark Strong and Vicky Funk also helped me during my internship at the Smithsonian. Frank Axelrod kindly provided the unpublished manuscript of his Vademecum to the Vascular Plants of Puerto Rico. The directors of the herbaria in Puerto Rico (SJ, UPR and UPRRP) provided the opportunity to examine the vouchers from the Guánica Forest. Jeanine Vélez (MAPR) helped me with the management of the Brahms database. Nestor Pérez Molière (NY) always responded immediately to any request for images or specimen data.

My friends Carlos C. Martínez and Amelia Merced were part of that small, but persistent group of students who decided to explore the unknown. Both of them were part of my first steps into botany. There was an extensive amount of field work on the Guánica Forest Reserve that would not be possible without the assistance of numerous graduate and undergraduate students; Javier Román and Iliana Morales were always there.

Also, I want to thank all my former partners at the Puerto Rican parrot project: Iván Llerandi, Jesús Ríos, Ana Estrella, Brian Ramos, Jong Piel Banch and Ricardo Valentín. You all know that more than friends, we are a family. There is a grumpy Puerto Rican botanist who

deserves all my admiration, Mr. José Sustache Sustache. Thanks Sustache for making me laugh and for your unconditional friendship.

The Department of Natural and Environmental Resources of Puerto Rico provided the collecting permits for this research. Also Mr. Miguel Canals provided access to the different areas of the Forest, helped me to locate some of the rare species and took me to pristine areas. The US Fish and Wildlife Service, Boquerón Field Office provided time to complete the revision of the manuscript and to do herbarium work. I will always be grateful for the support and the input of my partners at Boquerón. Thanks Carlitos for sharing your knowledge about the natural history and management of the Guánica Forest. To Jan Paul for your friendship and patience during the design of the maps.

Finally, I am gratefull to all my family for their patience and love. Especially to Bárbara Sánchez for being there and understanding why all our vacations ended up collecting plants. Thanks for helping me collect and getting pictures of the never-ending beauty of our loved Puerto Rico.

Table of contents

Abstract	ii
Resumen	iii
Acknowledgments	v
Table of contents	vii
List of tables	viii
List of figures	ix
List of appendices	x
Introduction	1
Objectives	5
Litterature review	6
Methodology	10
Results	17
Discussion	19
Summary of results	28
Conclusions	29
Recommendations	30
Literature cited	31
Tables	38
Figures	55
Appendices	63

List of tables

Table 1. Summary of the collecting days and the number of species collected, and the cumulative number of species not previously collected per collecting trip.	39
Table 2. Summary of the names attributed to the flora of the Guánica Forest Reserve.	41
Table 3. New vascular plants records for the Guánica Forest Reserve.	42
Table 4. Comparison between the proportion of unconfirmed taxa among the Guánica Forest Reserve, Mona Island, Susúa Forest and Vieques Island.	46
Table 5. Summary of regional endemics reported for the flora of the Guánica Forest Reserve.	47
Table 6. Species designated as critical elements by the Department of Natural and Environmental Resources (CE) or listed by the US Fish and Wildlife Service (FL).	48
Table 7. Comparison of the percent of the flora corresponding to Critical Elements and Federally Listed species between some natural areas in Puerto Rico.	50
Table 8. Rare species occurring within the Guánica Forest Reserve that deserve further study and should be considered to be designated as Critical Elements by Department of Natural and Environmental Resources or protected by U.S. Fish and Wildlife Service.	51
Table 9. Species confirmed within the flora of the Guánica Forest Reserve and known only from collections prior to 1951.	52
Table 10. Introduced and/or naturalized species within the Guánica Forest Reserve.	53

List of figures

Figure 1. Map of the location of the Guánica Forest Reserve, including the new boundaries of the West and East Units.	56
Figure 2. Map of the trails and collecting areas of the the Guánica Forest Reserve “East Unit”.	57
Figure 3. Map of the trails and collecting areas of the the Guánica Forest Reserve “West Unit”.	58
Figure 4. Map of the surveyed areas and collecting points in the Guánica Forest Reserve “East Unit”.	59
Figure 5. Map of the surveyed areas and collecting points in the Guánica Forest Reserve “West Unit”.	60
Figure 6. Cumulative number of species during the collecting period.	61
Figure 7. Distribution of collecting trips per month.	62

List of appendices

Appendix I. Table of personal communications.	64
Appendix II. Gazetteer for the Guánica Forest Reserve.	65
Appendix III. Checklist of the Vascular Flora of the Guánica Forest Reserve.	71
Appendix IV. Table of acronyms for the collectors of the Guánica Forest Reserve flora.	203

Introduction

Floras are systematic treatments of all plants occurring in a particular geographical or natural area (Woodland, 1997). Floras were accepted as formal science early in the history of taxonomy but with the advance of systematic studies they were considered only as bibliographies. Now with pressure and threats of loss of biodiversity they are considered a high priority once again (Funk, 1993). This has led to a strategy that involves writing florulas or accounts of the plants of very local areas (Cedeño, 1997). The kind of collecting program that leads to the construction of a florula is intensive and involves a year-round familiarity with the plants of the area (Raven, 1988). This increases the chances of finding species that will not be collected in wide-ranging or superficial works.

Surveying the floristic diversity and composition of a given area provides the essential basic knowledge for studies in different disciplines of biology, ecology, evolution, systematics and biogeography (Cedeño, 1997; Funk, 1993). The data collected from a botanical inventory are not only useful for the study of floristics and evolution, but are also of vital importance for conservation, utilization and management of the tropical vegetation (Prance, 1977). Plant inventories are now of greater importance due to the local, national and international laws governing and protecting plants and the greater emphasis being placed on discovering new plants for medicine, food, and as a genetic pool for future research (Woodland, 1997). This knowledge is especially critical for tropical regions where many of the species have a very narrow distribution and the biology of the species is often not known (Raven, 1988). It is in the tropical regions where the pressure on the biota is greatest due to rapid human population growth and subsequent destruction of natural areas for urban development. According to Prance et al. (2000) tropical regions remain undercollected and the total number of angiosperms is currently

underestimated. There are in fact between 300,000 and 320,000 species of vascular plants, the vast majority of which are tropical.

The Caribbean islands are among the top biodiversity hotspots (Mittermeier et al., 1998) and their dry forests are considered more diverse at the family level than similar continental areas (Gentry, 1995). Also the biogeographic area of the Caribbean is one of the centers of high endemism and speciation in the world (Santiago-Valentín and Olmstead, 2004). Tropical dry forests are the most threatened of the tropical forest types (Janzen, 1988). Much of the dry forest in the Caribbean has been cut, primarily for agriculture, urbanization and fuel (Lugo et al., 1996). However there have been only few attempts to focus on the distinctive floristic composition of dry forest (Gentry, 1995). According to Gentry, if we are interested in preserving the world's biodiversity, this exceptionally endangered tropical ecosystem deserves higher attention.

It is widely accepted that the island of Puerto Rico is one of the best floristically studied areas of the Caribbean (Cedeño, 1997). Treatments of the flora of Puerto Rico include Acevedo-Rodríguez (2003), Acevedo-Rodríguez & Strong (2005), Ackerman (1995), Britton & Wilson (1923-1926), Liogier (1985, 1988, 1994, 1995, 1997), Liogier & Martorell (1982, 2000), Little & Wadsworth (1964), Little et al. (1974), Proctor (1989), Quevedo et al. (1990), Stahl (1883-1888) and Urban (1903-1911). Despite the amount of work related to the Puerto Rican flora, species continue to be described and new records are added. Examples of species described within the last decade include *Agave minor* Proctor, *Cyperus pulguerensis* M.T. Strong, *Marsdenia woodburyana* Acev.-Rodr., *Pisonia taina* Trejo, *Reynosia vivesiana* Trejo, *Tabebuia karsoana* Trejo and *Zephyranthes proctorii* Acev.-Rodr. & M.T. Strong (Acevedo-Rodríguez, 1999; Acevedo-Rodríguez & Strong, 2005; Trejo-Torres, 2005, 2008, 2009;).

The Guánica Dry Forest is a natural area comprising the best remnant of dry forest vegetation in Puerto Rico. The forest has been designated as a biosphere reserve by the United Nations and is the focus of worldwide research on the ecology of tropical dry forest. However, to date there has not been any systematic study of the plants of the Guánica Forest Reserve (GFR).

Quevedo et al. (1990) listed about 500 species for the forest, including 19 endemics to Puerto Rico. However Figueroa (1996) reported 657 plant species for the forest, with 18 of the tree species being endemic to Puerto Rico. Neither Quevedo et al. (1990) nor Figueroa (1996) explain the source of their data, which is probably taken from Roy Woodbury's unpublished notebooks. Woodbury's made lists of the species he observed in the field and in some cases he also made collections, but no one has attempted to try to link the list with his collections. In any case linkage could be difficult due to the scanty data on the specimens. Moreover the reports in the literature lack vouchers and many of the herbarium collections, especially the earlier ones, lack precise location data. As a result, it is not clear for many of the collections if they were made within the boundaries of the reserve. The above differences in counts reflect both the absence of a systematic floristic study and the fact that further areas have been added to the forest. Most of these recent additions have not been extensively surveyed and the composition of the vegetation is mostly unknown (Miguel Canals, pers. comm., Appendix I).

Recent work in the Guánica Forest Reserve suggests that its flora remains under-collected. New species such as *Marsdenia woodburyana*, *Reynosia vivesiana* and *Zephyranthes proctorii* were recently described for the Reserve. New populations of a number of rare or federally listed species have recently been located in the forest [e.g. *Randia portoricensis*,

Cordia rupicola, *Eugenia woodburyana*, *Ottoschulzia rhodoxylon*, *Trichilia triacantha*] as well as the first report of *Metastelma monense*, which was previously known only from Mona Island.

This study will provide the most complete floristic account of the flora of the Guánica Dry Forest, and will give a more accurate idea of the plant richness within the forest boundaries. The flora of the Guánica Dry Forest will serve as a baseline for future management decisions of the forest. Herbarium specimens will provide a reference for future researchers with more precise location for most collections. Notes on growth habit, substrate preference and location will give a better idea of the ecology and habitat of the plants species.

Objectives

The primary objective of this study was to determine the vascular flora of the Guánica Dry Forest and document it with herbarium specimens.

In particular this study expects to:

1. Generate an updated checklist of the vascular flora of the Guánica Forest Reserve.
2. Locate populations of endangered and rare plant species to determine their status within the reserve, and identify rare species that deserve further study.
3. Identify introduced or naturalized species that require further study.

Literature review

Floristics

Many researchers do not consider floristic studies and inventories as formal science. There is an assumption that descriptive floristics and taxonomy are not explicitly experimental science, and are of lesser value (Prather et al., 2004b). To this can be added the pressure for funding required for maintaining and increasing herbarium collections plus the changes in priorities of some institutions. These support problems reduce the number of individuals interested in pursuing a career in taxonomy. Lack of support and the perception that taxonomy is a historical science affects not only botanists, but also a wide range of biologists working with different taxa. It is becoming difficult to recruit student or staff to take up floristic projects, and the implications for management of herbaria and taxonomic institutions in terms of career goals and rewards need to be addressed (Heywood, 2001). This is particularly important for small institutions and herbaria, which are generally located in high diversity areas. Heywood (2001) also notes the decrease in expertise in morphological studies as a consequence of the current focus on molecular systematics. This is critical because the knowledge about some taxa remains in the mind of specialists that spend their life gathering it, who do not have the time or resources to publish and train further students. Funk (2006) points out the importance of viewing floras and checklists as a continuum that involves systematics and biodiversity, and stresses their importance as a source of information for biodiversity studies and conservation biology.

As the previous statements remain an issue, plant collections around the world continue to decrease. Prather et al. (2004a) reported that collections in United States herbaria are declining and only 21% of the U.S. herbaria reached their peak in local collecting activity within

the last 20 years; most herbaria are no longer actively sampling the local flora. In fact, the peak in collections for most US herbaria was reached by 1930. There are many reasons to continue increasing herbarium collections and cataloguing our vegetation. Even in well known areas we need to track naturalized species that can increase in number and eventually threaten native species (Prather et al., 2004b). This underscores the need to collect not only in natural reserves and pristine areas but also in highly disturbed areas. Also, some groups are still poorly collected and their study can lead to the description of unknown species. Even in well recorded areas such as natural reserves, ongoing collecting can aid in determining extinctions and follow expansion and contraction in the distribution of species (Prather et al., 2004b).

According to Heywood (2001) plant collection and documentation has changed little over time even though we are now more aware of the need to sample variation. We need to increase the quality of field data and provide more exact geographical information. Quality data are essential to determine of the range of the species, and to establish priorities in order to preserve areas of high diversity. Nevertheless the biggest problem still remains the increasing loss of plant biodiversity that researchers are attempting to describe. A previous estimate is that about 65,000 plant species or 20% of the land flora is threatened with extinction, including species that have not been described (Raven, 1988). The process of observing and collecting plant material in the field, processing it and storing it in herbaria, and using it as the primary basis for describing new taxa and preparing floras of particular areas remains the essential basis from which we derive our knowledge of the identity of plants and our ability to communicate about them (Heywood, 2001). The importance of plant collecting in cataloguing biodiversity cannot be overstated: specimens are the very basis of floristic and plant taxonomic science, and as such, provide the foundation of nomenclature, the basis for identification, the common reference for

communication, the vouchers for floras and the tools for teaching (Prather et al., 2004a).

According to Heywood (2001) it has never been suggested that molecular systematics can substitute for floristic research; these disciplines are complementary and both are critical for the exploration and understanding of plant diversity.

History of the Guánica Forest

The management of the area that actually occupies the Guánica Forest Reserve goes back to the time of Spanish rule. It started with the establishment of the “Junta Superior para el Repartimiento de los Terrenos Baldíos” and the reestablishment of the “Inspección de Montes” in 1875 (Domínguez Cristóbal, 2003). At that time the primary use of forested areas was for pastures, timber, charcoal production and coconut plantations. However, the boundaries of the forest at the time were not clear.

The Guánica Dry Forest was designated as a state forest in 1917 by Governor Arthur Yager and has been protected and managed since 1930 (Lugo et al., 1996; Álvarez et al., 1990; Murphy and Lugo, 1990). In 1919 the Forest occupied approximately 2,079 ha. By 1996, as a result of land acquisitions the Forest area increased to about 4,016 ha, making it the third largest forest reserve on the island after the Caribbean National Forest and the Maricao Forest Reserve. It is now the largest Commonwealth protected area over limestone substrate (Lugo et al., 1996), with an estimated area of about 4,400 ha (Miguel Canals, pers. comm., Appendix I). The forest is divided in two main contiguous areas; the east unit, that includes the original forest area and the west unit, that was added after 1950 (Lugo et al., 1996). The GFR is considered one of the best examples of a subtropical dry forest in the world (Murphy and Lugo, 1990; Ewel and

Whitmore, 1973) and was designated as an UNESCO Biosphere Reserve in 1981 (Lugo et al., 1996; Lugo, 1983).

According to Murphy and Lugo (1990) dry forests tend to be favored for human habitation and as a result only a few tropical and subtropical dry forests remain undisturbed. Up to 1931 there was a small village known as El Maniel within the forest boundaries with an estimated population of 20 families (Molina, 1998). These people disturbed the forest by selective logging for timber, fence posts and charcoal production. The forest was also used as a grazing area for cattle. After 1931 these families were moved to La Luna village, a housing area located north of the main entrance of the reserve (Molina, 1998). During the depression of the 1930s and up to the 1950s some families still lived in the more protected canyons and valleys of the forest (Murphy et al., 1995).

After the reserve was established there were three major reforestation projects undertaken (Wadsworth, 1990). Between 1922 and 1931 plantations were established within the reserve. The Civilian Conservation Corps established a camp in the Guánica Forest in 1936, and from then until 1941 continued establishing plantations (Wadsworth, 1990). The last period of plantations started in 1945 and lasted until 1970. Species favored for plantations included *Casuarina equisetifolia*, *Haematoxylon campechianum*, *Prosopis juliflora*, *Swietenia mahogani*, *Eucalyptus rostrata*, *Guaiacum officinale*, *Zanthoxylum flavum* and *Leucaena leucocephala*. Chinae (1990) found that only eight of 23 tree species introduced to the forest for several purposes had been successful and appear to be self-regenerating (*Haematoxylon campechianum*, *Ziziphus mauritiana*, *Swietenia mahogany*, *Calotropis procera*, *Prosopis juliflora*, *Thespesia populnea*, *Gossypium barbadensis*, *Cocos nucifera* and *Casuarina equisetifolia*).

Methodology

Environmental setting and vegetation

The Guánica Dry Forest Reserve lies within the Subtropical Dry Life Zone, which is characterized by low annual rainfall and a high evapotranspiration ratio (Ewel and Whitmore, 1973). The low mean annual precipitation is due to the rain shadow effect as in other areas of the Caribbean. It is produced by the Cordillera Central, a mountain range running east to west across almost the full length of Puerto Rico (Castilleja, 1991). In Puerto Rico the majority of this life zone is located on the south coast extending 120 km from Cabo Rojo to Guayama (Ewel and Whitmore, 1973). Other fragments of subtropical dry forest occur in Ceiba and Fajardo at the east end of the island and on the small islands surrounding Puerto Rico (Murphy and Lugo, 1990).

The climate within the Forest is seasonal with most of the runoff between September and October (Lugo et al., 1978). The Guánica Forest Reserve has a major dry period from December to April and a less conspicuous dry period from June to August (Lugo et al., 1996). Evaporative demand exceeds water supply during approximately nine months of the year (Murphy et al., 1995) and annual rainfall for the forest has been reported as 929 mm (Medina and Cuevas, 1990), 861 mm (Cintrón and Lugo, 1990), and 860 mm (Murphy and Lugo, 1986). Moisture availability as a function of shallow soils plus low rainfall and its seasonality are the factors suggested as determining forest productivity, growth characteristics, water loss and physiognomy (Murphy and Lugo, 1990; Lugo et al., 1978). Temperature tends to be constant throughout the year, with a mean annual temperature of 25.2° C (Molina, 1998).

The effects on the vegetation of the low rainfall and its seasonality are increased by soil factors. The forest predominantly lies within the Ponce limestone formation, a Mid-Tertiary pink to white, fine-grain limestone (Lugo et al., 1996). The most common soil is a dark to grayish brown, friable pedon derived from relatively soft limestone. The soils are classified in the Mollisols order, which have a high pH (7.8), high organic matter content (18 - 23 %) and occur in areas where 25 % of the ground surface is exposed rock (Lugo et al., 1996; Murphy & Lugo, 1990). According to Lugo and Murphy (1986) the soils are nutrient-rich, but only a small fraction of the total phosphate and potassium is readily available. The plant diversity in the Guánica Forest can be explained by the wide diversity of habitats produced by the proximity of the limestone basement to the surface and the subsequent variation in soil depth (Lugo, 1978). Elevation ranges from zero to 228 m above sea level (Murphy et al., 1995). Also the variable topography with a mixture of hills, deep canyons or ravines, gentle to steep slopes and the effect of airborne salt contribute to the diversity of habitats.

In 1996 Hurricane Hortense impacted the area and in 1998 it was struck by Hurricane Georges. Hurricane Georges passed over Puerto Rico on September 22-23, 1998 with the southern part of the eye passing over the Forest (Van Bloem et al., 2003). Plantation areas were severely affected by Hurricane Georges and by the intensive drought period that followed (Skip Van Bloem, pers. comm., Appendix I). This natural disturbance had an effect on the phenology of rare tree species. For example, *Polygala cowellii* flowered conspicuously after this event (Miguel Canals, pers. comm., Appendix I). Furthermore, it has been suggested that hurricanes play an important role shaping the forest structure of dry forest within the Caribbean by promoting the multiple-stemmed condition prevalent within pristine or relative undisturbed areas (Van Bloem et al., 2006, 2005, 2003).

Little et al. (1974) referred to the Guánica Forest as part of the dry limestone forest formation that occurs on the south coast from Guánica to Ponce, and Lugo (1983) describes it as a dry coastal forest. According to Ewel and Whitmore (1973) vegetation in the subtropical dry life zone tends to form a complete ground cover and is almost completely deciduous. Cook and Gleason (1928) considered *Bucida buceras* to be the dominant tree on the southern coastal plain and the adjacent foothills. Dansereau (1966) classified the general area as a semi-deciduous forest with a regional climax dominated by *Bucida buceras* forest.

Lugo et al. (1978) described eight plant associations in the Guánica Forest: Plantations, Savannas, Mangrove, Salt flats, Beach thicket, Scrub forest, Deciduous forest and Semi-evergreen forest. Pool (1975) described the following vegetation associations for the Guánica Forest: Beach thicket, Red mangrove, Salt flats, Rocky coastal thickets, Vegas “Valleys” and rocky woodland or thorn scrub. Pool explained that most plants show small coriaceous or succulent leaves, and thorns or spines are common.

Methods

The first part of this research consisted of a systematic review of pertinent literature and existing reports to create a preliminary checklist. Since the Guánica Forest Reserve was established in 1919, I only considered botanical publications after this date for the purpose of generating the checklist. Critical publications included Acevedo-Rodríguez (2005), Acevedo-Rodríguez and Strong (2005), Ackerman (1995), Chinae (1990), Liogier (1985, 1988, 1994, 1995, 1997), Liogier and Martorell (1982, 2000), Little and Wadsworth (1964), Little et al. (1974), Proctor (1989) and Quevedo et al. (1990). Species mentioned in these publications as occurring within the Guánica Forest Reserve were included in the preliminary checklist. In

addition, unpublished list of plants collected in the Guánica Dry Forest by Pedro Acevedo-Rodríguez, and Frank Axelrod's unpublished manuscript were incorporated into the preliminary checklist.

A list of specimens collected within the Guánica Forest Reserve and deposited in the MAPR herbarium was generated from the BRAHMS database and incorporated into the preliminary checklist. This checklist was the baseline for the study of vouchers at different herbaria. Herbaria in Puerto Rico (SJ, UPR, UPRRP) and in the United States, the New York Botanical Garden (NY) and the Smithsonian Institution (US), were consulted to verify the status of reported species lacking vouchers. This was critical, as none of the previous literature dealing with the flora or vegetation of the Guánica Forest provide specimen citations to confirm the identity and precise locality of the species. Only consulted material that includes detailed information about the locality and that can be referenced within the area currently occupied by the Guánica Forest Reserve was incorporated into the checklist. Species cited by previous authors, as occurring within the GFR but lacking vouchers were not excluded from the checklist; they were listed under the category, "confirmation required". This conservative approach recognizes that the floristic composition of natural areas is not static.

The area of study comprised the entire Guánica Forest Reserve (East Unit and West Unit) including recently acquired lands (Figure 1). The areas selected were based on several criteria. I consulted published maps of land use and land cover of the Guánica Commonwealth Forest (Vélez, 1996). Priority was given to older closed forest; however all the vegetation types and habitats within the reserve were sampled. Historical locations of rare or unusual species were visited for the confirmation of old records and evaluation of their status. Finally, personal communication with the forest manager, Miguel Canals, and other researchers, allowed me to

locate areas of high diversity and areas where populations of endangered or rare plants could be found.

For the purpose of accurately sampling the areas within the Guánica Forest, a detailed map of the boundaries of the Forest was prepared (Figure 1). Furthermore, for the purpose of facilitating the use of the checklist, maps of the trails and collecting areas of the Forest were produced (Figure 2 and Figure 3). A gazetteer for the localities within the Forest was created using available topographic maps and the maps to the trails of the GFR (Appendix II). The gazetteer also includes detailed information about local names that are not included on any map. At least one reference coordinates (NAD 83) of each locality is given. A detailed set of maps of the surveyed areas was prepared (Figure 4 & Figure 5). These maps include the polygons of the surveyed areas and the GPS readings

Collecting permits were obtained from the Department of Natural and Environmental Resources of Puerto Rico. A total of 54 collecting trips were conducted and with the visits varying from four to ten hours depending on the phenology and the areas visited (Table 1 and Figure 6). Timing of field trips varied to provide a wide range of climate conditions throughout the year that promote flowering events. These included the main wet and dry seasons and accounted for the phenological periods of most plants (Figure 7). The collection period started in September 2003 and extended to August 2007.

For each plant collected, coordinates were gathered using a Garmin GPS 76 unit. Information about the morphology, phenology and microhabitat were recorded as well as growth habit for each collection. Reproductive material was collected when available and pressed in the field. When available, additional flowers and fruits were collected for future dissection and identification. Care was taken to collect plants that seemed representative of the populations and

to avoid undercollection of very large or small plants, succulents and grasses. The minimum recommended number of duplicates per specimen was three, avoiding to over collecting rare and endangered species. Procedures for collecting material in the field followed the recommendations of Judd et al. (2002), Woodland (1997) and Miller and Nyberg (1995). Material was dried at the facilities of the University of Puerto Rico at Mayagüez. Vouchers were deposited in the MAPR herbarium and when possible duplicates were sent to other herbaria (US, UPRRP, UPR, SJ, NY, JBSD). Identification followed the taxonomic keys available in the floristic literature of Puerto Rico and the Caribbean. Nomenclature was updated and followed Axelrod's unpublished Vademecum to the Vascular Plants of Puerto Rico, the prevailing system used at the MAPR and UPRRP herbaria.

The format followed in the checklist is explained at the beginning of that document (Appendix III). A table of the acronyms for the collectors of the Guánica Forest Reserve included on the checklist is also provided (Appendix IV). New records are defined as the species not previously cited on the literature and includes the taxa first collected by the author as well as specimens located in the different examined herbaria. A comparison was made of the number of confirmed vs unconfirmed taxa between the GFR flora and the floras of Mona Island, Vieques Island, Caja de Muertos Island and the Susúa Forest. Lists of endemics, rare and endangered plants were made and their general status assessed. An analysis of the plant species that occur within the GFR and that are designated by the Department of Natural and Environmental Resources as Critical Elements was done. The Department of Natural and Environmental Resources of Puerto Rico define the Critical Elements as the endemic or native species with a restricted distribution and threatened due to human activities (Quevedo et al., 1990). The species that are protected by the U.S. Fish and Wildlife Service under the Endangered Species Act were

also determined and designated as Federally Listed (FL). The criteria of the Department of Natural and Environmental Resources to define a Critical Element were used to identify other rare species that are unprotected. An analysis of the rare species that deserve further studies and that should be protected was done. Comments on the status of introduced species were based on my field observations.

Results

During a period of almost four years (Table 1) a total of 698 specimens were collected, corresponding to 404 taxa (Table 2). The combination of the literature review, herbarium searches and collecting in the field resulted in a total of 721 taxa (720 species, one of them with two subspecies) being associated with the Guánica Forest Reserve (Table 2; Appendix III). Six of the taxa cited on previous literature were excluded because they were based on misdetermined specimens. Of the 721 taxa, 460 were confirmed by herbarium specimens. I collected 88% of the 460 vouchered species; the other 56 (12%) species were confirmed by specimens from other collectors. Two hundred fiftyeight names were considered as unconfirmed reports from the literature or from herbarium specimens whose location data was too vague to be clearly assigned to the GFR. These names, based on unvouchered reports or on vague localities, are treated as unconfirmed reports and follow the confirmed taxa of each family (Appendix III).

Of the 460 confirmed names, 102 are new reports for the GFR. Fifty-four of the new reports are based on collections first made by me, the other 48 are from specimens located in herbaria, some of which I also collected (Table 3 and Table 4). Three species are considered endemics to the Forest because there is no evidence that they occur elsewhere in Puerto Rico (Table 5). Of the confirmed names, 47 are designated as critical elements by the DNER, and seven are listed by the U.S. Fish and Wildlife Service (Table 6 and Table 7). Furthermore, two of the species are restricted to the GFR and Mona Island Natural Reserve.

At least 20 species, including endemics and species with a limited distribution that occur within the GFR are considered as rare (Table 8). Furthermore, 10 of the confirmed species are considered extirpated from the forest (Table 9). Finally, 63 accepted names were identified as

introduced species (Table 10). *Sansevieria concinna* is here reported as a new record for the naturalized flora of Puerto Rico.

Discussion

Account of the flora

There is a need for further herbarium searches and fieldwork before a more complete account of the GFR flora is produced. The large number of unconfirmed reports for the GFR compared to the checklists for the Susúa Forest Reserve, Mona Island and Vieques Island is an indicator that further work is needed (Table 2 and Table 4). A majority of the unconfirmed reports for the GFR are from Axelrod's unpublished manuscript, which is based on herbarium specimens collected within the past 60 years that he has seen in herbaria. As his reports are based on supposed observed specimens it could be argued that they should be accepted, but I am only including names for which I have examined vouchers. While I have made an exhaustive survey of the MAPR herbarium, and a thorough review of possible species at US, my searches at NY, SJ, UPR, and UPRRP were not complete and were based on selected species.

The need for further field work is demonstrated in Figure 6, which shows that the cumulative species curve is beginning to plateau, but as Table 1 shows, I was still adding previously uncollected species until the next to the last trip. However, this is also true for other well surveyed natural areas such as the Mona Island Natural Reserve, where species continue to be added after extensive documentation of the flora (Breckon et al., 1998; José Sustache, pers. comm., Appendix I). I was not able to conduct an adequate exhaustive sample of the Forest both in time and space in 53 trips over a 48-month period (Table 1). Not all areas of the Forest were sampled, with some remote areas away from trails and roads in need of visitation (Figure 4 and Figure 5) and a number of areas in need of additional visitations at different times of the year. The need for further sampling is especially true for the canyons and ravines along the northern

boundary of the East Unit of the Forest, where 45 of the 102 new records were collected, 40 of them as part of this research (Table 3). These canyons and ravines provide a wide range of environmental conditions that support a higher diversity of species characteristic of more mesic conditions. Previous studies within the GFR have found that forest areas with closed canopy and mesic conditions promote greater species richness (Agosto, 2008). I collected in these areas more intensively than in the rest of the Forest, but more sampling is still needed at different times of the year.

It is likely that 11 of the unconfirmed reports are in error, *e.g. Tillandsia bulbosa, Ficus americana, Rondeletia portoricensis*. These species are otherwise only known from more mesic areas such as the Susúa Forest rather than the existing habitat that occur within the GFR.

Another 16 of the unconfirmed reports are for species that I saw, but did not collect, as they were sterile or unreachable. Four of these are common in the Reserve, *i.e. Bromelia penguin, Cocos nucifera, Euphorbia lactea, Haematoxylon campechianum*, while the others were only seen once, *i.e. Albizia lebbeck, Carica papaya, Ceiba pentandra, Cordia collococca, Dioscorea alata, Gliricidia sepium, Kalanchoe delagoensis, Kalanchoe pinnata, Momordica charantia, Sansevieria trifasciata, Solanum torvum, Stahlia monosperma*.

A large group of unconfirmed species are weeds associated with human disturbance. A number of these could have occurred in the Forest when human disturbance was more common and widespread, *e.g. cutting for charcoal and fence posts, and when there were homes, outbuildings, gardens and pastures within the GFR* (Molina, 1998; Murphy et al., 1995). Other weedy species no doubt occurred briefly as adventives along trails, roads and around buildings and in burned areas. These were seen and noted, and perhaps collected, but may no longer be

present in the Reserve. This latter contention is supported by the 22 new records of weedy species collected in the Forest in the last 10 years.

Some of the unconfirmed freshwater aquatic and wetland species could have been collected outside the Forest, *i.e.* *Eichhornia crassipes*, *Ceratophyllum demersum*, *Pistia stratiotes*, *Ruppia maritima*. This is especially true for some of the historical collections, which probably came from the now dry Laguna Guánica. Given the relatively limited amount of aquatic/wetland habitat within the GFR, the large number of unconfirmed aquatic/wetland species attributed to the Forest is surprising.

Endemism, rarity and species at risk

Of the 460 species confirmed as occurring in the GFR, three of them are limited to the Reserve and two of the three were recently described. Nineteen of the species are restricted to the Puerto Rican archipelago, and an additional 16 are limited to the Puerto Rican Bank “biogeographical area that includes the main island of Puerto Rico and the U.S. Virgin Islands” (Table 5). In attempting to preserve biodiversity, endemism, especially local endemism is critical. The protection of the habitat of these local endemics is critical as the populations can become ecological islands and eventually may face viability issues (Maunder et al., 2008). The protection of these endemics is also strengthened by the consensus of the importance of the Caribbean as one of the centers of global biodiversity and as a center of speciation (Acevedo-Rodríguez and Strong, 2008; Maunder et al., 2008; Francisco-Ortega et al., 2007). However, not all of the endemics found in the Forest can be considered as rare or at risk. For example *Rondeletia inermis*, *Gesneria pedunculosa*, *Clusia gundlachii*, *Croton flavens* var. *rigidus* and

Stigmaphyllon floribundum are examples of relatively common and widespread species within their range.

On the other hand, 15 of the endemics are considered as Critical Elements by the Department of Natural Resources and Environment and four are listed as Endangered species by the U.S. Fish and Wildlife Service (Table 6). Other endemic species occurring within the GFR should be considered for listing by the Federal government, *e.g. Reynosia vivesiana*, *Marsdenia woodburyana*, *Portulaca caulerpoides*, *Dalea carthagenensis* var. *portoricana*, *Myrciaria borinquena*, or by both the Federal and Commonwealth governments, *e.g. Zephyranthes proctorii*, *Mosiera xerophytica*, *Scolosanthus versicolor* (Table 8).

It is difficult to judge the relative importance of GFR as a depository of rare or at risk species without comparing it to other reserves or preserves in Puerto Rico. A comparison is complicated by the incomplete nature of the present study and the absence of comprehensive studies of other natural areas of Puerto Rico. This points out the importance on continuing cataloging the floristic composition of other natural areas in Puerto Rico. There are three unpublished floras of dry to dry/mesic forests. Comparison can be made with Susúa Forest Reserve, a more mesic forest on serpentine, Mona Island, which supports dry forest on limestone, and Vieques Island, which primarily has granitic and limestone substrates with dry to dry/mesic forest (Breckon, unpublished manuscripts). Certain caveats must be considered: The different forests differ greatly in size and habitat diversity. The three unpublished floras by Breckon are more complete being based on exhaustive searches in the salient herbaria and considerably more numerous and extensive field surveys, so that fewer of their unconfirmed species are likely to be confirmed in the future. The Vieques flora includes U.S. Fish and

Wildlife Refuge land, Commonwealth Forest Reserve, Puerto Rican Trust land and private lands, while the other three floras are only within DNRE reserves.

A greater proportion of the GFR confirmed flora consists of Critical Elements compared to the other three floras, and it also has more endangered species (Table 7). The number of Critical Elements will probably increase for the GFR if a number of unconfirmed Critical Elements are confirmed. About half of the unconfirmed species for Vieques are cultivated plants that were uncritically included by previous workers and will probably be dropped from that flora. Little and Wadsworth (1964) and Little et al. (1974) report a large number of tree species for the Susúa Forest that are unconfirmed. Most of these taxa fall within one of two groups: species that are found in the GFR on limestone and species that are found at higher elevations in the Maricao Forest Reserve. This suggests that they had overextended the Forest's boundaries to the south and the north. In both of these floras the number of confirmed Critical Elements is not likely to increase by confirmation of the unconfirmed species.

It is worth noting that Vieques Island, which is much larger than the GFR has only one more Critical Element, despite being richer in habitats and having a larger flora. Further, some of the Critical Elements on Vieques Island (*Amphitecna latifolia*, *Maytenus cymosa*, *Morisonia americana*, *Mouriri domingensis*) occur on private property and are unprotected. It is evident, even based on the incomplete nature of the present survey, that the Guánica Forest Reserve is a major depository of dry forest biodiversity in Puerto Rico, and perhaps for the Caribbean. Among the flora of the GFR there are species representative of genera endemic to the Caribbean such as *Leptocereus* Britton & Rose and *Ottoschulzia* Urban (Acevedo and Strong, 2008; Clubbe et al., 2004). In fact the GFR holds one of the biggest populations of *Leptocereus*

quadricostatus, a Caribbean endemic found in the south coast of Puerto Rico and the island of Anegada (Clubbe et al., 2004).

Adding to the biodiversity depository are species found in the GFR that are widespread, occurring elsewhere in the Antilles but are rare in Puerto Rico *e.g.*, *Tournefortia scabra*, *Bulbostylis curassavica*, *Cyperus floridanus*, *Passiflora berteriana*, *Passiflora murucuja*, *Oxandra lanceolata* (Table 8). *Passiflora berteriana* is a slender vine that has been reported only from the GFR. These and other species listed in Table 8 should be considered for listing as Critical Elements and possibly as Endangered Species.

Further herbarium and field work are needed to determine the probability of extirpation of species from the Forest, but at least nine species have a high likelihood of having been lost (Table 9). Three of them were last collected from the GFR in 1886 and none of the others have been collected since 1950. Four species are more or less weedy, occurring in sunny, often disturbed sites. Their loss would be expected as weedy species tend to have a high turnover (Breckon, 2000). *Indigofera micheliana* is noteworthy, as it has only been collected twice in Puerto Rico, both times in 1886. Both it and *Abutilon hirtum* are exotics.

Borrchia arborescens is a shrub that occurs on dry, exposed coastal bluffs and slopes. The GFR contains the habitat where one would expect this species to occur. The other three species are native trees whose extirpation from the Forest would not be expected without human alteration. The loss of these four species is a serious, long term or permanent loss in biodiversity for the GFR. In terms of the species richness count, they have been replaced by more common, widespread exotics. Despite the long protection status of the GFR the loss of these species may point out the impacts over biodiversity of the former land use of the Forest.

Exotics

Only 62 of the 460 confirmed species are exotics (Table 10), which is a surprisingly low number considering that somewhere between 30 and 40 % of the Puerto Rican flora is not native to the Island (Breckon, unpublished). While, many of the unconfirmed exotics are weedy, short-lived species with highly dispersible diaspores, the majority of the confirmed exotics are long-lived woody species. This may be a sign that the Forest is well along in recovering from past perturbations and that natural regeneration of native vegetation is more prominent within the Forest (Agosto, 2008; Molina and Lugo, 2006).

Some of the exotics were purposely planted and show little or no evidence of spreading (*e.g.*, *Annona reticulata*, *Bougainvillea × buttiana*, *Casuarina equisetifolia*, *Cnidoscolus aconitifolia*, *Opuntia cochenillifera*, *Thevetia peruviana*, *Yucca guatemalensis*). At the other extreme are species that are invasive and pose a serious threat to the stability and biodiversity of the Forest.

Cenchrus ciliaris, *Megathyrsus maximus*, and *Leucaena leucocephala* are fireadapted and spread into previously forested areas following burns (Wolfe, 2009). Once established they tend to maintain a fire regime, making it difficult if not impossible for native trees and shrubs to establish. After becoming established, species such as *Leucaena leucocephala* can remain as the dominant canopy species for more than 80 years (Wolfe, 2009). Other species invade disturbed forest margins and openings and probably compete with native species that would have occupied the same habitat. *Jasminum fluminense* is a common slender liana along forest margins in dry areas of Puerto Rico and apparently is successfully in competing with native species. Its effect is more evident on grasslands and early secondary forest, where it is observed covering young trees and shrub. *Antigonon leptopus* is a highly successful vine on Vieques and has established itself

in the West Unit of the GFR. *Erigeron ciliaris* and *Melinis repens* can be found in soil pockets on exposed limestone replacing native species that would occupy that specialized habitat.

Oeceoclades maculata is a common invader of undisturbed understory in the forests of Puerto Rico and it seems that competes with shade tolerant native species, as does *Sansevieria hyacinthoides* (Cohen and Ackerman, 2009). The latter species is widespread in lowland, dry to mesic forests where it often forms dense colonies.

Unlike *Sansevieria hyacinthoides*, which only spreads asexually, *Sansevieria concinna* produces seeds and has the potential to become a serious pest in the Forest. It is spreading and becoming very abundant locally, near where it was first discovered. Another herbaceous plant with a great potential to be invasive is *Agave sisalana*. This introduced agave is widespread within the GFR and is apparently invading undisturbed forest areas (Miguel Canals, pers. comm., Appendix I). It is not known if its spread is by the bulbils produced in the inflorescence or by seed. The annual herb *Arivela viscosa*, comes up abundantly following burns. Fire is a relatively new factor in the Caribbean dry forest, so that native fire-responsive species would be unexpected. However, *Boerhavia coccinea* and *Boerhavia diffusa* also appear to respond to burns, so competition between the two native species and the exotic is possible and should be studied.

Some of the exotic tree species have already become well established and form an important component in the vegetation where they occur (e.g., *Leucaena leucocephala*, *Prosopis juliflora*) (Wolfe, 2009; Agosto, 2008). This is consistent with other dry forest areas along the south coast of Puerto Rico, where *Leucaena leucocephala* is the dominant tree species in disturbed sites (Weaver and Chinea, 2003). Other tree species are becoming invasive and could have a major impact on the dry forest vegetation. *Haematoxylon campechianum* was planted in

the wet valleys of the GFR in the past and its success is apparently related to the high densities of the initial plantations (Agosto, 2008; China, 1990). This species is spreading out of the plantations and invading the surrounding areas with natural vegetation, including coastal dwarf forest. *Melicoccus bijugatus* is well established and becoming increasingly abundant in dry forests in Puerto Rico in general, *e.g.*, Vieques, Sierra Bermeja, Caja de Muertos and now the GFR. It has the potential to become a serious problem in the Forest.

Summary of Results

1. The flora of the GFR is composed of 460 confirmed species and 258 species that require confirmation before being accepted as part of the Forest flora. The confirmed species include a total of 102 new records for the reserve.
2. Nineteen of the confirmed species are endemics to Puerto Rico and 16 are restricted to the Puerto Rican Bank. At least three of the confirmed species are endemics to the GFR.
3. Forty-seven of the confirmed plant taxa correspond to species designated by the DNER as Critical Elements and seven of them are protected by the U.S. Fish and Wildlife Service.
4. The data suggest that at least seven native species have been extirpated from the Forest.
5. The flora of the GFR is composed of a total of 62 confirmed exotic species.
6. *Sansevieria concinna* is here reported as a new record for the naturalized flora of Puerto Rico.

Conclusion

More field collections and herbarium studies are needed for a complete accounting of the flora of the Guánica Forest Reserve. However, the present study shows that the Forest has higher plant diversity in general and is a richer depository of rare and endangered species compared to other dry forest of Puerto Rico. Available data suggest that extirpation of native taxa have been limited. But efforts must be made to provide further protection and enhance the populations of a number of rare species. Furthermore, there is a group of exotic invasive species that should be evaluated to determine their effect on the native vegetation.

Recommendations

1. Further field and herbaria work is needed to adequately document the species that require confirmation. Field work should be focused on recently acquired areas and mesic canyons.
2. The future acquisition of areas to be added as part of the GFR should consider areas with mesic habitats such as ravines and canyons, as these seen the areas that harbor the greatest species richness within the GFR.
3. Due to their limited distribution, *Reynosia vivesiana* and *Zephyranthes proctorii* should be evaluated for listing by the U.S. Fish and Wildlife Service.
4. The status of *Haematoxylon campechianum* and *Sansevieria concinna* deserves to be studied, as these species are apparently spreading to areas with natural vegetation.

Literature Cited

- Acevedo-Rodríguez, P. 2005. Vines and climbing plants of Puerto Rico and Virgin Islands. Smithsonian Institution, Washington, DC. 483 pp.
- Acevedo-Rodríguez, P. 1999. West Indian novelties I: a new species of *Marsdenia* (Asclepiadaceae) from Puerto Rico and a new name for a Jamaican species of *Calyptanthes* (Myrtaceae). *Brittonia* 51:166-169.
- Acevedo-Rodríguez, P. and M. Strong. 2008. Floristic richness and affinities in the West Indies. *Botanical Review* 74: 197-207.
- Acevedo-Rodríguez, P. and M. Strong. 2003. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Smithsonian Institution, Washington, DC. 415 pp.
- Acevedo-Rodríguez, P. and M. Strong. 2005. Cyperaceae. In: Acevedo-Rodríguez and Strong (eds.). Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands, pp. 237-383. Smithsonian Institution, Washington, DC.
- Ackerman, J. D. 1995. An Orchid Flora of Puerto Rico and the Virgin Islands. *Memoirs of the New York Botanical Garden*. Volume 73. The New York Botanical Garden, Bronx. 203 pp.
- Agosto, R. 2008. Human and environmental factors explaining the structural and compositional variability in a Sub-tropical Dry Forest. M. S. Thesis, University of Puerto Rico, Mayagüez Campus. 55 pp.
- Álvarez Ruiz M., V. L. Santiago and A. R. Puente. 1990. El Bosque de Guánica como recurso de investigación científica. *Acta Científica* 4 (1-3):3-14.
- Breckon, G. J. 2000. Revision of the Flora of Desecheo Island, Puerto Rico. *Caribbean Journal of Science* 36(3-4):177-209.
- Breckon, G. J., V. Santiago-Vélez and D. A. Kolterman. 1998. New plant records for Mona Island, Puerto Rico. *Caribbean Journal of Science* 34(1-2):136-137.
- Britton, N. L. and P. Wilson. 1923-1923. Botany of Porto Rico and the Virgin Islands. Scientific survey of Porto Rico and Virgin Islands Vol. 5 & 6. New York Academy of Sciences. New York.
- Castilleja, G. 1991. Seed Germination and Early Establishment in a Sub-Tropical Dry Forest. Dissertation, Doctor of Philosophy, Yale University. 209 pp.
- Cedeño, J. A. 1997. Vascular flora of the Río Maricao watershed. Thesis, Master Science, University of Puerto Rico, Mayagüez. 170 pp.

- Cedeño, J. A. 2005. Bromeliaceae. In: Acevedo-Rodríguez and Strong (eds.). *Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands*, pp. 199-231. Smithsonian Institution, Washington, DC.
- Chinea, J. D. 1990. Árboles introducidos a la reserva de Guánica Puerto Rico. *Acta Científica* 4(1-3):51-59.
- Cintrón, B. B. y A. E. Lugo. 1990. Litter fall in a subtropical dry forest. Guánica, Puerto Rico. *Acta Científica* 4(1-3):51-59.
- Clubbe, C., M. Gillman, P. Acevedo-Rodríguez and R. Walker. 2004. Abundance, distribution and conservation significance of regionally endemic plant species on Anegada, British Virgin Islands. *Oryx* 38(3): 342-346.
- Cohen, I. M. and J. D. Ackerman. 2009. *Oeceoclades maculate*, an alien tropical orchid in a Caribbean rainforest. *Annals of Botany* 104: 557-563.
- Cook, M. T. & H. A. Gleason. 1928. Ecological Survey of the Flora of Puerto Rico. *The Journal of the Department of Agriculture of Porto Rico* 12(1-2):139 pp.
- Dansereau, P. 1966. Studies on the vegetation of Puerto Rico. 1. Description and integration of the plant-communities. Special Publ. No. 1, University of Puerto Rico, Institute of Caribbean Science, Mayagüez. 287 p
- Domínguez Cristobal, C. 2003. Antecedentes Histórico-Forestales del Bosque Estatal de Guánica (1875-1889). *Acta Científica* 17(1-3):79-86.
- Ewel, J. J. and J. L. Whitmore. 1973. The ecological life zones of Puerto Rico and the U. S. Virgin Islands. Forest Service Research Paper ITF-18. U.S. Department of Agriculture. Forest Service. Southern Research Station. 72 pp.
- Figuerola, J. C. 1996. Phytogeographical trends, centers of high species richness and endemism, and the question of extinctions in the native flora of Puerto Rico. *Annals of the New York Academy of Sciences* 776:89-102.
- Francisco-Ortega, J., E. Santiago-Valentín, P. Acevedo-Rodríguez, C. Lewis, J. Pipoly, A. W. Meerow and M. Maunder. 2007. Seed plant genera endemic to the Caribbean Island biodiversity hotspot: A review and a molecular phylogenetic perspective. *Botanical Review* 73(3): 183-234.
- Funk, V. A. 1993. Uses and misuses of floras. *Taxon* 42:761-772.
- Funk, V. A. 2006. Floras: a model for biodiversity studies or a thing of the past?. *Taxon* 55:581-588.

- Gentry, A. H. 1995. Diversity and floristic composition of neotropical dry forest.
In: Bullock, Mooney and Medina (eds.), Seasonally dry tropical forest, pp.146-194.
Cambridge University Press, New York.
- Heywood, V. 2001. Floristics and monography-an uncertain future? *Taxon* 50:361-380.
- Janzen, D. H. 1988, Tropical dry forest: The most endangered major tropical ecosystem.
Pp. 130-137. In: Wilson, E. O. (ed.), Biodiversity. National Academic Press, Washington,
D.C.
- Judd, W. S., C. S. Campbell, E. A. Kellogg, P. F. Stevens and M. J. Donoghue. 2002.
Plant Systematics; A phylogenetic Approach 2nd edition. Sinauer Associates, Inc.
Sunderland. 576 pp.
- Lioger, H. A. 1985. Descriptive flora of Puerto and the adjacent islands. Volume 1:
Casuarinaceae to Connaraceae. Editorial de la Universidad de Puerto Rico, Río Piedras.
352 pp.
- Lioger, H. A. 1988. Descriptive flora of Puerto and the adjacent islands. Volume 2:
Leguminosae to Anacardiaceae. Editorial de la Universidad de Puerto Rico, Río Piedras.
481 pp.
- Lioger, H. A. 1994. Descriptive flora of Puerto and the adjacent islands. Volume 3:
Cyrillaceae to Myrtaceae. Editorial de la Universidad de Puerto Rico, Río Piedras. 461
pp.
- Lioger, H. A. 1995. Descriptive flora of Puerto and the adjacent islands. Volume 4:
Melastomataceae to Lentibulariaceae. Editorial de la Universidad de Puerto Rico, Río
Piedras. 617 pp.
- Lioger, H. A. 1997. Descriptive flora of Puerto and the adjacent islands. Volume 5:
Acanthaceae to Compositae. Editorial de la Universidad de Puerto Rico, Río Piedras. 436
pp.
- Lioger, H. A. and L. F. Martorell. 1982. Flora of Puerto and the adjacent islands: A
systematic synopsis. Editorial de la Universidad de Puerto Rico, Río Piedras. 342 pp.
- Lioger, H. A. and L. F. Martorell. 2000. Flora of Puerto and the adjacent islands: A
systematic synopsis 2nd edition. Editorial de la Universidad de Puerto Rico, Río Piedras.
382 pp.
- Little, E. L. and F. H. Wadsworth. 1964. Common Trees of Puerto Rico and the Virgin
Islands. U.S.D.A. Forest Service Agriculture Handbook No. 249, Río Piedras. 548 pp.
- Little, E. L., R. O. Woodbury and F. H. Wadsworth. 1974. The Trees of Puerto Rico and

- the Virgin Islands 2nd. Vol. U.S.D.A. Forest Service Agriculture Handbook No. 499, Río Piedras. 1024 pp.
- Lugo A. E. 1983. Coastal forest of Puerto Rico. In: *Los Bosques de Puerto Rico*, 177-203 pp. Puerto Dept. Natural Resources and Forest Service, Dept. of Agriculture, Puerto Rico.
- Lugo A. E. and P. G. Murphy. 1986. Nutrient dynamics of a Puerto Rican subtropical dry forest. *Journal of Tropical Ecology* 2:55-72.
- Lugo A. E., J. A. González-Liboy, Bárbara Cintrón and K. Dugger. 1978. Structure, productivity, and transpiration of a subtropical dry forest in Puerto Rico. *Biotropica* 10(4):278-291.
- Lugo A. E., O. Ramos, S. Molina, F. N. Scatena and L. L. Vélez. 1996. A fifty-three year record of land use change in the Guánica Forest Biosphere Reserve and its vicinity. Río Piedras, U.S. Dept. of Agriculture, Forest Service, International Institute of Tropical Forestry with Fundación Puertorriqueña de Conservación.
- Maunder M., A. Leiva, E. Santiago-Valentín, D. W. Stevenson, P. Acevedo-Rodrín, D. W. Stevenson, P. Acevedo-Rodríguez, A. W. Meerow, M. Mejía, C. Clubbe and J. Francisco-Ortega. 2008. Plant Conservation in the Caribbean Island Biodiversity Hotspot. *Botanical Review* 74: 197-207.
- Medina, E. & E. Cuevas 1990. Propiedades fotosintéticas y eficiencia de uso de agua de las plantas leñosas del Bosque Seco de Guánica: consideraciones generales y resultados preliminares. *Acta Científica* 4(1-3):25-36.
- Miller, A. G. and J. A. Nyberg. 1995. Collecting herbarium vouchers. In: L. Guarino, V. Ramanatha Rao and R. Reid (eds), *Collecting Plant Genetic Diversity*, pp 561-573. CAB International. Wallingford.
- Mittermeier R. A., N. Myers, J. B. Thomsen, G. A. B. de Fonseca and S. Olivieri. 1998. Biodiversity Hotspots and Major Tropical Wilderness Areas: Approaches to Setting Conservation Priorities. *Conservation Biology* 12(3): 516-520
- Molina Colón, S. 1998. Long-Term Recovery of a Caribbean Dry Forest after Abandonment of Different Land Uses in Guánica, Puerto Rico. Thesis, Doctor of Philosophy in Biology, University of Puerto Rico, Río Piedras. 258pp.
- Molina Colón S. and A. E. Lugo. (2006). Recovery of a Subtropical Dry forest after abandonment of different land uses. *Biotropica* 38(3): 354-364.
- Murphy, P. G. and A. E. Lugo. 1986. Structure and Biomass of a Subtropical Dry Forest. *Biotropica* 18(2): 89-96.

- Murphy, P. G. and A. E. Lugo. 1990. Dry forest of the tropics and subtropics: Guánica Forest in context. *Acta Científica* 4(1-3):15-24.
- Murphy, P. G. and A. E. Lugo. 1995. Dry forests of Central America and the Caribbean. In: Bullock, Mooney and Medina (eds.). *Seasonally dry tropical forest*, pp. 9-34. Cambridge University Press, New York.
- Murphy, P. G., A. E. Lugo, A. J. Murphy and D. C. Nepstad. 1995. The Dry Forest of Puerto Rico's South Coast. In: Lugo and Lowe (eds.). *Tropical Forest: Management and Ecology*, pp.178-209. Springer-Verlag, New York.
- Pool, D. J. 1975. The Vegetation Associations of Commonwealth Forest. Segundo Simposio del Departamento de Recursos Naturales.
- Prance, P. T. 1977. Floristic inventory of the tropics: Where do we stand? *Ann. Missouri Botanical Garden* 64(4):659-684.
- Prance, P. T., H. Beentje, J. Drandsfield and R. Johns. 2000. The Tropical Flora Remains Undercollected. *Ann. Missouri Botanical Garden* 87:67-71.
- Prather, L. A., O. Álvarez-Fuentes, M. A. Mayfield & C. J. Ferguson 2004a. The Decline of Plant Collecting in the United States: A Threat to the Infrastructure of Biodiversity Studies. *Systematic Botany* 29(1):15-28.
- Prather, L. A., O. Álvarez-Fuentes, M. A. Mayfield & C. J. Ferguson. 2004b. Implications of the Decline in Plant Collecting for Systematic and Floristic Research. *Systematic Botany* 29(1):216-220.
- Proctor, G. R. 2005. Arecaceae (Palmae). In: Acevedo-Rodríguez and Strong (eds.). *Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands*, pp. 135-153. Smithsonian Institution, Washington, DC.
- Proctor, G. R. 2005. Asphodelaceae. In: Acevedo-Rodríguez and Strong (eds.). *Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands*, pp. 133-134. Smithsonian Institution, Washington, DC.
- Proctor, G. R. 2005. Hydrocharitaceae. In: Acevedo-Rodríguez and Strong (eds.). *Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands*, pp. 63-70. Smithsonian Institution, Washington, DC.
- Proctor, G. R. 1989. Ferns of Puerto Rico and the Virgin Islands. *Memoirs of the New York Botanical Garden Volume 53*. The New York Botanical Garden. Bronx. 389 pp.
- Proctor, G. R. and P. Acevedo-Rodríguez. 2005. Agavaceae. In: Acevedo-Rodríguez and

- Strong (eds.). Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands, pp. 116-125. Smithsonian Institution, Washington, DC.
- Proctor, G. R., P. Acevedo-Rodríguez and M.T. Strong. 2005. Amaryllidaceae. In: Acevedo-Rodríguez and Strong (eds.). Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands, pp. 106-116. Smithsonian Institution, Washington, DC.
- Quevedo, V., S. R. Silander and R. O. Woodbury. 1990. Plantas críticas y en peligro de extinción en el Bosque de Guánica. *Acta Científica* 4(1-3):137-150.
- Raven P. H. 1988. Tropical floristics tomorrow. *Taxon* 37(3):59-560.
- Santiago-Valentín E. & R. G. Olmstead, 2004. Historical biogeography of the Caribbean plants: introduction to current knowledge and possibilities from a phylogenetic perspective. *Taxon* 53(2):299-319.
- Stahl, A. 1936-1937. Estudios sobre la flora de Puerto Rico. Folleto I-VI. Tip. El Asimilista, San Juan (Folleto I); Tip. Gonzáles & Cía, San Juan (Folleto II-VI).
- Trejo-Torres, J. C. 2009. *Tabebuia karsoana* (Bignoniaceae), a new species from the northern karst of Puerto Rico. *Kew Bulletin* 64(2):295-299.
- Trejo-Torres, J. C. 2008. A New Shrub Species from a Dry Forest of Puerto Rico, *Reynosia vivesiana* (Rhamnaceae). *Novon* 18(3):390-394.
- Trejo-Torres, J. C. 2005. A New Rare Tree Species from Puerto Rico, *Pisonia taina* (Nyctaginaceae). *Harvard Papers in Botany* 10(1):117-122.
- Urban, I. 1903-1911. Flora portoricensis. In. Urban, I. (ed.) *Symbolae antillanae*. Vol. 4 1-771.
- Van Bloem, S. J., A. E. Lugo and P. G. Murphy. 2006. Structural response of Caribbean dry forest to hurricane winds: a case study from Guánica Forest, Puerto Rico. *Journal of Biogeography*, Special Issue "Tropical savannas and seasonally dry forest: vegetation and environment".
- Van Bloem, S. J., P. G. Murphy, A. E. Lugo, R. Ostertag, M. Rivera Costa, I. Ruiz Bernard, S. Molina Colón and M. Canals Mora. 2005. The influence of Hurricane Winds on Caribbean Dry Forest Structure and Nutrient Pools. *Biotropica* 37(4):571-583.
- Van Bloem, S. J., P. G. Murphy and A. E. Lugo. 2003. Subtropical dry forest trees with no apparent damage sprout following a hurricane. *Tropical Ecology* 44(2): 137-145.
- Vázquez O. J. and D. A. Kolterman. 1998. Floristic Composition and Vegetation Types of the Punta Guaniquilla Natural Reserve-Cabo Rojo, Puerto Rico. *Caribbean Journal of Science* 34:265-279.

- Vélez Rodríguez, L. 1996. Land Use and Land Cover Maps Series of Guánica Commonwealth Forest. Puerto Rico Conservation Foundation and U.S. Department of Agriculture, Forest Service, International Institute of Tropical Forestry, Río Piedras.
- Wadsworth, F. H. 1990. Plantaciones Forestales en el Bosque Seco de Guánica. *Acta Científica* 4(1-3):61-68
- Weaver, P. L. and J. D. China, 2003. Secondary Subtropical Dry Forest at La Tinaja Tract of the Cartajena Lagoon National Wildlife Refuge, Puerto Rico. *Caribbean Journal of Science* 39(3): 273-285.
- Wolfe, B. 2008. Post-fire regeneration in subtropical dry forest of puerto rico. M. S. Thesis, University of Puerto Rico, Mayagüez Campus. 83 pp.
- Woodland, D. 1997. Contemporary plant systematics 2nd ed. Andrews University Press, Michigan. 619 pp.

Tables

Table 1. Summary of the collecting days, the number of species collected, and the cumulative number of species not previously collected per collecting trip.

Collecting date	Number of species collected	Number of species not previously collected
September 12, 2003	16	16
September 17, 2003	15	14
October 1, 2003	13	13
October 15, 2003	13	13
October 22, 2003	18	15
November 7, 2003	18	16
November 21, 2003	4	3
September 4, 2004	9	6
September 10, 2004	12	10
October 2, 2004	10	8
October 25, 2004	2	2
October 30, 2004	13	12
November 11, 2004	5	3
November 20, 2004	26	22
June 3, 2005	12	8
June 10, 2005	17	8
June 18, 2005	1	1
June 24, 2005	23	11
July 2, 2005	16	13
July 12, 2005	33	16
July 16, 2005	22	8
August 11, 2005	33	22
August 18, 2005	26	9
August 25, 2005	16	12
September 7, 2005	11	5
September 9, 2005	25	15
September 22, 2005	11	5
October 6, 2005	8	3
October 27, 2005	10	4
November 1, 2005	8	5
November 4, 2005	7	2
November 10, 2005	24	10
December 22, 2005	8	5
January 9, 2006	21	9
January 13, 2006	5	2
January 19, 2006	19	9
January 26, 2006	22	13
February 9, 2006	6	4
March 16, 2006	2	1
March 30, 2006	13	8
April 6, 2006	6	2

May 11, 2006	23	9
May 18, 2006	16	8
June 1, 2006	18	7
June 5, 2006	6	3
June 6, 2006	3	0
June 20, 2006	2	0
October 18, 2006	10	2
November 21, 2006	13	7
December 5, 2006	13	2
February 17, 2007	5	1
April 3, 2007	6	2
August 15, 2007	4	0
Total	698	404

Table 2. Summary of the names attributed to the flora of the Guánica Forest Reserve.

Category	Amount
Total number of species associated with the GFR	727
Number of excluded names	6
Number of remaining names	721
Number of unconfirmed names	261
Number of confirmed names	460 (*476)
Total number of collected taxa	404 (88% of confirmed names)

* = Number of confirmed species including 16 species that were observed within the GFR but were not collected due to the absence of flowers and/or fruits. For further details about these species see the discussion.

Table 3. New vascular plant records for the Guánica Forest Reserve. Includes all the species with vouchers that have not been previously cited on the literature. The collection date provided represents the first time the species was collected.

Species	Habitat	Area	Collection date
<i>Jacquemontia ovalifolia</i> subsp. <i>obcordata</i>	Coastal thickets	Unknown	1962
<i>Colubrina verrucosa</i>	Deciduous forest	Campamento Borinquen	1990
<i>Argythamnia stahlia</i>	Deciduous forest	Campamento Borinquen	1984
<i>Abildgaardia ovata</i>	Deciduous forest	El Fuerte Trail	2005
<i>Phoradendron quadrangulare</i>	Deciduous forest	Manglillo	1964
<i>Citrus</i> × <i>aurantium</i>	Disturbed sites	Campamento Borinquen	2006
<i>Euphorbia tithymaloides</i> subsp. <i>tithymaloides</i>	Disturbed sites	Campamento Borinquen	2006
<i>Plumbago scandens</i>	Disturbed sites	Campeche plantation	2006
<i>Echinochloa colona</i>	Disturbed sites	Campeche plantation	2006
<i>Piriqueta racemosa</i>	Disturbed sites	Campeche plantation	2005
<i>Arivela viscosa</i>	Disturbed sites	Caña Gorda	2005
<i>Euphorbia cyathophora</i>	Disturbed sites	Caña Gorda	2003
<i>Coursetia caribaea</i>	Disturbed sites	Caña Gorda	1997
<i>Corchorus aestuans</i>	Disturbed sites	Caña Gorda	1996
<i>Boerhavia coccinea</i>	Disturbed sites	Caña Gorda	2003
<i>Boerhavia erecta</i>	Disturbed sites	Caña Gorda	2003
<i>Cenchrus ciliaris</i>	Disturbed sites	Caña Gorda	1988
<i>Cnidoscolus aconitifolius</i> subsp. <i>aconitifolius</i>	Disturbed sites	Caña Gorda	2004
<i>Petiveria alliacea</i>	Disturbed sites	Cobana Trail	2005
<i>Talinum paniculatum</i>	Disturbed sites	El Cedro	2005
<i>Cordia oblique</i>	Disturbed sites	El Maniel	2005
<i>Spigelia anthelmia</i>	Disturbed sites	El Maniel	1994
<i>Abutilon hirtum</i>	Disturbed sites	El Maniel	1886
<i>Moringa oleifera</i>	Disturbed sites	El Maniel	2005
<i>Ipomoea hederifolia</i>	Disturbed sites	Forest Office	2006
<i>Merremia aegyptia</i>	Disturbed sites	Forest Office	2006
<i>Opuntia cochenillifera</i>	Disturbed sites	Forest Office	2006
<i>Bastardia viscosa</i>	Disturbed sites	Jaboncillo	1989
<i>Digitaria ciliaris</i>	Disturbed sites	Jaboncillo	1987

<i>Arundo donax</i>	Disturbed sites	La Jungla	2006
<i>Yucca guatemalensis</i>	Disturbed sites	La Jungla	2006
<i>Bougainvillea × buttiana</i>	Disturbed sites	La Jungla	2006
<i>Nephrolepis brownii</i>	Disturbed sites	Manglillo	2005
<i>Paspalum vaginatum</i>	Disturbed sites	Monte de la Brea	2005
<i>Solanum elaeagnifolium</i>	Disturbed sites	Monte de la Brea	1996
<i>Flaveria bidentis</i>	Disturbed sites	Playa Santa	1989
<i>Kalanchoe daigremontiana</i>	Disturbed sites	Punta Ballena	1995
<i>Indigofera micheliana</i>	Disturbed sites	Punta Ballena	1886
<i>Eriochloa polystachya</i>	Disturbed sites	Punta Ballena	2005
<i>Callisia fragrans</i>	Disturbed sites	Tamarindo	2006
<i>Indigofera spicata</i>	Disturbed sites	Tamarindo	2003
<i>Sansevieria cylindrica</i>	Disturbed sites	Tamarindo	2006
<i>Sansevieria concinna</i>	Disturbed sites	Tamarindo	1998
<i>Sansevieria hyacinthoides</i>	Disturbed sites	Tamarindo	1988
<i>Porophyllum leiocarpum</i>	Disturbed sites	Unknown	1948
<i>Trema lamarckiana</i>	Disturbed sites	Unknown	1987
<i>Ipomoea carnea</i> subsp. <i>fistulosa</i>	Disturbed sites	Unknown	1946
<i>Lantana exarata</i>	Dwarf forest	Ballena Trail	1997
<i>Forestiera eggersiana</i>	Dwarf forest	Campamento Borinquen	1992
<i>Lantana strigosa</i>	Dwarf forest	Campamento Borinquen	1995
<i>Lithophila muscoides</i>	Dwarf forest	Punta Vaquero	2006
<i>Sida ciliaris</i>	Dwarf forest	Punta Vaquero	1997
<i>Dendrophthora brachylepis</i>	Dwarf forest	Salinas de Providencia	2006
<i>Spondias dulcis</i>	Mesic canyons	Ballena trail	1996
<i>Cordia lima</i>	Mesic canyons	Campamento Borinquen	1999
<i>Acalypha portoricensis</i>	Mesic canyons	Campeche plantation	2005
<i>Maclura tinctoria</i>	Mesic canyons	Campeche plantation	1886
<i>Passiflora edulis</i>	Mesic canyons	Campeche plantation	2006
<i>Celtis iguanaea</i>	Mesic canyons	Campeche plantation canyon	2005
<i>Lithachne pauciflora</i>	Mesic canyons	Campeche plantation canyon	2006
<i>Pharus lappulaceus</i>	Mesic canyons	Campeche plantation canyon	2006
<i>Coccoloba venosa</i>	Mesic canyons	Campeche plantation canyon	2005

<i>Adiantum fragile</i>	Mesic canyons	Campeche plantation canyon	2006
<i>Pouteria multiflora</i>	Mesic canyons	Campeche plantation canyon	1886
<i>Asplenium heterochroum</i>	Mesic canyons	El Cedro	2006
<i>Rajania cordata</i>	Mesic canyons	El Cedro	2006
<i>Tectaria heracleifolia</i>	Mesic canyons	El Cedro	2006
<i>Gesneria pedunculosa</i>	Mesic canyons	El Cedro	2006
<i>Trichilia pallida</i>	Mesic canyons	El Cedro	2006
<i>Ficus trigonata</i>	Mesic canyons	El Cedro	2006
<i>Myrciaria borinquena</i>	Mesic canyons	El Cedro	2005
<i>Pisonia aculeate</i>	Mesic canyons	El Cedro	2006
<i>Neea buxifolia</i>	Mesic canyons	El Cedro	1983
<i>Peperomia humilis</i>	Mesic canyons	El Cedro	2006
<i>Piper amalago</i>	Mesic canyons	El Cedro	2005
<i>Adiantum tenerum</i>	Mesic canyons	El Cedro	2006
<i>Psychotria pubescens</i>	Mesic canyons	El Cedro	2006
<i>Chrysophyllum oliviforme</i>	Mesic canyons	El Cedro	2006
<i>Thelypteris guadalupensis</i>	Mesic canyons	El Cedro	2006
<i>Bonellia umbellate</i>	Mesic canyons	El Cedro	2006
<i>Casearia aculeate</i>	Mesic canyons	El Cedro	2006
<i>Furcraea tuberosa</i>	Mesic canyons	Hoya Honda	2005
<i>Chaptalia dentate</i>	Mesic canyons	Julio Vélez Trail	2004
<i>Poitea florida</i>	Mesic canyons	La Cobana Trail	1986
<i>Agave missionum</i>	Mesic canyons	Trichilia canyon	2007
<i>Oxandra lanceolata</i>	Mesic canyons	Trichilia canyon	2006
<i>Anthurium crenatum</i>	Mesic canyons	Trichilia canyon	2005
<i>Tillandsia setacea</i>	Mesic canyons	Trichilia canyon	2005
<i>Tillandsia variabilis</i>	Mesic canyons	Trichilia canyon	2005
<i>Celtis trinervia</i>	Mesic canyons	Trichilia canyon	2006
<i>Erythroxylum urbanii</i>	Mesic canyons	Trichilia canyon	2006
<i>Licaria parvifolia</i>	Mesic canyons	Trichilia canyon	2004
<i>Nectandra coriacea</i>	Mesic canyons	Trichilia canyon	2005
<i>Hyperbaena laurifolia</i>	Mesic canyons	Trichilia canyon	2006
<i>Dendrophylax porrectus</i>	Mesic canyons	Trichilia canyon	2004

<i>Ionopsis utricularioides</i>	Mesic canyons	Trichilia canyon	2005
<i>Passiflora murucuja</i>	Mesic canyons	Trichilia canyon	2006
<i>Manilkara pleeana</i>	Mesic canyons	Trichilia canyon	2004
<i>Cenchrus echinatus</i>	Sandy coast	Manglillo	2005
<i>Chromolaena odorata</i>	Sandy coast	Punta Ballena	2005
<i>Eleocharis geniculata</i>	Sandy coast	Tamarindo	1987

Table 4. Comparison between the proportion of unconfirmed taxa among the Guánica Forest Reserve, Mona Island, Susúa Forest and Vieques Island. Data from Mona, Susúa and Vieques obtained from Breckon, unpublished data.

	Guánica	Mona	Susúa	Vieques
Names attributed to the flora	727	501	561	928
Names excluded	6	25	7	54
Names retained	721	476	554	874
Names vouchered	460	424	448	767
Names unconfirmed	261 (36%)*	52 (11%)*	106 (19%)*	107 (12%)*

* The percent was calculated dividing the number of unconfirmed names by the number of retained.

Table 5. Summary of regional endemics reported for the flora of the Guánica Forest Reserve.

Guánica Forest Reserve	Growth Form
<i>Mitracarpus maxwelliae</i>	Herb
<i>Reynosia vivesiana</i>	Shrub
<i>Zephyranthes proctorii</i>	Herb
Guánica Forest Reserve and Mona Island	
<i>Marsdenia woodburyana</i>	Vine
<i>Metastelma monense</i>	Vine
Guánica Forest Reserve, Caja de Muertos Island and Mona Island	
<i>Portulaca caulerpoides</i>	Herb
Puerto Rico Island	
<i>Chionanthus holdridgei</i>	Tree
<i>Clusia gundlachii</i>	Vine
<i>Dalea carthagenensis</i> var. <i>portoricana</i>	Shrub
<i>Eugenia woodburyana</i>	Shrub
<i>Gesneria pedunculosa</i>	Shrub
<i>Ipomoea steudelii</i>	Vine
<i>Manilkara pleeana</i>	Tree
<i>Mosiera xerophytica</i>	Shrub
<i>Myrciaria borinquena</i>	Shrub
<i>Polygala cowellii</i>	Tree
<i>Psychilis krugii</i>	Epiphyte
<i>Randia portoricensis</i>	Shrub
<i>Rondeletia inermis</i>	Shrub
<i>Thouinia portoricensis</i>	Tree
<i>Trichilia triacantha</i>	Tree
<i>Zamia portoricensis</i>	Tree
Puerto Rican Bank	
<i>Acalypha portoricensis</i>	Herb
<i>Adiantum fragile</i> var. <i>fragile</i>	Fern
<i>Agave missionum</i>	Agave
<i>Argythamnia stahlui</i>	Shrub
<i>Cordia rickseckeri</i>	Tree
<i>Cordia rupicola</i>	Shrub
<i>Croton flavens</i> var. <i>rigidus</i>	Shrub
<i>Leptocereus quadriscostatus</i>	Cactus
<i>Machaonia portoricensis</i>	Shrub
<i>Neea buxifolia</i>	Shrub
<i>Opuntia repens</i>	Cactus
<i>Pictetia aculeata</i>	Tree
<i>Poitea florida</i>	Shrub
<i>Scolosanthus versicolor</i>	Shrub
<i>Senna polyphylla</i> subsp. <i>polyphylla</i>	Shrub
<i>Stigmaphyllon floribundum</i>	Vine

Table 6. Species designated as critical elements by the Department of Natural and Environmental Resources (CE) or listed by the US Fish and Wildlife Service (FL).

Family	Species	Protected status
Acanthaceae	<i>Oplonia spinosa</i>	CE
Annonaceae	<i>Oxandra lanceolata</i>	CE
Asclepiadaceae	<i>Marsdenia woodburyana</i>	CE
Boraginaceae	<i>Bourreria virgata</i>	CE
Boraginaceae	<i>Cordia rupicola</i>	CE, FL
Boraginaceae	<i>Rocheportia spinosa</i>	CE
Bromeliaceae	<i>Thillandsia flexuosa</i>	CE
Cactaceae	<i>Leptocereus quadricostatus</i>	CE
Cactaceae	<i>Opuntia repens</i>	CE
Cactaceae	<i>Opuntia stricta</i>	CE
Cannabaceae	<i>Celtis trinervia</i>	CE
Cyperaceae	<i>Bulbostylis curassavica</i>	CE
Euphorbiaceae	<i>Euphorbia cowellii</i>	CE
Euphorbiaceae	<i>Euphorbia turpinii</i>	CE
Fabaceae-Caesalpinoideae	<i>Caesalpinia bonduc</i>	CE
Fabaceae-Faboideae	<i>Dalea carthagenensis</i> var. <i>portoricana</i>	CE
Icacinaeae	<i>Ottoschulzia rhodoxylon</i>	CE, FL
Loranthaceae	<i>Dendropemon purpureus</i>	CE
Malpihiaceae	<i>Byrsonima lucida</i>	CE
Malvaceae	<i>Hibiscus clypeatus</i>	CE
Meliaceae	<i>Trichilia triacantha</i>	CE, FL
Myrtaceae	<i>Eugenia woodburyana</i>	CE, FL
Myrtaceae	<i>Myrcianthes fragrans</i>	CE
Myrtaceae	<i>Myrciaria borinquena</i>	CE
Nyctaginaceae	<i>Guapira discolor</i>	CE
Nyctaginaceae	<i>Guapira dominguensis</i>	CE
Oleaceae	<i>Chionanthus holdridgei</i>	CE
Orchidaceae	<i>Mesadenus lucayanus</i>	CE
Orchidaceae	<i>Psychilis krugii</i>	CE
Passifloraceae	<i>Passiflora bilobata</i>	CE
Passifloraceae	<i>Passiflora murucuja</i>	CE
Poaceae	<i>Bouteloua juncea</i>	CE
Polygalaceae	<i>Polygala cowellii</i>	CE
Polygalaceae	<i>Polygala hecatantha</i>	CE
Polygalaceae	<i>Polygala penaea</i>	CE
Portulacaceae	<i>Portulaca caulerpoides</i>	CE
Rhamnaceae	<i>Reynosia vivesiana</i>	CE
Rubiaceae	<i>Catesbaea melanocarpa</i>	CE, FL
Rubiaceae	<i>Erithalis fruticosa</i>	CE
Rubiaceae	<i>Mitracarpus maxwelliae</i>	CE, FL
Rubiaceae	<i>Mitracarpus polycladus</i>	CE, FL
Rubiaceae	<i>Randia portoricensis</i>	CE

Sapotaceae	<i>Manilkara pleeana</i>	CE
Theophrastaceae	<i>Bonellia umbellata</i>	CE
Zamiaceae	<i>Zamia portoricensis</i>	CE
Zygophyllaceae	<i>Guaiacum officinale</i>	CE
Zygophyllaceae	<i>Guaiacum sanctum</i>	CE

Table 7. Comparison of the percent of the flora corresponding to Critical Elements and Federally Listed species between some natural areas in Puerto Rico.

	Guánica Forest	Vieques Island	Mona Island	Susúa Forest	Puerto Rico
DNER Critical Elements	48 (10.4%)	50 (6.5%)	34 (8.0%)	31 (6.9%)	535 taxa
USFWS Federally Listed	7 (1.0%)	3 (0.4%)	1 (0.2%)	4 (0.9%)	49 taxa
Land area (ha)	4,400	13,390	5,617	1,336	889,700
Number of confirmed taxa	460	767	424	448	2410*

* = data from Figueroa Colón

DNER = Department of Natural and Environmental Resources

USFWS = U.S. Fish and Wildlife Service

Table 8. Rare species occurring within the Guánica Forest Reserve that deserve further study and should be considered to be designated as Critical Elements by Department of Natural and Environmental Resources or protected by U.S. Fish and Wildlife Service.

Family	Species
Agavaceae	<i>Agave missionum</i>
Amaryllidaceae	<i>Zephyranthes proctorii</i>
Apocynaceae	<i>Marsdenia woodburyana</i>
Apocynaceae	<i>Metastelma monense</i>
Boraginaceae	<i>Tournefortia scabra</i>
Cactaceae	<i>Leptocereus quadriscostatus</i>
Cactaceae	<i>Opuntia rubescens</i>
Cactaceae	<i>Melocactus intortus</i>
Cyperaceae	<i>Bulbostylis curassavica</i>
Euphorbiaceae	<i>Hippomane marcinella</i>
Fabaceae-Faboideae	<i>Dalea carthagenensis</i> var. <i>portoricana</i>
Myrtaceae	<i>Mosiera xerophytica</i>
Myrtaceae	<i>Myrciaria borinquena</i>
Orchidaceae	<i>Psychilis krugii</i>
Passifloraceae	<i>Passiflora murucuja</i>
Passifloraceae	<i>Passiflora berteriana</i>
Portulacaceae	<i>Portulaca caulerpoides</i>
Rhamnaceae	<i>Reynosia vivesiana</i>
Rubiaceae	<i>Randia portoricensis</i>
Rubiaceae	<i>Scolosanthus versicolor</i>

Table 9. Species confirmed within the flora of the Guánica Forest Reserve and known only from collections prior to 1951.

Species	Growth Form	Habitat	Year
<i>Alternanthera crucis</i>	Herb	Deciduous forest	1915
<i>Porophyllum leiocarpum</i>	Herb	Deciduous forest	1948
<i>Borrchia arborescens</i>	Shrub	Deciduous forest	1886
<i>Indigofera micheliana</i>	Shrub	Deciduous forest	1886
<i>Ipomoea carnea</i> subsp. <i>fistulosa</i>	Shrub	Disturbed site	1946
<i>Abutilon hirtum</i>	Shrub	Mesic canyon	1935, 1915, 1886
<i>Allophylus racemosus</i>	Tree	Mesic canyon	1950
<i>Amphitecna latifolia</i>	Tree	Mesic canyon	1940
<i>Cordia laevigata</i>	Tree	Wet valley	1950, 1940
<i>Pouteria multiflora</i>	Tree	Wet valley	1886

Table 10. Introduced and/or naturalized species within the Guánica Forest Reserve. This list includes only vouchered species, with the exception of *Haematoxylon campechianum*, which was planted and has become widely naturalized in the Forest.

Family	Species
Agavaceae	<i>Agave sisalana</i>
Agavaceae	<i>Yucca aloifolia</i>
Amaranthaceae	<i>Achyranthes aspera</i> var. <i>aspera</i>
Anacardiaceae	<i>Spondias dulcis</i>
Annonaceae	<i>Annona reticulata</i>
Apocynaceae	<i>Calotropis procera</i>
Apocynaceae	<i>Cryptostegia madagascariensis</i>
Apocynaceae	<i>Thevetia peruviana</i>
Asphodelaceae	<i>Aloe vera</i>
Asteraceae	<i>Cyanthillium cinereum</i>
Asteraceae	<i>Flaveria bidentis</i>
Asteraceae	<i>Verbesina encelioides</i>
Bignoniaceae	<i>Tecoma stans</i>
Boraginaceae	<i>Cordia obliqua</i>
Cactaceae	<i>Opuntia cochenillifera</i>
Casuarinaceae	<i>Casuarina equisetifolia</i>
Cleomaceae	<i>Arivela viscosa</i>
Combretaceae	<i>Terminalia catappa</i>
Commelinaceae	<i>Callisia fragrans</i>
Convolvulaceae	<i>Ipomoea carnea</i> subsp. <i>fistulosa</i>
Crassulaceae	<i>Kalanchoe daigremontiana</i>
Euphorbiaceae	<i>Cnidioscolus aconitifolius</i>
Euphorbiaceae	<i>Euphorbia tithymaloides</i> subsp. <i>tithymaloides</i>
Fabaceae-Caesalpinioideae	<i>Caesalpinia pulcherrima</i>
Fabaceae-Caesalpinioideae	<i>Delonix regia</i>
Fabaceae-Caesalpinioideae	* <i>Haematoxylon campechianum</i>
Fabaceae-Caesalpinioideae	<i>Parkinsonia aculeata</i>
Fabaceae-Caesalpinioideae	<i>Senna siamea</i>
Fabaceae-Caesalpinioideae	<i>Tamarindus indica</i>
Fabaceae-Faboideae	<i>Clitoria ternatea</i>
Fabaceae-Faboideae	<i>Indigofera micheliana</i>
Fabaceae-Faboideae	<i>Indigofera spicata</i>
Fabaceae-Mimosoideae	<i>Leucaena leucocephala</i>
Fabaceae-Mimosoideae	<i>Prosopis juliflora</i>
Fabaceae-Mimosoideae	<i>Vachellia farnesiana</i>
Lomariopsidaceae	<i>Nephrolepis brownii</i>
Malvaceae	<i>Abutilon hirtum</i>
Malvaceae	<i>Gossypium hirsutum</i>
Meliaceae	<i>Swietenia mahogani</i>
Moringaceae	<i>Moringa oleifera</i>
Nyctaginaceae	<i>Bougainvillea × buttiana</i>

Oleaceae	<i>Jasminum fluminense</i>
Orchidaceae	<i>Oeceoclades maculata</i>
Passifloraceae	<i>Passiflora edulis</i>
Poaceae	<i>Arundo donax</i>
Poaceae	<i>Bothriochloa pertusa</i>
Poaceae	<i>Cenchrus ciliaris</i>
Poaceae	<i>Dactyloctenium aegyptium</i>
Poaceae	<i>Eleusine indica</i>
Poaceae	<i>Eragrostis ciliaris</i>
Poaceae	<i>Eragrostis tenella</i>
Poaceae	<i>Megathyrsus maximus</i>
Poaceae	<i>Melinis repens</i>
Poaceae	<i>Tragus berteronianus</i>
Polygonaceae	<i>Antigonon leptopus</i>
Rhamnaceae	<i>Ziziphus mauritiana</i>
Ruscaceae	<i>Sansevieria concinna</i>
Ruscaceae	<i>Sansevieria cylindrica</i>
Ruscaceae	<i>Sansevieria hyacinthoides</i>
Rutaceae	<i>Citrus × aurantifolia</i>
Rutaceae	<i>Citrus × aurantium</i>
Sapindaceae	<i>Melicocccus bijugatus</i>

Figures

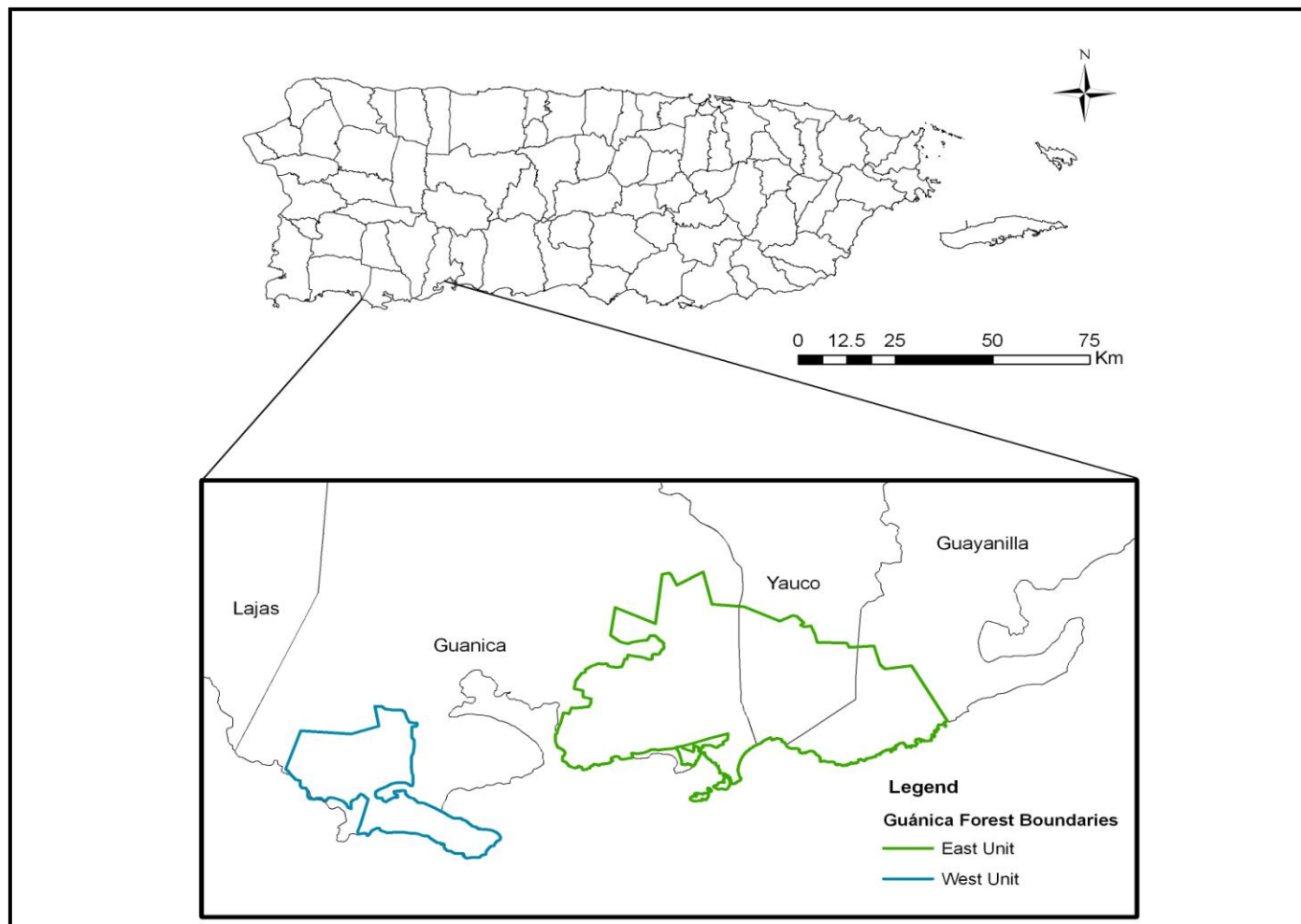


Figure 1. Map of the location of the Guánica Forest Reserve, including the West and East Unit.



Figure 2. Map of the trails of the Guánica Forest Reserve "East Unit".



Figure 3. Map of the trails the Guánica Forest Reserve “West Unit”.



Figure 4. Map of the surveyed areas and collecting points in the Guánica Forest Reserve "East Unit".



Figure 5. Map of the surveyed areas and collecting points in the Guánica Forest Reserve “West Unit”.

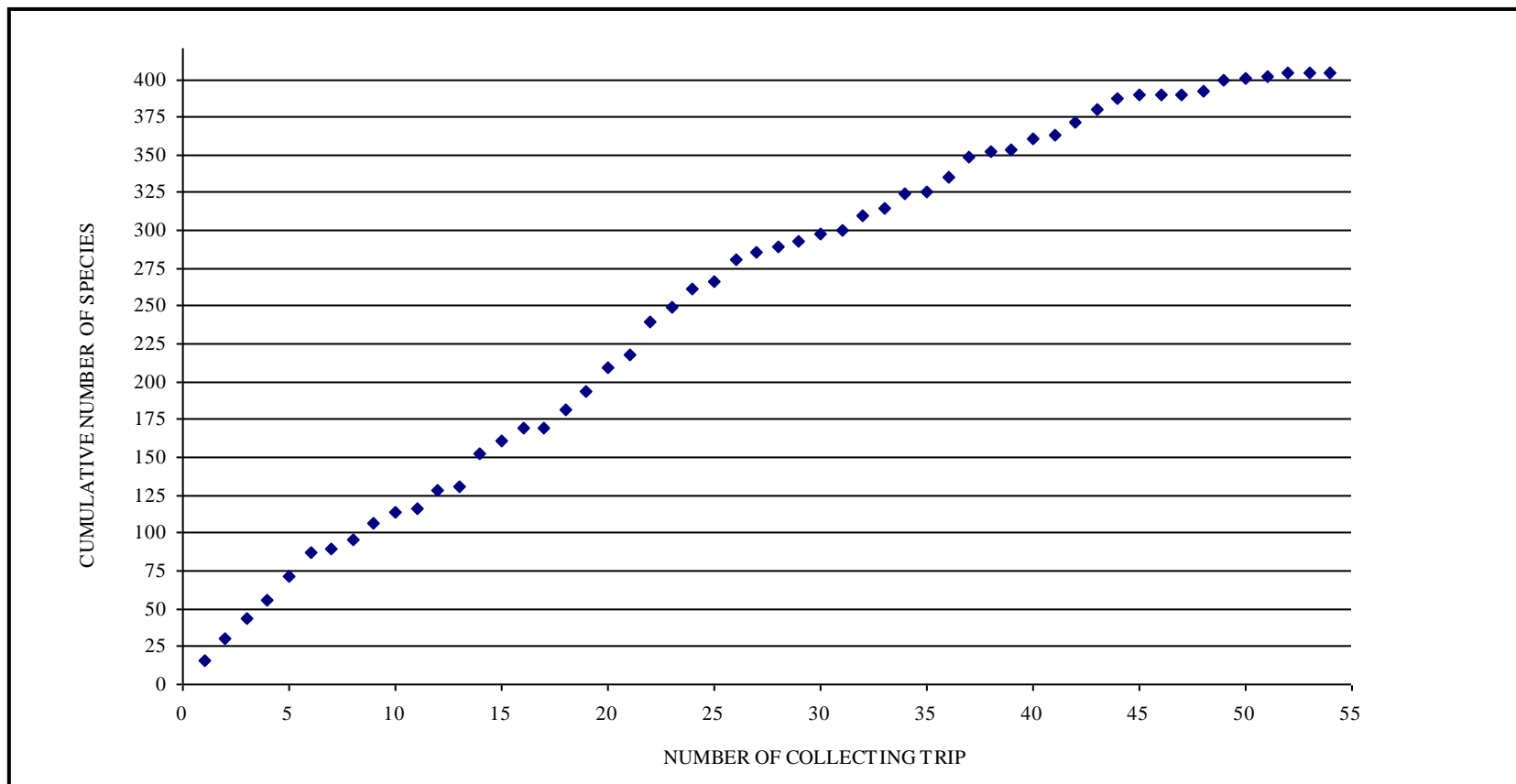


Figure 6. Cumulative number of species throughout the collecting period. The cumulative number of species was calculated by adding the number of previously uncollected species per collecting trip. There was a total of 54 collecting trips.

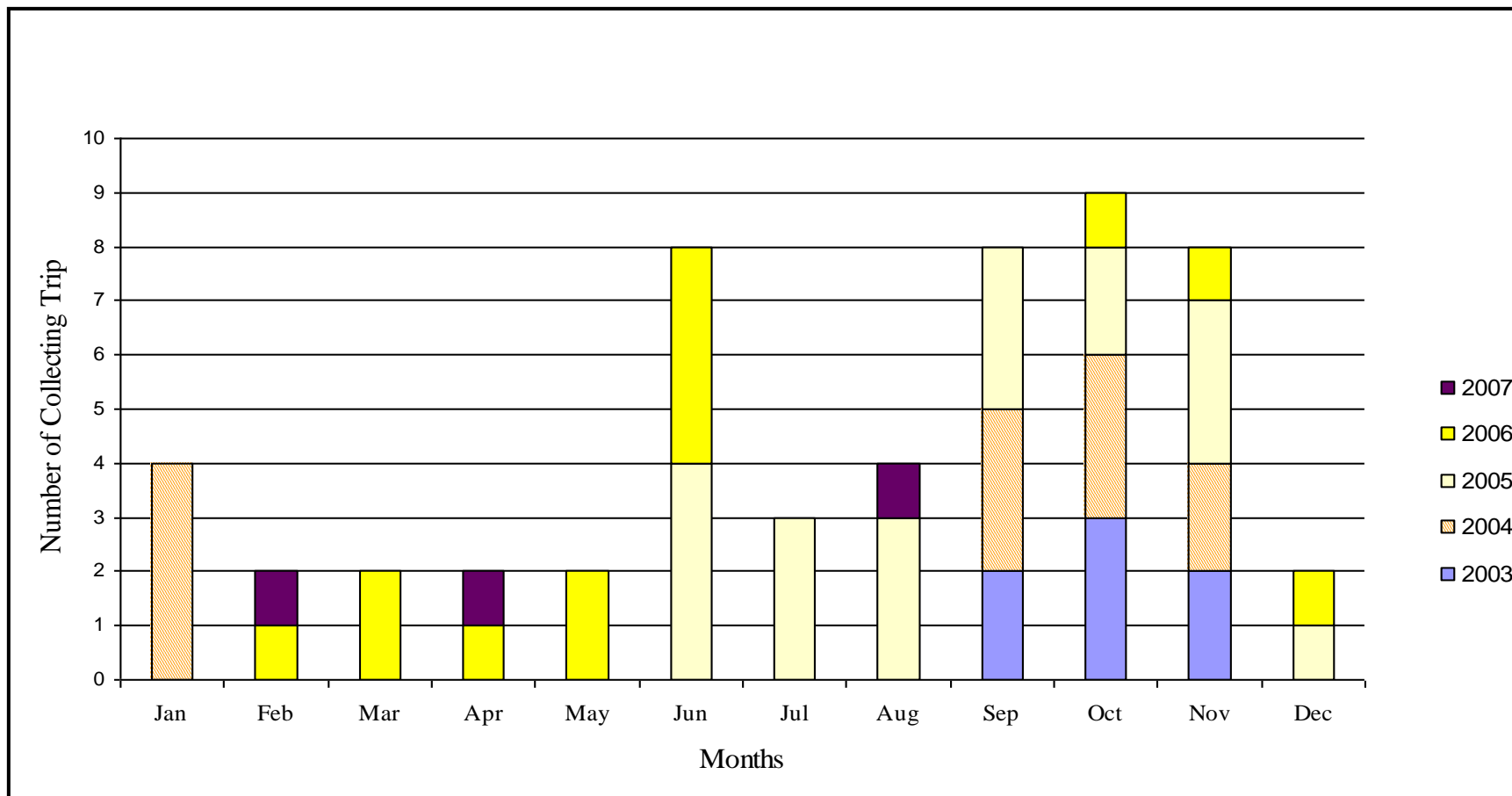


Figure 7. Distribution of collecting trips per month. Includes all the collecting trips from September 2003 to August 2007.

Appendices

Appendix I. Table of the personal communication.

Name	Position
Gary J. Breckon	Professor and Researcher Department of Biology University of Puerto Rico, Mayagüez
Miguel Canals	Manager of the Guánica Forest Reserve Department of Natural and Environmental Resources of Puerto Rico
Carlos Pacheco	Wildlife Biologist U.S. Fish and Wildlife Service Boquerón Field Office
José Sustache Sustache	Director of the SJ herbarium Department of Natural and Environmental Resources of Puerto Rico
Skip Van Bloem	Professor and Researcher Department of Crops and Agroenvironmental Sciences University of Puerto Rico, Mayagüez

Appendix II. Gazetteer for the Guánica Forest Reserve

The name of the geographical areas contained on the following list are taken from herbarium labels; from the literature; the Map of the Guánica Forest Trails, distributed by the Department of Natural and Environmental Resources; and from the USGS 1:20,000 Guánica and Punta Verraco quadrangles, 1966 editions. I also provide detailed information about local names that are not included on any map. At least one reference coordinate of the areas is included (NAD 83).

Bahía de Guánica - Also named as **Guánica Bay**, it is the entrance to the port of Guánica. It divides the Guánica Forest Reserve into the west and east unit. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°57'32.66"N, 66°54'37.16"W]

Bahía de la Ballena - Also known as **Bahía Ballena** or **Punta Ballena**, it is a sandy coastal area located between the municipalities of Guánica, Yauco and Guayanilla. An abandoned coconut plantation occupies the majority of this area. USGS 1:20,000 Punta Verraco quadrangle, 1966 topographic map. [17°57'18.88"N, 66°51'34.81"W]

Camino Ballena - Also known, as **Ballena Trail**, it is a dirt road that runs north from Road 333 and join Road 334 close to the Forest office. Map of the Guánica Forest Trails, DNER. [17°57'49.84"N, 66°51'59.14"W]

Camino Dinamita - Dirt road that starts close to the Forest nursery and runs south to a small canyon. Map of the Guánica Forest Trails, DNER. [17°58'10.44"N, 66°51'47.38"W]

Camino Gutierrez - Dirt road that runs north from Road 334 and joint with La Cobana trail. Map of the Guánica Forest Trails, DNER. [17°58'36.88"N, 66°52'18.88"W]

Camino Los Granado - Also known as **Los Granado Trail**, this is a dirt road that runs east starting at Road 334 just before the **DRNA office** and join with Julio Vélez Trail. Map of the Guánica Forest Trails, DNER. [17°58'26.68"N, 66°52'10.84"W; 17°58'33.29"N, 66°51'44.90"W]

Campamento Borinquen - Also known as **Campamento**, it is the area presently occupied by the Forest office at the end of paved Road 334. It was an area used by the Civilian Conservation Corps. USGS 1:20,000 Punta Verraco quadrangle, 1966 topographic map. [17°58'19.34"N, 66°52'7.70"W]

Campeche Plantation – An area also known as **Cobana Valley** or **La Cobana**, it is one of the biggest plantations established by the Civilian Conservation Corps. It is a *Haematoxylum campechianum* plantation and is located in a formerly cultivated valley to the north of the Forest. USGS 1:20,000 Punta Verraco quadrangle, 1966 topographic map. [17°58'54.81"N, 66°51'27.65"W]

Caña Gorda - Coastal area along Road 333, from the Guánica Lighthouse east to the Copamarina Hotel. USGS 1:20,000 Punta Verraco quadrangle, 1966 topographic map. [17°57'13.19"N, 66°53'3.40"W]

Cañon de las Trichilias - Also known as **Trichilia Canyon**, it is a local name for a mesic canyon located to the northern boundary of the Forest. To access this area you must walk north along La Cobana Trail. [17°58'59.37"N, 66°52'0.49"W; 17°59'15.17"N, 66°51'54.68"W]

Cañon de los Murciélagos - Mesic canyon located on the southern slopes of the Guánica Forest. This canyon is located along the boundary that divides the municipalities of Guánica and Yauco. The trail that goes from the canyon to the Forest Office is known as **Murciélago Trail**. Map of the Guánica Forest Trails, DNER. [17°58'9.03"N, 66°51'56.96"W; 17°57'46.70"N, 66°51'45.01"W]

Caretaker house - This name probably correspond to the area currently occupied by the **DRNA office**. [17°58'19.34"N, 66°52'7.70"W]

Cave - This is a cave system located between the municipalities of Yauco and Guayanilla. The entrance is near the end of Road 333, north to Lluveras Trail. Map of the Guánica Forest Trails, DNER. [17°57'40.64"N, 66°50'56.37"W]

Cerro Caprón - Hill area located on the east side of the Guánica Bay. An old brick tower formerly used by the Spanish army occupies the highest area of this hill. This place is also called **Fuerte Caprón**. Map of the Guánica Forest Trails, DNER. USGS 1:20,000 Punta Verraco quadrangle, 1966 topographic map. [17°57'39.05"N, 66°54'10.28"W]

Charco Azul - This is a local name for a small beach pocket on the south side of Monte de la Brea on the west side of **Guánica Bay**. [17°55'39.14"N, 66°55'33.61"W]

Cobana Valley - See **Campeche Plantation**. USGS 1:20,000 Punta Verraco quadrangle, 1966 topographic map. [17°58'54.81"N, 66°51'27.65"W]

Copa Marina - Hotel located at Road 333, neighboring the Caña Gorda recreational area. [17°57'12.44"N, 66°52'46.04"W]

Cueva del Negro - This is a local name for an area between the **DRNA office** and **Cerro Caprón**. It is located on the north side of **El Fuerte Trail**. [17°58'2.26"N, 66°53'13.51"W]

DRNA office - This is the office of the Department of Natural and Environmental Resources located at the end of paved Road 334, adjacent to the Forest visitors center. [17°58'19.34"N, 66°52'7.70"W]

El Cedro - Local name for a mesic canyon located close to Susa Baja Ward, in Guánica. The access to this area is by a small trail starting at a PRASA water reservoir at the entrance of the Forest by Road 334. [17°59'20.36"N, 66°52'57.41"W]

El Fuerte Trail - Dirt road from the DRNA office to the area of Cerro Caprón. Map of the Guánica Forest Trails, DNER. [17°58'12.09"N, 66°52'23.94"W; 17°57'46.40"N, 66°53'47.50"W]

El Maniel - Former community located within the Forest. This area is located between the radio antenna and the Forest monument on Road 334. When the Forest boundaries were expanded this community was relocated to the area presently known as **La Luna** at the main entrance of the Guánica Forest. Map of the Guánica Forest Trails, DNER. [17°58'43.36"N, 66°52'40.82"W; 17°58'31.14"N, 66°52'43.80"W]

El Vigía - Panoramic view area located at the northeast end of Julio Vélez Trail. Map of the Guánica Forest Trails, DNER. [17°58'39.84"N, 66°51'30.02"W]

Ensenada - Community located around the former Central Guánica “Sugar Mill”. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°58'10.04"N, 66°55'57.40"W]

Faro de Guánica - Abandoned lighthouse located on Road 333, close to Jaboncillo. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°57'3.07"N, 66°54'11.30"W]

Forest manager office - See **DRNA office**. [17°58'19.34"N, 66°52'7.70"W]

Guánica Lighthouse - See **Faro de Guánica**. [17°57'3.07"N, 66°54'11.30"W]

Guitarra area - Dwarf forest area located close to **Punta Vaquero** in Guayanilla. Map of the Guánica Forest Trails, DNER. [17°57'32.71"N, 66°50'7.76"W]

Hacienda Maria Antonia - Name used on the label of historical collections. Plantation located on Road 332 between the entrance of the Forest near La Luna and the town of Guánica. [17°58'53.54"N, 66°53'59.91"W]

Hacienda Ventura Quiñones - Name used on the label of historical collections. Plantation located on Road 116 between the entrance of the Forest near La Luna and Yauco. This area corresponds to the northwestern part of La Joya. [17°59'39.36"N, 66°53'13.15"W]

Hoya Honda - Mesic canyon located within the area of Caña Gorda, northeast of the Copamarina hotel. Map of the Guánica Forest Trails, DNER. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°57'29.06"N, 66°52'27.39"W; 17°57'41.96"N, 66°52'32.28"W]

Hoya Las Picúas - Mesic canyon located located within the area of Caña Gorda, northwest of the Copamarina hotel. Map of the Guánica Forest Trails, DNER. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°57'29.46"N, 66°53'8.03"W]

Jaboncillo - Also known as **Playa Jaboncillo** or **Jaboncillo beach**, is a small rocky beach on the east side of the Guánica Bay, close to the old lighthouse. Map of the Guánica Forest Trails, DNER. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°57'11.66"N, 66°54'14.91"W]

Julio Vélez Trail - Dirt road that starts in the Forest office and continue east toward El Vigía. Map of the Guánica Forest trails, DNER. [17°58'19.86"N, 66°52'0.78"W; 17°58'34.10"N, 66°51'27.38"W]

La Cobana Trail - Dirt road that starts on Road 334 and continues north to the Campeche plantation. Map of the Guánica Forest Trails, DNER. [17°58'53.19"N, 66°52'34.91"W; 17°58'52.81"N, 66°51'52.59"W]

La Jungla - Beach area located near the west end of Road 325. This is a local name for an area recently acquired by the DNER. [17°56'31.88"N, 66°57'42.36"W; 17°56'49.30"N, 66°58'2.09"W]

La Luna - Community located at the main entrance to the Forest on Road 334. Map of the Guánica Forest Trails, DNER. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°58'46.16"N, 66°53'3.00"W]

Lluveras Trail - Dirt road that crosses the Forest from Yauco to Guayanilla and ends at the northeast boundary of the Forest. Map of the Guánica Forest Trails, DNER. [17°57'48.00"N, 66°50'22.81"W; 17°58'21.91"N, 66°49'37.49"W]

Manglillo - Also known as **Punta Manglillo**, it is a sandy coastal area located in the west unit of the Forest. USGS 1:20,000 Punta Verraco quadrangle, 1966 topographic map. [17°56'4.85"N, 66°56'50.04"W]

Maruca - Local name for the coastal area on the west side of the **Guánica Bay**. This area is adjacent to **Punta de los Pescadores**. [17°56'59.93"N, 66°54'33.73"W]

Monte Cobana - Historical name used by the German collector Paul Sintenis. Presumed to be the same as **La Cobana Trail**. [17°58'54.67"N, 66°52'28.17"W]

Monte de la Brea - Peninsula located within the west unit of the Forest. Access to this area is by Road 325. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°56'0.97"N, 66°55'47.84"W]

Monte Ensenada - Historical name used by N.L. Britton. Probably corresponds to one of the hills surrounding the Ensenada community. This area is probably located outside the Forest. [17°58'15.89"N, 66°56'18.00"W]

Monte las Pargas - Hill area located on the west side of the Guánica Bay. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°57'6.57"N, 66°55'15.99"W]

Monte Manglillo - Historical name used by Paul Sintenis, probably the area between **Monte de la Brea** and **Playa Santa**. [17°57'3.07"N, 66°54'11.30"W]

Monte Puerco - Historical name used by Paul Sintenis. This is the same area as **Cerro Caprón**. [17°57'39.34"N, 66°54'9.74"W]

Murciélago Trail - See **Cañon de los Murciélagos**. [17°57'46.70"N, 66°51'45.01"W]

Ochoa pier - This is the pier located at the entrance to the Forest near Road 333. It is located on the west slopes of **Cerro Caprón**. [17°57'31.31"N, 66°54'22.70"W]

Ojo de Agua Trail - Small trail located adjacent to the area formerly occupied by El Maniel. Map of the Guánica Forest Trails, DNER. [17°58'25.71"N, 66°52'46.89"W; 17°58'16.44"N, 66°52'48.51"W]

Park Headquarters - See **DRNA office**. [17°58'19.34"N, 66°52'7.70"W]

Playa Jaboncillo - See **Jaboncillo**. [17°57'11.66"N, 66°54'14.91"W]

Playa Pelicano - Local name for a beach area located between **Playa Tamarindo** and **Punta Vaquero**. [17°57'2.92"N, 66°50'33.40"W]

Playa San Jacinto - Coastal area east of the Copamarina hotel extending to Punta Ballena. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°57'2.55"N, 66°52'34.42"W]

Playa Santa - Beach area located at the west end of Road 325. This area is located outside the Forest boundaries. [17°56'22.93"N, 66°57'20.67"W]

Playa Tamarindo - Also as **Tamarindo**. Beach area located at the east end of Road 333. USGS 1:20,000 Punta Verraco quadrangle, 1966 topographic map. [17°57'13.47"N, 66°50'57.08"W]

Punta Ballena - See **Bahía de la Ballena** [17°57'18.88"N, 66°51'34.81"W]

Punta de la Meseta - Rocky coastal area located on the east side of the Guánica Bay. This area is adjacent to Jaboncillo. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°57'3.14"N, 66°54'16.20"W]

Punta de los Pescadores - Rocky coastal area located on the west side of the Guánica Bay. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°56'59.93"N, 66°54'33.73"W]

Punta Jorobado - Small forested rocky outcrop located west of Manglillo. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°55'52.41"N, 66°57'21.98"W]

Punta Manglillo - See **Manglillo**. [17°56'4.85"N, 66°56'50.04"W]

Punta Sombrero - Area locally known as **La Jungla**. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°56'31.88"N, 66°57'42.36"W; 17°56'49.30"N, 66°58'2.09"W]

Punta Vaquero - Dwarf forest area along the coast located at the end of Road 333. USGS 1:20,000 Punta Vaquero quadrangle, 1966 topographic map. [17°56'59.92"N, 66°50'18.35"W]

Radio Antenna - Antenna located on Road 334. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°58'43.45"N, 66°52'41.31"W]

Salinas de Encenada - Also as Salinas the Guánica, this is probably the same area as Salina Las Pargas, an area adjacent to the boundaries of the West Unit of the Forest. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°56'32.68"N, 66°56'5.39"W]

Salinas de Providencia - Salt flats located at the end of Road 325. USGS 1:20,000 Guánica quadrangle, 1966 topographic map. [17°56'32.68"N, 66°56'5.39"W]

Santa Rita - Name on historical collections, used probably for a plantation located between Yauco and Guánica. This property shared its boundaries with the northern boundaries of the Forest. [17°59'47.61"N, 66°53'3.78"W]

Sapo Concho breeding area - Also known as Sapo Concho pond, this is a small seasonal pond located at the end of Road 333. This area is part of **Playa Tamarindo** in Guayanilla. [17°57'13.47"N, 66°50'57.08"W]

Sapo Concho new ponds - Artificial ponds located in **Manglillo**. This is a breeding area for the Puerto Rican Crested Toad. [17°56'5.41"N, 66°56'48.10"W]

Vereda El Fuerte - See **El Fuerte Trail**. [17°58'12.09"N, 66°52'23.94"W; 17°57'46.40"N, 66°53'47.50"W]

Vigilantes' house - This is the same area currently occupied by the **DRNA office**. However, the location of the vigilantes' office has changed over the time. [17°58'19.34"N, 66°52'7.70"W]

Zinc house - Old zinc structure located on the **Campeche plantation**. This structure is at the edge of the trail, just below the electric power lines that cross the Forest. [17°58'55.52"N, 66°51'24.76"W]

Appendix III.

Checklist of the Vascular Flora of the Guánica Forest Reserve

by
Omar A. Monsegur Rivera
Department of Biology, R.U.M.
Revised on October 4, 2009

The following list is based on collections made by the author, reports in the literature (Acevedo-Rodríguez, 2005; Acevedo-Rodríguez & Strong, 2005; Axelrod, unpublished; Chinae, 1990; Little & Wadsworth, 1964; Little et al., 1974 and Quevedo et al., 1990), and a review of herbarium collections. All collections from the Guánica Forest Reserve (GFR) deposited at MAPR and US were reviewed, while only selected material at UPRRP, UPR and NY was studied.

Species in boldface are vouchered by herbarium specimens from Guánica Forest Reserve. Those not in boldface are either cited for the Guánica Forest in the literature and there is no specimen to support the report, or herbarium specimens exist but the locality given on the label is not specific enough to determine if it came from the Reserve. Many herbarium specimens only state Guánica for the location and in a large number of cases it is not possible to determine if the collection was made within the present day boundaries of the Forest. This is especially true for collections made before 1919, when the Reserve did not exist. An asterisk is used to mark collections whose location is too vague for absolute placement in the GFR.

I am treating both the unvouchered citations and reports based on vague location data as requiring conformation before being accepted into the flora. This is a conservative approach and may omit species that formerly occurred in the Forest or that still are present, but it reduces the chance of creating or perpetuating erroneous information.

Other problems with locations is that many collectors assume that all of the GFR is within the municipality of Guánica and put down Guánica as the municipality for any collection made in the GFR. In fact much of the GFR is in the Municipalities of Guayanilla and Yauco. Finally, the Forest boundaries are not always evident to collectors in the field, and a number of collections from along roads 333 and 325 may in fact be from private lands adjacent to the Forest. However, new segments have been added to the Reserve, especially during the past ten years, so in some cases collections made on private land now can be treated as from the Forest. Figures 2 and 3 show the boundaries of the GFR and the major trails and collecting locations in the Reserve. A detailed gazetteer of locations was created and is given in Appendix II.

The acronym GFR is used for collections made within the Guánica Forest Reserve. All information added by the author is in brackets. The specimens cited are given in reverse chronological order, rather than in alphabetical order by collector, with the year of the collection in boldface. This is a fast way to determine the most recent year a species was collected. Collectors are indicated by acronym, a key to which is given in Appendix IV. An asterisk before

the species name indicates that the species is known to be an exotic, and may be naturalized, or cultivated, or persistent following cultivation.

Axelrod's unpublished checklist of the flora requires special comment. I provided him with a number of new records for GFR and he shared his unpublished manuscript with me, so that our two accounts are not independent. However, Axelrod only accepted species into his checklist for which there are herbarium vouchers. In a number of cases he cites species for the GFR for which I have not seen specimens. As he does not cite specimens, I am treating these species as requiring confirmation before accepting them into my checklist.

There are a number of species in the Reserve that are listed by the Department of Natural and Environmental Resources of Puerto Rico as Critical Elements. These species, due to their rarity and/or limited range, are considered as requiring protection. In addition, the GFR contains species listed by the U.S. Fish and Wildlife Service as Endangered, a category for species requiring protection and recovery programs to prevent their extinction. It is noted in the checklist if a species is listed as a DNER Critical Element, or as Federally listed by the U.S. Fish and Wildlife Service.

Distribution and habitat information is primarily based on Axelrod's unpublished manuscript, herbarium specimens at MAPR and the author's personal knowledge of the plants. Other sources consulted were: for climbing plants, Acevedo (2005); for monocotyledons (except grasses and orchids) and gymnosperms, Acevedo and Strong (2005); for orchids, Ackerman (1995); for grasses, Hitchcock (1935) and Howard (1979) and for dicots, Liogier's five volumes (1985-1997).

PTERIDOPHYTES

ASPLENIACEAE

Asplenium heterochroum Kunze

2006: OMR 841, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, El Cedro, mesic canyon, elev 60 m (MAPR!). (Axelrod, unpublished.) This species is rare in the Forest and was only observed growing on mesic, shaded rocks at El Cedro. It is a disjunct in the GFR, as it generally only occurs in the more mesic north coastal lowlands and mogotes. Outside of Puerto Rico, it is found in the Greater Antilles and warm to tropical America. **New record for the GFR.**

LOMARIOPSIDACEAE

**Nephrolepis brownii* (Desv.) Hovenkamp & Miyam.

2005: OMR 421, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau, elev 12 m (MAPR!). *Nephrolepis brownii* is a widespread, common, weedy fern in the more mesic areas of Puerto Rico; it is rare within the GFR. **New record for the GFR.**

PTERIDACEAE

Adiantum fragile Sw.

2006: OMR 749, 1 Jun, Yauco, Bo. Barina, GFR, mesic canyon area, north of an old campeche plantation, elev 45 m (MAPR!). (Axelrod, unpublished.) *Adiantum fragile* only occurs in the mesic canyons along the northern boundary of the Forest close to La

Cienaga. It is an Antillean species that is relatively common in Puerto Rico. **New record for the GFR.**

***Adiantum tenerum* Sw.**

2006: OMR 640, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, El Cedro, mesic canyon, elev 60 m (MAPR!). (Axelrod, unpublished.) This species is apparently restricted to mesic areas along the northern Forest boundary. **New record for the GFR.**

***Cheilanthes microphylla* (Sw.) Sw.**

2004: OMR 248, 30 Oct, Guánica, Bo. Carenero, GFR, mesic canyon area at Cañon las trichilias, elev 100 m (MAPR!). **1989:** PAR 3004, 7 Oct, Guánica, Bo. Carenero, GFR, Las Cobanitas Trail, in abandoned *Haematoxylon* plantation (US!). **1983:** GRP 39365, 20 Jul, Guánica, Bo. Carenero, along Road 333, east of Playa Caña Gorda (US!). **1962:** HAL 9140, 23 Jun, *Guánica, GFR (MAPR!). **1935:** FHS 212, 21 Mar, *Guánica (US!). **1915:** NLB 4887, 5-8 Mar, *Guánica (US!). **1886:** PS 3654, 7 Feb, *Guánica, *sylvia ad* Ensenada (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This is the most common fern in the Forest, occurring on rocks. It is a xeric species, but does extend into the north coastal region of the island.

TECTARIACEAE

***Tectaria heracleifolia* (Willd.) Underw.**

2006: OMR 639, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco El Cedro, mesic canyon, elev 60 m (MAPR!). (Axelrod, unpublished.) *Tectaria heracleifolia* is restricted in the GFR to shady, mesic areas along the northern Forest boundary. **New record for the GFR.**

THELYPTERIDACEAE

***Thelypteris guadalupensis* (Wikstr.) Proctor**

2006: OMR 641, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco El Cedro, mesic canyon, elev 60 m (MAPR!). (Axelrod, unpublished.) This fern is restricted to mesic, shady areas along the northern Forest boundary. **New record for the GFR.**

GYMNOSPERMS

ZAMIACEAE

***Zamia portoricensis* Urb.**

2005: OMR 488, 7 Sep, Guánica, Bo. Carenero, GFR, mesic canyon at Cañon Las Trichilia, elev 110 m (MAPR!). **1986:** GJB 3179, 17 Apr, Guánica, GFR, Bo. Lomas de Seboruco, GFR, about 25 m from junction on dirt road west off of Road 334 between entrance to forest and radio antenna [La Cobana Trail] (MAPR!). **1913:** FLS 341, 10 Feb, *Guánica (MAPR!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This species is widespread and locally common in mesic canyons and on slopes in the Reserve. This species is listed as a Critical Element by the DNER.

ANGIOSPERMS

ACANTHACEAE (including AVICENNIACEAE)

***Avicennia germinans* (L.) L.**

2005: OMR 289, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, end of paved Road 333, in swampy area, elev 5 m (MAPR!). **1984:** MEA 7, 6 Oct, Guánica, GFR, around Playa Tamarindo (MAPR!). **1976:** PAR s.n., 27 Mar, GFR (MAPR!). (Little and Wadsworth, 1964: 478, as *Avicennia nitida* Jacq.; Quevedo et al., 1990: 149; Axelrod, unpublished.) This tree is common in swampy areas along the coast.

***Justicia periplocifolia* Jacq.**

2004: OMR 221, 10 Sep, Guánica, Bo. Carenero, GFR, Faro de Guánica, north of Road 333, elev 24 m (MAPR!). **1985:** CMT 6184, 28 Sep, Guánica, along road that runs along shore [probably Road 333] (MAPR!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This herb is rare within the GFR; primarily observed in shady areas.

***Justicia sessilis* Jacq.**

2005: OMR 532, 6 Oct, Guánica, Bo. Carenero, GFR, Cañon de los Murciélagos, elev 50 m (MAPR!). **2002:** GJB 6516, 1 Apr, Guánica, GFR, Camino Gutierrez, elev 150-200 m (MAPR!). **1985:** DCW 1313, 4 Apr, GFR, dry coastal thicket, limestone ravine perpendicular to the coast, near sea level (US!). (Quevedo et al., 1990: 150, as *Siphonoglossa sessilis* (Jacq.) Gibson; Axelrod, unpublished.) This small herb occurs mostly in open areas.

***Oplonia spinosa* (Jacq.) Raf.**

2006: OMR 837, 5 Dec, Guánica, Carenero, GFR, Lomas de Seboruco, mesic canyon, El Cedro, elev 77 m (MAPR!). **2006:** OMR 647, 26 Jan, Guánica, Carenero, GFR, Lomas de Seboruco, mesic canyon, El Cedro, elev 60 m (MAPR!). **1985:** DCW 1312, 4 Apr, Guánica, GFR, coastal thicket, limestone ravine perpendicular to coast (US!). **1973:** AGM 4042, 1 Apr, *Guánica, Playa Santa, elev 60 m (MAPR!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) The author only observed this scrambling shrub in mesic canyons. This species is listed as a Critical Element by the DNER.

***Ruellia tuberosa* L.**

2005: OMR 292, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, end of paved Road 333, at pond area, elev 5 m (MAPR!). **1997:** GJB 5335, 28 Oct, Guayanilla, Bo. Boca, GFR, thicket above beach just east of Playa de Tamarindo, sea level (MAPR!). **1962:** HAL 9155, 23 Jun, GFR, in coastal thickets (MAPR!). **1913:** FLS 3060, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This herb is common in disturbed areas along the coast.

***Stenandrium tuberosum* (L.) Urb.**

2005: OMR 542, 27 Oct, Guánica, Bo. Carenero, GFR, Los Granados, shady mesic understory, elev 220 m (MAPR!). **1995:** PAR 7670, 12 Oct, Guánica, GFR, along trail off main road to ranger station [Road 334] (US!). **1991:** FSA 2921, 7 Sep, Guánica, GFR, dry scrub forest to campamento [along Road 334], elev 100 m (UPRRP!). **1930:** NLB 9596, 27 Dec, *Guánica (NY!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) *Stenandrium* is common in shady mossy areas along trails in the northern slopes of the Forest.

Confirmation required before accepting into the flora:

***Blechum pyramidatum* (Lam.) Urb.**

1935: FHS 260, 10 Mar, *Guánica (US!). (Quevedo et al., 1990: 150, as *Blechum brownei* Juss.) This is a common, widespread weedy herb that would be expected around homes, gardens, farms and roadsides.

AGAVACEAE

Agave missionum Trel.

2007: OMR 883, 3 Apr, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 following La Cobana Trail, north forest boundary by La Trichilia Canyon, elev 100 m (MAPR!). **1923:** NLB 4878, 9 Mar, *Guánica, Ensenada, rocky hills (NY!). **1915:** NLB 4878, 2 Mar, *Guánica, Bo. Montalva, border of salina (NY!). (Axelrod unpublished.) While relatively common on dry slopes in the southern areas of Puerto Rico, *Agave missionum* is a very rare plant within the GFR. **New record for the GFR.**

**Agave sisalana* Perrine

2005: OMR 529, 22 Sep, Guánica, Bo. Carenero, GFR, north of Road 333, at Ballena Trail, rocky plateau, elev 33 m (MAPR!). **1994:** DA 927, 12 Dec, Guánica, GFR, Vereda El Fuerte, off Road 334, elev 140 m (MAPR!). **1984:** SJD 25, 6 Oct, Guánica, GFR, on road to Playa Tamarindo, elev 5 m (MAPR!). (Quevedo et al., 1990: 145; Proctor & Acevedo-Rodríguez, 2005: 120.) This introduced agave is widespread within the GFR and is apparently invading undisturbed forest areas. It is not known if its spread is by the bulbils produced in the inflorescence or by seed. *Agave sisalana* should be evaluated to determine its potential as an invasive species.

Furcraea tuberosa (Miller) W. T. Aiton

2005: OMR 513, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, entrance of Hoya Honda canyon, elev 20 m (MAPR!). *Furcraea tuberosa* is a conspicuous species with its large rosettes and is more common in Puerto Rico than suggested by herbarium records. However, it is extremely rare in the GFR, where only one individual was observed. **New record for the GFR.**

**Yucca guatemalensis* Baker

2006: OMR 729, 18 May, Guánica, Bo. Montalva, GFR, entrance to La Jungla, persistent after cultivation, elev 2 m (MAPR!). (Axelrod, unpublished.) This ornamental is planted and persistent after cultivation, but there is no evidence of its spreading. It is native to Mexico and Central America. **New record for the GFR.**

Confirmation required before accepting into the flora:

**Agave fourcroydes* Lam.

(Quevedo et al., 1990: 145.) This agave may have been cultivated in the Forest in the past, but there is no evidence of its occurrence in recent times.

AIZOACEAE

Sesuvium portulacastrum (L.) L.

2003: OMR 175, 22 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, dwarf forest, elev 15 m (MAPR!). **1984:** MEA 11, 6 Oct, GFR, around Playa Tamarindo, growing beside lagoon, elev 5 m (MAPR!). **1947:** GVA 1, 26 Mar, GFR (MAPR!). **1913:** FLS 2418, 22 Jun, *Guánica (MAPR!). **1886:** PS 3614, 23 Jan, *Guánica, *litoralibus* (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This succulent herb occurs along the coast and is particularly abundant around saline ponds.

Confirmation required before accepting into the flora:

Trianthema portulacastrum Linnaeus

(Axelrod, unpublished.) *Trianthema* is a succulent herb that generally grows in open exposed habitats in both wet and dry areas. Its occurrence in the GFR would be expected.

ALISMATACEAE

Confirmation required before accepting into the flora:

Echinodorus berteroi (Spreng.) Fassett var. *bertoroi*

1913: *FLS* 335, 3 Feb, *Guánica (MAPR!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This is a wetland species that probably occurs in canals around the boundaries of the GFR.

AMARANTHACEAE (including CHENOPODIACEAE)

**Achyranthes aspera* L. var. *aspera*

2005: *OMR* 595, 22 Dec, Guánica, Bo. Carenero, GFR, Punta Ballena, at old coconut plantation, sandy soil, elev 3 m (MAPR!). **1913:** *FLS* 333, 3 Feb, *Guánica (MAPR!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) *Achyranthes aspera* is a common widespread weed, that is rare within the GFR.

Alternanthera crucis (Moq.) Boldingh

1915: *NLB* 4851, 2-4 Mar, Guánica, Bo. Montalva, [GFR], Isleta de la Montalva (US!). (Quevedo et al., 1990: 145.) This small herb is native to the Puerto Rican Bank and the Lesser Antilles. It occurs in scattered locations generally in sunny locations on exposed, sandy and rocky soils.

Atriplex cristata Humb. & Bonpl. ex Willd.

2005: *OMR* 413, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, Manglillo, sandy coastal area, elev 2 m (MAPR!). **2003:** *OMR* 177, 22 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, dwarf forest, elev 11 m (MAPR!). **2002:** *GJB* 6601, 14 Sep, Guayanilla, Bo. Boca, GFP, Punta Vaquero, limestone plateau near edge of coastal bluff, 5 m elev (MAPR!). **1913:** *NLB* 1895, 11-12 Mar, vicinity of *Guánica (US!). **1886:** *PS* 3955, 2 Mar, *prope* *Guánica, *litoralibus inter* Barina *et* Boca [probably collected between Yauco and Guayanilla] (US!). (Quevedo et al., 1990: 145, as *Atriplex pentandra* (Jacq.) Standl.; Axelrod, unpublished.) This is a very common herb species in sandy coastal areas and on limestone bluffs.

Celosia nitida Vahl

2004: *OMR* 274, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, Punta Manglillo, elev 7 m (MAPR!). **2003:** *OMR* 148, 1 Oct, Guánica, Bo. Carenero, GFR, mesic canyon at Cañon las trichilias, elev 144 m (MAPR!). **1991:** *FSA* 3320, 19 Nov, Guánica, Bo. Montalva, Manglillo section, jeep road along Monte de la Brea. elev 35-60 m (MAPR!). **1962:** *HAL* 9134, 23 Jun, GFR, coastal thickets (MAPR!). **1886:** *PS* 3444, 25 Jan, *Guánica (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.)

Lithophila muscoides Sw.

2007: *OMR* 887, 15 Aug, Guayanilla, Bo. Boca, GFR, Punta Vaquero, rocky plateau, elev 15 m (MAPR!). **2006:** *OMR* 772, 18 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, rocky plateau, elev 10 m (MAPR!). **1997:** *GJB* 5350, 28 Oct, Guánica, Bo. Carenero, GFR, Road 333, East of Punta Vaquero, elev 5-10 m (MAPR!). **1982:** *JHH* 67, 13 Nov, [GFR] 1.9 km after the end of paved Road 333, low elev (MAPR!).

(Axelrod, unpublished.) This is a locally common species on the rocky plateau close to the coast. **New record for the GFR.**

Confirmation required before accepting into the flora:

**Achyranthes aspera* L. var. *pubescens* (Moquin-Tandon) C.C. Townsend

(Axelrod, unpublished.) This variety is not common in Puerto Rico, but has been collected in scattered locations around the Island. It is a weedy species of waste areas.

Amaranthus crassipes Schlect.

(Quevedo et al., 1990: 145.) This prostrate herb is a weed of waste areas created by human disturbance in the dry southern part of Puerto Rico. While it is adapted to the climate of the Reserve, the necessary habitat is now largely missing from the forest.

Amaranthus dubius Mart. ex Thell.

1914: JAS 2246, 8 Sep, *Guánica (US!). (Quevedo et al., 1990: 145.) This herb is a common weed of waste areas around the Island. It is mostly found in areas subject to frequent human disturbance, such as around homes, gardens and fields.

Amaranthus spinosus L.

(Quevedo et al., 1990: 145.) This common weed occurs at low and middle elevations throughout Puerto Rico, generally growing in waste lands caused by frequent human disturbance. The removal of homes and farms from the Forest has probably eliminated much of its habitat.

**Amaranthus viridis* L.

(Quevedo et al., 1990: 145.) This herb is similar to and often confused with *Amaranthus dubius* and like that species it is a widespread, common weed in waste areas and fields.

Blutaparon vermiculare (L.) Mears

1913: FLS 3052, 19 Sep, *Guánica (MAPR!). Like many of the strand species in Puerto Rico, this herb is becoming rare due to the degradation of our beaches. It would be expected to have occurred on the sandy beaches in the GFR in the past.

**Chenopodium murale* L.

1913: NLB 1863, 11-12 Mar, vicinity of *Guánica (US!). (Axelrod, unpublished.) This old world herb has been collected occasionally from scattered locations around the Island. It is a wide-spread weed of cultivated and waste areas in tropical and temperate regions of the world. It would most likely have occurred around the fields and homes of the formerly inhabited area of the Forest.

Iresine angustifolia Euphrasén

(Quevedo et al., 1990: 145; Acevedo-Rodríguez, 2005: 55.) *Iresine angustifolia* is a herbaceous to subwoody plant that could occur in forest openings and margins, especially in the northern part of the forest.

AMARYLLIDACEAE

Zephyranthes proctorii Acev.-Rodr. & M.T. Strong

2007: OMR 890, 15 Aug, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, rocky plateau north of Playa Tamarindo, elev 20 m (MAPR!). **2003:** OMR 156, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda, north of Road 333, rocky plateau at the entrance to Hoya Honda canyon, elev 55 m (MAPR!). **1987:** GRP 43387, 19 Apr, GFR, Guayanilla, Bo. Boca, Punta Vaquero, pond area (US!). (Proctor et al., 2005: 115.) This

recently described species is only known from the GFR where it occurs on dry limestone. It grows in open rocky areas with little soil.

ANACARDIACEAE

Comocladia dodonaea (L.) Urb.

2006: OMR 675, 30 Mar, Guánica, Bo. Carenero, GFR, El Fuerte trail, elev 152 m (MAPR!). **1950:** ELL 13244, 4 Jul, Guánica, GFR (NY!). **1948:** CMP s.n., 1 May, GFR (MAPR!). **1940:** LEG 305, 23 Oct, Guánica, GFR, forest close to Campamento Borinquen (NY! US!). (Little et al., 1974: 438; Quevedo et al., 1990: 147; Axelrod, unpublished.) This is an extremely common shrub throughout the forest.

**Spondias dulcis* Parkinson

1996: LS 1097, 2 Jan, Guánica, GFR, along the Ballena Trail from Road 333 northwards (NY!). Probably this fruit tree is persistent after cultivation as it occurs close to a formerly populated area. **New record for the GFR.**

Confirmation required before accepting into the flora:

Metopium toxiferum (L.) Krug & Urb.

(Quevedo et al., 1990: 147.) Previously this was a widespread species in dry coastal areas of Puerto Rico, but apparently it has been extirpated from much of the island of Puerto Rico, including the GFR.

ANNONACEAE

**Annona reticulata* L.

2006: OMR 616, 9 Jan, Guánica, Bo. Montalva, GFR, Road 325 between Ensenada and Playa Santa, elev 17 m (MAPR!); OMR 662, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, mesic canyon, El Cedro, elev 60 m (MAPR!). (Little and Wadsworth, 1964: 102. Axelrod, unpublished.) A rare tree found in highly disturbed mesic areas in the forest and probably cultivated.

Oxandra lanceolata (Sw.) Baill.

2006: OMR 646, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, mesic canyon, El Cedro, elev 60 m (MAPR!). (Axelrod, unpublished.) This small tree is found in the mesic canyon to the northwest of the forest. It is relatively rare in Puerto Rico, but more common on the other islands of the Greater Antilles. This species is listed as a Critical Element by the DNER. **New record for the GFR.**

Confirmation required before accepting into the flora:

**Annona squamosa* L.

(Quevedo et al., 1990: 145.) Anón is commonly cultivated, especially in the southern part of Puerto Rico for its fruit. It is often persistent following planting and may still occur in the formerly inhabited areas of the GFR.

APOCYNACEAE (including ASCLEPIDACEAE)

**Calotropis procera* (Ait.) Ait.

1982: JHH 55, 13 Nov, GFR, 0.16 km after the end of paved Road 333, low elev (MAPR!). **1940:** LEG 291, 22 Oct, Guánica, GFR, Lluveras (UPR!); LEG 298, 23 Oct, Guánica, GFR, Caña Gorda (UPR!). (Little et al., 1974: 836; Chinea, 1990: 53; Quevedo

et al.1990: 149; Axelrod, unpublished.) Giant milkweed is a small tree common in open, disturbed areas along the coast. It is quite invasive in dry pastures in the southern and southwestern lowlands of Puerto Rico.

****Cryptostegia madagascariensis*** Bojer ex Decne.

2005: OMR 291, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, end of paved Road 333, at pond area, elev 5 m (MAPR!). **2003:** OMR 162, 22 Oct, Guánica, Bo. Carenero, GFR, south of Road 334 to the forest office, elev 177 m (MAPR!). **1999:** PAR 10800, 29 Jan, Guánica, GFR, along main road to ranger station (US!); GJB 5931, 30 Oct, Guánica, Bo. Carenero, GFR, local near edge of Road 334, km 3.1, elev 125 m (MAPR!). (Acevedo-Rodríguez, 2005: 74; Axelrod, unpublished.) This introduced species is rare and probably associated with former populated areas.

Echites agglutinatus Jacq.

2005: OMR 315, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Las Cobanas Trail to an old *Haematoxylon* plantation, elev 137 m (MAPR!); OMR 446, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail, elev 152 m (MAPR!); OMR 545, 27 Oct, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, close to the entrance of Los Granados, elev 225 m (MAPR!). **2003:** OMR 142, 1 Oct, Guánica, Bo. Carenero, GFR, Las Cobanas Trail, elev 129 m (MAPR!). **1982:** FNS 6958, 13 Nov, on the east side of the GFR (MAPR!). (Quevedo et al., 1990: 149, as *Prestonia agglutinata* (Jacq.) Woods.; Acevedo-Rodríguez, 2005: 61; Axelrod, unpublished.) Common vine along trails within the GFR.

Marsdenia woodburyana Acev.-Rodr.

2003: OMR 198, 21 Nov, Guánica, Bo. Carenero, GFR, Caña Gorda, north of Road 333, small canyon, elev 10 m (MAPR!). **1998:** PAR 10174, 23 Jan, Guánica, GFR, Caña Gorda (US!); LR 27, 26 May, Guánica, GFR, Caña Gorda, elev 10-20 m (MAPR!). (Acevedo-Rodríguez, 2005: 81; Axelrod, unpublished.) This recently described liana found only in the GFR, where it is known from only a few individuals and from Mona Island, where the population is more extensive, but still limited. It is found in open woodland in rocky areas of exposed limestone. This species is listed as a Critical Element by the DNER.

Matelea maritima (Jacq.) Woods.

2003: OMR 199, 21 Nov, Guánica, Bo. Carenero, GFR, Caña Gorda, north of Road 333, top of a rocky hill, elev 40 m (MAPR!). (Quevedo et al., 1990: 149.; Acevedo-Rodríguez, 2005: 83; Axelrod, unpublished.) This vine is relatively common along the coast.

Metastelma decipiens Schltr.

1991: PAR 4659, 23 Dec, Guánica, GFR, las Cobanitas in abandoned *Haematoxylum* plantation (US!). (Quevedo et al., 1990: 149, as *Cynanchum grisebachianum* (Griseb.) Alain.) This is a rare vine within the GFR, where it is known from the single collection.

Metastelma lineare Bello

2005: OMR 558, 4 Nov, Guánica, Bo. Carenero, GFR, Caña Gorda, south of Road 333, after Copa Marina Hotel (MAPR!). (Acevedo-Rodríguez, 2005: 87; Axelrod, unpublished.) *Metastelma lineare* is a rare vine within the Reserve, but is more common elsewhere in Puerto Rico.

Metastelma monense Britton

(Acevedo-Rodríguez, 2005: 89; Axelrod, unpublished.) Frank Axelrod at UPRRP, collected a single specimen of *Metastelma monense* in the GFR. The specimen, which is deposited at UPRRP has not been studied by the author, but has been studied by Breckon. The species is otherwise restricted to Mona Island. This species is listed as a Critical Element by the DNER.

***Metastelma parviflorum* (Sw.) R. Br.**

2006: OMR 840, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, forest area to El Cedro, elev 77 m (MAPR!). **2004:** OMR 270, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, Punta Manglillo, coastal forest, elev 10 m (MAPR!). **1998:** PAR 10177, 23 Jan, Guánica, sector Montalva, Ensenada, GFR (US!). (Acevedo-Rodríguez, 2005: 89; Axelrod, unpublished.) This vine is most common along open trails with scrubland vegetation.

***Pentalinon luteum* (L.) B.F. Hansen & Wunderlin**

2007: OMR 888, 15 Aug, Guayanilla, Bo. Boca, GFR, Punta Vaquero, dwarf forest, elev 15 m (MAPR!). **2005:** OMR 431, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau in Manglillo, elev 35 m (MAPR!). (Quevedo et al., 1990: 149, as *Urechites lutea* (L.) Britton; Acevedo-Rodríguez, 2005: 62; Axelrod, unpublished.) This is a common vine in the dwarf forest along the coast.

***Plumeria alba* L.**

2003: OMR 154, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda, north of Road 333, base of a hill close to the entrance to Hoya Honda, elev 57 m (MAPR!). **1993:** JAC 53, 2 Jan, *Guánica, Bo. Carenero, GFR, north side of Road 333 near km 7.0, just east of Hotel Copamarina, elev 5 m (MAPR!). **1990:** RGG 3347, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1987:** PAR 2238, 29 Sep, Guánica, GFR (US!). **1982:** VNO 52, 13 Nov, Guayanilla, Road 333, Punta Verraco, dry site near the beach with abundant herbs and shrubs (MAPR!). **1966:** WRS 3345, 8 Jul, Guánica, [GFR], beside Road 333 at km. 7 Hm. 5 (US!). **1950:** ELL 13209, 3 Jul, [GFR] (US!). **1948:** JRF s.n., 8 Jul, *Guánica (MAPR!). (Little and Wadsworth, 1964: 460; Quevedo et al., 1990: 149; Axelrod, unpublished.) This is a common shrub or small tree in the deciduous forest areas and in the dwarf forest along the coast.

***Rauvolfia nitida* Jacq.**

2006: OMR 661, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, mesic canyon, El Cedro, elev 60 m (MAPR!). **1987:** PAR 2243, 29 Sep; Guánica, GFR (US!). (Little and Wadsworth, 1964: 464; Quevedo et al., 1990: 149.) This is a rare tree in the GFR; it was only observed in mesic areas in the northern parts of the forest.

***Rauvolfia viridis* Willd. ex Roem. & Schult.**

2005: OMR 297, 10 Jun, Guayanilla, Bo. Boca, GFR, end of paved Road 333, to Punta Vaquero, dwarf forest, elev 7 m (MAPR!). **2003:** OMR 161, 15 Oct, Guayanilla, Bo. Boca, GFR, trail to the north, from Playa Tamarindo to the cave, disturbed area, elev 31 m (MAPR!); OMR 173, 22 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333 to Punta Vaquero, dwarf forest, elev 18 m (MAPR!). **1997:** GJB 5150, 5 Aug, Guayanilla, Bo. Boca, GFR, along Road 333 to west of Punta Vaquero, elev 5 m (MAPR!). **1987:** PAR 2242, 29 Sep, Guánica, GFR (US!). **1964:** HAL 10589, 1 Jan, GFR, dry thickets (MAPR!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This is an uncommon shrub of open grassland areas.

****Thevetia peruviana* (Pers.) K. Schum.**

2006: OMR 813, 21 Nov, Guánica, Bo. Carenero, GFR, parking area close to the forest office, elev 165 m (MAPR!). **1948:** CFR s.n., 1 May, GFR (MAPR!); MS s.n., 1 May, GFR (MAPR!). (Chinea, 1990: 53) *Thevetia* is a shrub or small tree that was planted by the parking area next to the GFR office. Most of the individuals have since been cutdown. There is no evidence of its spreading.

Confirmation required before accepting into the flora:

Asclepias curassavica L.

(Quevedo et al., 1990: 149.) This is a weedy species throughout Puerto Rico, but it is mostly in more mesic open, grassy areas. It would not be expected in the closed forest.

**Catharanthus roseus* (Linnaeus) G. Don

(Axelrod, unpublished.) This herb is common in gardens in Puerto Rico, and occasionally is seen in open habitats in the wild around the island.

ARACEAE

Anthurium crenatum (L.) Kunth

2005: OMR 341, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, mesic canyon, elev 85 m (MAPR!). This species is fairly abundant in the mesic canyons in the northwestern part of the forest. **New record for the GFR.**

Confirmation required before accepting into the flora:

Pistia stratiotes L.

(Axelrod, unpublished.) *Pistia* is a floating aquatic found in fresh water ponds and lakes. Its occurrence within the Reserve is questionable.

ARECACEAE

Thrinax morrisii H.Wendl.

2005: OMR 351, 2 Jul, Guánica, Carenero, GFR, Lomas de Seboruco, top of a hill to the north of Las Cobanas Trail, elev 85 m (MAPR!); OMR 425, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau, west of Manglillo, elev 35 m (MAPR!). **1949:** LMO s.n., 26 Mar, *Guánica (MAPR!). **1948:** AGM 108, 1 May, Guánica, GFR (MAPR!). **1913:** FLS 3013, 19 Sep, *Guánica (MAPR!). (Little et al., 1974: 78; Quevedo et al., 1990: 144; Proctor, 2005: 151; Axelrod, unpublished.) This is a widespread species throughout the forest; however it is more abundant in mesic canyons.

Confirmation required before accepting into the flora:

**Cocos nucifera* L.

(Little et al., 1974: 984; Chinea, 1990: 53; Quevedo et al., 1990: 144.) This introduced palm was not collected, but it is common along sandy coastal areas of the GFR, especially so in the Punta Ballena area.

**Phoenix dactylifera* L.

(Quevedo et al., 1990: 144.) Date palm apparently was cultivated more in the past than it is today. There is no evidence of its occurrence in the forest at this time.

Roystonea borinquena O.F.Cook

(Little and Wadsworth, 1964: 44; Quevedo et al., 1990: 144.)

According to Miguel Cannals (pers. comm. , Appendix I) there was a single palm growing within the forest boundary; however this plant died. Patches of the species occur at Ensenada close to Central Guánica.

Sabal causiarum (O.F. Cook) Becc.

1913: *NLB 1892*, 11 Mar, *Guánica, hillside near Yauco, Guánica and vicinity (NY!).

1886: *PS 3900*, 28 Feb, *prope* *Guánica, *sylvis circa* Hacienda Ventura Quiñones (NY!).

This species occurs at Ensenada, and there is a historical collection made in 1913 by Britton in the calcareous hills between Ponce and Peñuelas, but no individual have been located within the forest boundary during this survey. The species was probably extirpated from the area now occupied by the GFR. This species is listed as a Critical Element by the DNER.

ASPHODELACEAE

**Aloe vera* (L.) Burm. f.

2006: *OMR 669*, 9 Feb, Guánica, Bo. Carenero, GFR, end of Road 334, by the forest parking area, elev 144 m (MAPR!). (Quevedo et al., 1990: 144; Proctor, 2005: 134; Axelrod, unpublished.) This species is apparently persistent after cultivation, occurring in open sites in previously inhabited areas in the forest.

ASTERACEAE

Borrchia arborescens (L.) DC.

1886: *PS 3827*, 13 Feb, Guánica, Bo. Carenero, [GFR], *litoralibus ad* Caña Gorda (US!). (Quevedo et al., 1990: 150.) *Borrchia arborescens* is a widespread coastal shrub, generally found along the margins of dry coastal bluffs and slopes. Its absence today from the GFR is puzzling.

Chaptalia dentata (L.) Cass.

2006: *OMR 809*, 21 Nov, Yauco, Bo. Barina, GFR, end of Road 334, following Julio Vélez Trail to Playa Tamarindo, mesic ravine, elev 165 m (MAPR!). **2004:** *FSA 12796*, 20 Feb, Guánica, Bo. Carenero, GFR, along Julio Vélez Trail, elev 100-160 (MAPR!). (Axelrod, unpublished.) This herb occurs in the shady understory of the evergreen forest in the more mesic ravines along the northern border of the GFR. **New record for the GFR.**

Chromolaena odorata (L.) R.M. King & H. Rob.

2005: *OMR 594*, 22 Dec, Guánica, Bo. Carenero, GFR, Punta Ballea, sandy soil at an old Coconut plantation, elev 3 m (MAPR!). (Axelrod, unpublished.) This weedy annual or short-lived shrub is widespread and common in Puerto Rico. In the GFR it is known from only a single collection in a relatively open abandoned coconut plantation. **New record for the GFR.**

Chromolaena sinuata (Lam.) R.M. King & H. Rob.

2003: *OMR 182*, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail, from DRNA office east to Mirador El Vigia, elev 186 m (MAPR!). **1993:** *FSA 5969*, 22 Mar, Guánica, Bo. Montalva, GFR, Manglillo, along dirt road, toward the shore (US!). **1987:** *GRP 44316*, 9 Dec, Guánica, Bo. Montalva, GFR, interior slopes of Monte de la Brea (US!). **1961:** *HAL 9027*, 30 Dec, GFR (MAPR!). **1915:** *NLB 4954*, 4891, 5-8 Mar, vicinity of *Guánica, limestone hill (US!). **1886:** *PS 3360*, 24 Jan, Guánica, Bo. Carenero, [GFR], Monte Puerco (US!); *PS 3482*, 25 Jan, *Guánica, *litoralibus ad* Salinas (US!). (Quevedo

et al., 1990: 150, as *Eupatorium sinuatum* Lam.; Axelrod, unpublished.) This is a common shrub species in open areas throughout the forest.

****Cyanthillium cinereum* (L.) H. Rob.**

2006: OMR 719, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, sandy area at La Jungla, elev 1 m (MAPR!). **2005:** OMR 418, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, sandy coastal area at sapo concho breeding area, elev 2 m (MAPR!). (Quevedo et al., 1990: 150, as *Vernonia cinerea*.) This exotic weedy herb is common to abundant in disturbed sites throughout Puerto Rico

****Flaveria bidentis* (L.) Kuntze**

1996: FSA 10025, 30 Nov, Guánica, GFR, coastal flat near Punta Sombrero, Playa la Santa (UPRRP!). **1989:** CMT 9310, 25 Sep, Guánica, GFR, road between sewage treatment plant & DNR beaches, dry forest at shore (UPRRP!). (Axelrod, unpublished.) This is a small, weedy herb of found in open areas. In the GFR it apparently is limited to coastal sites. It is native to continental America. **New record for the GFR.**

***Launaea intybacea* (Jacq.) Beauverd**

2005: OMR 593, 22 Dec, Guánica, Bo. Carenero, GFR, Punta Ballena, trail to the south, at an old Coconut plantation, elev 3 m (MAPR!). **2004:** OMR 265, 20 Nov, Guánica, Bo. Montalva, GFR, Monte la Brea, dirt road south to Punta Manglillo, elev 3 m (MAPR!). **1966:** MDB 66-1156, 22 Oct, Guánica, GFR, Road 333 between km 8-9 (UPRRP!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This herb is very common species along coastal areas, especially in sandy soil. It is a pantropic weed.

***Pectis linifolia* L.**

2005: OMR 515, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, north of Road 333, entrance of Hoya Honda canyon, elev 20 m (MAPR!). **1997:** GJB 5345, 28 Oct, Guánica, Bo. Carenero, GFR, along Road 333 between km 7.4-7.5, west of Bahía de la Ballena, elev 25 m (MAPR!). **1966:** MDB 66-1101, 22 Oct, Guánica, GFR, Road 333, elev 50 m (US!). **1886:** PS 3593, 2 Feb, *Guánica (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This small annual herb is found in open, xeric sites.

***Pluchea carolinensis* (Jacq.) G. Don**

2006: OMR 718, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, sandy area at La Jungla, elev 1 m (MAPR!). **1989:** CMT 9311, Sep 25, Guánica, GFR, road between sewage treatment plant & DNR beaches, dry forest and mangrove flats (UPRRP!). **1935:** FHS 65, 19 Feb, *Guánica (US!). **1886:** PS 3797, 7 Feb, *Guánica, *pratis ad* Montalva (US!). (Quevedo et al., 1990: 150, as *Pluchea symphytifolia sensu* Gillis, *non* P. Miller; Axelrod, unpublished.) Apparently this shrub is restricted to highly disturbed areas with sandy soil within the GFR.

***Porophyllum leiocarpum* (Urb.) Rydb.**

1948: SP s.n., 7 Aug, GFR (MAPR!). (Axelrod, unpublished.) **New record for the GFR.** This herb is usually found in grassy or open sites in southern Puerto Rico. It also found in Hispaniola and Venezuela.

****Verbesina encelioides* (Cav.) Benth. & Hook. f. ex A. Gray**

1991: FSA 3324, 19 Nov, Guánica, GFR, Montalva, Road 325 near forest vigilantes house, south of Ensenada, 5 m elevation (UPRRP!). **1988:** CMT 8270, 28 Oct, *Guánica, 1 km on each side of the Reserve boundary along Road 334 (UPRRP!). **1956:** AGM s.n., 17 Nov, *Guánica (MAPR!). (Quevedo et al., 1990: 150, Axelrod, unpublished.) This

shrubby annual is a weed in the dry south and southwestern parts of the Island. It is not often collected in Puerto Rico.

***Wedelia calycina* Rich.**

2006: OMR 801, 21 Nov, Yauco, Bo. Barina, GFR, end of Road 334, following Julio Vélez Trail to the east, elev 170 m (MAPR!). **2005:** OMR 445, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail, elev 152 m (MAPR!). **2003:** OMR 106, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanas Trail, elev 150 m (MAPR!). **2002:** FSA 12234, 1 Sep, Guayanilla, Bo. Boca, GFR, central coast of Punta Verraco, dry scrub forest on limestone, elev 3 m (UPRRP!); GJB 6637, 17 Oct, Guánica, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1999:** JCT 1461, 16 Sep, Guánica, GFR, south side of intersection of Fuerte Trail and power line around Cerro Caprón (UPRRP!). **1995:** PAR 7683, 12 Oct, Guánica, GFR, along Road 334, a few km from ranger station (US!). **1992:** FSA 4594, 1 Jun, Guánica, GFR, jeep road at Monte de la Brea, dry scrub forest on limestone soil, elev 10-50 m (UPRRP!). **1991:** FSA 2882, 7 Sep, Guánica, GFR, along Murcielago Trail from Campamento, elev 50-150 m (MAPR!). **1989:** CMT 9295, 25 Sep, Guánica, GFR, Road 325 ca 1-3 km north of Playa Santa, at dry roadsides, elev 5-30 m (UPRRP!); PAR 3012, 7 Oct, Guánica, GFR, south of Lluveras road to El Vigia (US!). **1987:** BB 6960, 6 Jan, Guánica, GFR, near ranger station, near sea level (US!). **1984:** GJB s.n., 6 Oct, Guánica, GFR, along Road 334 by Campamento Borinquen, elev 195 m (MAPR!). **1981:** JDA 1491, 2 Oct, Guánica, GFR (UPRRP!). **1966:** MDB 66-1123, Oct 21, Guánica, GFR, east of the town, edge of Road 333, km 2.5 (UPRRP!); MDB 66-1158, Oct 22, Guánica, GFR, north of Road 333, km 8 to km 9 (UPRRP!). **1962:** HAL 9123, 23 Jun, GFR, coastal thickets (MAPR!); HAL 9279, 28 Jun, *Guánica (MAPR!). **1935:** FHS 73, 17 Feb, *Guánica, barren hillside (US!). **1925:** NLB 8299, 7 Mar, *Guánica, Salinas de Guánica, limestone hill (US!). **1915:** NLB 4892, 5-8 Mar, vicinity of *Guánica, limestone hill (US!). **1913:** NLB 1893, 11-12 Mar, *Guánica, coastal plain (US!). **1886:** PS 3709, 10 Feb, *prope* Guánica *ad litoralibus* Ballena [GFR] (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This is one of the more widespread and abundant shrubs within the forest. Typically it grows in open areas and along the trails.

Confirmation required before accepting into the flora:

Ambrosia hispida Pursh

1968: HAL s.n., 23 Jul, *Guánica, Salinas de Guánica (UPR!). (Axelrod, unpublished.)

Ambrosia hispida is a softly woody perennial found on coastal rocks and on beaches. It would be expected along the coast in the Reserve.

Bidens alba (L.) DC. var. *radiata* (Sch. Bip.) R.E. Ballard

1935: FHS 34, 3 Mar, *Guánica (US!). This weedy herb would be expected in highly disturbed sites and along roadsides in sunny, mesic sites. It probably occurred around the houses and gardens in the formerly inhabited areas in the northern portions of the Forest.

Bidens cynapifolia Kunth

(Quevedo et al., 1990: 150.) This *Bidens* would be expected along roads and trails in the northern portions of the Forest; it generally is found in slightly more xeric conditions than *Bidens alba* var. *radiata*.

Bidens pilosa L.

(Quevedo et al., 1990: 150.) The occurrence of this species in the Forest would be surprising as it found in more mesic areas of the island. It could be that the report here is due to the historical nomenclatural confusion as to the application of this name. In the past this name was misapplied to the species that is *Bidens alba* var. *radiata*.

Conyza canadensis (L.) Cronq. var. *pusilla* (Nutt.) Cronq.

(Quevedo et al., 1990: 150, as *Conyza canadensis* var. *pusilla* (Nutt.) Cronq.) This weedy herb could have occurred in the northern part of the Reserve around the homes and gardens of the formerly inhabited areas. It generally is found in more mesic areas than GFR, but was collected historically on the coastal plane of Mona Island, when that area was under cultivation.

Emilia fosbergii Nicols.

(Quevedo et al., 1990: 150.) This weedy herb could occur in open sites of the Forest, especially in areas under cultivation or in pasture.

Emilia sonchifolia (L.) DC.

(Quevedo et al., 1990: 150.) This weedy species would be expected in disturbed sites around homes and gardens in the formerly inhabited areas of the GFR.

Erigeron cuneifolius DC.

(Quevedo et al., 1990: 150.) *Erigeron cuneifolius* is a small, rosette species found in lawns and on exposed soil. It is found in the more mesic areas of the island, so its occurrence in the GFR is somewhat surprising. It possibly occurred around homes in the formerly inhabited areas in the northern portion of the Reserve.

Flaveria trinervia (Spreng.) C. Mohr

(Quevedo et al., 1990: 150.) This herbaceous weed is uncommon in Puerto Rico, where it is found in the dry limestone hills of Guayanilla and on serpentine in the Susúa Forest Reserve. Its occurrence in the GFR, in open, sunny sites would not be unexpected.

Lagascea mollis Cav.

1913: FLS 2414, 22 Jun, *Guánica (MAPR!). (Quevedo et al., 1990: 150.) *Lagascea mollis* is a distinctive subwoody herb found in open, disturbed sites. It could occur in the Reserve, but I would expect it to have been in the northern portions around homes, gardens and pastures.

Mikania congesta DC.

1886: PS 3873, 28 Feb, inter *Yauco et Guánica (US!). (Acevedo-Rodríguez, 2005: 100.) This is probably a specimen of *Mikania mirantha* Kunth. There is some confusion as to the distinctiveness of the two species. Acevedo- Rodríguez (2005) accepts both, while Axelrod (unpubl.) questions the cited differences. Both species are weedy vines and are generally found in more mesic habitats than those of the GFR.

Parthenium hysterophorus L.

(Quevedo et al., 1990: 150.) *Parthenium* is a common weedy species of open sites. It probably occurred in the formerly inhabited areas of the northern part of the Reserve.

Pectis tenuicaulis Urb.

(Quevedo et al., 1990: 150.) This prostrate herb was collect from scattered locations in western and southern Puerto Rico five times between 1885 and 1929. It has not been collected since and none of the collections were from the Guánica area. However, it occurs in xeric areas, so it could possibly occur in the Forest.

Pluchea odorata (L.) Cass.

(Quevedo et al., 1990: 150; Axelrod, unpublished.) This somewhat shrubby annual is usually associated with wetlands and river margins. It typically is coastal but can occur inland. It is found in open, sunny situations. It most likely would occur along the edge of a coastal ephemeral pond in the Reserve.

**Sonchus oleraceus* L.

(Quevedo et al., 1990: 150.) This European annual weed is generally associated with human disturbance. It occurs occasionally on dry limestone in Vieques, so its occurrence in the GFR would not be surprising, especially when the area was more disturbed.

Synedrella nodiflora (L.) Gaertn.

(Quevedo et al., 1990: 150.) This small, weedy herb occurs on the limestone plateau of Mona Island, so its occurrence in the Reserve would not be unexpected.

Tridax procumbens L.

1935: *FHS* 77, 21 Feb, *Guánica, barren hillside (US!). (Quevedo et al., 1990: 150.) This widespread weedy herb occurs throughout Puerto Rico and would be expected in open, disturbed sites and degraded grasslands. Its historical occurrence in the previously inhabited areas of the Forest would be expected.

**Zinnia peruviana* (L.) L.

1962: *HAL* 9281b, 28 Jun, *Guánica (MAPR!). **1899:** *CFM* 690, 20 Jan, *Guánica (US!). **1886:** *PS* 3407, 25 Jan, *Guánica, *ad Salinas versus* (US!). *Zinnia peruviana* is a herbaceous annual found in open, typically disturbed sites in the dry southern and southwestern parts of the Island. It would not be unexpected in the GFR.

BASELLACEAE

Confirmation required before accepting into the flora:

**Anredera cordifolia* (Ten.) Steenis

(Acevedo-Rodríguez, 2005: 113.) This is a cultivated species and probably does not occur in the wild in Puerto Rico. It is possible that it is persistent around some of the formerly inhabited areas of the GFR.

BATACEAE

Batis maritima L.

1999: *GJB* 5850, 2 May, Guayanilla, Bo. Boca, GFR, margin of ephemeral pond behind Playa de Tamarindo, east end of pavement on Road 333, elev 5 m (MAPR!). **1996:** *PAR* 7865, 25 Jan, Guánica, GFR (US!). **1948:** *CFR* s.n., 1 May, GFR (MAPR!). (Axelrod, unpublished.) This succulent herb is common around seasonal saline ponds and in mangrove areas in the forest.

BIGNONIACEAE

Amphitecna latifolia (Mill.) A.H. Gentry

1940: *LEG* 313, 23 Oct, Guánica, [GFR], playa de Guánica (UPR!). (Little et al., 1974: 897, as *Enallagma latifolia* (Mill.) Small.) This species was not observed during this survey, but it would be expected to occur in mesic ravines and canyons in the northern part of the Reserve. In western Puerto Rico it is relatively rare, but is found more commonly in the eastern part of the Island. It is a wide spread species in the Caribbean and in tropical America. This species is listed as a Critical Element by the DNER

Crescentia linearifolia Miers.

2006: OMR 603, 9 Jan, Guánica, Bo. Montalva, GFR, Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!). **1982:** HAL 32617, 10 Feb, *Guánica, Salinas de Guánica (UPR!). **1937:** MAP 467, 12 May, GFR, Tract L (UPR!). **1925:** NLB 8297, 7 Mar, *Guánica, hillside of Montalva (US! UPR!). **1913:** NLB 1906, 11-12 March, *Guánica, sandy coastal thicket (US!). (Little et al., 1974: 892; Quevedo et al., 1990: 150; Axelrod, unpublished.) This small tree is most common in the west side of the GFR in La Jungla, where it occurs in open areas. Its distribution in Puerto Rico is limited to GFR and the southwestern lowlands; it also occurs in Hispaniola, the Virgin Islands and on St. Martin and St. Barts in the Lesser Antilles.

***Distictis lactiflora* (Vahl.) DC.**

2006: OMR 848, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, trail to El Cedro, elev 60 m (MAPR!). **2005:** OMR 538, 6 Oct, Guánica, Bo. Carenero, GFR, Road 334 to the ranger office, close to the entrance of Las Cobanas Trail, elev 169 m (MAPR!). **2004:** OMR 214, 10 Sep, Guánica, Bo. Carenero, GFR, Faro de Guánica, north of Road 333, elev 18 m (MAPR!). **1994:** HAL 143, 3 Nov, Guánica, GFR, Camino Ballenas (UPR!). **1983:** HAL 34305, 12 May, *Guánica, coastal thicket (UPR!). **1978:** HAL 27966, 19 Dec, *Guánica (UPR!). **1961:** HAL 9028, 30 Dec, GFR (MAPR!). (Quevedo et al., 1990: 150; Acevedo-Rodríguez, 2005: 122; Axelrod, unpublished.) This slender liana is generally found scattered along trail sides and in openings. It is a common element in sunny locations in the dry portions of Puerto Rico.

***Macfadyena unguis-cati* (L.) A.H. Gentry**

2005: OMR 536, 6 Oct, Guánica, Bo. Carenero, GFR, Road 334 to the forest office, elev 196 m (MAPR!). **2004:** OMR 226, 2 Oct, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, from the sapo concho pond taking the trail north to the cave, elev 4 m (MAPR!). **2002:** GJB 6517, 1 Apr, Guánica, GFR, Camino Gutierrez, elev 150-200 m (MAPR!). **1935:** FHS 74, 17 Feb, *Guánica, barren hillsides (US!). **1886:** PS 5000, 29 Jul, *Guayanilla, Los Indios (US!). (Quevedo et al., 1990: 150; Acevedo-Rodríguez, 2005: 122; Axelrod, unpublished.) This liana can be locally abundant in some disturbed areas and well-developed forests in the mesic quebradas. It is a common species in the forests of Puerto Rico.

***Tabebuia heterophylla* (DC.) Britton**

2006: OMR 726, 18 May, Guánica, Montalva, GFR, end of Road 325, at La Jungla, elev 3 m (MAPR!). **2005:** OMR 296, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, by the sapo concho pond, south facing slope, elev 30 m (MAPR!). **2004:** OMR 230, 2 Oct, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, from the sapo concho pond taking the trail north to the cave, elev 4 m (MAPR!). **2000:** PAR 11434, 6 Sep, GFR (US!). **1990:** RGG 3329, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1986:** GJB 3187, 30 Dec, Guánica, GFR, on north side of Road 333 between Balneario de Caña Gorda and Playa Tamarindo (MAPR!). **1965:** HAL 9165, 23 Jun, GFR (MAPR!). **1950:** ELL 13187, 1 Jul, GFR, (US! UPR!). **1948:** DRB s.n., 1 May, GFR (MAPR!). **1944:** MC s.n., 4 Feb, GFR, near caretaker house (MAPR!). **1939:** LRH 362, 18 Aug, Guánica, GFR (UPR!). **1913:** FLS 3087, 19 Sep, *Guánica (MAPR!). **1886:** PS 3859, 23 Feb, *prope* *Guánica *ad fruticetis litoralibus* (US!); PS 3885, 2 Mar, *prope* *Guánica *ad Barina* (US!). (Little and Wadsworth, 1964: 498; Quevedo et al., 1990: 150; Axelrod, unpublished.) This is a widespread shrub or small tree throughout the forest.

****Tecoma stans* (L.) Kunth**

2005: OMR 590, 22 Dec, Guánica, Bo. Carenero, GFR, Road 334, junction with the entrance to Las Cobanas Trail, elev 160 m (MAPR!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This widespread weedy shrub/small tree is rare in the GFR. It is most common in highly disturbed areas.

Confirmation required before accepting into the flora:

****Crescentia cujete* L.**

(Little et al., 1974: 990; Quevedo et al., 1990: 150.) This tree occurs in pasture areas around the GFR, but has not been collected in the preserve itself. It probably occurred around homes in the formerly occupied portions of the GFR.

***Cydista aequinoctialis* (L.) Miers**

(Acevedo-Rodríguez, 2005: 118.) *Cydista* is a liana that occurs in the northern and eastern southeastern parts of the Island. It possibly could occur in the more mesic northern parts of the GFR.

***Nama jamaicensis* L.**

(Axelrod, unpublished.). *Nama* is an annual herb that occurs in shaded situations in dry areas, so it would be expected in the Forest. It is apparently an infrequent in Puerto Rico in general. The genus previously was placed in the Hydrophyllaceae.

BORAGINACEAE

***Boussieria baccata* Raf.**

2005: OMR 393, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail, elev 177 m (MAPR!). **2004:** OMR 271, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 7 m (MAPR!). **2003:** OMR 129, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita, from DRNA office south to Cañon de los Murciélagos, elev 127 m (MAPR!). **1996:** PAR 7894, 25 Jan, Guánica [Guayanilla], GFR, east of end of road beyond Playa Pelicano (US!). **1990:** RGG 3356, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1982:** JGR 2, 29 Aug, Guánica, GFR, Road 334, Campamento Borinquen, at end of plazoleta, elev 160 m (MAPR!). **1950:** ELL 13178, 1 Jul, GFR (UPR!). **1948:** RP s.n., 1 May, GFR (MAPR!). **1913:** FLS s.n., *Guánica (MAPR!). (Little and Wadsworth, 1964: 466, as *Boussieria succulenta* Jacq.; Quevedo et al., 1990: 149, as *Boussieria succulenta*; Axelrod, unpublished.) This is a common tree of the evergreen forest and occasional in the deciduous forest.

***Boussieria virgata* (Sw.) G.Don**

2006: OMR 779, 18 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, trail east to Punta Vaquero, Guitarra Trail, elev 15 m (MAPR!). **2005:** OMR 392, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail, elev 175 m (MAPR!); OMR 397, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, along Road 334 to the forest main office, elev 176 m (MAPR!); OMR 457, 18 Aug, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Fuerte Trail at the junction with the trail to Hoya Honda, elev 157 m (MAPR!); OMR 504, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, along a cactus forest from a small canyon north of Road 333, elev 23 m (MAPR!). **1999:** GJB 5966, 29 Dec, Guánica, Bo. Carenero, GFR, Fuerte Trail, ca 100 m from trail head off Road 334, elev 180-200 m (MAPR!). **1995:**

PAR 7669, 12 Oct, Guánica, GFR, along trail off main road to ranger station (US!).

1994: HAL 17, 3 Nov, *Guánica (UPR!). **1986:** GJB 3183, 17 Apr, Guánica, Bo. Lomas de Seboruco, GFR, ca. 25 m from junction on dirt road east off of Road 334 at km 2.8 between entrance to forest and radio antenna, elev 170 m (MAPR!). **1982:** HAL 33646, 9 Nov, *Guánica, Maruca (UPR!). **1978:** HAL 27935, 19 Dec, *Guánica (UPR!). **1969:** ROW 341, Dec, Guánica (UPR!). **1962:** HAL 9662, 29 Jul, *Guánica (MAPR!). **1961:** HAL 9023, 30 Dec, GFR, coastal thickets (MAPR!). **1944:** JIO 1374, 2 Apr, [GFR, Road 333], road to Caña Gorda (UPR!). **1943:** HTC 2585, 12 Feb, GFR (US!). **1938:** LRH 345, 14 Jul, GFR (UPR!). **1932:** LEG 59, 23 Jan, GFR (UPR!). **1915:** NLB 4822, 2 Mar, *Guánica, Bo. Montalva, Limestone hill (UPR!). **1886:** PS 3887, 2 Mar, *Guánica (US!). (Little et al., 1974: 840; Quevedo et al., 1990: 149; Axelrod, unpublished.) *Bourreria virgata* is a widespread shrub throughout the GFR, where it often occurs sympatrically with *Bourreria baccata*. There is no evidence of hybridization between the two species. This species is listed as a Critical Element by the DNER

Cordia curassavica (Jacq.) Roem. & Schult.

2003: OMR 122, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita, from DRNA office south to Cañon de los Murciélagos, elev 140 m (MAPR!). **1997:** GJB 5343, 28 Oct, Guánica, Bo. Carenero, GFR, along Road 333 between km 7.4-7.5, west of Bahía de la Ballena, elev 25 m (MAPR!). **1962:** HAL 9121, 23 Jun, *Guánica (MAPR!). **1948:** NLB s.n., 1 May, *Guánica (MAPR!). **1913:** FLS 3074, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This is a common shrub along trails and disturbed areas in the Reserve.

Cordia globosa (Jacq.) Kunth

2005: OMR 335, 24 Jun, Yauco, Bo. Barinas, GFR, from Road 334 taking Las Cobanas Trail to the north, to an old campeche plantation, elev 71 m (MAPR!); OMR 564, 10 Nov, Guánica, Bo. Carenero, GFR, from Road 333, taking a dirt road to Jaboncillo beach, elev 27 m (MAPR!). **1962:** HAL 9171, 23 Jun, *Guánica beach, coastal thickets (MAPR!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This is a common shrub of the coastal forest and in disturbed open areas of the Forest in general.

Cordia laevigata Lam.

1950: ELL 13173, 1 Jul, GFR, 100 m alt (UPR!). **1940:** LEG 203, 11 Oct, Guánica, [GFR] Cobanas Valley (UPR!). (Little and Wadsworth, 1964: 472, as *Cordia nitida* Vahl) This is a rare tree of the mesic valleys and canyons in the northern parts of the GFR.

Cordia lima (Desv.) Roem. & Schult.

1999: PAR 10803, 29 Jan, Guánica, GFR, along main road to ranger's station (US!). This shrub is rare in the GFR; it is most common in mesic forests on serpentine. **New record for the GFR.**

****Cordia obliqua*** Willd.

2005: OMR 403, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334 to the forest main office, elev 204 m (MAPR!). (Axelrod, unpublished.) This introduced small tree was apparently planted as an ornamental or used as living fencepost in the former populated area of El Maniel. **New record for the GFR.**

Cordia rickseckeri Millsp.

2005: OMR 509, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, cactus forest north of Road 333, elev 23 m (MAPR!). **1997:** GJB 5153, 5 Aug, Guayanilla, Bo. Boca, GFR,

along Road 333 to east of Punta Vaquero, elev 5 m (MAPR!). **1993:** FSA 5967, 22 Mar, Guánica, Bo. Montalva, GFR, Manglillo at a high area along entrance road (US!). **1990:** GJB 3694, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, ca. 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1964:** HAL 10784, 1 Apr, *Guánica, coastal thickets (MAPR!). **1962:** HAL 9146, 23 Jun, GFR (MAPR!). **1950:** ELL 13158, 30 Jun, GFR, elev 100 m (UPR!). (Little et al., 1974: 846; Quevedo et al., 1990: 149; Axelrod, unpublished.) This is a small tree of the coastal forest along Road 333 where it occurs as scattered individuals. It is rare in the GFR and apparently never is common anywhere in its range.

Cordia rupicola Urb.

2005: OMR 356, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 138 m (MAPR!); OMR 467, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail to El Maniel, elev 209 m (MAPR!). **1999:** PAR 10803, 29 Jan, Guánica, GFR, along main road to ranger station [Road 334] (US!). **1995:** PAR 7684, 12 Oct, Guánica, GFR, along Road 334, a few km from the ranger station (MAPR! US!). **1915:** FLS 9104, 29 Jul, *Guánica (NY!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This is a rare shrub found in the dry limestone forests and shrublands of Puerto Rico, Vieques and Anegada. In the GFR it forms small, relatively dense patches in scrubland areas. It is listed as federally endangered by Fish and Wildlife Service and as a Critical Element by the DNER.

Heliotropium angiospermum Murray

2005: OMR 364, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, close to a mesic canyon, elev 132 m (MAPR!). **2003:** OMR 188, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail, from DRNA office east to Mirador El Vigia, elev 214 m (MAPR!). **1997:** GJB 5336, 28 Oct, Guayanilla, Bo. Boca, GFR, thicket above beach just east of Playa de Tamarindo, sea level (MAPR!). **1964:** AGM 2715, 2 Oct, GFR (MAPR!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This herb is common along trails and in sandy areas along the coast.

Heliotropium curassavicum L.

2006: OMR 696, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, by sapo concho breeding area, elev 1 m (MAPR!). **2005:** OMR 577, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south by old coconut plantation, elev 3 m (MAPR!). **1973:** ROW s.n., *Guánica (UPR!). **1913:** FLS 2415, 22 Jun, *Guánica (MAPR!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This decumbent herb is common in open areas along the coast.

Rochefortia acanthophora (DC.) Griseb.

1996: GJB 4909, 26 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, steep north-facing slope above Road 334 between sharp switch back, elev 100 m (MAPR!). **1990:** GJB 3711, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km. 3.1, ca. 100 m from Bahía de Guánica., elev 10-20 m (MAPR!). **1989:** PAR 3002, 7 Oct, Guánica, GFR, along main road a few m from entrance to forest (US!). **1963:** HAL 9764, 27 Jun, *Guánica (US!). (Little et al., 1974: 850; Quevedo et al., 1990: 149; Axelrod, unpublished.) *Rochefortia caanthophora* is a common shrub in the GFR. This species is listed as a Critical Element by the DNER.

Rochefortia spinosa (Jacq.) Urb.

1977: ROW *s.n.*, 14 Nov, *Guánica (UPR!). **1974:** ROW *s.n.*, 22 Sep, GFR, (UPR!). (Quevedo et al., 1990: 149, as *Rochefortia cuneata* Sw.; Axelrod, unpublished.) This uncommon shrub apparently is disjunct in the Forest, as it otherwise is known for Puerto Rico from Fajardo and from the mogotes of the north coast. This species is listed as a Critical Element by the DNER.

***Tournefortia scabra* Lam.**

2005: OMR 485, 7 Sep, Guánica, Bo. Carenero, GFR, Las Cobanas Trail to the north, mesic canyon at Cañon las trichilias, elev 110 m (MAPR!). **1886:** PS 3378, 24 Jan, *Guánica (US!). (Acevedo-Rodríguez, 2005: 138.) This is a rare vine in Puerto Rico in general and in the GFR in particular. The single confirmed collection from the Reserve was made in the northern part of the forest.

***Tournefortia volubilis* L.**

2005: OMR 461, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail, from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 155 m (MAPR!). **2005:** OMR 401, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334 to the forest main office, elev 192 m (MAPR!). **2004:** OMR 216, 10 Sep, Guánica, Bo. Carenero, GFR, Faro de Guánica, to the north of Road 333, elev 30 m (MAPR!). **2003:** OMR 174, 22 Oct, Guayanilla, Bo. Boca, GFR, trail from Playa Tamarindo, sapo concho pond to Punta Vaquero, at dwarf forest, elev 10 m (MAPR!). **2000:** PAR 11424, 6 Sep, GFR (MAPR! US!). **1996:** PAR 7893, 7866, 25 Jan, Guánica [Guayanilla], GFR, east end of road area beyond Playa Pelicano (US!). **1991:** FSA 2890, 7 Sep, Guánica, GFR, along Murcielago Trail from Campamento, elev 50-150 m (MAPR!). **1962:** HAL 9163, 23 Jun, GFR, coastal thickets (MAPR!). **1935:** FHS 633, 14 May, *Guánica, dry brushy hillside (US!). **1913:** FLS 3108, 19 Sep, *Guánica (MAPR!). **1886:** PS 3404, 24 Jan, *Guánica, Punta de la Meseta (US!). (Quevedo et al., 1990: 149, as *Tournefortia volubilis* L.; Acevedo-Rodríguez, 2005: 138; Axelrod, unpublished.) This is a common shrub or vine throughout the GFR.

Confirmation required before accepting into the flora:

***Cordia alliodora* (Ruiz & Pav.) Oken**

(Little and Wadsworth, 1964: 468.) If this tree species occurs within the GFR, it would be expected to be in the more mesic northern portion of the Reserve.

***Cordia collococca* L.**

(Little et al., 1974: 842.) This tree species was observed during the survey along the northern boundary line for the GFR in mesic canyons. It was not possible to tell if it was in the Reserve or not.

***Cordia polycephala* (Lam.) I.M. Johnst.**

(Acevedo-Rodríguez, 2005: 133.) This shrub often occurs as a scrambler climbing over adjacent shrubs and up into trees. It is generally associated with more mesic areas could possibility be expected in the canyons and ravines in the northern part of the forest.

***Heliotropium crispiflorum* Urb.**

1982: HAL 33644, 9 Nov, *Guánica, Maruca, at sea level (UPR!). **1915:** NLB 4889, 5-8 Mar, vicinity of *Guánica, limestone hill (US! UPR!). (Quevedo et al., 1990: 149, as *Heliotropium microphyllum* Sw.; Axelrod, unpublished.) This species would be expected in open sunny areas, especially in soil pockets on exposed limestone.

***Heliotropium indicum* L.**

(Quevedo et al, 1990: 149.) This herb is found in sunny, open areas, but usually in more mesic sites.

Heliotropium ternatum Vahl.

(Quevedo et al., 1990: 149.) This small subshrub would be expected in open, sunny areas. Its absence is unexpected as it occurs on limestone in areas just to the east of the Forest.

Tournefortia gnaphalodes (L.) R. Br. ex Roem. & Schult.

(Quevedo et al., 1990: 149.) This is a beach species that is becoming uncommon in Puerto Rico due to human impact on our beaches. It would be expected on the sandy beaches of the GFR and its loss is not surprising.

BRASSICACEAE

Cakile lanceolata (Willd.) O.E. Schulz

2006: OMR 711, 11 May, Yauco, Bo. Barina, GFR, Road 333 by Punta Ballena at surfing area, elev 2 m (MAPR!). **2005:** OMR 411, 11 Aug, Guánica, Bo. Montalva, GFR, Monte la Brea, at sapo concho breeding area at Manglillo, elev 2 m (MAPR!). **1997:** GJB 5334, 28 Oct, Guayanilla, Bo. Boca, GFR, beach just east of Playa de Tamarindo, sea level (MAPR!). **1886:** PS 3503, 25 Jan, *Guánica, ad Salinas (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) *Cakile* is an annual herb that occurs on sandy beaches and has fruits adapted for dispersal by ocean currents. Like many beach species in Puerto Rico, it is becoming rare due to human impact.

Confirmation required before accepting into the flora:

Lepidum virginicum L.

(Quevedo et al., 1990: 145.) This small herb is found in open weedy sites, especially around homes and gardens. It well could have occurred in the formerly inhabited areas of the Forest.

BROMELIACEAE

Tillandsia fasciculata Sw.

2003: OMR 111, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanas Trail, elev 120 m (MAPR!). **1913:** NLB 1935, 11-12 Mar, *Guánica, Monte Ensenada (US!). (Quevedo et al., 1990: 144; Cedeño-Maldonado, 2005: 219; Axelrod, unpublished.) This is a very common epiphytic and lithophytic herb throughout the GFR.

Tillandsia flexuosa Sw.

2006: OMR 676, 30 Mar, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking El Fuerte Trail to the west, by Cueva del Negro, elev 165 m (MAPR!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This is a rare epiphytic herb in the GFR; it was only seen one time, growing on *Bucida buceras*. It is a widespread species in the Antilles and tropical America, but in Puerto Rico, *Tillandsia flexuosa* is apparently restricted to the Tortuguero Lagoon Preserve and Susúa Forest Reserve. This species is listed as a Critical Element by the DNER.

Tillandsia recurvata (L.) L.

2004: OMR 232, 2 Oct, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, from the sapo concho pond taking the trail to the cave, elev 17 m

(MAPR!). **1994:** *HAL 137*, 3 Nov, Guánica, Bo. Carenero, GFR, Camino las Ballenas (US!). **1991:** *BB 10025*, 6 Jan, GFR, (US!). **1990:** *BB 9970*, 16 Mar, GFR (US!). **1914:** *JAS 2256*, 8 Sep, *Guánica, Santa Rita (US!). (Quevedo et al., 1990: 144; Cedeño-Maldonado, 2005: 219; Axelrod, unpublished.) This epiphytic herb is widespread and locally common in mesic areas of the forest.

***Tillandsia setacea* Sw.**

2006: *OMR 630*, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, at the first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2005:** *OMR 477*, 25 Aug, Yauco, Bo. Barina, GFR, Las Cobanas Trail to the north, at old campeche plantation (zinc house), taking a canyon to the north, elev 48 m (MAPR!). (Axelrod, unpublished.) *Tillandsia setacea* was only found the trees in mesic canyons in the northern part of the forest. **New record for the GFR.**

***Tillandsia utriculata* L.**

2005: *OMR 350*, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, at the top of a hill to the west of a mesic canyon running north, close to Susúa Baja, elev 85 m (MAPR!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) A rare, large epiphytic bromeliad in the forest, but it is widespread and often common elsewhere in Puerto Rico (especially on Mona Island).

***Tillandsia variabilis* Schltdl.**

2006: *OMR 634*, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, at the first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!); *OMR 649*, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, at the first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2005:** *OMR 478*, 25 Aug, Yauco, Bo. Barina, GFR, Las Cobanas Trail to the north, at old campeche plantation to the zinc house, taking a canyon to the north of the forest, elev 48 m (MAPR!). (Axelrod, unpublished.) This is an uncommon epiphyte that grows in shady, humid areas in the northern part of the forest. **New record for the GFR.**

Confirmation required before accepting into the flora:

****Bromelia pinguin* L.**

(Quevedo et al., 1990: 144; Cedeño-Maldonado, 2005: 219; Axelrod, unpublished.) This is a common terrestrial herb in the northern part of La Cobana Trail bordering the Campeche plantation and along Road 334 by the entrance at La Luna.

***Tillandsia bulbosa* Hook.**

(Quevedo et al., 1990: 144.) This epiphytic herb is not likely to occur within the GFR. It is found in more mesic forests such as at Maricao and Susúa and along the northcoast. It was collected historically on a relatively wet ridge on Desecheo Island.

***Tillandsia lineatispica* Mez**

(Quevedo et al., 1990: 144.) Axelrod (unpubl.) only cites this species from the Virgin Islands, Culebra and Vieques. Acevedo-Rodríguez (1996) considers it to be a hybrid between *T. utriculata* and *T. fasciculata*, and while both species occur within the Reserve, the former is rare. It would appear that the probability of the species occurrence in the GFR is slight. This species is listed as a Critical Element by the DNER.

Tillandsia usneoides (L.) L.

(Quevedo et al., 1990: 144; Cedeño-Maldonado, 2005: 219.) Spanish-moss (not to be confused with the lichen with the same common name), is a wide-spread species in the New World subtropics and tropics, but apparently it is rare in Puerto Rico, with only scattered records of its occurrence.

BURSERACEAE

Bursera simaruba (L.) Sarg.

2004: OMR 209, 4 Sep, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, at the area of the new sapo concho ponds, elev 16 m (MAPR!). **1990:** RGG 3333, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1988:** GC 514, 20 Mar, GFR (US!). **1986:** GJB 3188, 17 Apr, Guánica, GFR, on north side of Road 333 opposite of Balneario Caña Gorda (MAPR!). **1984:** JES 19, 6 Oct, Guánica, GFR, around Playa Tamarindo (MAPR!). **1950:** ELL 13148, 30 Jun, GFR (US!); ELL 13257, 6 Jul, GFR (US!). (Little and Wadsworth, 1964: 236; Quevedo et al., 1990: 146; Axelrod, unpublished.) This is a common tree in the GFR found in a wide range of habitats. It is a fast growing tree that is more dominant in coastal areas.

Confirmation required before accepting into the flora:

Tetragastris balsamifera (Sw.) Kuntze

(Little and Wadsworth, 1964: 240.) This small tree is generally found in more mesic forests in the western, northern and north-central portions of the Island. However, isolated there is an isolated population in a mesic ravine on Vieques and another in a mesic, north-facing ravine in the Sierra Bermeja. It is possible that the species could occur in the evergreen forest in mesic ravines along the northern bountry of the Forest.

CACTACEAE

Hylocereus trigonus (Haw.) Saff.

2005: OMR 495, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, cactus forest, along a small canyon north of Road 333, elev 8 m (MAPR!). **1993:** HAL 37188, 20 Oct, GFR, elev 100 m (UPR!). **1913:** NLB 1860, 11-13 Mar, *Guánica, rocky hillside (NY!). (Quevedo et al., 1990: 148; Acevedo-Rodríguez, 2005: 142; Axelrod, unpublished.) This is climbing cactus is locally common throughout the forest.

Leptocereus quadriscostatus (Bello) Britton & Rose

2004: OMR 207, 4 Sep, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, at the area of sapo concho ponds, elev 12 m (MAPR!). **1983:** HAL 34445, 10 Sep, *Guánica, Maruca, Manglillo, at sea level (NY!). **1982:** HAL 32662, 10 Feb, *Guánica, Salinas de Guánica (NY!). **1913:** NLB 1907, 11 Mar, *Guánica and vicinity, sandy coastal thicket (NY!). **1886:** PS 4002, 27 Feb, *prope* *Guánica (NY!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) This columnar cactus occurs in the dry forest of Puerto Rico and Anegada. It is locally abundant in the GFR. This species is listed as a Critical Element by the DNER.

Melocactus intortus (Mill.) Urb.

1923: NLB 1923, 11 Mar, *Guánica, rocky coastal thicket (NY!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) This is a common cactus of the coastal forest and rocky plateau along the south coast of Puerto Rico.

****Opuntia cochenillifera* (L.) Mill.**

2006: OMR 684, 30 Mar, Guánica, Carenero, GFR, Lomas de Seboruco, end of Road 334, around the ranger house, elev 144 m (MAPR!). (Axelrod, unpublished.) This is a succulent shrub or tree planted and persistent around the GFR office. It is also persistent at other areas surrounding the GFR. There is not evidence of it spreading in Puerto Rico. **New record for the GFR.**

***Opuntia repens* Bello**

1992: FSA 4602, 1 Jun, Guánica, Bo. Montalva, GFR, Manglillo section, jeep road along Monte de la Brea, elev 10-50 m (UPRRP!). **1914:** JAS 2959, 18 Feb, *Guánica, Calabaza to Ensenada Honda, dry rocky hillside (NY!). **1886:** PS 4019, 23 Feb, *prope* *Guánica (NY!). (Quevedo et al., 1990: 148, Axelrod, unpublished.) This small *Opuntia* is most common in dry scrub forest along the southern slopes of the GFR. This species is listed as a Critical Element by the DNER.

***Opuntia rubescens* Salm-Dyck ex DC.**

2005: OMR 308, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 11 m (MAPR!). **1996:** VSV *s.n.*, 30 Dec, Guayanilla, Bo. Boca, GFR, Playa de Tamarindo, behind seasonal lagoon (JBSD). (Little and Wadsworth, 1964: 378; Quevedo et al., 1990: 148; Axelrod, unpublished.) Locally common in dwarf forest areas to the south of the GFR. This is a succulent tree that has been affected by the cactus moth *Cactoblastis cactorum* that kills most of the juveniles. Almost no recruitment has been observed during this survey. The biggest populations have been observed in the dwarf forest areas from Caña Gorda to Punta Vaquero.

***Opuntia stricta* (Haw.) Haw.**

2005: OMR 511, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, in a cactus Forest, by a small canyon north of Road 333, elev 8 m (MAPR!). **1913:** FLS 326, 3 Feb, *Guánica (MAPR!). (Quevedo et al., 1990: 148, as *Opuntia dillenii* (Der-Gawl.) Haw.; Axelrod, unpublished.) This is a very rare succulent shrub in the GFR and was only observed as scattered individuals along the southern slopes of the forest in Caña Gorda. It otherwise is a widespread, common species throughout the Caribbean. This species is listed as a Critical Element by the DNER.

***Pilosocereus royenii* (L.) Byles & G.D. Rowley**

2005: OMR 512, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, in a cactus Forest on a small canyon north of Road 333, elev 8 m (MAPR!). **1988:** SG 96, 25 Nov, *Guánica, GFR, Tamarindo, Road 333 [Guayanilla] (NY!). (Little and Wadsworth, 1964: 376, as *Cephalocereus royenii* (L.) Britton & Rose; Quevedo et al., 1990: 148; Axelrod, unpublished.) This is a very widespread columnar cactus but is now been attack by the *Harrisia* cactus mealybug *Hypogeococcus pungens*, wich is killing the plants. Almost no recruitment has been observed during this survey.

***Stenocereus fimbriatus* (Lam.) Lourteig**

2005: OMR 510, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, in a cactus forest from a small canyon north of Road 333, elev 8 m (MAPR!). **1996:** VSV *s.n.*, 30 Dec, Guayanilla, Bo. Boca, GFR, Playa de Tamarindo, forest area behind seasonal lagoon (MAPR!). (Little et al., 1974: 602; Quevedo et al., 1990: 148, as *Lemaireocereus hystrix* (Haw.) Britton & Rose, as *Stenocereus peruvianus* (Miller) R. Kiesling.) This is a very

common columnar cactus in dwarf forest areas from Caña Gorda to Punta Vaquero. The largest populations have been seriously damaged and reduced by human-set fires.

Confirmation required before accepting into the flora:

**Hylocereus undatus* (Haw.) Britton & Rose

(Acevedo-Rodríguez, 2005: 142.) This cactus is cultivated in the dryer areas of the island and is often persistent follow cultivation. It may have been planted in the inhabited areas of the Reserve, which are now covered by secondary forest.

Excluded species:

†*Opuntia cubensis* Britton & Rose

(Quevedo et al., 1990: 148, as *Opuntia antillana* Britton & Rose) Historically this species has been cited in various floras and checklists for Puerto Rico. However, most specimens originally determined as this species have been assigned elsewhere with the few remaining ones being undeterminable. As a result, Axelrod (unpubl.) questions the occurrence of this species in Puerto Rico.

CANELLACEAE

Canella winterana (L.) Gaertn.

2005: OMR 432, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau, west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 35 m (MAPR!). **1994:** DA 930, 12 Dec, Guánica, GFR, Vereda Fuerte, off Road 334, elev 140 m (MAPR!). **1990:** RGG 3360, 18 Dec, Guánica, Bo. Carenero, GFR, along Road 334, km 5.5-5.6, elev 145 m (MAPR!). **1950:** ELL 13157, 30 Jun, GFR (US!); ELL 13238, 4 Jul, GFR (US!). **1948:** OD s.n., 1 May, Guánica, GFR (MAPR!). **1948:** JR s.n., 8 Jul, Guánica, GFR (MAPR!). **1946:** JIO s.n., 28 Sep, Guánica, GFR (MAPR!). (Little and Wadsworth, 1964: 362; Quevedo et al., 1990: 148; Axelrod, unpublished.) This is a widespread shrub or small tree in the forest, but is more abundant near the coast.

CANNABACEAE

Celtis iguanaea (Jacq.) Sarg.

2006: OMR 752, 1 Jun, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail, to the old campeche plantation, elev 68 m (MAPR!). **2005:** OMR 483, 25 Aug, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail to the north, at old campeche plantation (zinc house), taking a canyon to the north of the forest, elev 48 m (MAPR!). (Axelrod, unpublished.) This vine is rare within the reserve and is restricted to mesic disturbed valleys. **New record for the GFR.**

Celtis trinervia Lam.

2006: OMR 618, 13 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, close to the entrance to Las Cobanas Trail, elev 160 m (MAPR!). (Axelrod, unpublished.) This tree is restricted to mesic canyons in the northern boundary of the GFR. This species is listed as a Critical Element by the DNER. **New record for the GFR.**

Trema lamarckiana (Roem. & Schult.) Blume

1987: PAR 2244, 29 Sep, Guánica, GFR (US!). This tree species was not seen by the author during the field survey. *Trema lamarckiana* is an early successional species typical of newly recovering forest sites and forest edges. **New record for the GFR.**

CAPPARACEAE

Cynophalla amplissima (Lam.) Iltis & Cornejo

2006: OMR 738, 1 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north, old campeche plantation, elev 70 m (MAPR!). **2005:** OMR 314, 18 Jun, Yauco, Bo. Barina, GFR, by road 335, south taking an entrance to the right after Las Ruinas, by La Cienaga, elev 25 m (MAPR!). (Little et al., 1974: 218, as *Capparis amplissima* Lam.; Quevedo et al., 1990: 145, as *Capparis amplissima*; Axelrod, unpublished.) This is a rare small tree in the Reserve, occurring along the north boundary of the forest.

Cynophalla flexuosa (L.) J. Presl

2005: OMR 333, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 56 m (MAPR!); OMR 449, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 144 m (MAPR!). **2003:** OMR 133, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita from DRNA office south to Cañon de los Murciélagos, elev 119 m (MAPR!). **1990:** GJB 3693, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1944:** MC s.n., 2 Apr, GFR (MAPR!). **1935:** FHS 46, 16 Feb, *Guánica, roadside shrub (US!). **1886:** PS 3379, 24 Jan, *prope* Guánica, Monte Puerco [GFR] (US!); PS 3613, 2 Feb, *Guánica, *umbrosis ad* Montalva (US!); PS 3841, 23 Feb, Guánica, Bo. Carenero, [GFR], Monte Puerco (US!); PS 3954, 2 Mar, *Guánica, *declivibus ad* Barinas [Yauco] (US!). (Little et al., 1974: 220, as *Capparis flexulosa* L.; Quevedo et al., 1990: 145, as *Capparis flexulosa* L.; Acevedo-Rodríguez, 2005: 147, as *Capparis flexulosa* L.; Axelrod, unpublished.) *Capparis flexuosa* can grow as a prostrate to sarmentose or erect shrub or small tree. It is widespread throughout the GFR.

Cynophalla hastata (Jacquin) J. Presl

2005: OMR 409, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, to the forest main office, elev 216 m (MAPR!). **1991:** FSA 2873, 7 Sep, Guánica, Bo. Carenero, GFR, along Murcielago Trail from Campamento Borinquen, elev 50-150 m (MAPR!). **1983:** SMC 106, 8 Oct, Guánica, Bo. Carenero, GFR, Campamento Borinquen, Lluveras trail km 5.6 (MAPR!). **1964:** HAL 10630, 3 Jan, GFR, in dry thickets on limestone, elev 20-40 m (US!). **1913:** NLB 1879, 11-12 Mar, vicinity of *Guánica, hillside thicket (US!). (Little et al., 1974: 224, as *Capparis hastata* Jacq.; Quevedo et al., 1990: 145, as *Capparis hastata*; Axelrod, unpublished.) This medium-sized tree is widespread throughout the Reserve.

Quadrella cynophallophora (L.) Hutch.

2005: OMR 304, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 12 m (MAPR!). **1990:** GJB 3708, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); RGG 3348, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1977:** JLL 5143, 7 Jul, GFR, subtropical dry

forest overlying limestone, and mangrove (US!). **1963:** *HAL* 9754, 27 Jun, GFR, dry thickets on limestone (MAPR!). **1950:** *ELL* 13203, 3 Jul, Guánica, Bo. Carenero, GFR, Parque de recreo de Tamarindo (US!). **1944:** *MC* 1147, 2 Apr, Guánica, GFR, along road (MAPR!). **1915:** *NLB* 4824, 2-4 Mar, *Guánica, Bo. Montalva, limestone hill (US!). **1886:** *PS* 3734, 7 Feb, *Guánica, *sylva ad* Ensenada (US!). (Little et al., 1964: 132, as *Capparis cynophallophora* L.; Quevedo et al., 1990: 145, as *Capparis cynophallophora*; Axelrod, unpublished.) This is a small widespread tree found throughout the GFR.

***Quadralla indica* (L.) Iltis & Cornejo**

2006: *OMR* 708, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, by sapo concho breeding area, elev 2 m (MAPR!). **2005:** *OMR* 331, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north, to an old campeche plantation, elev 82 m (MAPR!); *OMR* 366, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, to a mesic canyon, elev 110 m (MAPR!). **2004:** *OMR* 208, 4 Sep, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 16 m (MAPR!). **2003:** *OMR* 132, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita, from DRNA office south to Cañon de los Murciélagos, elev 119 m (MAPR!). **1991:** *FSA* 2889, 7 Sep, Guánica, Bo. Carenero, GFR, along Murciélago Trail, from Campamento, elev 50-150 m (MAPR!). **1990:** *GJB* 3696, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1989:** *HI s.n.*, 11 Jun, Guánica, Bo. Carenero, Road 334, above La Luna at entrance to GFR in the Lomas de Seboruco (MAPR!). **1989:** *PAR* 3000, 7 Oct, Guánica, Bo. Carenero, GFR, along main road a few m from entrance to forest [Road 334] (US!). **1984:** *JES* 16, 6 Oct, Guánica, GFR, along jeep trail opposite km 4.9, 0.7 km by road from Campamento Borinquen towards La Luna (MAPR!). **1913:** *FLS* 3106, 19 Sep, *Guánica (MAPR!). **1913:** *NLB* 1924, 11-12 Mar, *Guánica, vicinity of Monte Ensenada, at rocky slopes (US!). (Little et al., 1974: 226, as *Capparis indica* (L.) Fawcett & Rendle; Quevedo et al., 1990: 145, as *Capparis indica*; Axelrod, unpublished.) This is a small tree widespread throughout the GFR.

Confirmation required before accepting into the flora:

***Capparidastrum frondosum* (Jacq.) Cornejo & Iltis**

(Little et al., 1974: 222, as *Capparis frondosa* Jacq.; Quevedo et al., 1990: 145, as *Capparis frondosa*.) This tree would be expected to occur in mesic canyons within the forest.

***Morisonia americana* L.**

(Little et al., 1974: 228.) It is very likely that this small tree did occur in the GFR, but has been extirpated. There are no recent collections of it from the island of Puerto Rico (Axelrod, unpubl.). It was collected once in 1914 on Desecheo Island and once in 1972 on Mona Islands, but has not been seen since from either island. It is known from Vieques Island by a single, partially fallen individual, although it remains relatively common on nearby Culebra Island and St. John. This species is listed as a Critical Element by the DNER.

CARICACEAE

Confirmation required before accepting into the flora:

**Carica papaya* L.

1913: *FLS* 348, 10 Feb, *Guánica (MAPR!). (Quevedo et al., 1990: 148.) A solitary individual was observed by the author at an open area in a canyon in the northern area of the forest. This is a small tree widely cultivated in the valleys surrounding the GFR. While the species has naturalized on the coastal plane of Mona Island around Sardinera, which supports dry forest, it apparently has not persisted or naturalized in the GFR.

CASUARINACEAE

**Casuarina equisetifolia* J.R. Forst & G. Forst

2005: *OMR* 294, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, by the sapo concho pond, elev 5 m (MAPR!). **1964:** *AGM* 2711, 2 Oct, Guánica, GFR (MAPR!). **1948:** *AGM* 647, 1 May, Guánica, GFR (MAPR!). **1935:** *FHS* 41, 2 Mar, *Guánica (US!). (Little et al., 1974: 984; Chinae, 1990: 53; Quevedo et al., 1990: 145; Axelrod, unpublished.) This exotic tree has been planted and is persistent in recreative areas along the coast. There is no evidence of it spreading.

CELASTRACEAE

Crossopetalum rhacoma Crantz

2005: *OMR* 456, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from, DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 140 m (MAPR!); *OMR* 544, 27 Oct, Guánica, Bo. Carenero, GFR, Los Granados Trail, at the top of the hill close to the power lines tower, elev 227 m (MAPR!). **2003:** *OMR* 184, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail from DRNA office east to Mirador El Vigia, elev 186 m (MAPR!). **1997:** *GJB* 5152, 5 Aug, Guayanilla, Bo. Boca, GFR, along Road 333 to west of Punta Vaquero, elev 5 m (MAPR!). **1992:** *PAR* 4771, 15 Jan, Guánica, GFR (US!); *FSA* 4585, 1 Jun, Guánica, Bo. Montalva, GFR, jeep road along Monte de la Brea (US!). **1990:** *RGG* 3345, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1984:** *SJD s.n.*, 6 Oct, Guánica, Bo. Carenero, GFR, along jeep trail opposite km 4.9, Campamento Borinquen, towards La Luna (MAPR!). **1964:** *HAL* 10579, 1 Jan, GFR (US!). **1962:** *HAL* 9127, 23 Jun, Guánica, GFR, coastal thickets (MAPR!); *HAL* 9142, 23 Jun, Guánica, GFR, coastal thickets (MAPR!); *HAL* 9156, 23 Jun, Guánica, GFR, coastal thickets (MAPR!). **1961:** *HAL* 9014, 30 Dec, Guánica, GFR (MAPR!); *HAL* 9024, 30 Dec, Guánica, GFR, coastal thickets (MAPR!). **1944:** *MC* 1163, 2 Apr, Guánica, GFR (MAPR!). **1913:** *FLS* 3088, 3111, 19 Sep, *Guánica (MAPR!). **1886:** *PS* 3747, 13 Feb, *prope* *Guánica (US!). (Little et al., 1974: 462; Quevedo et al., 1990: 147; Axelrod, unpublished.) This is a widespread shrub, mostly found in open areas and along the trails.

Elaeodendrum xylocarpum (Vent.) DC.

2005: *OMR* 362, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 149 m (MAPR!); *OMR* 395, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, to the forest main office, elev 176 m (MAPR!); *OMR* 551, 1 Nov, Guánica, Bo. Carenero, GFR, Road 334, from the entrance of the forest to the ranger's office, elev 210 m (MAPR!). **2004:** *OMR* 218, 10 Sep, Guánica, Bo. Carenero, GFR, Faro de Guánica to the north of Road 333, elev 28 m (MAPR!). **1991:** *FSA* 2922, 7 Sep, Guánica, Bo. Carenero, GFR, along Murcielago Trail from campamento, elev 50-150 m (MAPR!). **1990:** *RGG* 3363, 18 Dec, Guánica, Bo.

Carenero, GFR, elev 145 m (MAPR!). **1966:** WRS 3261, 5 Jul, GFR, along Road 333 Km 4 hm 7 (US!). **1962:** HAL 9124, 23 Jun, *Guánica (MAPR!). **1959:** GLW 8828, 9 Jul, GFR (US!). **1948:** EAI s.n., 1 May, Guánica, GFR (MAPR!); SRR s.n., 7 Aug, Guánica, GFR (MAPR!). **1944:** MC 1164, 2 Apr, Guánica, GFR (MAPR!). **1886:** PS 3363, 21 Jan, *prope* *Guánica (US!). (Little et al., 1974: 460, as *Cassine xylocarpa* Vent.; Quevedo et al., 1990: 147, as *Cassine xylocarpa*; Axelrod, unpublished.)

Elaeodendrum xylocarpum is a medium size tree found throughout the Forest.

***Gyminda latifolia* (Sw.) Urb.**

2002: GJB 6641, 17 Oct, Guánica, Bo. Carenero, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1990:** GJB 3716, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, elev 10-20 m (MAPR!). **1964:** HAL 10796, 1 Apr, *Guánica (US!). **1948:** MS s.n., 1 May, Guánica, GFR (MAPR!). **1944:** MC 1155, 2 Apr, Guánica, GFR (MAPR!). **1940:** LEG 176, 8 Oct, GFR, southwestern dry section (US!); LEG 177, 8 Oct, GFR (US!); LEG 195, 10 Oct, Guánica, Bo. Carenero, GFR, Hoya Honda (US!). (Little et al., 1974: 464; Quevedo et al., 1990: 147.) This is a common small tree throughout the Reserve.

***Schaefferia frutescens* Jacq.**

2005: OMR 802, 21 Nov, Yauco, Bo. Barina, GFR, end of Road 334, following Julio Vélez Trail to the east, elev 170 m (MAPR!). **1983:** SMC 104, 8 Oct, Guánica, Bo. Carenero, GFR, Campamento Borinquen, Lluveras Trail km 5.6, south side of road (MAPR!). (Little et al., 1974: 474; Quevedo et al., 1990: 147; Axelrod, unpublished.) *Schaefferia frutescens* typically occurs as an understory shrub in the dry forest.

Confirmation required before accepting into the flora:

Maytenus laevigata (Vahl.) Griseb. ex Eggers

(Quevedo et al., 1990: 147, as *Maytenus elliptica* (Lam.) Krug & Urb.) This small tree was not observed during the survey, but could occur in mesic ravines in the north of the Reserve.

CERATOPHYLLACEAE

Confirmation required before accepting into the flora:

Ceratophyllum demersum L.

(Axelrod, unpublished.) *Ceratophyllum demersum* is a freshwater aquatic that grows submerged in quiet lakes and ponds.

CLEOMACEAE

**Arivela viscosa* (L.) Raf.

2005: OMR 516, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, entrance of Hoya Honda at the edge of Road 333, elev 23 m (MAPR!). This is a small herb along roads and burned areas, particularly common in Caña Gorda. **New record for the GFR.**

***Cleome stenophylla* Klotzsch ex Urb.**

2006: OMR 725, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, at La Jungla, elev 3 m (MAPR!). (Quevedo et al., 1990: 145.) This small herb occurs in scattered sites in the forest.

Confirmation required before accepting into the flora:

Tarenaya spinosa (Jacq.) Raf.

(Quevedo et al., 1990: 145, as *Cleome spinosa* L.) This species was not observed during the survey. If it occurs within the GFR it will be expected from open disturbed areas close to roads.

CLUSIACEAE

Clusia gundlachii Stahl

2005: OMR 338, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail on a mesic canyon running north close to Susúa Baja, elev 90 m (MAPR!). **1989:** PAR 3007, 7 Oct, Guánica, Bo. Carenero, GFR, Las Cobanitas Trail, in abandoned *Haemotoxylon* plantation (US!). (Acevedo-Rodríguez, 2005: 153; Axelrod, unpublished.) This climbing or scandent shrub is rare within the Forest, and is only found in mesic canyons along its northern boundary.

Clusia rosea Jacq.

2004: OMR 251, 11 Nov, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, elev 110 m (MAPR!). **1998:** GC 525., 24 Mar, GFR (US!). (Little and Wadsworth, 1964: 352; Quevedo et al., 1990: 148; Axelrod, unpublished.) *Clusia rosea* occurs scattered through the Forest but is most common along the north boundary at La Cobana.

COMBRETACEAE

Bucida buceras L.

2003: OMR 168, 22 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333 following the trail from Playa Tamarindo at sapo concho pond, to Punta Vaquero, dwarf forest, elev 8 m (MAPR!). **1990:** GJB 3717, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); RGG 3338, 18 Dec, Guánica, Bo. Carenero, GFR, elev, 140 m (MAPR!). **1986:** GJB 3211, 12 Jun, Guánica, Bo. Carenero, km 5.9, sandy parking area in Balneario Caña Gorda, Road 333 (MAPR!). **1966:** WRS 3336, 8 Jul, GFR, northeast of Caña Gorda beach (US!). **1950:** ELL 13182, 1 Jul, GFR (US!). **1935:** FHS 265, 7 Mar, *Guánica (US!). **1913:** JAS 983, 28 Aug, *Guánica, Santa Rita (US!); JRJ 983, 28 Aug, *Guánica, Santa Rita (US!). **1886:** PS 3857, 23 Feb, Guánica, Bo. Carenero, [GFR], Monte Puerco (US!). (Little and Wadsworth, 1964: 390; Quevedo, et al., 1990: 148; Axelrod, unpublished.) This is one of the more widespread and common trees within the GFR. Also it is one of the tree species that attains the greatest trunk diameter.

Conocarpus erectus L.

2004: OMR 267, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 2 m (MAPR!). **1988:** SG 101, 25 Nov, Guánica, Tamarindo sector, GFR, Road 333, at edge of lagoon, [probably collected in Guayanilla] (MAPR!). **1982:** FNS 8961, 13 Nov, east part of GFR, at edge of lagoon in front of beach, elev 25 m, [probably collected in Guayanilla] (MAPR!); JHH 58, 13 Nov, Guayanilla, GFR, 1.12 km after the end of paved Road 333, going inland at the shore of a saline lagoon, sandy clay soil, low elev (MAPR!). **1964:** JAD 7481, 13 April, GFR (US!). **1950:** ELL 13206, 3 Jul, Guayanilla, GFR, Tamarindo Parque de Recreo (US!). **1913:** FLS 3049, 19 Sep, *Guánica (MAPR!). **1886:** PS 3456, 25 Jan, *Guánica

(US!). (Little and Wadsworth, 1964: 390; Quevedo et al., 1990: 145; Axelrod, unpublished.) This is a common tree along the coast.

Laguncularia racemosa (L.) C.F. Gaertn.

2004: OMR 262, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 3 m (MAPR!). **1982:** JHH 59, 13 Nov, Guánica. GFR, 1.12 km after the end of paved Road 333, low elevation (MAPR!).

1950: ELL 13212, 3 Jul, Guánica, GFR, Parque de Recreo Caña Gorda (US!). **1913:** FLS 352, 10 Feb, *Guánica (MAPR!). (Little and Wadsworth, 1964: 392; Quevedo et al., 1990: 145; Axelrod, unpublished.) This is a mangrove common along the coast.

****Terminalia catappa*** L.

2005: OMR 416, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, at sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 2 m (MAPR!). (Quevedo, et al.: 148) The Almendro is an exotic tree, planted in recreative areas and along the sandy coastal areas of the GFR. While it reproduces readily in the open coastal areas where seedlings and saplings can be found, it was not seen to invade the undisturbed forest.

COMMELINACEAE

****Callisia fragrans*** (Lindl.) Woodson

2006: OMR 665, 9 Feb, Guayanilla, Bo. Boca, GFR, end of paved Road 333, taking a dirt road to the north, from Playa Tamarindo sapo concho to the caves, elev 15 m (MAPR!).

This is a rare herb in the forest that was apparently cultivated as an ornamental and is found in sites where houses use to be. It is apparently persistent and spreading locally by runners. **New record for the GFR.**

Commelina erecta L.

2005: OMR 302, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 7 m (MAPR!). **2004:** OMR 228, 2 Oct, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, from the sapo concho pond taking the trail north to the cave, elev 4 m (MAPR!). **1997:** GJB 5347, 28 Oct, Guánica, Bo. Carenero, GFR, Road 333 km 7.5, west of Bahía de la Ballena, elev 25 m (MAPR!). (Quevedo et al., 1990: 144, as *Commelina elegans* Kunth.; Axelrod, unpublished.) This is a herbaceous species, locally common in shady mesic areas of the forest.

Confirmation required before accepting into the flora:

Callisia repens (Jacq.) L.

(Quevedo et al., 1990: 144.) This small, creeping herb is often grown in hanging pots and is used as a ground cover. Apparently it rarely (never?) flowers in Puerto Rico, at least in dry areas. On Vieques it is widespread and often extensive in the understory of dry forests on granitic substrate, but is not common to absent on limestone. This may explain its inability to persist in the Reserve.

CONVOLVULACEAE (including Cuscutaceae)

Convolvulus nodiflorus Desr.

2003: OMR 196, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail, from DRNA office east to Mirador El Vigia, at the junction with Lluveras Trail, elev 203 m (MAPR!).

1998: PAR 10171, 23 Jan, Guánica, Bo. Montalva, Ensenada, GFR (US!). **1996:** PAR 7870, 25 Jan, Guánica, GFR (US!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 161.) This is a common vine throughout the GFR.

***Cuscuta americana* L.**

2003: OMR 190, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail, from DRNA office east to Mirador El Vigia, at the junction with Lluveras Trail, elev 226 m (MAPR!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 222.) This is an uncommon parasitic vine in the Forest.

***Cuscuta umbellata* Kunth**

1996: PAR 7876, 25 Jan, Guánica [Guayanilla], GFR, east of end of road beyond Playa Pelicano (US!). **1914:** JAS 2248, Sep 8, *Guánica, Santa Rita (US!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This parasitic vine was not observed during the field survey.

***Evolvulus sericeus* Sw.**

2005: OMR 465, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 185 m (MAPR!); OMR 522, 22 Sep, Guánica, Bo. Carenero, GFR, Ballena Trail, from Road 333 to the north, elev 54 m (MAPR!). **1913:** NLB 1910, 11-12 Mar, *Guánica (US!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This is a small prostrate herb that can be common locally along trails and in openings.

****Ipomoea carnea* Jacq. ssp. *fistulosa* (Mart. ex Choisy) D.F. Austin**

1946: RNG s.n., 28 Sep, GFR (MAPR!). This is a cultivated shrub and apparently has not persisted in the Forest. **New record for the GFR.**

***Ipomoea hederifolia* L.**

2006: OMR 810, 21 Nov, Guánica, Bo. Carenero, GFR, end of Road 334, forest manager office, close to the nursery, elev 169 m (MAPR!). This is a rare vine in the GFR that apparently was introduced in the imported topsoil used in the Forest nursery. **New record for the GFR.**

***Ipomoea nil* (L.) Roth**

2005: OMR 548, 27 Oct, Guánica, Bo. Carenero, Caña Gorda, Road 333, after the entrance to Hoya Honda, elev 38 m (MAPR!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 173; Axelrod, unpublished.) This is a rare vine within the Forest. It is not uncommon in open, generally disturbed sites in the drier areas of the Island.

***Ipomoea pes-caprae* (L.) R. Br. ssp. *brasiliensis* (L.) Ooststr.**

2004: OMR 263, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325, taking a dirt road south to Punta Manglillo, elev 3 m (MAPR!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 173.) This is a common vine in sandy coastal areas where it typically is found along the upper beach, but it can also spread to adjacent shrubs and thickets. It is one of the few beach species that seems to be surviving human impact. For some reason there are few collections of it from the Reserve.

***Ipomoea steudelli* Millsp.**

2006: OMR 609, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!); OMR 679, 30 Mar, Guánica, Bo. Carenero, GFR, from Road 334 taking El Fuerte Trail, elev 144 m (MAPR!). **2005:** OMR 588, 22 Dec, Guánica, Bo. Carenero, GFR, Road 334, close to the ranger office, at the entrance to El Fuerte Trail, elev 140 m (MAPR!). **1999:** PAR 10799,

29 Jan, Guánica, GFR, along main road to ranger's station (US!). **1996:** *PAR* 7867, 25 Jan, Guánica, GFR (US!). **1981:** *FIH* 19, 21 Feb, Guánica, GFR, on Road 389 ca. 200 ft from forest entrance plaque (MAPR!). **1961:** *HAL* 9029, 30 Dec, GFR, coastal thickets (MAPR!); *HAL* 9068, 30 Dec, GFR, coastal thickets (MAPR!). **1915:** *NLB* 4813, 2-4 Mar, *Guánica, Bo. Montalva, limestone hill (US!). **1913:** *FLS* 3045, 19 Sep, *Guánica (MAPR!). **1886:** *PS* 3637, 10 Feb, Guánica, GFR, *sylva montis* Maniel [GFR] (US!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 177; Axelrod, unpublished.) This is one of the most widespread and common vines in the GFR. It is found in coastal scrub forest as well as in the more mesic forest along the northern boundary.

***Ipomoea triloba* L.**

2005: *OMR* 530, 22 Sep, Guánica, Bo. Carenero, GFR, entrance of Ballena Trail; from Road 333 to the north, elev 30 m (MAPR!). **1886:** *PS* 3454, 20 Jan, *Guánica, Hacienda Maria Antonia (US!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 179; Axelrod, unpublished.) It is a very rare vine within the forest and only observed in a single locality. Elsewhere it is a common weed.

***Ipomoea violacea* L.**

2005: *OMR* 415, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, at sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 2 m (MAPR!); *OMR* 575, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south by old coconut plantation, elev 3 m (MAPR!). **2004:** *OMR* 210, 4 Sep, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo at the area of sapo concho ponds, elev 6 m (MAPR!); *OMR* 261, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 3 m (MAPR!). **1969:** *AGM* 3794, 22 Dec, GFR, close to the shore and close to Playa Tamarindo [probably collected by the end of Road 333] (MAPR!). (Acevedo-Rodríguez, 2005: 181; Axelrod, unpublished.) This is a common vine that typically grows in sandy coastal areas.

***Jacquemontia cayensis* Britton**

2003: *OMR* 183, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail from DRNA office east to Mirador El Vigia, elev 186 m (MAPR!). **1996:** *PAR* 7874, 25 Jan, Guánica [Guayanilla], GFR, east of end of road, area beyond Playa Pelicano (US!). **1964:** *HAL* 10794, 1 Apr, *Guánica, in coastal thickets (US!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 184; Axelrod, unpublished.) This is an occasional vine throughout the forest.

***Jacquemontia cumanaensis* (Kunth) Kuntze**

2006: *OMR* 773, 18 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333; trail east to Punta Vaquero, elev 10 m (MAPR!); *OMR* 774, 18 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333, trail east to Punta Vaquero, elev 10 m (MAPR!). **2005:** *OMR* 503, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, along cactus forest from a small canyon north of Road 333, up to a rocky plateau, elev 23 m (MAPR!). **2003:** *OMR* 167, 22 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333, trail from Playa Tamarindo sapo concho pond to Punta Vaquero dwarf forest, elev 10 m (MAPR!); *OMR* 178, 22 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333, trail from Playa Tamarindo sapo concho pond to Punta Vaquero dwarf forest, elev 20 m (MAPR!); *OMR* 181, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail, from DRNA office east to Mirador El Vigia, elev 181 m (MAPR!). **2000:** *PAR* 11423, 6 Sep, GFR (MAPR! US!). **1996:** *PAR* 7882,

25 Jan, Guánica [Guayanilla], GFR, east of end of road beyond Playa Pelicano (US!). **1991:** *FSA 2906*, 7 Sep, Guánica. GFR, along Murciélago Trail from Campamento, elev 50-150 m (MAPR!). **1982:** *JHH 70*, 13 Nov, GFR, 1.9 km after the end of [paved] Road 333, low elev (MAPR!). **1969:** *AGM 3789*, 22 Dec, Guánica, Bo. Carenero, GFR, close to the brick tower by the entrance to the forest to the left (MAPR!). **1964:** *HAL 10605*, 2 Jan, Guánica, GFR, coastal thickets, west of Tamaringo beach (US!). **1961:** *HAL 9020*, 30 Dec, GFR, coastal thickets (MAPR!); *HAL 9044*, 30 Dec, GFR, coastal thickets (MAPR!). **1915:** *NLB 4823*, 2-4 Mar, *Guánica, Bo. Montalva (US!). **1913:** *FLS 3035*, 19 Sep, *Guánica (MAPR!). **1913:** *NLB 1894*, 11-12 Mar, *Guánica, coastal plain (US!); *NLB 1934*, 11-12 Mar, *Guánica, Monte Ensenada, rocky slopes (US!). (Acevedo-Rodríguez, 2005: 185; Axelrod, unpublished.) This is highly abundant vine in coastal rocky areas and dwarf forest. Two different forms occur in the GFR, the common one with purple flowers and a very rare form with white flowers. The white variety only occurs in dwarf forest areas in Punta Vaquero; however both of the form can be found growing together.

Jacquemontia havanensis (Jacq.) Urb.

2004: *OMR 272*, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325, taking a dirt road south to Punta Manglillo, elev 7 m (MAPR!). **1996:** *PAR 7896*, 25 Jan, Guánica, GFR, east of end of road beyond Playa Pelicano (US!). **1964:** *HAL 10794*, 1 Apr, *Guánica, coastal thickets (MAPR!). **1886:** *PS 3453*, 25 Jan, *Guánica (US!). (Acevedo-Rodríguez, 2005: 185; Axelrod, unpublished.) This is an occasional vine throughout the GFR and in the absence of reproductive material it can be confused with *Jacquemontia cayensis* Britton.

Jacquemontia ovalifolia (Choisy) Hallier f. ssp. ***obcordata*** (Millsp.) K.R. Robertson

1962: *HAL 9159*, 23 Jun, GFR, coastal thickets (MAPR!). **New record for the GFR.**

Jacquemontia solanifolia (L.) H. Hall

2006: *OMR 626*, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, following the trail north-northwest to a canyon by El Cedro, elev 79 m (MAPR!). **2005:** *OMR 549*, 1 Nov, Guánica, Bo. Carenero, GFR, Road 334, from the entrance of the forest to the ranger's office, elev 191 m (MAPR!). **1999:** *PAR 10804*, 29 Jan, Guánica, GFR, along main road to ranger station (US!). (Acevedo-Rodríguez, 2005: 187; Axelrod, unpublished.) This is an occasional vine throughout the GFR.

Merremia aegyptia (L.) Urb.

2006: *OMR 613*, 9 Jan, Guánica, Bo. Montalva, GFR, end of Road 325, at the entrance to La Jungla, south of Salinas Providencia, elev 11 m (MAPR!); *OMR 811*, 21 Nov, Guánica, Bo. Carenero, GFR, end of Road 334, forest manager office, close to the nursery, elev 169 m (MAPR!). (Axelrod, unpublished.) This vine occurs in open, disturbed areas. It is a pantropical weed. **New record for the GFR.**

Merremia dissecta (Jacq.) Hall. f.

2006: *OMR 615*, 9 Jan, Guánica, Bo. Montalva, GFR, Road 325, between Ensenada and Playa Santa, elev 17 m (MAPR!). **2004:** *OMR 215*, 10 Sep, Guánica, Bo. Carenero, GFR, Faro de Guánica, to the north of Road 333, elev 18 m (MAPR!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 190.) *Merremia dissecta* is a common vine found in frequently disturbed areas and along roadsides.

Confirmation required before accepting into the flora:

Evolvulus convolvuloides (Willd. ex Schult.) Stearn

1981: HAL 31605, 27 Jan, *Guánica, in thickets at the salines of Ensenada, sea level (US!). **1913:** NLB 1867, 11-12 Mar, vicinity of *Guánica, rocky thicket (US!). (Quevedo et al., 1990: 149, as *Evolvulus alsinoides* (L.) L. var. *debilis* (Kunth) Ooststr.; Axelrod, unpublished.) This small, prostrate herb would be expected to occur in soil pockets of exposed limestone.

Ipomoea alba L.

(Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 164; Axelrod, unpublished.) A common weedy vine of mesic habitats in Puerto Rico.

Ipomoea calantha Griseb.

1886: PS 3684, 2 Feb, *Guánica (US!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 166, citing Quevedo et al.) This vine is known for Puerto Rico from two historical collections made by Sintenis in 1866, one from Guánica and the other from Coamo.

Ipomoea imperati (Vahl) Griseb.

(Quevedo et al., 1990: 149, as *Ipomoea stolonifera* (Cyrill.) J.F.Gmelin.; Acevedo-Rodríguez, 2005: 169.) This is a beach species and would be expected in the beach vegetation of sandy beaches in the GFR.

Ipomoea meyeri (Spreng.) G. Don

(Acevedo-Rodríguez, 2005: 171.) While Acevedo-Rodríguez cites it for GFR, Axelrod (unpublished.) reports the species as known for Puerto Rico from only three collections made between 1886 and 1902, none of which are from GFR.

**Ipomoea ochracea* (Lindl.) G. Don var. *curtissii* (House) Stearn

(Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 173; Axelrod, unpublished.) A common weedy introduced vine found in western and southern Puerto Rico. It would be expected in open disturbed sites in the more northern portion of the Reserve.

Ipomoea tiliacea (Willd.) Choisy

(Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 179.) Acevedo-Rodríguez (2005) considers this species as one of the commonest *Ipomoea*'s on the island, occurring in open, sunny disturbed habitats.

Jacquemontia pentanthos (Jacq.) G. Don

(Acevedo-Rodríguez, 2005: 185; Axelrod, unpublished.) This species is to be expected in the forest. It is found in openings in the dry coastal lowlands adjacent to the Forest and in dry forest and woodland on limestone on Vieques and Mona Islands.

Merremia cissoides (Lam.) Hall. f.

(Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 190, citing Quevedo et al.) This is a doubtful report. The species is considered by Acevedo-Rodríguez as occasional in disturbed areas in eastern Puerto Rico and Axelrod (unpublished.) also reports it only from the eastern part of the island.

Merremia quinquefolia (L.) Hall. f.

1935: FHS 261, 10 Mar, *Guánica (US!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 192.) This vine would be expected to occur in disturbed areas of the Forest. It is found in disturbed areas in dry forest elsewhere in Puerto Rico.

Merremia umbellata (L.) Hall. f.

(Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 192.) *Merremia umbellata* is a common vine of disturbed sites throughout the island at middle and lower elevations. It would not be unexpected in GFR.

Excluded species:

- †*Evolvulus alsinoides* (L.) L. var. *debilis* (Kunth) Ooststr.
(Quevedo et al., 1990: 149.) According to Axelrod (unpublished.) all specimens that had been determined as *Evolvulus alsinoides* var. *debilis* were misdetermined and are *Evolvulus convolvuloides*. Further, Liogier & Martorell (1982, 2000) and Liogier (1995) cite *Evolvulus alsinoides* var. *debilis* only from the Morillos de Cabo Rojo.

CRASSULACEAE

****Kalanchoe daigremontiana*** Raym.-Hamet & H. Perrier

2006: OMR 672, 30 Mar, Guánica, Bo. Carenero, GFR, Road 334, between the tower and the entrance to Ojo de Agua Trail, elev 194 m (MAPR!); OMR 715, 11 May, Yauco, Bo. Barina, GFR, Road 333, by Punta Ballena at surfing area, elev 2 m (MAPR!). **1995:** PAR 7676, 12 Oct, Guánica, GFR, along Road 333, just north of Playa Jaboncillo (US!). (Axelrod, unpublished.) This is an introduced herb that grows primarily along roads and in former urban areas. It often forms dense colonies via the plantlets produced along the edge of the leaves. **New record for the GFR.**

Confirmation required before accepting into the flora:

****Kalanchoe delagoensis*** Eckl. & Zeyh.

This herb was observed by the author in Punta Ballena. However no voucher was collected due to the absence of reproductive material.

****Kalanchoe pinnata*** (Lam.) Pers.

(Quevedo et al., 1990: 149, as *Bryophyllum pinnatum* (Lam.) Oken)

This species was observed along Road 334. This is an introduced herb that grows primarily along roads and around former urban areas. It is commonly found in the semi-shade at the edges of dry forests.

CUCURBITACEAE

Doyerea emetocathartica Grosourdy

2006: OMR 735, 1 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north, by old campeche plantation, elev 68 m (MAPR!). **2005:** OMR 332, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail, to the north to an old campeche plantation, elev 71 m (MAPR!); OMR 586, 10 Nov, Guánica, Bo. Carenero, along Road 333, close to the Ochoa pier, elev 17 m (MAPR!). (Quevedo et al., 1990: 149; Acevedo-Rodríguez, 2005: 209.) This is an occasional vine of disturbed areas.

Confirmation required before accepting into the flora:

****Cucumis anguria*** L.

(Quevedo et al., 1990: 150; Axelrod, unpublished.) *Cucumis anguria* is an annual vine that is found in open sites in dry areas. It would be expected in the GFR in disturbed, sunny areas.

****Momordica charantia*** L.

(Quevedo et al., 1990: 150.) This is a common vine in agricultural areas surrounding the GFR. This species was observed by the author in burned grassland in Punta Ballena after

the field survey was completed. It is a common weedy vine found in disturbed areas throughout Puerto Rico.

CYMODACEAE

Confirmation required before accepting into the flora:

Halodule wrightii Asch.

(Axelrod, unpublished.) This sea-grass is found in mudflats off shore and is to be expected in the shallow water along the coast.

Syringodium filiforme Kütz.

1975: PAR 3687, 10 Mar, *Guánica, in *Thalassia* bed (US!). This is a common marine herb that grows in shallow waters and undoubtedly occurs off of the coast of the GFR.

CYPERACEAE

Abildgaardia ovata (Burm. f.) Kral

2006: OMR 767, 20 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, by Ojo de Agua Trail to the south, elev 200 m (MAPR!); OMR 464, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail, from DRNA office always taking the trails to the north-northeast leading to Road 334, close to El Maniel, elev 185 m (MAPR!). (Axelrod, unpublished.) *Abildgaardia* is a grass-like sedge of open areas with deep soil. It is rare within the GFR. **New record for the GFR.**

Bulbostylis curassavica (Britton) Kük. & Ekman ex Svenson

2005: OMR 518, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, after Copa Marina Hotel at the edge of Road 333, elev 29 m (MAPR!); OMR 523, 22 Sep, Guánica, Bo. Carenero, GFR, Ballena Trail, from Road 333 to the north, elev 54 m (MAPR!). **1969:** RDM 81, 30 May, Guánica, GFR, Playa San Jacinto (MAPR!). **1960:** AGM 1004, 1001, 990, 971, 967, 965, 959, 958, 30 Oct, Guánica, Bo. Carenero, GFR, Playa San Jacinto (MAPR! NY!). (Quevedo et al., 1990: 144; Acevedo-Rodríguez & Strong, 2005: 245; Axelrod, unpublished.) *Bulbostylis curassavica* is a locally abundant herb in shallow soil pockets on exposed limestone. This species is listed as a Critical Element by the DNER

Bulbostylis subaphylla C.B. Clarke

1991: GRP 47162, 10 Sep, Guánica, Bo. Montalva, GFR, interior slopes of Monte de la Brea, elevation 40-50 m (US!). **1987:** GRP 44317, 30 Oct, Guánica, Bo. Montalva, GFR, interior slopes of Monte de la Brea, elevation 40-50 m (US!). (Acevedo-Rodríguez & Strong, 2005: 247; Axelrod, unpublished.) This tufted herb of dry limestone thickets and scrubland is only known for the Forest from two collections made at the same place.

Cyperus brunneus Sw.

2006: OMR 714, 11 May, Yauco, Bo. Barina, GFR, Road 333, by Punta Ballena at surfing area, elev 2 m (MAPR!). **2005:** OMR 428, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau, west of sapo concho breeding area in Manglillo, elev 35 m (MAPR!). **1960:** AGM 996, 30 Oct, Guánica, Bo. Carenero, GFR, San Jacinto Beach (US!); AGM 997, 30 Oct, *Guánica (US!); AGM 998, 30 Oct, Guánica, Bo. Carenero, GFR, San Jacinto Beach (US!); AGM 1006, 30 Oct, *Guánica, Bo. Carenero, La Ballena (MAPR! US!); AGM 1007, 30 Oct, Guánica, Bo. Carenero, GFR, La Ballena Beach, sandy soil (US!). **1913:** FLS s.n., 19 Sep, *Guánica (MAPR!). **1886:** PS 3419, 25 Jan, *Guánica, ad Salinas (US!). (Acevedo-Rodríguez & Strong, 2005: 261; Axelrod,

unpublished.) *Cyperus brunneus* is an occasional herb found in sand and sandy soil along the coast.

***Cyperus elegans* L.**

2005: OMR 433, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau, west of sapo concho breeding area in Manglillo, elev 35 m (MAPR!). (Quevedo et al., 1990: 144.) This is a tufted herb of wet, coastal habitats and disturbed areas. It is not common in the GFR.

***Cyperus planifolius* L.C. Rich.**

1988: MTS 441, 16 Jan, Yauco, Bo. Barina, GFR, Tamarindo Beach to Jacinto Point, along shoreline, accessible from Road 333, sandy soil (US!). **1960:** AGM 997, 30 Oct, Guánica, Bo. Carenero, [GFR], San Jacinto beach (MAPR!); AGM 1007, 30 Oct, Guánica, Bo. Carenero, GFR, at La Ballena (MAPR!). (Quevedo et al., 1990: 144, as *Mariscus planifolius* (L.C.Rich.) Urb.; Acevedo-Rodríguez & Strong, 2005: 283.) Rhizomatous herb of coastal habitats. Acevedo-Rodríguez & Strong point out that this species is often confused with *Cyperus brunneus*. It is more abundant on the smaller islands around Puerto Rico than on the main island itself.

***Cyperus unifolius* Boeck.**

2005: OMR 426, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau, west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 35 m (MAPR!); OMR 497, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, Cactus Forest, along a small canyon north of Road 333, elev 8 m (MAPR!). **2003:** OMR 157, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda to the north of Road 333, at the entrance of Hoya Honda Canyon, elev 55 m (MAPR!). **1999:** FSA 10897, 3 Jul, Yauco, Bo. Barina, GFR, ridge above Bahía de la Ballena (US!). **1994:** HAL s.n., 3 Nov, *Guánica (US!). **1993:** FSA 5961, 22 Mar, Guánica, Bo. Montalva, Manglillo, GFR, high area along entrance road (US!). **1987:** GRP 43386, 19 Apr, Guayanilla, Bo. Boca, GFR, 0.6 km west -northwest of Punta Vaquero (US!). **1987:** GRP 44305, 9 Dec, Guánica, Bo. Montalva, Punta Jorobado (US!). **1963:** AGM 2407, Jun, GFR, Tamarindo Beach [probably collected by the end of Road 333] (MAPR!); AGM 2406, Jun, Guánica, Bo. Carenero, [GFR], near San Jacinto Beach. (MAPR!). **1962:** HAL 9162, 23 Jun, GFR, coastal thickets, on rocks (MAPR!). **1960:** AGM 985, 980, 30 Oct, Guánica, GFR, San Jacinto Beach (US!); AGM 1002, 974, 963, 30 Oct, Guánica, Bo. Carenero, GFR, San Jacinto Beach (MAPR!); AGM 1008, 30 Oct, Guánica, Bo. Carenero, GFR, La Ballena (US!). **1935:** FHS 647, 14 May, *Guánica (US!). **1886:** PS 3353, 24 Jan, *Guánica (US!). (Quevedo et al., 1990: 144, as *Torulinium filiforme* (Sw.) C.B.Clarke; Acevedo-Rodríguez & Strong, 2005: 292; Axelrod, unpublished.) Common herb in the understory and margins of the dry forest and scrub lands in the coastal areas of the GFR.

***Eleocharis geniculata* (L.) Roem. & Schult.**

2006: OMR 707, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, by sapo concho breeding area, elev 2 m (MAPR!). **1960:** AGM 954, 30 Oct, *Guánica (US!). (Axelrod, unpublished.) This is a tufted annual herb that occurs rarely in the GFR at the edge of ephemeral ponds. It is found in wetlands of the tropics and subtropics worldwide. **New record for GFR.**

***Fimbristylis cymosa* (Lam.) R. Br.**

2005: OMR 561, 4 Nov, Guayanilla, Bo. Boca, GFR, end of paved Road 333, at the sapo concho breeding area, Playa Tamarindo, elev 4 m (MAPR!); OMR 571, 570, 10 Nov,

Guánica, Bo. Carenero, GFR, Caña Gorda, from Road 333, taking the road to the right, just before the Copa Marina Hotel, mangrove area, elev 15 m (MAPR!). **2004: OMR 557**, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 1 m (MAPR!). **1960: AGM 950**, 30 Oct, *Guánica (US!); **AGM 995**, 30 Oct, Guánica, Bo. Carenero, San Jacinto Beach (MAPR!). **1935: FHS 64**, 17 Feb, *Guánica (US!). **1913: FLS s.n.**, 22 Jun, *Guánica (MAPR!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) *Fimbristylis cymosa* is a common rhizomatous herb of wet or dry coastal habitats, both within and outside of the GFR.

***Scleria lithosperma* (L.) Sw.**

2004: OMR 219, 10 Sep, Guánica, Bo. Carenero, GFR, Faro de Guánica to the north of Road 333, behind the lighthouse building, elev 28 m (MAPR). **1989: PAR 3025**, 7 Oct, Guánica, GFR, along main road to ranger's station (US!). **1991: FSA 2914**, 7 Sep, Guánica, GFR, along Murciélago Trail from Campamento, elev 50-150 m (MAPR!). (Quevedo et al., 1990: 144; Acevedo-Rodríguez & Strong, 2005: 375; Axelrod, unpublished.) *Scleria lithosperma* is a common tufted herb of the dry forest understory.

Confirmation required before accepting into the flora:

***Bulbostylis pauciflora* (Liebm.) C.B. Clarke**

1966: ROW 129, 2 Nov, *Guánica (MAPR!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This is a tufted herb found in dry forests on limestone and serpentine. It would be expected to occur in the GFR. This species is listed as a Critical Element by the DNER

***Cyperus floridanus* Britt.**

1960: AGM 966, 30 Oct, Guánica[*?], San Jacinto Beach, [in] soil on rock (MAPR!). (Axelrod, unpublished.; Strong & Acevedo-Rodríguez, 2005, cite *AGM 966*.) This sedge is only known for Puerto Rico from two collections: the one cited for *AGM* and one made by GRP on Mona Island in 1987. The Mona collection was made in a soil pocket in exposed limestone.

****Cyperus involucratus* Rottb.**

1960: AGM 1009, 30 Oct, *Guánica (MAPR!). An erect herb, often cultivated and now widely escaped along wet areas of Puerto Rico, but more evidence for its occurrence in GFR is needed. It would be expected in sunny areas along streams in bottom of ravines.

***Cyperus laevigatus* L.**

1913: FLS s.n., 3 Feb, *Guánica (MAPR!). **1886: PS 3847**, 23 Feb, *Guánica (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This rhizomatous herb would be expected in wet coastal areas of the Forest.

***Cyperus ligularis* L.**

(Quevedo et al., 1990: 144, as *Mariscus ligularis* (L.) Urb.; Axelrod, unpublished.) *Cyperus ligularis* is a rhizomatous herb generally found in sandy coastal areas in a variety of open, wet habitats. It would not be unexpected in the Reserve.

***Cyperus odoratus* L.**

(Axelrod, unpublished.) *Cyperus odoratus* is a common weedy species of wet, open disturbed areas and would be expected in such habitats in the Forest.

***Cyperus polystachyos* Rottb.**

(Quevedo et al., 1990: 144, as *Pycneus polystachyos* (Rottb.) P. Beauv.) This is a tufted herb of wetlands.

Cyperus rotundus L.

1960: AGM 1013, 1010, 30 Oct, *Guánica (MAPR!). **1935:** FHS 42, 11 Mar, *Guánica, waste ground (US!). (Quevedo et al, 1990: 144; Acevedo-Rodríguez & Strong, 2005: 284.) *Cyperus rotundus* is a weedy, tufted herb that spreads by stolons. It can form dense colonies in disturbed, sunny areas, and is generally associated with human disturbance.

Eleocharis interstincta (Vahl) Roem. & Schult.

1960: AGM 1014, 30 Oct, *Guánica (MAPR!).

(Acevedo-Rodríguez & Strong, 2005: 301; Axelrod, unpublished.) This species is a tufted herb of wet areas and occurs throughout the tropics and subtropics of the world.

Fimbristylis ferruginea (L.) Vahl

1935: FHS 192, 18 Mar, *Guánica (US!). (Quevedo et al., 1990: 144.) *Fimbristylis ferruginea* is a tufted herb of brackish coastal habitats and would not be unexpected along the coast of the Reserve.

Fimbristylis spadicea (L.) Vahl

1886: PS 3871, 2 Mar, *Guánica, *litoralibus inter Boca ed Barina* (US!). (Quevedo et al., 1990: 144. Axelrod, unpublished.) This tufted herb of wet coastal habitats would be expected along the coast of the GFR.

DIOSCOREACEAE

Rajania cordata L. var. *cordata*

2006: OMR 632, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). Vine found only along mesic canyon to the north of the GFR, by El Cedro. (Axelrod, unpublished.) **New record for the GFR.**

Confirmation required before accepting into the flora:

**Dioscorea alata* L.

This vine was observed by the author in the northern boundary of the GFR, by Cañon las Trichilias. No voucher was collected due to the absence of reproductive material.

ERYTHROXYLACEAE

Erythroxylum areolatum L.

2006: OMR 704, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, by sapo concho breeding area, elev 2 m (MAPR!). **2005:** OMR 287, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, by the sapo concho pond, elev 5 m (MAPR!); OMR 187, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail, from DRNA office east to Mirador El Vigía, elev 214 m (MAPR!). **1995:** PAR 7672, 12 Oct, Guánica, GFR, along Road 333 (US!). **1982:** JHH 54, 13 Nov, GFR, 0.64 km after end of paved Road 333, low elevation (MAPR!). **1964:** HAL 10793, 1 Apr, *Guánica, coastal thicket (US!). **1948:** JSM s.n., 1 May, Guánica, GFR (MAPR!). **1915:** NLB 4953, 5-8 Mar, Guánica, coastal thicket near the lighthouse [GFR] (US!). **1913:** NLB 1905, 11-12 Mar, *Guánica, vicinity of Guánica, sandy coastal thicket (US!). (Little and Wadsworth, 1964: 210; Quevedo et al., 1990: 146; Axelrod, unpublished.) This is a common small tree, and while it occurs in a wide range of habitats, it is most frequently found along the coast.

***Erythroxylum brevipes* DC.**

2004: OMR 269, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 10 m (MAPR!). **1962:** HAL 9154, 9135, 23 Jun, *Guánica, coastal thickets (MAPR!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) *Erythroxylum brevipes* is a small widespread tree in the GFR.

***Erythroxylum rotundifolium* Lunan**

1998: PAR 10173, 23 Jan, Guánica, Bo. Montalva, Ensenada, GFR, coastal scrub forest (US!). **1995:** PAR 7679, 12 Oct, Guánica, GFR, by parking area close to ranger's station, dry forest (MAPR!); PAR 7688, 12 Oct, Guánica, GFR, south area of forest, off Road 333 (US!). **1992:** PAR 4776, 15 Jan, Guánica, GFR (US!). **1991:** FSA 2933, 7 Sep, Guánica, Bo. Carenero, along dirt road off Road 334, just north of entrance to GFR, elev 150 m (MAPR!); FSA 3275, 19 Nov, Guánica, Bo. Carenero, Road 334 just north of entrance to GFR, elev 150 m (MAPR/ US!). **1990:** RGG 3367, 18 Dec, Guánica, Bo. Carenero, GFR, elev 145 m (MAPR!). **1989:** PAR 3029, 7 Oct, Guánica, GFR, along main road to ranger's station (US!). **1985:** HAL 35773, 11 Dec, *Guánica, Salinas de Guánica, Maruca, in thickets on limestone (US!). **1940:** LEG 299, 23 Oct, GFR (US!). **1925:** NLB 8293, 7 Mar, *Guánica, Salinas de Guánica, limestone hill (US!). **1915:** NLB 4854, 2-4 March, *Guánica, Montalva, limestone hill (US!). **1913:** FLS 3032, 19 Sep, *Guánica (MAPR!). (Woodbury et al., 1974: 314; Quevedo et al., 1990: 146; Axelrod, unpublished.) This is a very common small tree in the GFR. It is frequently found on dry slopes and hill tops..

***Erythroxylum urbanii* O.E. Schulz**

2006: MCO 1298, 12 Nov, Yauco, Bo. Susua Baja, [GFR], south of the municipal dump of Yauco (UPR!). *Erythroxylum urbanii* is a small tree restricted to the more mesic areas along the northern boundary of the Reserve. **New record for the GFR.**

EUPHORBIACEAE

***Acalypha portoricensis* Müll. Arg.**

2005: OMR 479, 25 Aug, Yauco, Bo. Barina, GFR, Las Cobanas Trail to the north, at old campeche plantation by zinc house, taking a canyon to the north of the forest, elev 48 m (MAPR!). (Axelrod, unpublished.) *Acalypha portoricensis* is a slender, sparsely branched, small shrub. In the GFR is apparently limited to a mesic canyon along the northern boundary. **New record for the GFR.**

***Adelia ricinella* L.**

2005: OMR 565, 10 Nov, Guánica, Bo. Carenero, GFR, from Road 333, taking a dirt road to Jaboncillo beach, elev 27 m (MAPR!). (Little et al., 1974: 387; Quevedo et al., 1990: 147; Axelrod, unpublished.) This is an occasional shrub or small tree found scattered throughout the Reserve.

***Argythamnia candicans* Sw.**

2005: OMR 367, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, mesic canyon, elev 110 m (MAPR!). **1915:** NLB 4798, 2-4 Mar, *Guánica, Montalva, limestone slope (US!). **1886:** PS 3383, 20 Jan, *Guánica (US!); **1886:** PS 3586, 2 Feb, *Guánica (US!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) This small understory shrub is common on shaded slopes and in mesic canyons.

***Argythamnia fasciculata* (Vahl ex A. Juss.) Müll. Arg.**

2006: OMR 687, 6 Apr, Yauco, Bo. Barina, GFR, end of paved Road 333, taking the trail north to the cave, at small canyon to the left of the dirt road, mesic canyon, elev 40 m (MAPR!); **OMR 806**, 21 Nov, Yauco, Bo. Barina, GFR, end of Road 334, following Julio Vélez Trail to the east, close to El Vigía, elev 183 m (MAPR!). **1991:** BF s.n., 5 Jun, Guánica. GFR, Murciélago Trail where it enters a steep ravine (MAPR!). **1886:** PS 3713, 7 Feb, *Guánica, *ad* Montalva (US!). (Quevedo, et al., 1990: 147; Axelrod, unpublished.) This is a common small shrub on shady slopes. It is more woody and branched than the previous species.

***Argythamnia stahlia* Urb.**

2002: GJB 6515, 1 Apr, Guánica, GFR, Gutierrez Trail, elev 150-200 m (MAPR!).

1989: PAR 3015, 7 Oct, Guánica, GFR, Lluveras road, along mahogany plantation (US!).

1984: MEA 5, 6 Oct, Guánica. GFR, along jeep trail opposite km 4.9, 0.7 km by road from Campamento Borinquen towards Luna, elev 195 m (MAPR!). **New record for the GFR.** *Argythamnia stahlia* can be told from the two previous species by its prostrate growth habit. It is rare in the GFR, occurring along trails in open shade.

***Bernardia dichotoma* (Willd.) Müll. Arg.**

1992: PAR 4768, 15 Jan, Guánica, GFR (US!). **1962:** HAL 9280, 28 Jun, GFR, thickets (MAPR!). **1913:** FLS 355, 3 Feb, *Guánica (MAPR!). (Little et al., 1974: 390; Quevedo et al., 1990: 147; Axelrod, unpublished.) *Bernardia dichotoma* is a shrub that occurs on dry limestone slopes. It is apparently rare in the Forest.

****Cnidoscolus aconitifolius* (Mill.) I.M. Johnst. subsp. *aconitifolius***

2004: OMR 225, 10 Sep, Guánica, Bo. Carenero, GFR, Road 333 to Faro de Guánica, facing Guánica Bay, elev 23 m (MAPR!). (Axelrod, unpublished.) This exotic small tree is restricted to a single locality along the Road 334. It was probably started from a cutting or discarded branch as the plant is sterile in Puerto Rico. **New record for the GFR.**

***Croton betulinus* Vahl**

2006: OMR 807, 21 Nov, Yauco, Bo. Barina, GFR, end of Road 334, following Julio Vélez Trail to the east, close to El Vigía, elev 175 m (MAPR!). **2005:** OMR 380, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 137 m (MAPR!). **2003:** OMR 141, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on the Cobanas Trail, north to Cañon las trichilias, elev 186 m (MAPR!).

1990: RGG 3352, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1964:** HAL 10584, 1 Jan, GFR, open thickets, elev 100 m (MAPR! US!). **1886:** PS 3436, 25 Jan, *prope* *Guánica *ad* litoralibus (US!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) *Croton betulinus* is a very abundant shrub along the coast and on the rocky slopes and hilltops. It typically grows along trails in the deciduous dry forest.

***Croton discolor* Willd.**

2005: OMR 298, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 7 m (MAPR!). **2003:** OMR 123, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita, from DRNA office south to Cañon de los Murciélagos, elev 140 m (MAPR!). **1992:** PAR 4769, 15 Jan, Guánica, GFR, east of end of road, area beyond Playa Pelicano (US!). **1991:** FSA 2931, 7 Sep, Guánica, GFR, along Murciélago Trail from Campamento, elev 50-150 m (MAPR!). **1990:** GJB 3721, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1., 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); RGG 3350, 18 Dec,

Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1989:** PAR 3023, 7 Oct, Guánica, GFR, along main road to ranger's station on Road 334 (US!). **1984:** MEA 6, 6 Oct, Guánica, GFR, along jeep trail opposite km 4.9, 0.7 km by road from Campamento Borinquen towards Luna, elev 195 m (MAPR!). **1982:** VNO 20, 16 Sep, Guánica, GFR, elev 200 m (MAPR!). **1982:** SMC 12, 15 Sep, Guánica, dry forest, elev 200 m (MAPR!); FNS s.n., 13 Nov, GFR, elev 25 m (MAPR!). **1963:** HAL 9757, 27 Jun, *Guánica, coastal thickets (MAPR! US!). **1935:** FHS 72, 17 Feb, *Guánica (US!). **1913:** FLS 3103, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) *Croton discolor* is a common shrub in the GFR, especially in the coastal areas. It is found in exposed habitats, such as along trails, on coastal bluffs and on open slopes. It is not common in shady conditions.

***Croton flavens* L. var. *rigidus* Müll. Arg.**

2005: OMR 375, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 132 m (MAPR!); OMR 402, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, to the forest main office, elev 192 m (MAPR!). **2002:** GJB 6645, 17 Oct, Guánica, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1991:** FSA 2872, 7 Sep, Guánica, GFR, along Murciélagos Trail from Campamento, elev 50-150 m (MAPR!). **1989:** PAR 3001, 7 Oct, Guánica, GFR, along main Road 334 a few meters from entrance to forest (US!); PAR 3010, 7 Oct, Guánica, GFR, south of Lluveras road to El Vigia (US!). **1986:** GJB 3182, 17 Apr, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, 25 m from junction on dirt road west off Road 334 between entrance to forest and radio antenna, elev 130 m (MAPR!). **1979:** HAL 29486, 26 Sep, GFR, in thickets on limestone (US!). **1962:** HAL 9170, 23 Jun, GFR, Guánica beach, coastal thickets (MAPR!). **1948:** MR s.n., 1 May, GFR (MAPR!). **1935:** FHS 144, 21 Feb, *Guánica, barren hillside (US!). **1915:** NLB 4895, 5-8 Mar, vicinity of *Guánica, limestone hill (US!). **1886:** PS 3693, 10 Feb, *Guánica, *litoralibus* (US!). (Little et al., 1974: 398; Quevedo et al., 1990: 147, as *Croton ridigus* (Müll. Arg.) Britton.; Axelrod, unpublished.) This is a widespread shrub throughout the GFR. This is a very common species along the trails of the forest. It requires high-light conditions.

***Croton lucidus* L.**

2003: OMR 103, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanas Trail, elev 150 m (MAPR!). **1996:** PAR 7888, 25 Jan, Guánica, GFR, east of end of road, area beyond Playa Pelicano (US!). **1994:** DA 736, 9 Nov, Guánica, GFR, Road 333, 8 km east of town of Guánica, elev 245 m (MAPR!). **1991:** FSA 2871, 7 Sep, Guánica, GFR, along Murciélagos Trail from Campamento, elev 50-150 m (MAPR!). **1990:** RGG 3351, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1989:** PAR 3003, 7 Oct, Guánica, GFR, Las Cobanas Trail, in abandoned *Haemotoxylum* plantation (US!); PAR 3013, 7 Oct, Guánica, GFR, south of Lluveras road to El Vigia (US!). **1986:** GJB 3192, 17 Apr, Guánica, GFR, in low coastal limestone hills along Road 333, between Balneario de Caña Gorda & Playa Tamarindo (MAPR!). **1984:** MEA 3, 6 Oct, Guánica, GFR, along jeep trail opposite km 4.9, 0.7 km by road from Campamento Borinquen towards Luna, elev 195 m (MAPR!). **1982:** VNO 18, 16 Sep, Guánica, GFR, along Road 334, elev 200 m (MAPR!); SMC 76, 6 Dec, Guánica, dwarf forest section in Caña Gorda beach, elev 142 m (MAPR!). **1963:** HAL 9763, 27 Jun, *Guánica, dry coastal thickets on limestone (MAPR, US!). **1960:** JAD 7460, 10 Apr, GFR (US!). **1948:** MRT s.n., 2 May, GFR (MAPR!). **1935:** FHS 742, 19 Jun,

*Guánica, dry brushy hillside (US!). **1935:** *FHS* 637, 14 May, *Guánica, dry brushy hillside (US!). **1913:** *FLS* 3029, 3085, 19 Sep, *Guánica (MAPR!). **1886:** *PS* 3672, 7 Feb, *prope* *Guánica *inter* Montalva *et* Las Salinas (US!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) This is a widespread shrub throughout the GFR. It is one of the most common species along the trails of the forest.

***Dalechampia scandens* L.**

2004: *OMR* 211, 4 Sep, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, at the area of sapo concho new ponds, elev 40 m (MAPR!). **1962:** *HAL* 9132, 23 Jun, GFR, coastal thickets (MAPR!). **1886:** *PS* 3579, 2 Feb, *Guánica, *ad* Montalva (US!). (Quevedo et al., 1990: 147; Acevedo-Rodríguez, 2005: 231; Axelrod, unpublished.) This vine is rare within the Reserve where it occurs along trails. However this is a common species outside the GFR in open, disturbed areas in dry regions.

***Euphorbia articulata* (Aubl.) Britton**

2004: *OMR* 268, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325, taking a dirt road south to Punta Manglillo, elev 10 m (MAPR!). (Little et al., 1974: 392, as *Chamaesyce articulata* (Aubl.) Britton; Quevedo et al., 1990: 147, as *Chamaesyce articulata* (Aubl.) Britton; Axelrod, unpublished.) *Euphorbia articulata* is a rare small shrub found in scrubland forest. It is common on the limestone plateau of Mona Island; on Desecheo Island it becomes a small tree 3 m high (Breckon, 2000).

***Euphorbia berteroana* Balb. ex Spreng.**

2005: *OMR* 484, 25 Aug, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, at the entrance of Las Cobanas Trail, elev 160 m (MAPR!). **1997:** *GJB* 5344, 28 Oct, Guánica, Bo. Carenero, GFR, along Road 333 between km 7.4-7.5, west of Bahía de la Ballena, elev 25 m (MAPR!). **1996:** *GJB* 4906, 26 Sep, Yauco, Bo. Barina, GFR, south-facing, coastal slopes in low, limestone hills on north side of Bahía Ballena, elev 100 m (MAPR!). **1987:** *GRP* 44327, 9 Dec, Guánica, Bo. Montalva, GFR, Monte de la Brea, south coast east of Manglillo (US!). **1982:** *VNO* 56, 13 Nov, GFR, Road 333, Punta Verraco, dry site near the beach, elev 25 m (MAPR!). **1964:** *HAL* 10607, 2 Jan, Guánica, GFR, west of Tamarindo Beach, on rocks near seashore (US!). **1915:** *NLB* 4899, 5-8 Mar, *Guánica, vicinity of Guánica, limestone hill (US!). **1913:** *NLB* 1921, 11-12 Mar, *Guánica, vicinity of Guánica, rocky coastal thicket (US!). **1886:** *PS* 3491, 28 Jan, *Guánica, *rupibus litoralibus* (US!). (Quevedo et al., 1990: 147, as *Chamaesyce berteroana* (Balbis) Millsp.; Axelrod, unpublished.) This is a widespread, common herb within the GFR. It occurs in trails with deep soil.

***Euphorbia cowellii* (Millsp. ex Britton) Oudejans**

2006: *OMR* 602, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!). **1996:** *PAR* 7880, 25 Jan, Guánica, [Guayanilla] GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!); *GJB* 4904, 26 Sep, Yauco, Bo. Barina, GFR, south-facing, coastal slopes in low, limestone hills on north side of Bahía Ballena, elev 100 m (MAPR!). (Quevedo et al., 1990: 147. *Chamaesyce cowellii* Millsp. ex Britton; Axelrod, unpublished.) *Euphorbia cowellii* is a widespread and common herb within the GFR. This species was typically observed growing in cracks and shallow soil pocks of exposed limestone in full sun. This species is listed as a Critical Element by the DNER.

***Euphorbia cyathophora* Murray**

2003: OMR 159, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda, to the north of the Road 333 at the entrance of Hoya Honda Canyon, elev 51 m (MAPR!). *Euphorbia cyanthophora* is a herbaceous weed generally associated with human disturbance; it is apparently rare in the Reserve. (Axelrod, unpublished.) **New record for the GFR.**

***Euphorbia hirta* L.**

2006: OMR 703, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, by sapo concho breeding area, elev 2 m (MAPR!). (Quevedo et al., 1990: 147, as *Chamaesyce hirta* (L.) Millsp.) This weedy species is widespread within the GFR growing along sunny trails and around parking areas.

***Euphorbia mesembryanthemifolia* Jacq.**

2005: OMR 592, 22 Dec, Guánica, Bo. Carenero, GFR, from Road 333 taking Ballena Trail to the south, at an old coconut plantation, elev 3 m (MAPR!). **1964:** HAL 10787, 1 Apr, coastal rocks, *Guánica (MAPR! US!). **1913:** FLS 3086, 19 Sep, *Guánica (MAPR!). **1886:** PS 3788, 13 Feb, Guánica, GFR, ad Caña Gorda [GFR] (US!). (Quevedo et al., 1990: 147, as *Chamaesyce mesembryanthemifolia* (Jacq.) Dugand; Axelrod, unpublished.) This is a coastal species found on limestone bluffs and ledges and on the upper fringes of sandy beaches.

***Euphorbia petiolaris* Sims**

2005: OMR 499, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, cactus forest along a small canyon north of Road 333, elev 8 m (MAPR!). **1932:** GSM 1671, 4 April, Guánica, between Guánica Bay and Salinas (US!). (Little and Wadsworth, 1964: 271; Quevedo et al., 1990: 147; Axelrod, unpublished.) *Euphorbia petiolaris* is a shrub or small tree that is restricted to remnants of undisturbed coastal forest within the Reserve.

***Euphorbia serpens* Kunth**

1982: ISR 54, 13 Nov, Guánica, Playa de Caña Gorda (MAPR!); JHH 64, 13 Nov, GFR, 1.9 km after the end of paved road, Road 333, in small cracks close to the shore, low elev (MAPR!). **1913:** NLB 1876, 11-12 Mar, *Guánica, vicinity of Guánica (US!). (Quevedo et al., 1990: 147.) This prostrate herb was not observed during the field survey.

***Euphorbia thymifolia* L.**

1964: HAL 10604, 2 Jan, Guánica, GFR, west of Tamarindo Beach (US!). (Axelrod, unpublished.) This weedy herb was not observed during the field survey, but would be expected in open, disturbed sites along trails and in parking areas.

***Euphorbia tithymaloides* L. ssp. *angustifolia* (Poit.) V.W. Steinm.**

1985: JDA 2130, 26 Apr, Guánica, La Luna, GFR, elev 100 m (MAPR!). (Quevedo et al., 1990: 147, as *Pedilanthus tithymaloides* (L.) Poit. ssp. *angustifolius* (Poit.) Dressler; Axelrod, unpublished.) This succulent shrub was observed by the author in a mesic canyon at the northern boundary of the forest.

****Euphorbia tithymaloides* L. ssp. *tithymaloides***

2006: OMR 668, 9 Feb, Guánica, Bo. Carenero, GFR, end of Road 334, around the ranger office, parking area, elev 144 m (MAPR!). This succulent shrub is planted around the Forest office. There is no evidence that this subspecies is spreading to other areas of the Reserve. **New record for the GFR.**

***Euphorbia turpinii* Boiss.**

2007: OMR 873, 17 Feb, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 following the dirt road to Manglillo, elev 30 m (MAPR!). **2005:** OMR 285, 3 Jun, Guayanilla, Bo. Boca, Playa Tamarindo, at the end of paved Road 333, by the sapo

concho pond, elev 5 m (MAPR!); *OMR* 422, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 12 m (MAPR!); *OMR* 506, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, cactus forest, from a small canyon north of Road 333, up to a rocky plateau, elev 23 m (MAPR!). **1996:** *PAR* 7879, 25 Jan, Guánica [Guayanilla], GFR, east of end of road, area beyond Playa Pelicano (US!). **1962:** *HAL* 9138, 9139, 23 Jun, *Guánica (MAPR!). **1962:** *HAL* 9168, 23 Jun, *Guánica beach, coastal rocks (MAPR!). **1961:** *HAL* 9033, 30 Dec, GFR (MAPR!). **1915:** *NLB* 4914, 5-8 Mar, *Guánica, vicinity of Guánica, crevices of limestone (US!). (Quevedo et al., 1990: 147, as *Chamaesyce turpinii* (Boiss.) Millsp.; Axelrod, unpublished.) *Euphorbia turpinii* is a common small herb in rocky open areas and along trails by the coast. This species is listed as a Critical Element by the DNER.

***Gymnanthes lucida* Sw.**

2005: *OMR* 568, 10 Nov, Guánica, Bo. Carenero, GFR, from Road 333, taking a dirt road to Jaboncillo beach, elev 27 m (MAPR!). **2002:** *GJB* 6639, 17 Oct, Guánica, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1992:** *FSA* 4579, 1 Jun, Guánica, Bo. Montalva, GFR, jeep road along Monte de la Brea, elev 10-50 m (MAPR!). **1991:** *FSA* 2897, 7 Sep, Guánica, GFR, along Murciélago Trail from Campamento, elev 50-150 m (MAPR!). **1990:** *GJB* 3703, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1. ca. 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); *RGG* 3337, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1987:** *PAR* 2232, 29 Sep, Guánica, GFR (US!). **1986:** *GJB* 3213, 12 Jun, Guánica, Bo. Carenero, GFR, elev 150 m (MAPR!). **1950:** *ELL* 13191, 2 Jul, GFR (US!). **1948:** *RAG* s.n., 1 May, Guánica, GFR (MAPR!). **1947:** *JAR* s.n., 11 Oct, Guánica, GFR (MAPR!). **1886:** *PS* 3718, 10 Feb, Guánica, Bo. Carenero, *ad Montis* El Maniel [GFR] (US!). (Little and Wadsworth, 1964: 272; Quevedo et al., 1990: 147, as *Ateramnus lucidus* (Sw.) Rothm.; Axelrod, unpublished.) *Gymnanthes lucida* is a widespread and abundant small tree or shrub within the Reserve. It is most often found on slopes and hill tops.

***Hippomane marcinella* L.**

2005: *OMR* 437, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, sandy coast, at sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 2 m (MAPR!). **1948:** *EMG* s.n., 1 May, GFR (MAPR!). (Little and Wadsworth, 1964: 276; Quevedo et al., 1990: 147; Axelrod, unpublished.) In the GFR this toxic tree is almost entirely restricted to sandy coastal areas of Manglillo. The species apparently has been nearly extirpated from the main island of Puerto Rico, including the GFR, but still is fairly common on Mona and Caja de Muertos. The individuals in Manglillo appear to be planted.

***Jatropha gossypifolia* L.**

2004: *OMR* 217, 10 Sep, Guánica, Bo. Carenero, GFR, Faro de Guánica, to the north of Road 333, behind the lighthouse building, elev 25 m (MAPR!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) This small, weedy shrub occurs in grassy areas along the coast.

***Jatropha hernandiifolia* Vent.**

2005: *OMR* 319, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to the north, to an old campeche plantation, elev 137 m (MAPR!); *OMR* 487, 7 Sep, Guánica, Bo. Carenero, GFR, from Road 334 taking Las

Cobanas Trail to the north, mesic area at cañon de las trichilias, elev 110 m (MAPR!). **2004:** OMR 237, 25 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, Road 334 taking Las Cobanas Trail to the north, at a canyon to the north, elev 104 m (MAPR!). **2000:** PAR 11428, 6 Sep, GFR (US!). **1986:** GJB 3178, 17 Apr, Guánica, Bo. Lomas de Seboruco, GFR, about 25 m from junction on dirt road west off Road 334 between entrance to forest and radio antenna, elev 130 m (MAPR!). **1962:** HAL 9285, 28 Jun, Guánica, GFR, coastal thickets (MAPR!). **1932:** GSM 1674, 4 Apr, Guánica, between Guánica Bay and Salinas (US!). (Little et al., 1974: 418; Quevedo et al., 1990: 147; Axelrod, unpublished.) *Jatropha hernandiifolia* is a shrub or small tree that grows as solitary individuals in the evergreen forest along the northern boundary of the Reserve.

***Tragia volubilis* L.**

2005: OMR 539, 27 Oct, Guánica, Bo. Carenero, GFR, Los Granados Trail, at the boundary of the municipalities of Yauco and Guánica, elev 180 m (MAPR!). **1913:** JAS 991, 28 Aug, *Guánica (US!). **1899:** CFM 696, 22 Jan, *Guánica (US!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) This is a common vine in along trails and in openings in the Forest.

Confirmation required before accepting into the flora:

***Euphorbia adenoptera* Bertoloni subsp. *pergamena* (Small) Oudejans**

(Axelrod, unpublished.) This small prostrate herb is reported by Axelrod (unpubl.) from Mona Island and the GFR. Breckon (unpubl.) also reported it from a single individual from Vieques. It would be expected in soil pockets in exposed limestone in sunny, coastal areas.

***Croton astroites* Dryand.**

(Quevedo et al., 1990: 147.) This *Croton* is found on dry limestone and chert in the southern coastal lowlands. It is to be expected in sunny openings in the Forest.

***Croton humilis* L.**

1915: NLB 4901, 5-8 Mar, *Guánica, limestone hill (US!). **1913:** JAS 987, 28 Aug, *Guánica, Ensenada (US!). **1886:** PS 3691, 7 Feb, *Guánica, *prope* Guánica *ad* Ensenada (US!). (Quevedo et al., 1990: 147.) This shrub was not observed in the forest during the field survey. This species has often been confused with *Croton lucidus* in the past, but it is far less common on the Island. It is found in the limestone hills of the southern coastal plane of Puerto Rico and would be expected to occur in the Reserve.

***Croton microcarpus* Ham.**

(Liogier and Martorell, 1982: 88, as *Croton nummulariifolius* A.Rich; Liogier and Martorell, 2000: 101; Quevedo et al., 1990: 147 as *Croton nummulariifolius* A. Rich.; Axelrod, unpublished.) This low shrub should be looked for on exposed coastal bluffs. It is very rare in Puerto Rico, but occurs also in Cuba and Hispaniola of the Greater Antilles and Anguilla and St. Barts in the Lesser Antilles. This species is listed as a Critical Element by the DNER.

***Euphorbia heterophylla* L.**

(Quevedo et al., 1990: 147.) *Euphorbia heterophylla* is a seasonal weed of gardens, roadsides, and other frequently disturbed open areas. It is often confused with the similar *Euphorbia cyathophora*, which frequently has red blotches on the bracts subtending the cyathia and oblong, rather than round glands on the involucre.

***Euphorbia hypericifolia* L.**

1913: *FLS* 3075, 19 Sep, *Guánica (MAPR!). **1899:** *CFM* 753, 736, 22 Jan, *Guánica (US!). (Quevedo et al., 1990: 147, as *Chamaesyce glomerifera* Millsp.) This weedy herb is typically found in open, frequently disturbed sites.

Euphorbia hyssopifolia L.

(Quevedo et al., 1990: 147, as *Chamaesyce hyssopifolia* (L.) Small) As with the former species, *Euphorbia hyssopifolia* is found in open, frequently disturbed sites.

**Euphorbia lactea* Haw.

(Little et al., 1974: 410; China, 1990: 53; Quevedo et al., 1990: 147; Axelrod, unpublished.) This shrub or small tree with succulent stems used to be fairly abundant along Road 333 by the coast. It apparently has been extirpated from there. *Euphorbia lactea* is not often collected, and what specimens do exist are sterile. Apparently the species does not reproduce sexually in Puerto Rico and is dependent on rooting of cut or broken stems for reproduction.

Euphorbia ophthalmica Persoon

(Axelrod, unpublished.) *Euphorbia ophthalmica* would be expected in soil pockets in the exposed limestone in open sunny areas.

Euphorbia prostrata Aiton

(Quevedo et al., 1990: 147, as *Chamaesyce prostrata* (Ait.) Small; Axelrod, unpublished.) This small, weedy species occurs in open, frequently disturbed sites and would be expected in such habitats in the GFR.

**Jatropha curcas* L.

(Little et al., 1974: 416; China, 1990: 53; Quevedo et al., 1990: 147; Axelrod, unpublished.) *Jatropha curcas* grows as a shrub or small tree. It is more likely to occur in urban and rural areas outside of around the GFR. It is occasionally seen in yards and along fence rows and probably occur in past in the populated areas of the Forest.

**Jatropha multifida* L.

(Axelrod, unpublished.) This small tree or shrub is often seen in yards in Puerto Rico and it apparently has naturalized in some of the bajuras on Mona Island. Axelrod (unpublished.) considers it as planted and persistent. It would be expected to occur around formerly populated areas in the forest.

**Ricinus communis* L.

1964: *AGM* 2614, 16 Apr, *Guánica, near road to forest, by sugarcane field (MAPR!). (Quevedo et al., 1990: 147.) This small tree is very abundant in agricultural areas and waste lands around the GFR. It is a weedy species requiring high light conditions and would be expected to have occurred in the formerly populated areas of the Forest.

FABACEAE-CAESALPINIOIDEAE (LEGUMINOSAE-CAESALPINIOIDEAE)

Caesalpinia bonduc (L.) Roxb.

2005: *OMR* 576, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south, by old coconut plantation, elev 3 m (MAPR!). **1925:** *NLB* 8326, 9 Mar, *Guánica, Salinas de Guánica, coastal thickets (US!). **1913:** *NLB* 1900, 11-12 Mar, *Guánica, sandy coastal thickets (US!). **1886:** *PS* 3752, 7 Oct, *Guánica (US!). (Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 234; Axelrod, unpublished.) This is a common spiny scandent shrub of sandy areas and roadsides along the coast. This species is listed as a Critical Element by the DNER

**Caesalpinia pulcherrima* (L.) Sw.

2006: OMR 733, 18 May, Guánica, Bo. Montalva, GFR, Road 325, to La Jungla, elev 15 m (MAPR!). (Little et al., 1974: 273; Chinae, 1990: 53; Axelrod, unpublished.) This ornamental shrub is planted and persistent along roads in the Reserve. There is no evidence that it is spreading into undisturbed areas.

Chamaecrista lineata (Sw.) Greene var. ***brachyloba*** (Griseb.) H.S. Irwin & Barneby

2006: OMR 721, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, at La Jungla, elev 1 m (MAPR!). **2005:** OMR 309, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 11 m (MAPR!); OMR 430, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, at a rocky plateau, west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 35 m (MAPR!); OMR 579, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south by, old coconut plantation, elev 4 m (MAPR!). **1996:** GJB 4897, 26 Sep, Yauco, Bo. Barina GFR, south facing coastal slope in low limestone hills on north side of Bahía Ballena, elev 100 m (MAPR!). **1962:** HAL 9136, 23 Jun, *Guánica (MAPR!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) This small shrub is common in sandy areas along the coast.

****Delonix regia*** (Bojer ex Hook.) Raf.

2006: OMR 755, 5 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, after communication tower, elev 200 m (MAPR!). (Little et al., 1974: 986; Quevedo et al., 1990: 146; Chinae, 1990: 53; Axelrod, unpublished.) An exotic tree that is more common in mesic areas of the forest. The exotic tree is invading some forested areas along the northern boundaries of the Reserve in La Cobana.

****Parkinsonia aculeata*** L.

2006: OMR 732, 18 May, Guánica, Bo. Montalva, GFR, Road 325, close to the entrance to La Jungla, elev 10 m (MAPR!). **1992:** FSA 4566, 1 Jun, Guánica, Bo. Montalva, GFR, roadside of Road 325, at power lines (US!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) This is a rare tree/shrub within the Forest. It is found along roadsides and similar disturbed areas. However *Parkinsonia* is fairly common in pastures surrounding the Reserve.

Senna polyphylla (Jacq.) H.S. Irwin & Barneby subsp. ***polyphylla***

2006: OMR 617, 9 Jan, Guánica, Bo. Montalva, GFR, Road 325, between Ensenada and Playa Santa, elev 17 m (MAPR!). **2005:** OMR 459, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail, from DRNA office, after the junction with the trail to Hoya Honda, elev 155 m (MAPR!). **2003:** OMR 180, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail, from DRNA office east to Mirador El Vigia, elev 181 m (MAPR!). **1998:** PAR 10179, 23 Jan, Guánica, GFR, Sector Montalva, Ensenada (US!). **1994:** DA 931, 12 Dec, Guánica, GFR, Vereda Fuerte, off Road 334, elev 140 m (MAPR!). **1913:** FLS 3079, 19 Sep, *Guánica (MAPR!). (Little et al., 1974: 280; Quevedo et al., 1990: 146 as *Cassia polyphylla* Jacq.; Axelrod, unpublished.) This shrub or small tree is occasionally found in the deciduous forest on gentle slopes and hilltops.

****Senna siamea*** (Lam.) H.S. Irwin & Barneby

2005: OMR 557, 4 Nov, Guánica, Bo. Carenero, GFR, from Road 333, taking the second entrance to the south after the Copamarina Hotel, elev 30 m (MAPR!). (Little et al., 1974: 986 as *Cassia siamea* Lam.; Chinae, 1990: 53, as *Cassia siamea* Lam.; Axelrod, unpublished.) *Senna siamea* is an introduced tree that grows along roads close to the

forest boundaries on the coast. The species has not been observed to spread into the adjacent undisturbed forest.

Senna uniflora (Mill.) H.S. Irwin & Barneby

2005: OMR 439, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, highest parts of dirt road to sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 57 m (MAPR!). (Quevedo et al., 1990: 146; Axelrod, unpublished.)

This is a rare small shrub that forms dense patches along the disturbed side of the trail.

**Tamarindus indica* L.

2006: OMR 660, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, at the first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 155 m (MAPR!). **2005:** OMR 293, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, by the sapo concho pond, elev 5 m (MAPR!). **1948:** AML s.n., 7 Aug, GFR (MAPR!). (Little et al., 1974: 986; China, 1990: 53; Quevedo et al., 1990: 146.) This is an exotic tree that grows in the secondary forest of in the more mesic valleys of the GFR and along the coast. It has naturalized in the dry forests of Puerto Rico, including those of the GFR.

Confirmation required before accepting into the flora:

Caesalpinia ciliata (Bergius ex Wikstrom) Urb.

(Quevedo et al., 1990: 146 as *Caesalpinia divergens* Urb.; Acevedo-Rodríguez, 2005: 235) This species, if it is distinct from *Caesalpinia bonduc* would be expected to occur in shrubby thickets along the coast. This species is listed as a Critical Element by the DNER

Caesalpinia portoricensis (Britt. & P. Wilson) Alain

(Liogier, 1988: 64; Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 237.) This species is only known from the type specimen. While Axelrod (unpublished) places it in synonymous under *Caesalpinia ciliata*, I am following Acevedo-Rodríguez and recognizing it as a distinct taxon. This species is listed as a Critical Element by the DNER

**Cassia grandis* L.

(Axelrod, unpublished.) This showy ornamental tree is widely planted in the tropics and occasionally cultivated in Puerto Rico. Britton and Wilson (1923-30) apparently considered it as native to the Island, reporting it as occurring on “hillsides in dry parts of the southwestern districts...sometimes planted”. Little et al. (1974) treated it as “apparently introduced to Puerto Rico” and naturalized in St. Thomas and St. Croix. Axelrod (unpublished) cites only two collections for the species and it is not clear which one is for GFR.

Chamaecrista nictitans (L.) Moench ssp. *nictitans* var. *diffusa* (DC.) Irwin & Barneby

(Quevedo et al., 1990: 146 as *Cassia chamaecrista* L.) This small, weedy subshrub, would be expected in more mesic, open areas of the forest, such as would have occurred in the formerly populated areas along the northern boundry of the Reserve.

Chamaecrista portoricensis (Urb.) Cook & Collins var. *portoricensis*

(Quevedo et al., 1990: 146 as *Cassia portoricensis* Urb.) This *Chamaecrista* is common along the forest edge on limestone in Vieques and so its occurrence in the GFR would not be unexpected.

**Haematoxylon campechianum* L.

(Little et al., 1974: 286; Chinea, 1990: 53; Axelrod, unpublished.) This tree was planted in the Forest and is apparently spreading to some natural areas. It is fairly common in the GFR; however no specimens were collected due to the absence of reproductive material. There is a former plantation at the end of La Cobana Trail, but the species have been also observed in dwarf forest areas along Punta Vaquero.

Stahlia monosperma (Tul.) Urb.

(Little et al., 1974: 986.) This endangered tree was observed in Punta Ballena, apparently planted. According to Carlos Pacheco (pers. comm., Appendix I.) the species grows scattered throughout the GFR, specimens supporting this observation are needed. It occurs naturally outside the Forest by Punta Verraco. This species is listed as a Critical Element by the DNER.

FABACEAE-FABOIDEAE (LEGUMINOSAE-PAPILIONOIDEAE)

Andira inermis (W. Wright) Kunth ex DC.

2005: OMR 470, 25 Aug, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail to the north, at old campeche plantation (zinc house) taking a canyon to the north, elev 56 m (MAPR!). **1950:** ELL 13235, 4 Jul, GFR (US!). **1935:** FHS 61, 5 Feb, *Guánica (US!). **1886:** PS 3356, 20 Jan, *prope* *Guánica (US!). (Little and Wadsworth, 1964: 190; Quevedo et al., 1990: 146.) Moca is a common tree in Puerto Rico; however it is rare in the GFR. Within the Reserve grows in the mesic forest in canyons along the northern boundaries.

Canavalia rosea (Sw.) DC.

2003: OMR 169, 22 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, Trail from Playa Tamarindo, at sapo concho pond to Punta Vaquero by dwarf forest, elev 8 m (MAPR!). (Quevedo et al., 1990: 146 as *Canavalia maritima* (Aubl.) Thouars.; Acevedo-Rodríguez, 2005: 248. Axelrod, unpublished.) *Canavalia rosea* is adapted to grow on sandy beaches but it also invades the adjacent coastal thickets. Unlike many beach species, this vine is still relatively common along the coast.

Centrosema virginianum (L.) Benth.

2006: OMR 845, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, at the first small trail to the left on Road 334, when you enter the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2005:** OMR 554, 1 Nov, Guánica, Bo. Carenero, GFR, Road 334, from the entrance of the forest to the ranger's office, close to the communication tower, elev 197 m (MAPR!). **2005:** OMR 453, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 143 m (MAPR!). **2003:** OMR 143, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on Las Cobanas Trail, north to Cañon las trichilias, elev 129 m (MAPR!). **1996:** PAR 7881, 25 Jan, Guánica, GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!). **1962:** HAL 9120, 23 Jun, *Guánica (MAPR!). **1886:** PS 3573, 2 Feb, *Guánica, *ad pratis* (US!). (Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 251; Axelrod, unpublished.) This is a common vine in openings, along trails and roads and in open, often disturbed sunny sites in general in the Forest.

**Clitoria ternatea* L.

2003: OMR 170, 22 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, Trail from Playa Tamarindo, sapo concho pond to Punta Vaquero at dwarf forest,

elev 11 m (MAPR!). **1914:** JAS 2244, 8 Sep, *Guánica, Santa Rita (US!). **1913:** FLS 3066, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 255.) This exotic vine occurs sporadically in open sites throughout the Forest.

Coursetia caribaea (Jacq.) Lavin

1997: GJB 5338, 28 Oct, Guánica, Bo. Carenero, GFR, along Road 333, between km 7.4-7.5, west of Bahía de Ballena, elev 25 m (MAPR!). **1935:** FHS 49, 15 Feb, *Guánica, barren hillside (US!). **1886:** PS 3690, 7 Feb, *Guánica, *sylva ad* Ensenada (US!).

(Axelrod, unpublished.) This subwoody species is apparently rare within the Reserve.

New record for the GFR.

Crotalaria lotifolia L.

2006: OMR 628, 19 Jan, Guánica, Bo. Carenero, GFR, at the first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 68 m (MAPR!). **1886:** PS 3581, 2 Feb, *prope* *Guánica *ad* Montalva (US!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) This is a very common subwoody herb along trails and in openings in the mesic canyons on the northern portion of the Forest.

Dalea carthagenensis (Jacq.) J.F. Macbr. var. ***portoricana*** Barneby

1991: FSA 3312, 19 Nov, Guánica. Bo. Montalva, GFR, Manglillo section, jeep road along Monte de la Brea, dry scrub forest on limestone, elev 35-60 m (MAPR! US!).

1961: HAL 9025, 30 Dec, GFR, coastal thickets (MAPR!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) This endemic shrub is found along the south coast of Puerto Rico, where it is apparently rare. This species is listed as a Critical Element by the DNER.

Desmodium glabrum (Mill.) DC.

2005: OMR 569, 10 Nov, Guánica, Bo. Carenero, GFR, from Road 333, taking a dirt road to Jaboncillo beach, elev 27 m (MAPR!). **2003:** OMR 191, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail, from DRNA office east to Mirador El Vigía, entrance of Los Granados Trail, elev 207 m (MAPR!). **1994:** DA 729, 9 Nov, Guánica, Road 333, 7.1 km east from town of Guánica, elev 25 m (MAPR!). **1886:** PS 3588, 2 Feb, *Guánica (US!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) This annual herb is common along trails throughout the GFR.

Galactia dubia DC.

2006: OMR 847, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, at the first small trail to the left on Road 334, when you enter the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2005:** OMR 547, 27 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda, Road 333, after the entrance to Hoya Honda, elev 38 m (MAPR!). **2003:** OMR 140, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on Las Cobanas Trail, north to Cañon las trichilias, elev 186 m (MAPR!). (Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 262; Axelrod, unpublished.) This vine is common along trails throughout the GFR.

Galactia striata (Jacq.) Urb.

2005: OMR 441, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, entrance to the dirt road to sapo concho breeding area in Manglillo, close to Road 325, elev 23 m (MAPR!); OMR 553, 1 Nov, Guánica, Bo. Carenero, GFR, Road 334, from the entrance of the forest to the ranger's office, close to the communication tower, elev 197 m (MAPR!). **2003:** OMR 189, 7 Nov, Yauco, Bo. Barinas, GFR, Julio Vélez Trail from DRNA office

east to Mirador El Vigia, elev 214 m (MAPR!). **1999:** PAR 10802, 29 Jan, Guánica, GFR, along main road [Road 334] to ranger's station (US!). **1996:** PAR 7871, 25 Jan, Guánica, GFR (US!). (Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 265; Axelrod, unpublished.) This vine is common in open sites throughout the GFR.

Indigofera micheliana Rose

1886: PS 3682, 10 Feb, prope Guánica, *litoralibus ad* La Ballena [GFR] (US!). Axelrod (unpublished.) treats this shrub as a historical record, with two collections known from Puerto Rico, both made in 1886. The species is probably an exotic, otherwise being known from St. Thomas and Mexico, Central and South America. **New record for the GFR.**

****Indigofera spicata*** Forssk.

2003: OMR 165, 22 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333, trail from Playa Tamarindo, sapo concho pond to Punta Vaquero, dwarf forest, elev 9 m (MAPR!). (Axelrod, unpublished.) **New record for the GFR.** This exotic herb occurs in scattered locations at lower elevations in Puerto Rico, but is apparently most common in the dryer southern areas. It is apparently rare in the Forest.

Macropitium lathyroides (L.) Urb.

2006: OMR 781, 18 Oct, Guánica, Bo. Carenero, GFR, Road 333, edge of the forest north of Caña Gorda, elev 8 m (MAPR!). (Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 268; Axelrod, unpublished.) This is a common erect to vining herb in disturbed areas of Puerto Rico; however in the GFR it was observed only near the boundaries of the Forest close to urban areas.

Pictetia aculeata (Vahl) Urb.

2005: OMR 286, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, by the sapo concho pond, elev 5 m (MAPR!). **2003:** OMR 172, 22 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333, trail from Playa Tamarindo, sapo concho pond to Punta Vaquero, dwarf forest, elev 18 m (MAPR!). **1994:** DA 730, 9 Nov, Guánica, Road 333, 7.1 km east from town of Guánica, elev 25 m (MAPR!). **1990:** RGG 3340, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!); GJB 3713, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1989:** PAR 3019, 7 Oct, Guánica, GFR, along main road (334) to ranger station (US!). **1966:** WRS 3266, 5 Jul, Guánica, Bo. Carenero, GFR, top of a mountain just east of Guánica Bay (US!). **1962:** HAL 9169, 23 Jun, GFR, coastal thickets (MAPR!). **1950:** ELL 13166, 30 Jun, GFR (US!). **1913:** FLS 3105, 19 Jul, *Guánica (MAPR!). (Little and Wadsworth, 1964: 202; Quevedo et al., 1990: 146; Axelrod, unpublished.) This is a widely distributed and abundant small tree in the GFR. In the past the species was logged for timber and charcoal production.

Poitea florida (Vahl) Lavin

2007: OMR 884, 3 Apr, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 following La Cobana Trail, north forest boundary by La Trichilia Canyon, elev 50 m (MAPR!). **2006:** OMR 805, 21 Nov, Yauco, Bo. Barina, GFR, end of Road 334, following Julio Vélez Trail to the east, close to El Vigía, elev 183 m (MAPR!). **1986:** GJB 3180, 17 Apr, Guánica, Bo. Lomas de Seboruco, GFR, about 25 m from junction on dirt road west off of Road 334 between entrance to forest and radio antenna, elev 130 m (MAPR!). **1935:** FHS 145, 21 Feb, *Guánica, barren hillside (US!). (Axelrod,

unpublished.) *Poitea florida* is a shrub or small tree that is found in dry forests on hillsides in the GFR, where it is uncommon. **New record for the GFR.**

***Rhynchosia reticulata* (Sw.) DC.**

2005: OMR 490, 7 Sep, Guánica, Bo. Carenero, GFR, from Road 334 taking Las Cobanas Trail to the north, mesic area at Cañon de las Trichilia, elev 85 m (MAPR!).

1886: PS 3724, 10 Feb, Guánica, *montis* El Maniel [GFR] (US!). (Quevedo et al., 1990: 146.) This is a rare vine within the GFR, but widespread elsewhere in open, disturbed situations in Puerto Rico.

***Sesbania sericea* (Willd.) Link**

2005: OMR 572, 10 Nov, Guánica, Bo. Carenero, GFR, from Road 333, Caña Gorda, taking the road to the right just before the Copa Marina Hotel, mangrove area to the east of the hotel, elev 15 m (MAPR!). **2004:** OMR 256, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 1 m (MAPR!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) This annual, which can reach 2 m or more in height is characteristic of disturbed areas with wet sandy soil. It is not common within the GFR.

***Stylosanthes hamata* (L.) Taub.**

2003: OMR 124, 17 Sept, Guánica, Bo. Carenero, GFR, Camino Dinamita, from DRNA office south to Cañon de los Murciélagos, elev 127 m (MAPR!). **2002:** GJB 6638, 17 Oct, Guánica, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1994:** DA 734, 9 Nov, Guánica, [GFR] Road 333, 8.0 km east from town of Guánica, elev 25 m (MAPR!). **1964:** AGM 2719, 2 Oct, GFR (MAPR!). **1948:** PPM *s.n.*, 7 Aug, GFR (MAPR!). **1886:** PS 3756, 13 Feb, *Guánica, *ad litora maris* (US!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) This small herb is common along trails and other open, sunny areas throughout the GFR.

***Tephrosia cinerea* (L.) Pers.**

2005: OMR 560, 4 Nov, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, end of paved Road 333, at the sapo concho breeding area, elev 3 m (MAPR!). **2004:** OMR 206, 4 Sep, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, at the area of sapo concho new ponds, elev 12 m (MAPR!). **2003:** OMR 151, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda to the north of the Road 333, at the entrance of Hoya Honda Canyon, elev 43 m (MAPR!). **2002:** GJB 6614, 1 Apr, Guánica, GFR, Camino Gutierrez, elev 150-200 m (MAPR!). **1982:** JHH 68, 13 Nov, GFR, 1.9 km after end of paved Road 333, in small cracks close to the shore, low elev (MAPR!). **1962:** HAL 9277, 28 Jun, *Guánica (MAPR!). **1913:** FLS 3023, 3078, 19 Jul, *Guánica (MAPR!). **1886:** PS 3430, 25 Jan, *Guánica, *ad Salinas* (US!); PS 3879, 2 Mar, *Guánica, *litoralibus inter* Barina *et* La Boca [probably collected between Yauco and Guayanilla] (US!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) This small, suffrutescent herb is common in sunny areas, such as along trails and the edge of thickets and dry forest.

***Teramnus labialis* (L. f.) Spreng.**

1964: AGM 2707, 2 Oct, GFR (MAPR!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) *Teramnus labialis* is a vine found in openings and disturbed sites. It is apparently rare within the Reserve.

Confirmation required before accepting into the flora:

**Abrus precatorius* L.

(Acevedo-Rodríguez, 2005: 243.) This vine is common in openings and along roadsides and trails in the dry forests elsewhere in Puerto Rico and would not be unexpected in the GFR.

**Alysicarpus vaginalis* (L.) DC.

(Quevedo et al., 1990: 146.) *Alysicarpus vaginalis* is a weedy herb frequently found in disturbed and open urban and rural areas. It probably occurred in the formerly populated areas of the forest.

Crotalaria incana L.

1886: PS 3359, 20 Jan, *Guánica (US!). (Quevedo et al., 1990: 146.) This common weedy herb was not observed by the author within the GFR. It probably occurred in the past in the previously populated areas of the Reserve.

**Crotalaria pallida* Ait. var. *obovata* (G. Don) Polhill

(Quevedo et al., 1990: 146.) This herb occurs in open areas throughout Puerto Rico, and its occurrence in the GFR would not be unexpected, especially around parking areas, trails and roads.

Dalbergia ecastaphyllum (L.) Taub.

(Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 255.) *Dalbergia ecastaphyllum* would be expected in coastal thickets and adjacent coastal dry forest in the Reserve.

Desmodium incanum DC.

(Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 258.) *Desmodium incanum* is a common, widespread weedy herb often found around frequently disturbed areas. It would be expected to have occurred in the previously inhabited areas of the Forest.

Desmodium procumbens (Miller) Hitchcock

(Axelrod, unpublished.) This widespread weedy herb would be expected in open, disturbed areas in the Reserve.

Desmodium tortuosum (Sw.) DC.

(Quevedo et al., 1990: 146.) *Desmodium tortuosum* is a widespread weedy species, found throughout much of Puerto Rico; its occurrence, especially historically when disturbance by humans was more common would be expected.

Desmodium triflorum (L.) DC.

(Quevedo et al., 1990: 146.) This low, often prostrate herb occurs in open dry areas in southwestern Puerto Rico, and could well have occurred historically in the GFR when the Forest was more open due to human disturbance.

**Gliricidia sepium* (Jacq.) Kunth ex Walp.

1935: FHS 53, 14 Feb, *Guánica (US!). (Quevedo et al., 1990: 146.) This exotic tree was observed at the east corner of the visitor's center. It was apparently planted and is persistent. This species is commonly used as a living fence post. In more mesic areas of the Island it spreads by seeding into adjacent pastures and open areas. There is no evidence of it spreading in the GFR.

Indigofera suffruticosa Mill.

(Quevedo et al., 1990: 146.) This suffrutescent herb is known from the Mona Island, the limestone hills near Yauco, and from the dry southwestern area of the Island, so its occurrence in GFR would not be unexpected. It is typically found in open sites or under light shade.

Lonchocarpus sericeus (Poir.) Kunth ex de Candolle

(Little et al., 1974: 300 as *Lonchocarpus domingensis* (Pers.) DC.) This species is generally found in more mesic areas, but it does occur in the southwest area of the Island. It could well be found in some of the more mesic canyons in the northern part of the Reserve.

Piscidia carthagenensis Jacq.

(Little et al., 1974: 306; Quevedo et al., 1990: 146.) This small tree is often found in dry coastal thickets and dry forests elsewhere in Puerto Rico; its occurrence in the Reserve would be expected.

Poitea paucifolia (de Candolle) Lavin

(Axelrod, unpublished.) This is a small shrub of dry areas, so its occurrence in the GFR would not be unexpected, especially in more open sites in the northern part of the Forest.

**Pterocarpus indicus* Willd.

(Chinea, 1990: 53) This species was planted in the forest in the past (Chinea, 1990: 53) but it apparently has not persisted. It has not been collected or reported for the forest since the planting.

Rhynchosia minima (L.) DC.

1886: PS 3888, 2 Mar, *Guánica, *inter* Boca *et* Barinas *ad fossas* [probably collected between Yauco and Guayanilla] (US!). (Acevedo-Rodríguez, 2005: 27p.) This vine is common in open, sunny sites in dry shrublands and forests. It would be expected to occur in the Reserve.

**Sesbania grandiflora* (L.) Pers.

1935: FHS 45, 12 Feb, *Guánica, roadside ornamental tree (US!). This species is characteristic of urban areas. The occurrence of it within the GFR is doubtful.

Tephrosia senna Kunth

(Quevedo et al., 1990: 146.) This *Tephrosia* is not as common in Puerto Rico as the former species, and while it may occur in dry regions, it tends to be in more mesic habitats than *Tephrosia cinerea*. If it is found in the GFR, it would probably be in a sunny opening in a mesic northern ravine. The species has erroneously been reported from Mona Island.

Vigna antillana (Urb.) Fawc. & Rendle

(Quevedo et al., 1990: 146 as *Phaseolus antillanus* Urb.; Acevedo-Rodríguez, 2005: 286.) This vine is found mainly in dry and disturbed areas of Puerto Rico, and would be expected to occur within the GFR, which it may have done historically when the Forest was more subject to disturbance.

Vigna luteola (Jacq.) Benth.

(Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 288.) This trailing or vining species is common along beaches and also in open, disturbed sites inland throughout Puerto Rico. Its apparent absence from the littoral zone in the GFR is puzzling.

FABACEAE-MIMOSOIDEAE (LEGUMINOSAE-MIMOSOIDEAE)

Desmanthus virgatus (L.) Willd.

2006: OMR 702, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, by sapo concho breeding area, elev 2 m (MAPR!). **2005:** OMR 327, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north, to an old campeche plantation, elev 86 m (MAPR!). (Quevedo et al., 1990: 146.) *Desmanthus*

virgatus typically a small, more or less prostrate or spreading shrub found in open, sandy areas of the Reserve.

****Leucaena leucocephala*** (Lam.) de Wit

2005: OMR 450, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail, from DRNA office always taking the trails to the north-northeast leading to Road 334, close to El Maniel, elev 144 m (MAPR!). **1984:** MEA 8, 6 Oct, Guánica, GFR, around Playa Tamarindo, elev 5 m (MAPR!). **1983:** SMC 118, 11 Nov, Guánica, GFR, Tamarindo sector, towards the forest (MAPR!). **1982:** JHH 62, 13 Nov, GFR, 1.9 km after the end of paved Road 333, low elev (MAPR!). **1950:** ELL 13200, 2 Jul, GFR (US!). **1913:** FLS 3081, 19 Sep, *Guánica (MAPR!). **1886:** PS 3641, 10 Feb, *Guánica, *sylva montis* (US!). (Little and Wadsworth, 1964: 156 as *Leucaena glauca* (L.) Benth.; Quevedo et al., 1990: 146; Axelrod, unpublished.) *Leucaena leucocephala* is very common shrub or small tree along trails, forest edges and in areas formerly used for pasture that are now going into secondary forest. It apparently cannot invade the closed forest, but more study is needed on its potential role as an invasive species in the Reserve.

Pithecellobium unguis-cati (L.) Mart.

2006: OMR 680, 30 Mar, Guánica, Bo. Carenero, GFR, Cerro Caprón, from Road 334 taking El Fuerte Trail, close to las banderas, elev 138 m (MAPR!). **2005:** OMR 365, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, mesic canyon, elev 132 m (MAPR!). **2004:** OMR 258, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 1 m (MAPR!). **2000:** PAR 11433, 6 Sep, GFR (US!). **1990:** RGG 3368, 18 Dec, Guánica, Bo. Carenero, GFR, W, elev 145 m (MAPR!). **1985:** TBC 60840, 4 Apr, *Guánica, GFR, canyon at km 7.2 off highway 333, elev 10-25 m (US!). **1935:** FHS 47, 16 Feb, *Guánica (US!). **1913:** FLS 337, 10 Feb, *Guánica (MAPR!). **1886:** PS 3382, 21 Jan, *Guánica, *declivibus* (US!); PS 3863, 23 Feb, *Guánica, *litoralibus* (US!). (Little et al., 1974: 262; Quevedo et al., 1990: 146; Axelrod, unpublished.) This small, spiny tree is particularly common along trails and roadsides; it generally does not occur in more closed forest.

****Prosopis juliflora*** (Sw.) DC.

2004: OMR 213, 4 Sep, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, end of paved Road 333, on sapo concho pond, taking a trail north to the cave, elev 10 m (MAPR!). **1990:** GJB 3719, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1964:** HAL 10619, 2 Jan, Guánica, GFR, dry coastal thickets (MAPR! US!); JAD 7271, 20 Mar, GFR (US!).. **1950:** ELL 13240, 4 Jul, GFR (US!). **1944:** MC 1153, 2 Apr, Guánica, GFR (MAPR!). **1935:** FHS 48, 16 Feb, *Guánica (US!). **1914:** JAS 2242, 8 Sep, *Guánica (US!). (Little and Wadsworth, 1964: 166; Chinea, 1990: 53; Quevedo et al., 1990: 146 as *Prosopis pallida* (Humb. & Bonpl. ex Willd.) Kunth; Axelrod, unpublished.) This tree is locally common along the coast in open grassy areas.

Senegalia riparia (Kunth) Britton & Rose

2005: OMR 546, 27 Oct, Guánica, Bo. Carenero, GFR, Road 334, close to the entrance of Los Granados, elev 130 m (MAPR!). **2004:** OMR 231, 2 Oct, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, from the sapo concho pond taking the trail north to the cave, elev 4 m (MAPR!). **1914:** JAS 2237, 8 Sep, *Guánica, Santa

Rita (US!). (Quevedo et al., 1990: 146, as *Acacia retusa* (Jacq.) Howard; Axelrod, unpublished.) This is a common spiny, scrambling shrub found in disturbed open sites.

**Vachellia farnesiana* (L.) Wight & Arn.

2006: OMR 720, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, at La Jungla, elev 1 m (MAPR!). **2005:** OMR 559, 4 Nov, Guánica, Bo. Carenero, GFR, Caña Gorda, Road 333, taking the second entrance to the south after the Copamarina Hotel, before the entrance to Hoya Honda, elev 34 m (MAPR!). **1973:** AGM 4045, 1 Apr, *Guánica, Playa Santa (MAPR!). **1935:** FHS 51, 15 Feb, *Guánica (US!). **1914:** JAS 2245, 8 Sep, *Guánica (US!). **1886:** PS 3860, 23 Feb, Guánica, Bo. Carenero, [GFR], Monte Puerco (US!). (Little and Wadsworth, 1964: 144., as *Acacia farnesiana* (L.) Willd. Axelrod, unpublished.) This spiny shrub is locally common along the coast in grassy areas exposed to fires.

Zapoteca portoricensis (Jacq.) H.M. Hern.

2005: OMR 320, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to the north, to an old campeche plantation, elev 148 m (MAR). **1886:** PS 3544, 2 Feb, *Guánica (US!); PS 3644, 10 Feb, *Guánica (US!). (Quevedo et al., 1990: 146 as *Calliandra portoricensis* (Jacq.) Benth.; Axelrod, unpublished.) This is an uncommon spiny shrub in the Forest that grows in open areas to the north of La Cobana Trail.

Confirmation required before accepting into the flora:

**Albizia lebbek* (L.) Benth.

1935: FHS 214, 21 Mar, *Guánica (US!). (Quevedo et al., 1990: 146.) This tree was observed along the Forest boundaries in Caña Gorda. It is common in open dry areas of Puerto Rico.

Desmanthus pernambucanus (Linnaeus) Thellung

(Axelrod, unpublished.) This low, slender short-lived shrub would be expected in open sites in the Reserve.

Inga laurina (Sw.) Willd.

(Little and Wadsworth, 1964: 150.) This tree is most likely to occur in the evergreen forest in the mesic canyons in the northern area of the GFR. It is generally found in more mesic habitats than those found in the Reserve.

Neptunia plena (L.) Benth.

1886: PS 3806, 18 Feb, *Guánica, *litore paludoso* (US!). This herb may be found in canals and ponds outside the GFR. It's occurrence within the reserve is doubtful, however, it does occur on exposed dry limestone along roads on Puerto Faro Peninsula in Vieques.

GESNERIACEAE

Gesneria pedunculosa (DC.) Fritsch

2006: OMR 635, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). (Axelrod, unpublished.) This is a very common shrub in the mesic limestone hills in northern Puerto Rico and on serpentine in western Puerto Rico. However in the GFR it is rare, being restricted to mesic canyons along the northern boundaries. **New record for the GFR.**

GOODENIACEAE

Scaevola plumieri (L.) Vahl

2005: OMR 573, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south, by old coconut plantation, elev 3 m (MAR). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This shrub is restricted to the sandy coast of Punta Ballena. It is a beach species that was once widespread in the Caribbean and probably more abundant along the beaches of the Reserve. It has become scarce over much of its range due to use of beaches for recreation and the mining of sand for construction. In the Cayman Islands, *Scaevola taccada* (Gaertn.) Roxb. from the Pacific has been introduced as a landscape plant and it is replacing the native *Scaevola plumieri* (Proctor, 1984). More recently, landscapers are using this exotic *Scaevola* in coastal planting in Puerto Rico, and at least two collections of it have been made from the wild in the eastern part of the island. It could become an additional threat to the already threatened *Scaevola taccada* in Puerto Rico.

HYDROCHARITACEAE

Halophila decipiens Ostenf.

(Proctor, 2005: 66, citing *Gittins 7557*, Guánica, Cayos de Caña Gorda, 1 mi. offshore near Guánica.)

Thalassia testudinum Banks & Sol. ex K.D. Koenig

2005: FSA 12949, 5 Feb, Guánica, Bo. Carenero, GFR, sea off picnic area at Road 333, just west of Caña Gorda (UPRRP!). (Proctor, 2005: 70; Axelrod, unpublished.) This is a common herb in shallow water along the coast.

Confirmation required before accepting into the flora:

Halophila baillonis Asch.

(Proctor, 2005: 65, for Guánica in general.) This marine species is to be expected in the shallow water along the coast.

ICACINACEAE

Ottoschulzia rhodoxylon (Urb.) Urb.

2007: OMR 880, 3 Apr, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 following La Cobana Trail, north forest boundary by La Trichilia Canyon, elev 100 m (MAPR!). **2005:** OMR 591, 22 Dec, Guánica, Bo. Carenero, GFR, Hoya Honda, Road 333 to the north, after the Copa Marina Hotel, elev 40 m (MAPR!). **2004:** OMR 240, 30 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, at the junction with a trail taking the canyon to the north, elev 110 m (MAPR!); OMR 252, 11 Nov, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, at the junction with a trail taking the a canyon to the north, elev 110 m (MAPR!). **1995:** PAR 7693, 12 Oct, Guánica, GFR, south area of forest, off Road 333 (US!). **1985:** DCW 1311, 4 Apr, GFR (US!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) This tree is typically associated with mesic canyons in the GFR. This species is listed as an endangered species by the US Fish and Wildlife Service and as a Critical Element by the DNER. The GFR sustain the largest populations found in the south coast of Puerto Rico.

KRAMERIACEAE

Krameria ixina L.

2004: OMR 233, 2 Oct, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, from the sapo concho pond taking the trail north to the cave, elev 17 m (MAPR!). **2003:** OMR 118, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 to the main trail of Las Cobanas, elev 130 m (MAPR!). **2002:** GJB 6640, 17 Oct, Guánica, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1995:** PAR 7677, 12 Oct, Guánica, GFR, along Road 334, a few km from ranger station (US!). **1994:** DA 718, 8 Nov, Guánica, Road 333, 8 km east of town of Guánica, south side of road, elev 25 m (MAPR!). **1991:** FSA 2883, 7 Sep, Guánica, GFR, along Murciélago Trail from campamento, elev 50-150 m (MAPR!). **1989:** PAR 3018, 7 Oct, Guánica, GFR, Lluveras road, along mahogany plantation (US!). **1983:** HAL 34313, 12 May, *Guánica (US!). **1982:** FNS 8952, 13 Nov, Guánica, GFR, (MAPR!). **1976:** MSo 75, 4 Dec, GFR (MAPR!). **1964:** AGM 2611, 16 Apr, Guánica, Bo. Carenero, GFR, near foresters house (MAPR!). **1961:** HAL 9016, 30 Dec, GFR, coastal thickets (MAPR!). **1947:** AGM 39, 4 Oct, Guánica, GFR (MAPR!). **1946:** RNG s.n., 28 Sep, Guánica, GFR, near Caña Gorda (MAPR!). **1940:** LEG 189, 10 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda road (US!). **1913:** FLS 3048, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) This is a very common small parasitic shrub. It most often is found along the margins of the coastal scrub and coastal forests in the Reserve.

LAMIACEAE

Clerodendrum aculeatum (L.) Schltldl.

2005: OMR 436, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, sandy coast, at sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south., elev 2 m (MAPR!). **1994:** DA 741, 9 Nov, Guánica, Bo. Ensenada, Road 325, 2.5 km south of Ensenada, elev 25 m (MAPR!). **1913:** FLS 3071, 19 Sep, *Guánica (MAPR!). (Little et al., 1974: 860; Quevedo et al., 1990: 149; Axelrod, unpublished.) This spiny shrub is locally common on Monte de la Brea; it is a common element of coastal forests and thickets in Puerto Rico.

Ocimum campechianum Mill.

2005: OMR 534, 6 Oct, Guánica, Bo. Carenero, GFR, from ranger's office taking the Dinamita Trail, close to the junction with the main trail, elev 160 m (MAPR!). **2003:** OMR 192, 7 Nov, Yauco, Bo. Barinas, GFR, Julio Vélez Trail from DRNA office east to Mirador El Vigia, entrance of Los Granados trail, elev 207 m (MAPR!). (Quevedo et al., 1990: 149, as *Ocimum micranthum* Willd.; Axelrod, unpublished.) This is an herb that occurs sporadically along trails throughout the GFR.

LAURACEAE

Cassytha filiformis L.

2005: OMR 410, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 2 m (MAPR!). **1913:** NLB 1896, 11-12 Mar, *Guánica, vicinity of Guánica, sandy coastal thicket (US!). (Quevedo et al., 1990: 145; Acevedo-Rodríguez, 2005: 300.) This achlorophyllous parasitic vine is found on herbs, shrubs and even in trees along the coast.

Licaria parvifolia (Lam.) Kosterm.

2006: OMR 645, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2004:** OMR 255, 11 Nov, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, at the junction with a trail taking the canyon to the north, elev 110 m (MAPR!). (Axelrod, unpublished.) This tree occurs in more mesic sites within dry forests; in the GFR it is restricted to the mesic canyons along the northern boundaries. **New record for the GFR.**

Nectandra coriacea (Sw.) Griseb.

2005: OMR 345, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail on a mesic canyon running north close to Susúa Baja, elev 70 m (MAPR!); OMR 368, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, Cañon las Trichilia, on mesic area, elev 90 m (MAPR!). (Axelrod, unpublished.) *Nectandra coriacea* is a small tree restricted to the mesic canyons in the northern boundaries of the GFR, where it is uncommon. **New record for the GFR.**

Confirmation required before accepting into the flora:

Nectandra patens (Sw.) Griseb.

(Axelrod, unpublished.) This small tree can also grow as a shrub with sarmentose branches. It would be expected to occur in the evergreen forest of the mesic canyons in the northern portion of the Forest.

LOASACEAE

Confirmation required before accepting into the flora:

Mentzelia aspera L.

(Quevedo et al., 1990: 148.) This stimulos herb is found in the dry southern lowlands of the Island, and its occurrence in the GFR would not be unexpected.

LOGANIACEAE

Spigelia anthelmia L.

2005: OMR 454, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte, Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 143 m (MAPR!). **1997:** GJB 5339, 28 Oct, Guánica, Bo. Carenero, GFR, along Road 333, between km 7.4-7.5, west of Bahía de la Ballena, elev 25 m (MAPR!). **1994:** DA 731, 9 Nov, Guánica, Road 333, 7.1 km east from town of Guánica, elev 25 m (MAPR!). (Axelrod, unpublished.) This small herb is common in open sites within the low dry forest. **New record for the GFR.**

LORANTHACEAE

Dendropemon caribaeus Krug & Urb.

1986: GJB 3146, 24 Mar, Guánica, GFR, between km 5.6-5.7, on dirt road that leads from near the Park headquarters to ocean near old lighthouse at Road 333, elev 120 m (MAPR!). **1915:** NLB 4904, 5-8 Mar, vicinity of *Guánica (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This parasitic epiphyte is apparently rare within the Forest.

Dendropemon purpureus (L.) Krug & Urb.

2006: OMR 606, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 16 m (MAPR!). **1986:** GJB 3146, 24 Mar, Guánica, GFR, between km 5.6-5.7 on Fuerte Trail, elev 110-130 m (MAPR!). **1886:** PS 3781, 10 Feb, *prope* Guánica *ad montis* El Maniel [GFR] (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This parasitic shrub has been collected several time, from widely separated areas within the Forest. This species is listed as a Critical Element by the DNER.

LYTHRACEAE (including Punicaceae)

Confirmation required before accepting into the flora:

Ammannia latifolia L.

(Quevedo et al., 1990: 148.) *Ammannia latifolia* is an annual wetland herb. It would be expected around ephemeral ponds.

Cuphea parsonia (L.) R. Br. ex Steud.

(Quevedo et al., 1990: 148.) This small annual species is generally associated with more mesic habitats than those found in the GFR and there are no records of it from the southern lowlands of Puerto Rico (Axelrod, unpublished). Its occurrence in the Reserve, even historically is questionable.

Ginoria rohrii Koehne

(Little et al., 1974: 608; Quevedo et al., 1990: 148.) This spiny shrub or small tree is found in coastal thickets and forests in the dry zones of the Island. It would be expected to occur in the Reserve. However, it does not seem to occur on limestone in Puerto Rico, which probably explains its absence from the Forest.

**Punica granatum* L.

(Chinea, 1990: 53) This exotic shrub or small tree is sometimes persistent following cultivation in Puerto Rico, but there is no evidence of it spreading. It would be expected around the former settlement areas in the Forest.

MALPIGHIACEAE

Bunchosia glandulosa (Cav.) DC.

2006: OMR 736, 1 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north by, old campeche plantation, elev 68 m (MAPR!). **2005:** OMR 322, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to the north, to an old campeche plantation, entrance to Cañon las trichilias, elev 125 m (MAPR!). **1994:** HAL *s.n.*, 3 Nov, Guánica, GFR, Camino Ballenas (US!). **1990:** GJB 3695, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1989:** PAR 3016, 7 Oct, Guánica, GFR, Lluveras road, along mahogany plantation (US!). **1983:** SMC 97, 8 Oct, Guánica, GFR, Lluveras Trail, km 5.6 (MAPR!). **1962:** HAL 9283, 28 Jun, GFR, thickets (MAPR!). **1886:** PS 3789, 23 Feb, *prope* *Guánica *ad sylvis montanis ultra* Barina [probably collected within the municipality of Yauco] (US!); PS 3927, 2 Mar, *prope* *Guánica *inter* Barina *et* la Boca [probably collected between Yauco and Guayanilla] (US!). (Little et al., 1974: 364; Quevedo et al., 1990: 146; Axelrod, unpublished.) This tree is common in moist valleys and mesic canyons in the northern portions of the GFR.

Byrsonima lucida DC.

2006: OMR 758, 5 Jun, Guánica, Bo. Carenero, GFR, to the north of Road 333, at Hoya Honda, entrance to the canyon, elev 27 m (MAPR!). **1948:** AGM 139, 26 Jun, GFR (MAPR!). (Little et al., 1974: 366; Quevedo et al., 1990: 146; Axelrod, unpublished.) While this small, attractive tree does occur in xeric scrub forests on limestone on Mona and Vieques Island, in the Guánica Forest it apparently is restricted to mesic canyons. This species is listed as a Critical Element by the DNER

***Heteropteris purpurea* (L.) Kunth**

2006: OMR 674, 30 Mar, Guánica, Bo. Carenero, GFR, from Road 334 taking El Fuerte Trail to the west, close to the entrance to Hoya Honda, elev 152 m (MAPR!). **2005:** OMR 486, 7 Sep, Guánica, Bo. Carenero, GFR, from Road 334 taking Las Cobanas Trail to the north, mesic area at Cañon de las Trichilia, elev 110 m (MAPR!). **1996:** PAR 7897, 25 Jan, Guánica, GFR, in front of ranger station (US!); GJB 4697, 1 Feb, Guayanilla, Bo. Boca, GFR, east of Playa Tamarindo, elev 10-20 m (MAPR!). **1986:** GJB 3189, 17 Apr, Guánica, GFR, low coastal, limestone hills on north side of Road 333 between km 4.4 and 4.5 at Caña Gorda (MAPR!). **1990:** GJB 3704, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1962:** HAL 9157, 23 Jun, Guánica, GFR (MAPR!). **1948:** AGM 92, 93, 1 May, *Guánica (MAPR!). **1913:** JAS 988, 28 Aug, *Guánica (US!); JRJ 988, 28 Aug, *Guánica, Santa Rita (US!). **1886:** PS 3545, 2 Feb, *Guánica, *umbrosis* (US!); PS 3848, 23 Feb, *Guánica (US!). (Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 302; Axelrod, unpublished.) This is a very common slender liana most often found in sunny conditions in scrub forest.

***Stigmaphyllon emarginatum* (Cav.) A. Juss.**

2005: OMR 582, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south, by old coconut plantation, elev 4 m (MAPR!); OMR 584, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south, by old coconut plantation, elev 4 m (MAPR!). **2003:** OMR 164, 22 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333, trail from Playa Tamarindo, sapo concho pond to Punta Vaquero, dwarf forest, elev 9 m (MAPR!). **2003:** OMR 131, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita, from DRNA office south to Cañon de los Murciélagos, elev 127 m (MAPR!). **2000:** PAR 11430, 6 Sep, GFR (US!). **1986:** GJB 3184, 17 Apr, Guánica, GFR, low coastal, limestone hills on north side of Road 333 between Balneario de Caña Gorda and Playa Tamarindo (MAPR!). **1982:** FNS 8953, 13 Nov, GFR (MAPR!). **1964:** AGM 2712, 2 Oct, GFR (MAPR!). **1962:** HAL 9164, 23 Jun, *Guánica, coastal thickets (MAPR!). (Quevedo et al., 1990: 146; Acevedo-Rodríguez, 2005: 305; Axelrod, unpublished.) This is a very common vine typically found in scrub forest.

***Stigmaphyllon floribundum* (DC.) C.E. Anderson**

2006: OMR 633, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2005:** OMR 372, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to Cañon las Trichilia, mesic canyon, elev 90 m (MAPR!). (Acevedo-Rodríguez, 2005: 306; Axelrod, unpublished.) This vine is rare in the Reserve and is restricted to evergreen forest along the northern boundaries.

Confirmation required before accepting into the flora:

Bunchosia polystachia (Andrews) DC.

1886: PS 3927, 2 Mar, near *Guánica (GH, *fide* Axelrod, unpublished.) Sintenis' 1886 collection of this small tree is the only one known for Puerto Rico.

Heteropterys laurifolia (L.) A. Juss.

1886: PS 3809, 18 Feb, *Guánica (US!). (Acevedo-Rodríguez, 2005: 302.) This liana generally is found in more mesic areas. If it occurs in the Reserve, it would be expected in the more mesic evergreen forests in along the northern boundary.

MALVACEAE (including BOMBACACEAE, STERCULIACEAE and TILIACEAE)

***Abutilon hirtum** (Lam.) Sweet

1935: FHS 741, 19 Jun, *Guánica (US!). **1915:** NLB 4885, 5-8 Mar, vicinity of *Guánica (US!). **1886:** PS 3737, 10 Feb, Guánica, Bo. Carenero *ad* El Maniel [GFR] (US!). This exotic subshrub is typically found in open, disturbed areas in the dry south coastal lowlands of Puerto Rico. **New record for the GFR.**

Ayenia insulicola Cristóbal

2003: OMR 149, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda, to the north of the Road 333, at the entrance of Hoya Honda Canyon, elev 43 m (MAPR!). **1996:** PAR 7875, 25 Jan, Guánica, GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!); GJB 4905, 26 Sep, Yauco, Bo. Barina, GFR, south-facing, coastal slopes in low, limestone hills on north side of Bahía Ballena, elev 100 m (MAPR!). **1995:** PAR 7689, 12 Oct, Guánica, GFR, south area of forest, off Road 333 (US!). **1994:** DA 720, 8 Nov, Guánica, Road 333, 8 km east of town of Guánica, south side of road, elev 25 m (MAPR!). **1991:** FSA 2909, 7 Sep, Yauco, GFR, along Murciélago Trail from Campamento, slope opposite limestone plateau, elev 50-70 m (MAPR!). **1961:** HAL 9035, 30 Dec, GFR, coastal sands (MAPR!). **1886:** PS 3551, 2 Feb, *Guánica, *losis cultis* (US!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) This is a common small suffrutescent herb along the trails of the Forest. It generally occurs in semi-shady sites, but can also be found in the full sun.

Bastardia viscosa (L.) Kunth

1990: GJB 3724, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1989:** PAR 3011, 7 Oct, Guánica, GFR, south of Lluveras road to El Vigia (US!). **1913:** NLB 1884, 11-12 Mar, *Guánica (US!). **1886:** PS 3519, 28 Jan, *Guánica, Punta de los Pescadores (US!). (Axelrod, unpublished.) *Bastardia viscosa* is a suffrutescence perennial that is found occasionally in the Reserve in open sunny areas. **New record for the GFR.**

Corchorus aestuans L.

2005: OMR 517, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, entrance of Hoya Honda, at the edge of Road 333, elev 23 m (MAPR!). **1996:** FSA 9768, 7 Apr, Guánica, Bo. Carenero, GFR, burned over area near Bahía la Ballena (US!). (Axelrod, unpublished.) This annual suffrutescent herb is rare within the Reserve. It occurs in open, usually disturbed habitats at lower elevations in Puerto Rico. **New record for the GFR.**

Corchorus hirsutus L.

1994: DA 737, 9 Nov, Guánica, [GFR], Road 333, 8 km east of town of Guánica, elev 25 m (MAPR!). **1987:** BB 6990, 6 Jan, Guánica, Bo. Carenero, GFR, along Road 333, east of Guánica (US!); PAR 2137, 8 Sep, Guánica, GFR, Playa Ballena (US!). **1982:** JHH 74,

13 Nov, GFR, 1.9 km after the end of paved Road 333, low elev (MAPR!). **1976:** *PAR s.n.*, 27 Mar, GFR (MAPR!). **1964:** *HAL 10393*, 2 Jan, GFR, coastal thickets, elev 5-6 m (MAPR!); *HAL 10598*, 2 Jan, GFR (US!); *AGM 2708*, 2 Oct, GFR (MAPR!). **1961:** *HAL 9040*, 30 Dec, GFR, coastal thickets (MAPR!). **1944:** *MC 1162*, 2 Apr, GFR (MAPR!). **1886:** *PS 3678*, 7 Feb, *Guánica, Montalva (US!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) This widespread weedy shrub is relatively common within the GFR, usually occurring along trails and in sunny openings.

***Gossypium hirsutum* L.**

2006: *OMR 608*, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, entrance to La Jungla, elev 1 m (MAPR!). **2004:** *OMR 266*, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 3 m (MAPR!). **1982:** *VNO 67*, 13 Nov, GFR, Road 333, Punta Verraco, elev 25 m (MAPR!); *JHH 53*, 13 Nov, GFR, 0.64 km after the end of paved Road 333, low elev (MAPR!). **1975:** *ROW s.n.*, Feb, *Guánica (US!). **1964:** *HAL 10597*, 2 Jan, GFR, coastal thickets (MAPR! US!). **1949:** *AAG s.n.*, 26 May, GFR (MAPR!). **1886:** *PS 3717*, 7 Feb, *Guánica, Montalva (US!). (Quevedo, 1990: 147.; Axelrod, unpublished.) Wild cotton is locally common in disturbed areas with sandy soil, especially near the coast.

***Guazuma ulmifolia* Lam.**

2006: *OMR 657*, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **1940:** *LEG 194*, 11 Oct, GFR, Hoya Honda well (US!); *LEG 194*, 10 Oct, Guánica, Bo. Carenero, GFR, Hoya Honda well (US!). **1935:** *FHS 267*, 8 Mar, *Guánica (US!). **1914:** *JAS 2266*, 8 Sep, *Guánica (US!). (Woodbury & Wadsworth, 1964: 338; Quevedo et al., 1990: 148; Axelrod, unpublished.) This early successional tree is common along trails in former agricultural and pasture areas of the south coast of Puerto Rico. In the GFR it is restricted to a few localities of the more mesic forest.

***Helicteres jamaicensis* Jacq.**

2005: *OMR 360*, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 149 m (MAPR!); *OMR 444*, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail, from DRNA office always taking the trails to the north-northeast, leading to Road 334 close to El Maniel, elev 152 m (MAPR!). **1991:** *BB 10013*, 5 Jan, GFR (US!). **1990:** *GJB 3706*, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1984:** *SJD 23*, 6 Oct, Guánica, GFR, along jeep trail opposite km 4.9, 0.7 km by road from Campamento Borinquen towards Luna, elev 195 m (MAPR!). **1982:** *VNO 59*, 13 Nov, GFR, Road 333, Punta Verraco, elev 25 m (MAPR!). **1949:** *AAG s.n.*, 26 May, GFR (MAPR!). **1932:** *GSM 1675*, 4 Apr, Guánica, between Guánica Bay & Salinas (US!). **1913:** *FLS 3051*, 3195, 19 Sep, *Guánica (MAPR!). **1886:** *PS 3652*, 7 Feb, *Guánica (US!). (Little et al., 1974: 534; Quevedo et al., 1990: 148; Axelrod, unpublished.) *Helicteres jamaicensis* is a common shrub, rarely a small tree that occurs as scattered individuals along trails and in openings throughout the Forest.

***Herissantia crispa* (L.) Brizicky**

2006: *OMR 838*, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 77 m (MAPR!). **2003:** *OMR 179*, 22 Oct, Guayanilla, Bo. Boca, GFR, end of paved

Road 333, trail from Playa Tamarindo, sapo concho pond to Punta Vaquero, dwarf forest, elev 20 m (MAPR!); **OMR 185**, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez, Trail from DRNA office east to Mirador El Vigia, elev 190 m (MAPR!). **1913: FLS 324**, Feb, *Guánica (MAPR!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) *Herissantia crispata* is a suffrutescent herb of found in open, typically disturbed sites throughout the GFR.

***Hibiscus clypeatus* L.**

2006: OMR 619, 13 Jan, Guánica, Bo. Carenero, GFR, Road 334, close to the entrance to Las Cobanas Trail, elev 160 m (MAPR!). **2003: OMR 146**, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on the Cobanas Trail north to Cañon las trichilias, elev 134 m (MAPR!). **1886: PS 3700**, 7 Feb, *Guánica *umbrosis* (US!); **PS 3666**, 10 Feb, Guánica, Bo. Carenero, *sylva ad El Maniel* [GFR] (US!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) This is a rare shrub in Puerto Rico, being restricted to limestone areas in Guánica and Guaynilla. In the Reserve it occurs as scattered individuals in shrubland areas. This species is listed as a Critical Element by the DNER.

***Hibiscus phoeniceus* Jacq.**

2005: OMR 400, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, to the forest main office, along the road, elev 192 m (MAPR!). **2003: OMR 195**, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail, from DRNA office east to Mirador El Vigia, elev 218 m (MAPR!). **1998: PAR 10176**, 23 Jan, Guánica, GFR, Caña Gorda (US!). **1986: GJB 3193**, 17 Apr, Guánica, GFR, on north side of Road 333, km 4.4-4.5, 1 km by road west of Balneario de Caña Gorda (MAPR!). **1983: SMC 109**, 8 Oct, GFR, Campamento Borinquen, Lluveras Trail, km 5.6 (MAPR!). **1935: FHS 75**, 17 Feb, *Guánica, barren hillside (US!). **1913: JRJ 981**, 28 Aug, *Guánica, Santa Rita (US!); **FLS 3957, 3058**, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) This is a common small suffrutescent plant of open to semi-shady sites.

***Malachra alceifolia* Jacq.**

2006: OMR 812, 21 Nov, Guánica, Bo. Carenero, GFR, end of Road 334, forest manager office, close to the nursery, elev 169 m (MAPR!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) *Malachra alceifolia* is a widespread, weedy annual of open, disturbed sites. Within the Reserve it is rare, being found only in an area subject to frequent human disturbance.

***Melochia tomentosa* L.**

2006: OMR 804, 21 Nov, Yauco, Bo. Barina, GFR, end of Road 334, following Julio Vélez Trail to the east, at the entrance to Los Granados, elev 182 m (MAPR!). **2005: OMR 496**, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, Cactus Forest, along a small canyon north of Road 333, elev 8 m (MAPR!). **1994: DA 739**, 9 Nov, Guánica, Road 333, 8 km east of town of Guánica, elev 25 m (MAPR!). **1986: MV s.n.**, Dec, Guánica, Caña Gorda, Road 333, between km 7.7-8.0 (MAPR!). **1964: HAL 10797**, 1 Apr, GFR, coastal thickets (MAPR! US!). **1961: HAL 9026**, 30 Dec, GFR, coastal thickets (MAPR!). **1948: LL s.n.**, 4 Aug, *Guánica (MAPR!). **1913: FLS 3084**, 19 Sep, *Guánica (MAPR!). **1886: PS 3499**, 28 Jan, *Guánica, Punta de los Pescadores (US!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) *Melochia tomentosa* is a common shrub throughout the Reserve. It is found primarily in sunny sites, such as roadsides and trail margins or in brushlands.

***Pavonia spinifex* (L.) Cav.**

2006: OMR 700, 11 May, Guayanilla, Bo. Boca, GFR, Punta Berraco, end of paved Road 333, by sapo concho breeding area, elev 1 m (MAPR!). **2004:** OMR 236, 25 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, elev 104 m (MAPR!). **1989:** PAR 3005, 7 Oct, Guánica, GFR, Las Cobanitas Trail, in abandoned *Haemotoxylum* plantation (US!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) This suffrutescent shrub is most common in open areas along the trails. It was not observed growing at forested areas.

***Pseudabutilon umbellatum* (L.) Fryxell**

2006: OMR 803, 21 Nov, Yauco, Bo. Barina, GFR, end of Road 334, following Julio Vélez Trail to the east, at the entrance to Los Granados, elev 182 m (MAPR!). **1990:** GJB 3725, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1913:** FLS 3076, 19 Sep, *Guánica (MAPR!). **1913:** JRJ 1030, 28 Aug, *Guánica, Santa Rita (US!). (Quevedo et al., 1990: 147, as *Abutilon umbellatum* (L.) Sweet; Axelrod, unpublished.)

Pseudabutilon umbellatum is a suffrutescent (annual?) shrub found in open sites throughout the GFR.

***Sida abutifolia* Mill.**

1999: GJB 5967, 29 Dec, Guánica, Bo. Carenero, GFR, edge of Road 334, by trail head to Fuerte and Ballerna, elev 200 m (MAPR!). **1997:** GJB 5349, 28 Oct, Guánica, Bo. Carenero, GFR, Road 333, east of Punta Vaquero, elev 5-10 m (MAPR!). **1996:** GJB 4895, 26 Sep, Yauco, Bo. Barina, GFR, south-facing, coastal slopes in low, limestone hills on north side of Bahía Ballena, elev 100 m (MAPR!). **1991:** FSA 2910, 7 Sep, Yauco, GFR, along Murciélago Trail from Campamento, slope opposite limestone plateau, elev 50-70 m (MAPR!). **1886:** PS 3676, 7 Feb, *Guánica, *inter* Montalva *et* Salinas (US!); PS 3771, 13 Feb, *Guánica (US!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) *Sida abutifolia* is a suffrutescent weed found along roads and trails and disturbed openings throughout the Reserve.

***Sida ciliaris* L.**

2003: OMR 163, 22 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333, trail from Playa Tamarindo, sapo concho pond to Punta Vaquero, dwarf forest, elev 8 m (MAPR!). **1997:** GJB 5337, 28 Oct, Guayanilla, Bo. Boca, GFR, along road above beach, just east of Playa de Tamarindo, sea level (MAPR!). (Axelrod, unpublished.) *Sida ciliaris* is a prostrate suffrutescent weed found primarily on exposed soil; it is common along sunny rocky trails throughout the GFR. **New record for the GFR.**

***Thespesia populnea* (L.) Sol. ex Corrêa**

2004: OMR 259, 22 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 1 m (MAPR!). **1984:** MEA 9, 6 Oct, *Guánica, (Guayanilla), GFR, around Playa Tamarindo, elev 5 m (MAPR!). **1950:** ELL 13146, 30 Jun, GFR (US!). (Chinea, 1990: 53; Quevedo et al., 1990: 148; Axelrod, unpublished.) This tree grows along the coast and is commonly planted in on sandy beaches and by roadsides and parking areas.

***Waltheria indica* L.**

2006: OMR 614, 9 Jan, Guánica, Bo. Montalva, GFR, end of Road 325, at the entrance to La Jungla, south of Salinas Providencia, elev 11 m (MAPR!). **2005:** OMR 543, 27 Oct, Guánica, Bo. Carenero, GFR, Los Granados Trail, at the top of the hill close to the power lines tower, elev 240 m (MAPR!). **1987:** PAR 2241, 29 Sep, Guánica, GFR, south area

of forest, off Road 333 (US!). (Quevedo et al., 1990: 148; Axelrod, unpublished.)
Waltheria indica is a slender shrub found in sunny opening throughout the GFR.

Confirmation required before accepting into the flora:

Abutilon abutiloides (Jacq.) Garcke ex Britton & P. Wilson

1886: PS 3423, 21 Jan, *Guánica, *ad* Punta de la Meseta (US!); PS 3738, 7 Feb, *Guánica, *inter* Montalva *ed* salinas (US!). In Puerto Rico this subfrutescent herb is only known from Mona Island and the municipality of Guánica where it occurs in open, sunny disturbed areas. It would be expected in such habitats in the Reserve.

Abutilon hulseanum (Torr. & Gray) Torr. ex A. Gray

(Quevedo et al., 1990: 147, as *Abutilon commutatum* Schumann.) Britton & Wilson (1924) reported this shrub as occurring in thickets and hillsides in the vicinity of Guánica. Their report was subsequently cited by Liogier & Martorell (1982, 2000) and Liogier (1988: 123). Both Britton & Wilson (1924) and Liogier & Martorell (1982) misapplied the name *Abutilon commutatum* K. Schumann to the species. This species is listed as a Critical Element by the DNER

Ceiba pentandra (L.) Gaertn.

1935: FHS 88, 23 Jan, *Guánica (US!). This species is common in the mesic valleys and ravines outside of the Reserve and medium size trees were observed, but not collected within the northern boundaries. This species is listed as a Critical Element by the DNER

Corchorus siliquosus L.

(Quevedo et al., 1990: 147.) *Corchorus siliquosus* is a short-lived, suffrutescent herb found in sunny disturbed sites. It generally occurs in more mesic areas than the GFR and while it is found in the southwestern lowlands of Puerto Rico, it is not known from Guánica and the southern coastal plains. Its occurrence in the GFR is questionable.

Hibiscus furcellatus Lam.

1962: HAL 9286, 28 Jun, *Guánica (MAPR!). This species of *Hibiscus* is a suffrutescent to woody shrub that is found in open, sunny sites. While it is known from Guánica and Guaynilla, it is more common in wetter areas. If *Hibiscus furcellatus* occurs in the GFR, it would be in the northern more mesic areas.

Malvastrum americanum (L.) Torr.

1981: HAL 31592, 27 Jan, *Guánica, Salinas de Ensenada, road side at sea level (US!).

1915: NLB 4884, 5-8 Mar, vicinity of *Guánica (US!). **1913:** FLS 3080, 19 Sep, *Guánica (MAPR!). **1886:** PS 3537, 31 Jan, *inter* *Guánica *et* Yauco (US!). This weedy annual is found in open, disturbed habitats and may have occurred in the past within the Reserve around homes and pastures.

Malvastrum corchorifolium (Desv.) Britton ex Small

1914: JAS 2257, 8 Sep, *Guánica, Santa Rita (US!). **1913:** JRJ 989, 28 Aug, *Guánica, Santa Rita (US!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) This is a weedy suffrutescent annual of open habitats; it is often found in dry areas and would be expected to occur in disturbed areas in the Forest.

Malvastrum coromandelianum (L.) Garcke

1913: FLS 3064, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 148.) This weedy suffrutescent annual, like the previous two species would be expected in areas subject to human disturbance.

Melochia nodiflora Sw.

(Quevedo et al., 1990: 148.) *Melochia nodiflora* is a small, often weedy shrub found along roadsides and in grassland and other open, disturbed habitats. It could well have occur in the formerly populated areas of the forest.

Melochia pyramidata L.

1915: JAS 5013, Aug, *Guánica (US!). (Quevedo et al., 1990: 148.) This weedy species is found in open and grassy sites and probably occurred in former pasture areas in the Forest.

Sida acuta Burman f.

(Quevedo et al., 1990: 148, as *Sida stipularis* Cav.) This common weedy *Sida* is typically found in areas subject to frequent human disturbance and probably occurred around the houses, gardens and pastures in the formerly occupied areas of the Forest.

Sida glabra Mill.

1913: NLB 1877, 11-12 Mar, vicinity of *Guánica (US!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) This suffrutescent weed is common in open sunny areas in dry areas and would be expected to occur in the Reserve.

Sida glomerata Cav.

(Quevedo et al., 1990: 148.) This weedy *Sida* would not be unexpected in the GFR. It is very likely to have occurred around homes, pastures and gardens in the previously occupied areas of the Forest.

Sida rhombifolia L.

(Quevedo et al., 1990: 148.) *Sida rhombifolia* is most likely to have occurred in the formerly populated areas of the Reserve. It is a common, widespread suffrutescent weed.

Sida spinosa L.

(Quevedo et al., 1990: 148.) This slender, subwoody *Sida* species is often found in dry grasslands and would not be unexpected in present day grassy areas subject to fire or in the now extinct pastures of former times.

Sida urens L.

(Quevedo et al., 1990: 148.) *Sida urens* is generally found in more mesic habitats than found in the GFR. It is a weedy species and could possibly have occurred around the homes, gardens and pastures in the formerly occupied areas in the northern part of the Reserve.

Sidastrum multiflorum (Jacq.) Fryxell

(Quevedo et al., 1990: 148; Axelrod, unpublished.) This suffrutescent weedy species is found in sunny habitats. It occurs on limestone on Mona Island, so it should tolerate conditions in the GFR.

Waltheria calcicola Urb.

(Quevedo et al., 1990: 148.) This small shrub is rare in Puerto Rico having been collected recently only from Cabo Rojo and the coastal limestone hills of the Peñón de Ponce in Peñuelas. The latter site is rapidly being developed and the latter population is probably extirpated. Attempts should be made to establish the species in the Reserve. This species is listed as a Critical Element by the DNER.

Wissadula hernandioides (L'Hér.) Garcke

1913: FLS 3063, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 148, as *Wissadula amplissima* (L.) R.E.Fries; Axelrod, unpublished.) This weedy herb is found in disturbed sunny sites in the GFR.

Wissadula periplocifolia (L.) Presl

(Quevedo et al., 1990: 148.) This weedy species and the previous one are often confused, especially in older collections, and both occur in disturbed sites in the dry southern portions of Puerto Rico. While it could have occurred historically in the Preserve, it is just as likely that the report is based on a mis-determination.

Excluded species:

†**Gossypium barbadense* L.

(Little et al., 1974: 518; Chinae, 1990: 53.) Historically there has been considerable confusion as to *Gossypium* in Puerto Rico. Apparently, *Gossypium barbadense* only occurs in cultivation in Puerto Rico, and as cotton is no longer cultivated on the Island, this shrub is no longer found here. Chinae's reference to the species is based on the name used during the original planting. The taxonomy of *Gossypium* in Puerto Rico has a long history of confusion and it is not possible to know if they planted *Gossypium barbadense* or *Gossypium hirsutum*. If the former, it did not survive in the Forest; if the latter, it has persisted.

MARTYNIACEAE

Confirmation required before accepting into the flora:

Martynia annua L.

(Axelrod, unpublished.) This weedy herb occurs in dry areas of the Island and would not be unexpected in the GFR.

MELASTOMATACEAE

Confirmation required before accepting into the flora:

Tetrazygia elaeagnoides (Sw.) DC.

1961: HAL 9030, 30 Dec, *Guánica (MAPR!). (Axelrod, unpublished.) This shrub or small tree was not observed within the GFR; however it occurs in early secondary forests just north of the Reserve's boundaries and would be expected in the northern part of the Reserve.

MELIACEAE

**Swietenia mahogani* L.

2005: OMR 455, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail, from DRNA office always taking the trails to the north-northeast, leading to Road 334 close to El Maniel, elev 140 m (MAPR!). **1990:** RGG 3361, 18 Dec, Guánica, Bo. Carenero, GFR, elev 145 m (MAPR!). **1950:** ELL 13220, 3 Jul, GFR (US!). (Little and Wadsworth, 1964: 252; Quevedo et al., 1990: 146; Chinae, 1990: 53; Axelrod, unpublished.) This species was planted in plantations in the GFR in the 1940's. The plantations were subsequently abandoned. Mortality has occurred over the years, apparently due to hurricanes and severe droughts. Recruitment of the species is occurring with saplings observed in open sites with exposed soil. There is no evidence of the mahogany establishing in undisturbed forest.

Trichilia hirta L.

2005: OMR 323, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north, to an old campeche plantation, elev 104 m (MAPR!). **1962:** HAL 9282, 28 Jun, *Guánica (MAPR!). **1950:** ELL 13171, 30 Jun, GFR (US!). **1935:** FHS

585, 21 Mar, *Guánica (US!). (Little and Wadsworth, 1964: 254; Quevedo et al., 1990: 146; Axelrod, unpublished.) *Trichilia hirta* is a small tree early successional tree found in mesic areas of the GFR. It is mostly seen around the margins of the forest.

***Trichilia pallida* Sw.**

2006: OMR 843, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). This is a small tree found in a northern mesic canyon. Its occurrence in the Forest is surprising, as it generally is found in the wetter areas of Puerto Rico. **New record for the GFR.**

***Trichilia triacantha* Urb.**

2005: OMR 346, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, on a mesic canyon running north close to Susúa Baja, elev 70 m (MAPR!); OMR 494, 7 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to the north, at the main trail, elev 177 m (MAPR!). **1994:** ESV s.n., 28 Dec, Guánica, GFR, La Hoya Trail (MAPR!). **1990:** ESV 108, May, Guánica, GFR, towards the right side of the Las Cobanas Trail, when one goes from the road to the forest office (MAPR!). **1886:** PS 3749, 13 Feb, *prope* Guánica *sylvia montana ad* Cobana [GFR] (US!). (Little et al., 1974: 362; Quevedo et al., 1990: 146; Axelrod, unpublished.) This endemic shrub or small tree is found in the more mesic areas of the GFR. It is listed as an Endangered Species by the US Fish and Wildlife Service and as a Critical Element by the DNER.

Confirmation required before accepting into the flora:

****Melia azedarach* L.**

(Little et al., 1974: 987.) This small, exotic tree occurs in secondary dry forests elsewhere in Puerto Rico, where it primarily is found along the margins.

MENISPERMACEAE

***Hyperbaena laurifolia* (Poir.) Urb.**

2006: MCO 1337, 12 Nov, Yauco, Bo. Susua Baja, [GFR] south of the municipal dump of Yauco (UPR!). This woody vine is rare in the Reserve and in dry areas in general. It is usually found in the more mesic coastal limestone forests in the northern part of the Island. **New record for the GFR.**

MOLLUGINACEAE

Confirmation required before accepting into the flora:

****Mollugo nudicaulis* Lam.**

1886: PS 3596, 02 Feb, *Guánica, *loris cultis* (US!). *Mollugo nudicaulis* is a small herb found on exposed soil under sunny conditions in dry areas of Puerto Rico. It could possibly occur in Reserve, but at least in present times it is not known from the surrounding area.

MORACEAE

***Ficus citrifolia* Mill.**

2005: OMR 311, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 9 m (MAPR!); OMR 587, 10 Nov,

Guánica, Bo. Carenero, GFR, along Road 333, close to the Ochoa pier, elev 17 m (MAPR!). **1991:** *FSA 2911*, 7 Sep, Yauco, GFR, along Murciélago Trail from Campamento, on slope opposite limestone plateau, elev 50-70 m (MAPR!). **1984:** *JES 18*, 6 Oct, Guánica, GFR, around Playa Tamarindo, elev 5 m (MAPR!). **1964:** *HAL 10788*, 1 Apr, *Guánica, coastal thickets (MAPR!). **1959:** *GLW 8840*, 9 Jul, Guánica, GFR (US!). **1950:** *ELL 13254*, 5 Jul, GFR (US!). **1886:** *PS 3855*, 20 Feb, Guánica, *sylvia* ad Cobana [GFR] (US!). (Little and Wadsworth, 1964: 70 as *Ficus laevigata* Vahl; Quevedo et al., 1990: 145; Axelrod, unpublished.) This is a common tree throughout the GFR.

***Ficus trigonata* L.**

2006: *OMR 650*, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!); *OMR 842*, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). This tree is only known from a single locality in the Forest, but it would be expected to occur in similar mesic canyons along the northern boundary. **New record for the GFR.**

***Maclura tinctoria* (L.) D. Don ex Steud.**

2006: *OMR 746*, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, elev 44 m (MAPR!). **1886:** *PS 3760*, 13 Feb, Guánica, *sylvia* monte Cobana [GFR] (US!). (Axelrod, unpublished.) *Maclura tinctoria* is a rare tree within the Reserve. It is known only from a single individual found in a mesic canyon near the northern boundary. **New record for the GFR.**

Confirmation required before accepting into the flora:

***Ficus americana* Aubl.**

(Little and Wadsworth, 1964: 74.) It is very unlikely that this tree ever occurred in the GFR. It is found in mesic to wet forests.

****Ficus microcarpa* L. f.**

(Little et al., 1974: 985; Chinea, 1990: 53.) This tree species was planted in the forest in the past, but apparently has not persisted. It generally is found in more mesic habitats.

MORINGACEAE

****Moringa oleifera* Lam.**

2005: *OMR 537*, 6 Oct, Guánica, Bo. Carenero, GFR, Road 334 to the ranger office, close to the antenna, elev 187 m (MAPR!). (Axelrod, unpublished.) This introduced tree was apparently planted as it is found in a formerly populated area in El Maniel. **New record for the GFR.**

MYRSINACEAE

***Ardisia obovata* Desv. ex Ham.**

2004: *OMR 254*, 11 Nov, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, elev 110 m (MAPR!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) *Ardisia obovata* is a small, shade-tolerant understory tree that is found in mesic and dry forests in Puerto Rico. In the GFR it is rare being known

from only a single individual, but was probably more common in pre-Columbian times before the forests in the mesic canyons were cut.

MYRTACEAE

Calypttranthes pallens (Poir.) Griseb. var. *pallens*

2006: OMR 745, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, elev 45 m (MAPR!). **2005:** OMR 474, 475, 25 Aug, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail to the north, at old campeche plantation (zinc house), taking a canyon to the north of the forest, elev 48 m (MAPR!); OMR 343, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail on a mesic canyon running north close to Susúa Baja, elev 70 m (MAPR!). (Little et al., 1974: 632; Quevedo et al., 1990: 148; Axelrod unpublished.) This *Calypttranthes* species is common shrub or small tree in coastal forests on limestone throughout the Caribbean. However, is uncommon in the GFR.

Eugenia axillaris (Sw.) Willd.

2007: OMR 881, 3 Apr, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 following La Cobana Trail, north forest boundary by La Trichilia Canyon, elev 100 m (MAPR!). **2006:** OMR 627, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, at the first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 68 m (MAPR!). **2005:** OMR 371, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, Cañon las Trichilia, on mesic canyon, elev 90 m (MAPR!). **2002:** GJB 6643, 17 Oct, Guánica, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1991:** BB 10041, 6 Jan, GFR (US!). (Little et al., 1974: 642; Quevedo et al., 1990: 148; Axelrod, unpublished.) This shrub or small tree occurs scattered in the evergreen forest of the Reserve.

Eugenia foetida Pers.

2005: OMR 310, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 11 m (MAPR!); OMR 355, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 138 m (MAPR!); OMR 405, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, along Road 334, to the forest main office, elev 216 m (MAPR!). **2003:** OMR 104, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanitas Trail, elev 150 m (MAPR!). **1995:** PAR 7694, 12 Oct, Guánica, GFR, south area of forest, off Road 333, forest along canyons (US!). **1990:** RGG 3328, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1989:** PAR 3027, 7 Oct, Guánica, GFR, along main road to ranger's station (US!). **1964:** HAL 10578, 1 Jan, Guánica, GFR, on rocks, in thickets, elev 100 m (MAPR!); AGM 2713, 2 Oct, Guánica, GFR (MAPR!). **1962:** HAL 9133, 23 Jun, Guánica, GFR, coastal thickets (MAPR!). **1961:** HAL 9031, 30 Dec, Guánica, GFR, coastal thickets (MAPR!). **1959:** GLW 8815, 9 Jul, Guánica, GFR (US!). **1944:** JIO 815, 2 Apr, Guánica, GFR, Guánica Forest (US!). **1944:** MC 1165, 1166, 2 Apr, Guánica, GFR (MAPR!). **1940:** LEG 215, 11 Oct, Guánica, GFR, near Campamento Borinquen (US!); LEG 204, 11 Oct, Guánica, GFR, Close to Campamento Borinquen (US!); LEG 202, 11 Oct, Guánica, GFR, Gutierrez Farm, north of Campamento Borinquen (US!). **1915:** NLB 4912, 5-8 Mar, *Guánica, Salinas de Guánica (US!). **1913:** FLS 3113, 19 Sep, *Guánica (MAPR!). (Little et al.,

1974: 660; Quevedo et al., 1990: 148; Axelrod, unpublished.) This is one of the most common shrubs or small trees in the GFR. The foliage can be very odoriferous in some individuals, so that you often smell the plant before seeing it. It is not clear if the variation in odor is genetic or due to local conditions.

Eugenia ligustrina (Sw.) Willd.

2004: OMR 239, 241, 30 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, at the junction with other trail, taking the canyon to the north, elev 110 m (MAPR!). **1990:** GJB 3701, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); RGG 3355, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1962:** HAL 9150, 23 Jun, *Guánica (MAPR!). **1948:** LL s.n., 8 Aug, *Guánica (MAPR!). (Little et al., 1974: 658; Quevedo et al., 1990: 148; Axelrod, unpublished.) *Eugenia ligustrina* grows a small tree in the more open sunny coastal thickets, but further inland in the shady understory of the evergreen forest it is a shrub.

Eugenia monticola (Sw.) DC.

2005: OMR 472, 25 Aug, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail to the north, at old campeche plantation (zinc house), taking a canyon to the north of the forest, elev 48 m (MAPR!). **1983:** SMC 94, 8 Oct, GFR, Campamento Borinquen, Lluveras Trail, km 5.6 (MAPR!). **1964:** HAL 10633, 3 Jan, Guánica, GFR, thickets, elev 50-60 m (MAPR! US!). **1962:** HAL 9128, 23 Jun, *Guánica (MAPR!). (Little et al., 1974: 662; Quevedo et al., 1990: 148; Axelrod, unpublished.) This shrub/small tree is uncommon within the GFR, being restricted to the more mesic areas in the north.

Eugenia rhombea Krug & Urb.

2006: OMR 846, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!); OMR 849, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, entrance to El Cedro, elev 79 m (MAPR!). **2005:** OMR 349, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, at the top of a hill to the west of a mesic canyon running north close to Susúa Baja, elev 85 m (MAPR!); OMR 531, 6 Oct, Guánica, Bo. Carenero, GFR, Cañon Los Murciélagos, from ranger office taking a trail to the south, elev 61 m (MAPR!). **2003:** OMR 112, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanitas Trail, on the first turn to the left on the main trail to a small *Trichillia triacanta* population, elev 110 m (MAPR!); OMR 121, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita, from DRNA office south to Cañon de los Murciélagos, elev 140 m (MAPR!). **1991:** FSA 2898, 7 Sep, Guánica, GFR, along Murciélago Trail from campamento, elev 50-150 m (MAPR!). **1990:** GJB 3698, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); RGG 3357, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1987:** PAR 2237, 29 Sep, Guánica, GFR (US!). **1984:** SDM 28, 6 Oct, Guánica, GFR, along jeep trail opposite km 4.9, 0.7 km by road from Campamento Borinquen towards Luna, elev 195 m (MAPR!). **1983:** SMC 120, 11 Nov, Guánica, GFR, Tamarindo sector (MAPR!). **1964:** HAL 10582, 1 Jan, GFR (US!). **1963:** HAL 9755, 27 Jun, Guánica, GFR, dry coastal thickets (MAPR!). **1962:** HAL 9131, 23 Jun, Guánica, GFR, coastal thickets (MAPR!). **1950:** ELL 13180, 1 Jul,

GFR (US!). (Woodbury & Wadsworth, 1964: 406; Quevedo et al., 1990: 148; Axelrod, unpublished.) *Eugenia rhombea* is a common shrub throughout the Reserve.

Eugenia woodburyana Alain

1995: PAR 7690, 12 Oct, Guánica, GFR (US!). **1964:** HAL 10617, 2 Jan, Guánica, GFR, dry thickets (MAPR!). **1946:** RNG s.n., 28 Sep, Guánica, GFR (MAPR!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) This small tree is listed as federally endangered by Fish and Wildlife Service and as a Critical Element by the DNER. It is rare within the GFR, where it occurs in canyons and ravines.

Mosiera xerophytica (Britton) Salywon

2006: OMR 728, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, at La Jungla, elev 8 m (MAPR!). **2005:** OMR 348, 2 Jul, Guánica, Bo. Carenero, GFR, from Road 334 taking Las Cobanas Trail, top of a hill to the, west of a mesic canyon runing north close to Susúa Baja, elev 85 m (MAPR!). **2002:** GJB 6642, 17 Oct, Guánica, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1996:** PAR 7868, 25 Jan, Guánica, GFR (US!). **1992:** FSA 4598, 1 Jun, Guánica, Bo. Montalva, GFR, jeep road along Monte de la Brea, elev 10-50 m (MAPR!). **1991:** GRP 47258, 6 Nov, GFR, upper end of Hoya Las Picuas, north of Caña Gorda (SJ!); GRP 46767, 8 Mar, GFR, along track north of Playa Tamarindo (SJ!). **1990:** GRP 46429, 2 Jul, GFR, Guánica. Bo. Carenero, Quebrada El Cedro, north side of Lomas de Seboruco (SJ!); GRP 46475, 17 Oct, GFR, Guayanilla, Bo. Boca, Guitarra area, northeast of Punta Vaquero (US!). **1986:** GJB 3194, 17 Apr, Guánica, GFR, low, limestone hills on north side of Road 333, between Balneario de Caña Gorda and Playa Tamarindo (MAPR!). **1962:** HAL 9141, 23 Jun, *Guánica (MAPR!). **1940:** LEG 192, 11 Oct, GFR, Guánica Forest (US!). **1913:** FLS s.n., 19 Sep, *Guánica (MAPR!). (Little et al., 1974: 676, as *Eugenia xerophytica* Britton; Quevedo et al., 1990: 148, as *Eugenia xerophytica*; Axelrod, unpublished.) This shrub or small tree is endemic to the dry coastal forests of Puerto Rico. It is uncommon within the GFR and should be evaluated to determine if listing is needed.

Myrcianthes fragans (Sw.) McVaugh

2006: OMR 664, 9 Feb, Guayanilla, Bo. Boca, GFR, end of paved Road 333, taking a dirt road to the north from Playa Tamarindo, sapo concho pond to the caves, elev 49 m (MAPR!). **2005:** OMR 491, 7 Sep, Guánica, Bo. Carenero, GFR, from Road 334 taking Las Cobanas Trail to the north, mesic area at Cañon de las Trichilia, elev 85 m (MAPR!). **1992:** MFQ 478, 10-17 Feb, GFR, Guánica, mahogany plantation (UPR!). **1977:** ROW s.n., 15 Feb, Guánica, Ensenada (US!). **1963:** HAL 9766, 27 Jun, *Guánica, dry coastal thickets (MAPR! US!). (Little et al., 1974: 686; Quevedo et al., 1990: 148; Axelrod, unpublished.) This tree is uncommon within the GFR where it is found in mesic canyons. This species is listed as a Critical Element by the DNER.

Myrciaria borinquena Alain

2006: OMR 642, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2005:** OMR 480, 25 Aug, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail to the north, at old campeche plantation (zinc house) taking a canyon to the north of the forest, elev 48 m (MAPR!). (Axelrod, unpublished.) This shrub is endemic to southwestern Puerto Rico and is rare within the GFR, and uncommon or even rare in Puerto Rico in general. This species is listed as a Critical Element by the

DNER. It should be considered for listing by the U.S. Fish and Wildlife Service. **New record for the GFR.**

Confirmation required before accepting into the flora:

Calyptanthus sintenisii Kiaerskov

(Axelrod, unpublished.). This citation surely must be an error as this understory shrub or small tree is otherwise only known from mesic forests.

**Eucalyptus rostrata* Schlecht.

(Chinea, 1990: 53) This exotic tree was planted in plantations in the GFR in the 1940's. It apparently failed to establish.

**Eucalyptus robusta* Sm.

(Chinea, 1990: 53) *Eucalyptus robusta*, which is generally found in more mesic areas in Puerto Rico was planted in plantations in the Forest. There is no evidence that the species very established.

Eugenia biflora (L.) DC.

(Little et al., 1974: 644; Little et al., 1974: 646, as *Eugenia boqueronensis* Britton; Quevedo et al., 1990: 148.) This is a wide-spread shrub or small tree occurring in both mesic and dry forests in Puerto Rico. It is found in Guayanilla on limestone and on Mona Island. The lack of collections from the GFR is puzzling.

Eugenia procera (Sw.) Poir.

(Quevedo et al., 1990: 148; Axelrod, unpublished.) This shrub/small tree is not common in Puerto Rico, but it is found on limestone on the north coast and south coast of the Island and is to be expected in the GFR.

Mosiera longipes (O. Berg) Small

(Quevedo et al., 1990: 148, as *Eugenia bellonis* Krug & Urb.; Axelrod, unpublished.) This is a rare shrub in the Puerto Rican flora, although it occurs elsewhere in the Bahamas and Antilles. Axelrod cites specimens of it from Caja de Muertos, Ponce, Guánica Forest Reserve, and Vieques. The Caja de Muertos collection was made in 1959 (UPR) and consisted of a juvenile plant (the entire plant was taken). Breckon (unpublished checklist) failed to locate any other individuals in his survey of the island in 2003. The Vieques specimens were collected by Woodbury in 1978 (UPR) and by Proctor in 1992 (SJ). Both were from mature plants growing in a dense scrub on limestone at the extreme eastern end of the island. That population is no longer extant. The status of the Ponce population is unknown, but the lower limestone hills of Ponce are undergoing rapid development making its continued existence very questionable. It is critical to evaluate the status of this species in the Forest.

Myrciaria floribunda (West ex Willd.) Berg.

(Little et al., 1974: 688.) *Myrciaria floribunda* is a small tree that could possibly occur in the more mesic canyons in the northern part of the Forest.

**Psidium guajava* L.

(Quevedo et al., 1990: 148.) Guayaba was not found by me within the GFR; however it is common at agricultural areas around the Reserve. It is a shade intolerant shrub or small tree that is common in hedgerows and invades degraded pastures. It may have occurred around formerly occupied areas in the Forest.

NYCTAGINACEAE

***Boerhavia coccinea* Mill.**

2003: OMR 155, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda, to the north of Road 333, at the entrance of Hoya Honda Canyon, elev 57 m (MAPR!). **1886:** PS 3917, 2 Apr, *prope* *Guánica, *ad riparian fluminis ad* Barina [probably collected in Yauco] (US!). (Axelrod, unpublished.) This herb occurs on the rocky slopes and flats along Road 333. **New record for the GFR.**

***Boerhavia diffusa* L.**

2005: OMR 424, 11 Aug, Guánica, Bo. Montalva, GFR, at rocky plateau west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 12 m (MAPR!). **2005:** OMR 334, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 56 m (MAPR!). **2005:** OMR 290, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, by the sapo concho pond, elev 5 m (MAPR!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) *Boerhavia diffusa* is more common than the previous species, occurring on rocky flats and slopes and in recently disturbed areas.

***Boerhavia erecta* L.**

2006: OMR 709, 11 May, Yauco, Bo. Barina, GFR, Road 333 by Punta Ballena, at surfing area, elev 2 m (MAPR!). **2003:** OMR 153, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda, to the north of Road 333 at the entrance of Hoya Honda Canyon, elev 57 m (MAPR!). **1913:** FLS 310, 1 Feb, *Guánica (MAPR!). This herb is found in openings on exposed limestone and in recently disturbed areas. (Axelrod, unpublished.) **New record for the GFR.**

****Bougainvillea x buttiana* Holtum & Standley**

2006: OMR 730, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, at the entrance to La Jungla, elev 2 m (MAPR!). This species was planted and is still persistent in formerly populated area of La Jungla. (Axelrod unpublished.) **New record for the GFR.**

***Commicarpus scandens* (L.) Standl.**

2005: OMR 419, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 2 m (MAPR!). **1999:** PAR 10801, 29 Jan, Guánica, GFR, along main road to ranger station (US!). **1996:** PAR 7892, 25 Jan, Guánica, GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This climbing shrub is relatively common along the coast generally occurring in at the edges of shrubby thickets on sandy soil.

***Guapira discolor* (Spreng.) Little**

2006: OMR 604, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, entrance to La Jungla, elev 1 m (MAPR!); OMR 713, 11 May, Yauco, Bo. Barina, GFR, Road 333 by Punta Ballena, at surfing area, elev 2 m (MAPR!). **1963:** HAL 9769, 27 Jun, *Guánica, dry coastal thicket (US!). **1962:** HAL 9172, 23 Jun, *Guánica (MAPR!). **1915:** NLB 4853, 2-4 Mar, *Guánica, limestone hill at Punta Montalva (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) *Guapira discolor* a shrub/small tree that is most common in dryer low forest of the Reserve. This species is listed as a Critical Element by the DNER.

***Guapira domingensis* (Heimerl) Alain**

2006: *OMR 621*, 13 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail, elev 134 m (MAPR!); *OMR 766*, 20 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking La Cobana Trail to the north, elev 45 m (MAPR!); *OMR 626*, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 68 m (MAPR!); *OMR 636*, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!); *OMR 644*, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!); *OMR 677*, 30 Apr, Guánica, Bo. Carenero, GFR, from Road 334 taking El Fuerte Trail, elev 142 m (MAPR!); *OMR 740*, 743, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, elev 50 m (MAPR!); *OMR 754*, 5 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking La Cobana Trail to the north, elev 45 m (MAPR!); *OMR 760*, 761, 6 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking La Cobana Trail to the north, elev 45 m (MAPR!). **2005:** *OMR 476*, 25 Aug, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail to the north, old campeche plantation (zinc house) taking a canyon to the north of the forest, elev 48 m (MAPR!); *OMR 492*, 7 Sep, Guánica, Bo. Carenero, GFR, from Road 334 taking Las Cobanas Trail to the north, elev 134 m (MAPR!). **2004:** *OMR 243*, 30 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, elev 110 m (MAPR!). **1990:** *GJB 3718*, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); *RGG 3335*, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). (Little et al., 1974: 166; Quevedo et al., 1990: 145, as *Guapira obtusata* (Jacq.) Little; Axelrod, unpublished.) *Guapira domingensis* is relatively common throughout the deciduous and evergreen forests of the GFR. This species previously was known as *Guapira obtusata*, which is restricted to the Bahamas and Cuba (Axelrod, unpublished.). This species is listed as a Critical Element by the DNER.

Guapira fragrans (Dum. Cours.) Little

2005: *OMR 344*, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, on a mesic canyon running north close to Susúa Baja, elev 70 m (MAPR!); *OMR 489*, 7 Sep, Guánica, Bo. Carenero, GFR, from Road 334 taking Las Cobanas Trail to the north, mesic area at Cañon de las Trichilia, elev 85 m (MAPR!). (Little et al., 1974: 985; Quevedo et al., 1990: 145; Axelrod, unpublished.) *Guapira fragrans* is restricted to mesic canyons within the Forest. It is a common tree in lowland dry and mesic forests elsewhere on the Island.

Neea buxifolia (Hook. f.) Heimerl

1983: *SMC 96*, 8 Oct, GFR, Campamento Borinquen, Lluveras Trail, km 5.6 (MAPR!). This small shrub was observed by the author in a mesic ravine in the north of the Forest at El Cedro. While it is most abundant in the mesic forest on limestone along the north coast of Puerto Rico, it also occurs in dry forests on Vieques and in the Sierra Bermeja. (Axelrod, unpublished.) **New record for the GFR.**

Pisonia aculeata L.

2006: OMR 654, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). *Pisonia aculeate* is liana that with stout thorns. It was only observed in El Cedro, but is characteristic of forest openings and disturbed areas outside the GFR. (Axelrod, unpublished.) **New record for the GFR.**

***Pisonia albida* (Heimerl) Britton**

2006: OMR 673, 30 Mar, Guánica, Bo. Carenero, GFR, from Road 334 taking El Fuerte Trail to the west, elev 151 m (MAPR!). **1987:** GRP 43380, 19 Apr, Guánica, GFR, Road 333, km 4.65, sea level (US!). **1986:** GJB 3147, 24 Mar, Guánica, GFR, between km 5.6-5.7 along Fuente Trail, elev 110-130 m (MAPR!); GJB 3181, 17 Apr, Guánica, Bo. Lomas de Seboruco, GFR, about 25 m from junction on dirt road west off of Road 334, between entrance to forest & radio antenna, elev 130 m (MAPR!); GJB 3191, 17 Apr, Guánica, GFR, limestone hills on north side of Road 333, km 4.4-4.5 ca. 1 km by road west of Balneario de Caña Gorda (MAPR!). **1985:** DCW 1309, 4 Apr, GFR, dry coastal thicket near sea level (US!). **1964:** HAL 10611, 2 Jan, GFR, dry thicket at sea level (US!). **1962:** HAL 9145, 23 Jun, *Guánica (MAPR!); HAL 10786, 1 Apr, *Guánica, coastal thickets (MAPR! US!). **1950:** ELL 13219, 3 Jul, GFR (US!). **1948:** MS 101, 1 May, GFR (MAPR!). **1944:** MC 1150, 2 Apr, GFR (MAPR!). **1913:** NLB 1902, 11-12 Mar, vicinity of *Guánica (US!). **1886:** PS 3869, 2 Mar, *prope* *Guánica, *sylvis litora inter* Barina *et* la Boca [probably collected between Yauco and Guayanilla] (US!). (Little & Wadsworth, 1964: 88; Quevedo et al., 1990: 145; Axelrod, unpublished.) This tree has a very wide distribution in the GFR, occurring from coastal scrubland to dry rocky slopes and ridges to evergreen forests in mesic canyons.

Confirmation required before accepting into the flora:

***Pisonia subcordata* Sw.**

(Axelrod, unpublished.) The taxonomy of *Pisonia* is currently in a state of flux, with the addition of new species. This citation may be in error due to taxonomic confusion that exists within the group. On the other hand, while *Pisonia subcordata* is generally associated with the more mesic forests along the north coast of Puerto Rico, it does occur in dry forests on limestone in Vieques.

OLACACEAE

***Ximenia americana* L.**

2005: OMR 295, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, by the sapo concho pond, slope northeast side of the pond, elev 30 m (MAPR!). **1997:** GJB 5154, 5 Aug, Guayanilla, Bo. Boca, GFR, along unpaved Road 333 to east of Punta Vaquero, elev 10 m (MAPR!). **1995:** PAR 7686, 12 Oct, Guánica, GFR, along Road 334, a few km from ranger's station (US!). **1964:** HAL 10792, 1 Apr, *Guánica, coastal thickets (MAPR!). **1940:** LEG 179, 10 Oct, GFR, Guánica Forest (US!). **1925:** NLB 8327, 9 Mar, *Guánica, Salinas de Guánica (US!). **1915:** NLB 4910, 4952, 5-8 Mar, vicinity of *Guánica (US!). **1913:** NLB 1918, 11-12 Mar, vicinity of *Guánica (US!). **1886:** PS 3530, 28 Jan, *prope* *Guánica, *sylva Montana ad* Punta de los pescadores (US!); PS 3767, 13 Feb, [GFR], *prope* Guánica, *sylvis litoralis ad* Caña

Gorda [GFR] (US!). (Woodbury et al., 1974: 146; Axelrod, unpublished.) This small shrub only occurs in low dry forest and shrubby thickets along the coast in the Reserve.

OLEACEAE

Chionanthus holdridgei (Camp & Monachino) Stearn

2006: OMR 643, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **1990:** RGG 3364, 18 Dec, Guánica, Bo. Carenero, GFR, elev 145 m (MAPR!). **1964:** HAL 10592, 1 Jan, GFR, dry thickets, elev 80 m (MAPR! US!). **1940:** LEG 178, 10 Oct, GFR (US!). (Little et al., 1974: 822, as *Linociera holdridgii* Camp & Monachino; Quevedo et al., 1990: 149; Axelrod, unpublished.) This small endemic tree is rare within the GFR. It is also collected once in 1995 in the limestone hills next to highway 2 in Guayanilla, where there are a number of large electrical towers. That area is subject to extensive cutting and clearing. There are several collections of it from one limestone hill on the east side of Road 113 next to highway 2 in Quebradillas. The species is most common in the nearby Susúa Forest Reserve where it occurs on serpentine. *Chionanthus holdridgei* is rare outside of Susúa Forest and should be evaluated for protective status. This species is listed as a Critical Element by the DNER

Forestiera eggersiana Krug & Urb.

1992: PAR 4775, 15 Jan, Guánica, GFR (US!). This shrub was not observed by the author during the field survey. It is found in dry woodlands and xeric forests in Puerto Rico, the Virgin Islands and St. Bards. It is relatively uncommon in Puerto Rico and its status should be evaluated. **New record for the GFR.**

Forestiera segregata (Jacq.) Krug & Urb.

2006: OMR 607, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 15 m (MAPR!). **2005:** OMR 526, 22 Sep, Guánica, Bo. Carenero, GFR, Ballena Trail, from Road 333 to the north, top of a hill to the west of the trail, elev 63 m (MAPR!). **1998:** PAR 10172, 23 Jan, Guánica, Sector Montalva, Ensenada, GFR (US!). **1996:** PAR 7889, 25 Jan, Guánica, GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!); GJB 4900, 26 Sep, Yauco, Bo. Barina, GFR, south facing, coastal slopes in low, limestone hills on north side of Bahía Ballena, elev 100 m (MAPR!). **1940:** LEG 303, 23 Oct, Guánica, GFR, Caña Gorda (US!). **1886:** PS 3432, 25 Jan, *prope* Guánica, Monte Manglillo [GFR] (US!); PS 3721, 10 Feb, *prope* Guánica, *rupibus summi montis* El Maniel [GFR] (US!). (Little et al., 1974: 808; Quevedo et al., 1990: 149; Axelrod, unpublished.) This shrub is relatively common in the GFR, where it is found on exposed slopes and hilltops in the low deciduous woodlands and forest.

**Jasminum fluminense* Vell.

2005: OMR 385, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, at the entrance to Las Cobanas Trail, elev 64 m (MAPR!). **1996:** PAR 7872, 25 Jan, Guánica, GFR (US!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This exotic liana is very common in trees and higher shrubs along the road and in young secondary forest.

ONAGRACEAE

Confirmation required before accepting into the flora:

Ludwigia octovalvis (Jacq.) P.H Raven

(Quevedo et al., 1990: 148.) *Ludwigia octovalvis* is a shubby annual that is common in wetlands and in weedy areas such as drainage ditches. It was not observed by me in the GFR.

ORCHIDACEAE

Dendrophylax porrectus (Rchb. f.) Carlswald & Whitten

2006: OMR 622, 13 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail to Cañon las trichilias, elev 100 m (MAPR!); OMR 624, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 79 m (MAPR!). **2004:** OMR 246, 30 Oct, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, junction with other trail taking the canyon to the north, elev 100 m (MAPR!). This orchid species is rare within the GFR and occurs as an epiphyte in trees in mesic canyons along the northern boundary of the Forest at La Cobana. **New record for the GFR.**

Ionopsis utricularioides (Sw.) Lindl.

2006: OMR 741, 1 Jun, Yauco, Bo. Barina, GFR, Lomas de Seboruco, from old campeche plantation taking a canyon to the north, elev 50 m (MAPR!). **2005:** OMR 481, 25 Aug, Yauco, Bo. Barina, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail to the north, at old campeche plantation (zinc house) taking a canyon to the north of the forest (to the forest boundary), elev 48 m (MAPR!). (Axelrod, unpublished.) This orchid is very rare within the GFR and only occurs as an epiphyte in mesic canyons in the northern boundary of the forest in La Cobana. **New record for the GFR.**

Mesadenus lucayanus (Britton) Schltr.

2006: OMR 620, 13 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail, elev 186 m (MAPR!). (Quevedo et al., 1990: 145 as *Spiranthes polyantha* Rchb.f.; Ackerman, 1995: 116, as to the municipality of Guánica, as *Mesadenus polyanthus* (Reichenbach f.) Schlechter; Axelrod, unpublished.) This terrestrial orchid was only seen once by me in a trail. Axelrod (unpublished.) only reports it from Las Piedras Chiquitas, which are along the border of Salinas and Coamo, and Guánica Forest Reserve, but Ackerman cites it from seven municipalities and Mona Island and describes it as “locally abundant but generally uncommon,” occurring most often in coastal scrub in dry regions.

**Oeceoclades maculata* (Lindl.) Lindl.

2006: OMR 844, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter the forest by La Luna, following the trail north-northwest to canyon, El Cedro, elev 60 m (MAPR!). **2005:** OMR 493, 7 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to the north, at the main trail, elev 138 m (MAPR!). **2004:** OMR 250, 30 Oct, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, junction with other trail taking the canyon to the north, elev 100 m (MAPR!). (Ackerman, 1995: 119, as to the municipality of Guánica; Axelrod, unpublished.) This exotic terrestrial orchid is very common throughout the

GFR, occurring in light to dense shade of deciduous and evergreen forests. The species is invasive and its competitive impact on native understory species needs to be assessed.

***Psychilis krugii* (Bello) Saulea**

2006: OMR 686, 6 Apr, Yauco, Bo. Barina, GFR, end of paved Road 333, taking the trail north to the cave, at a small canyon to the left of the dirt road, after the small trail to the cave, elev 40 m (MAPR!); OMR 776, 18 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333, trail east to Punta Vaquero, La Guitarra Trail, elev 15 m (MAPR!). **2005:** OMR 342, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, on a mesic canyon running north close to Susúa Baja, elev 80 m (MAPR!). **2004:** OMR 235, 2 Oct, Guayanilla, Bo. Boca, GFR, Playa Tamarindo at the end of paved Road 333, from the sapo concho pond taking the trail north to the cave, elev 17 m (MAPR!). **2003:** OMR 113, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanitas Trail, first turn to the left on the main trail to a small *Trichillia triacanta* population, elev 110 m (MAPR!); OMR 201, 21 Nov, Guánica, Bo. Carenero, GFR, small canyon north of Road 333, just before Caña Gorda recreative area, north of the road about 65-100 m, elev 40 m (MAPR!). **1996:** GJB 4694, 1 Feb, Guayanilla, Bo. Boca, GFR, east of Playa Tamarindo, elev 10-20 m (MAPR!). **1988:** GRP 44516, 27 Feb, Guayanilla, Bo. Boca, Punta Verraco (SJ!). **1987:** GRP 44320, 9 Dec, GFR, Guánica, Bo. Montalva, interior slopes of Monte Brea (SJ!). **1986:** GRP 41769, 4 Jun, GFR, Road 333, km 7.2 (SJ!). **1983:** GRP 39363, 20 Jul, GFR, Road 333, east of Caña Gorda (SJ!). (Quevedo et al., 1990: 145; Ackerman, 1995: 149, as to the municipality of Guánica; Axelrod, unpublished.) This epiphytic species is generally found at the base or lower trunk of trees or shrubs; is the most common orchid in the GFR. It is becoming rarer due to over-collecting. This species is listed as a Critical Element by the DNER.

***Tolumnia variegata* (Sw.) Braem**

2006: OMR 739, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, elev 50 m (MAPR!). **2005:** OMR 340, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, on a mesic canyon running north close to Susúa Baja, elev 85 m (MAPR!). (Quevedo et al., 1990: 145, as *Oncidium variegatum* (Sw.) Sw.; Ackerman, 1995: 161, as to the municipality of Guánica; Axelrod, unpublished.) This small epiphytic orchid occurs on the outer branches and twigs of trees and shrubs in mesic canyons. It is rare in the Reserve, but common in more mesic areas of Puerto Rico, especially in old or abandoned coffee plantations.

***Vanilla barbellata* Rchb. f.**

2006: OMR 690, 6 Apr, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking El Fuerte Trail, close to the entrance to Hoya Honda, elev 151 m (MAPR!). **2003:** OMR 109, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanitas Trail, first turn to the left on the main trail, to a small *Trichillia triacanta* population, elev 125 m (MAPR!). **1992:** GRP 47505, 5 Jan, GFR, Guánica, Bo. Carenero, near upper end of Hoya Honda, north of Caña Gorda (UPR!). **1988:** GRP 44519, 27 Feb, GFR, Guayanilla, Bo. Boca, Punta Verraco (UPR!). (Quevedo et al., 1990: 145; Ackerman, 1995: 171, as to the municipality of Guánica; Acevedo-Rodríguez, 2005: 430; Axelrod, unpublished.) This succulent vine is characteristic more open, low deciduous forest where it trails on the ground and climbs in the shrubs and low trees.

Confirmation required before accepting into the flora:

Psychilis kraenzlinii (Bello) Sauleda

(Quevedo et al., 1990: 145; Ackerman, 1995: 149, as to the municipality of Guánica.)

This species was not observed during the field survey. Like other species of *Psychilis* it is found in light to open shade of shrubby forests. It is typically found in more mesic coastal scrub forests of the north coast and in Susúa Forest and its occurrence in Guánica Forest is very questionable. This species is listed as a Critical Element by the DNER.

Vanilla claviculata Sw.

(Ackerman, 1995: 174, as to the municipality of Guánica; Acevedo-Rodríguez, 2005: 430.)

PAPAVERACEAE

Confirmation required before accepting into the flora:

Argemone mexicana L.

1964: AGM 2613, 16 Apr, *Guánica, road to the forest near sugar cane field ditch (MAPR!). **1951:** AGM 244, 20 Apr, *Guánica, Bo. Montalva, Ensenada, (MAPR!). **1948:** AGM 104, 105, 1 May, *Guánica (MAPR!). **1940:** MRT s.n., 1 May, GFR (MAPR!). **1935:** FHS 55, 12 Feb, *Guánica (US!). **1913:** FLS 347, 3 Feb, *Guánica (MAPR!). **1886:** PS 3963, 4 Mar, *Guánica, *circa oppidum* (US!). This herb of open disturbed sites is common in the dry parts of the Island and is to be expected in the forest.

PASSIFLORACEAE

Passiflora berteriana Balb. ex DC.

2007: OMR 870, 17 Feb, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 following the dirt road to Manglillo, elev 30 m (MAPR!). (Liogier, 1994: 291; Acevedo-Rodríguez, 2005: 329; Axelrod, unpublished.) *Passiflora berteriana* is known from Cuba, Hispaniola and Puerto Rico. In Puerto Rico it is found only in the GFR, where it is extremely rare. Only a single individual was seen during this study. The species requires study and protection.

Passiflora bilobata Juss.

2005: OMR 354, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 138 m (MAPR!). **2003:** OMR 138, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on the Cobanas Trail north to the Cañon las trichilias, elev 186 m (MAPR!). **2000:** PAR 11422, 6 Sep, GFR (US!). **1995:** PAR 7681, 12 Oct, Guánica, GFR, along Road 334, a few km from ranger station (US!). (Quevedo et al., 1990: 148; Acevedo-Rodríguez, 2005: 329; Axelrod, unpublished.) This is a common vine along the trails of the GFR. This species is listed as a Critical Element by the DNER.

**Passiflora edulis* Sims

2006: OMR 748, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, at a valley parallel to the northern forest boundary, elev 45 m (MAPR!). (Axelrod, unpublished.) This commonly cultivated vine is rare within the GFR. **New record for the GFR.**

Passiflora murucuja L.

2006: MCO 1305, 12 Nov, Yauco, Bo. Susua Baja, [GFR], south of the municipal dump of Yauco (UPR!). *Passiflora murucuja* is found in Hispaniola and Puerto Rico, where it is rare. Previously in Puerto Rico it was only known from a few collections along the northern limestone hills. This is the first record for the south coast of Puerto Rico. This species is listed as a Critical Element by the DNER. **New record for the GFR.**

***Passiflora suberosa* L.**

2006: OMR 839, 5 Dec, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 77 m (MAPR!). **2005:** OMR 742, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, elev 50 m (MAPR!); OMR 336, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north, to an old campeche plantation, elev 72 m (MAPR!). **2003:** OMR 139, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on the Cobanas Trail north to the Cañon las trichilias, elev 186 m (MAPR!). **1989:** PAR 3006, 7 Oct, Guánica, GFR, Las Cobanitas Trail, in abandoned *Haemotoxylon* plantation (US!). (Quevedo et al., 1990: 148; Acevedo-Rodríguez, 2005: 339; Axelrod, unpublished.) This vine is the most common species of the genus in the GFR.

Confirmation required before accepting into the flora:

***Passiflora multiflora* L.**

(Quevedo et al., 1990: 148.) This vine is most commonly collected in sunny openings on the tops of limestone hills on the north coast of the Island. It has also been collected in southern Puerto Rico east of Guánica in Juana Diaz and Coamo. Its occurrence in Guánica is doubtful.

PHYLLANTHACEAE

***Flueggea acidoton* (L.) G.L. Webster**

2004: OMR 224, 10 Sep, Guánica, Bo. Carenero, GFR, Road 333 to Faro de Guánica, facing the Guánica Bay, elev 17 m (MAPR!). (Little et al., 1974: 430; Quevedo et al., 1990: 147, as *Securinea acidoton* (L.) Fawc. & Rendle; Axelrod, unpublished.) This spiny shrub occurred occasionally in the deciduous forest the Reserve. It is a relatively rare to common species in the dry forests of Puerto Rico and its islands.

***Phyllanthus epiphyllanthus* L.**

2005: OMR 434, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 35 m (MAPR!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) This shrub is common in undisturbed forest on exposed limestone.

***Phyllanthus pentaphyllus* C. Wright ex Griseb. ssp. *polycladus* (Urb.) G.L. Webster**

2006: OMR 610, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!). **2005:** OMR 505, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, cactus forest, from a small canyon north of Road 333, up to a rocky plateau, before the recreative area, elev 23 m (MAPR!); OMR 525, 22 Sep, Guánica, Bo. Carenero, GFR, Ballena Trail, from Road 333 to the north, elev 54 m (MAPR!). **1996:** PAR 7885, 25 Jan, Guánica, GFR, east of end of paved Road 333, area beyond Playa Pelicano, elev 3 m (US!). **1961:** HAL 9034, 30 Dec, GFR, coastal sands (MAPR!). **1915:** NLB 4913, 5-8 Mar, vicinity of *Guánica, crevices of

limestone (US!). **1913:** *NLB 1912*, 11-12 Mar, vicinity of *Guánica, rocky coastal thicket (US!). **1886:** *PS 3492*, 28 Jan, *Guánica, *rupibus litoralibus ad* Punta de los Pescadores (US!). **1886:** *PS 3440*, 25 Jan, *circa* *Guánica, [type specimen] (US!). (Quevedo et al., 1990: 147.) This small subshrub is very common throughout the GFR.

Savia sessiliflora (Sw.) Willd.

2003: *OMR 108*, 12 Sep, Guánica, Bo. Carenero, GFR, from Road 334 on Las Cobanitas Trail, first turn to the left on the main trail to a small *Trichillia triacanta* population, elev 125 m (MAPR!). **1940:** *LEG 180*, 10 Oct, GFR (US!); *LEG 201*, 11 Oct, GFR (US!). (Little et al., 1974: 428; Quevedo et al., 1990: 47; Axelrod, unpublished.) *Savia sessiliflora* is a common shrub throughout the GFR and in the dry forests of Puerto Rico in general. It can occur in high-light conditions or as an understory shrub in light to medium shade.

Confirmation required before accepting into the flora:

Phyllanthus amarus Schumach. & Thonn

(Quevedo et al., 1990: 147.) This weedy annual herb is typically associated with human-disturbed areas. It could have occurred in the formerly populated areas of the Forest.

Phyllanthus cuneifolius (Britton) Croizat

(Quevedo et al., 1990: 147; Axelrod, unpublished.) This shrub would be expected in highlight conditions, most probably in more mesic areas of the Forest. It has been collected occasionally in dry forests in the southern and southwestern parts of the Island, but it is most common in Susúa Forest. This species is listed as a Critical Element by the DNER.

PHYTOLACCACEAE

Petiveria alliacea L.

2005: *OMR 374*, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, mesic canyon, elev 110 m (MAPR!). (Axelrod, unpublished.) This weedy herb was only found once in the Forest. It is common weed in much of Puerto Rico. **New record for the GFR.**

Rivina humilis L.

2005: *OMR 363*, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, close to a mesic canyon, elev 132 m (MAPR!). **1964:** *AGM 2710*, 2 Oct, GFR (MAPR!). **1886:** *PS 3870*, 2 Apr, *prope* *Guánica, *sylva litorale inter* Barina et la Boca [probably collected between Yauco and Guayanilla] (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This small shrubby herb or subshrub is most common in shady mesic areas.

Confirmation required before accepting into the flora:

Trichostigma octandrum (L.) H. Walter

(Acevedo-Rodríguez, 2005: 342) This liana is to be expected in openings and disturbed sites especially in the more mesic canyons in the northern portions of the Reserve.

PICRAMNIACEAE

Picramnia pentandra Sw.

2005: OMR 373, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, mesic canyon, elev 110 m (MAPR!). **2003:** OMR 147, 1 Oct, Guánica, Bo. Carenero, GFR, Cañon las Trichilias, taking the Cobanas Trail to the north, elev 144 m (MAPR!). **1950:** ELL 13233, 4 Jul, GFR (US!). (Little and Wadsworth, 1964: 234; Quevedo et al., 1990: 146; Axelrod, unpublished.) This is a common small tree in shady areas of mesic canyons.

PIPERACEAE

Peperomia humilis A. Dietr.

2006: OMR 648, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). This succulent herb was only found once in a single locality in a mesic canyon. It is a widespread understory herb in dry forests of the Caribbean, Florida and Central America. **New record for the GFR.**

Piper amalago L.

2006: OMR 659, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334 when you enter the forest by La Luna, following the trail north-northwest to a canyon El Cedro, elev 60 m (MAPR!). **2005:** OMR 482, 25 Aug, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail to the north, old campeche plantation (zinc house) taking a canyon to the north of the forest (to the forest boundary), elev 48 m (MAPR!). (Axelrod, unpublished). *Piper amalago* is a widespread shrub found in shady disturbed areas and early secondary forests. In the Reserve it was found in two localities in the evergreen forest of the mesic canyons along the northern boundary. **New record for the GFR.**

PLANTAGINACEAE

Confirmation required before accepting into the flora:

Bacopa monnieri (L.) Pennell

1913: FLS 2416, 22 Jun, *Guánica (MAPR!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This low, creeping herb is usually found in mud along the edge of freshwater ponds and streams. It could possibly occur around the margins of some of the empermal ponds in the Reserve. It is a pantropical species that is common at lower elevations throughout Puerto Rico.

Mecardonia procumbens (Mill.) Small

(Quevedo et al., 1990: 150.) *Mecardonia procumbens* is a small, creeping herb found in sunny locations on wet soil. It could possibly have occurred around the formerly occupied areas or at the edge of empermal ponds. It is widespread in the West Indies and continental America.

Scoparia dulcis L.

(Quevedo et al., 1990: 150.) This annual herb is a common weed in sunny sites on moist to wet soils. Like *Mecardonia procumbens*, it could have occurred in wet grassy areas in the formerly occupied areas or at the edges of empermal ponds. It is widespread in the new world tropics.

PLUMBAGINACEAE

***Plumbago scandens* L.**

2006: OMR 737, 1 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the North, by old campeche plantation, elev 68 m (MAPR!). This climbing shrub was found once in a single locality within the GFR. It is found in most of the dry forests of Puerto Rico, but only occasionally is it very abundant. (Axelrod, unpublished.) **New record for the GFR.**

POACEAE

***Aristida adscensionis* L.**

2006: OMR 724, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, at La Jungla, elev 3 m (MAPR!). **2004:** OMR 280, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 24 m (MAPR!). **1997:** GJB 5341, 28 Oct, Guánica, Bo. Carenero, GFR, along Road 333, between km 7.4-7.5, west of Bahía de la Ballena, elev 25 m (MAPR!). **1995:** FSA 8858, 26 Mar, Guánica, Montalva, GFR, along dirt road over Monte de la Brea to seashore (US!). **1990:** GRP 46471, 17 Oct, Guayanilla, Bo. Boca, GFR, Guitarra area, 0.5 km northeast of Punta Vaquero, elev 15-20 m (US!); GRP 46577, 10 Nov, Guánica, Bo. Carenero, GFR, Campamento Borinquen, elev 165 m, on border of clearing (US!). **1979:** ROW s.n., 7 Sep, *Guánica, GFR, Road 333 (US!). **1954:** BGS 371, 17 Nov, GFR, by forest road, 1 km (US!). **1886:** PS 3438, 25 Jan, *prope* *Guánica *ad* Salinas *versus* (US!); PS 3766, 13 Feb, Guánica, Bo. Carenero, Caña Gorda [GFR] (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This annual grass is very common in soil pockets of exposed limestone in the open, deciduous forest and woodland. It is a common dry area species in Puerto Rico and the Caribbean and continental America.

****Arundo donax* L.**

2006: OMR 731, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, entrance to La Jungla, old housing area, elev 3 m (MAPR!). **1913:** FLS 3065, 19 Aug, *Guánica (MAPR!). This robust grass is common in drainage and irrigation ditches of agricultural areas and along rivers in Guánica. However, in the GFR it was found only in a single locality growing in the forest understory on sandy soil. It was in a formerly populated area and is assumed to be persistent following planting. **New record for the GFR.**

****Bothriochloa pertusa* (L.) A. Camus**

2005: OMR 361, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 149 m (MAPR!). **2002:** GJB 6644, 17 Oct, Guánica, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1995:** PAR 10170, 23 Jan, Guánica, Sector Montalva, Ensenada, GFR (US!). (Quevedo et al, 1990: 144; Axelrod, unpublished.) This tufted perennial grass is common along trails in the Forest. It is found in urban areas and along roadsides and in grassy areas primarily in dry areas in western part of the Island and on Culeba and Vieques Islands in the east.

***Bouteloua juncea* (Desv. ex P. Beauv.) Hitchc.**

2004: OMR 278, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 12 m (MAPR!). **1995:** FSA 8856, 26 Mar, Guánica, Montalva, GFR, along dirt road over Monte de la Brea to seashore, dry scrub forest on limestone, elev 5-20 m (US!); FSA 8862, 26 Mar, Guánica, Montalva, GFR, along dirt road over Monte de la Brea to seashore, dry scrub forest on limestone, elev 5-20 m (US!). **1987:** GRP 44315, 9 Dec, Guánica, Bo. Montalva, GFR, interior

slopes of Monte de la Brea, elev 40-50 m (SJ!). **1913:** *FLS s.n.*, 19 Sep, *Guánica (MAPR!). (Quevedo et al, 1990: 144; Axelrod, unpublished.) This small perennial grass is relatively common in the Montalva portion of the Forest where it occurs on exposed, rocky soil. It apparently is known only from this area in Puerto Rico; it is also found in Cuba and Hispaniola. This species is listed as a Critical Element by the DNER

Bouteloua repens (Kunth) Scribn.

2006: *OMR 757*, 5 Jun, Guánica, Bo. Carenero, GFR, north of Road 333, at Hoya Honda, entrance to the canyon, elev 27 m (MAPR!). **1997:** *GJB 5342*, 28 Oct, Guánica, Bo. Carenero, GFR, along Road 333, between km 7.4-7.5, west of Bahía de la Ballena, elev 25 m (MAPR!). **1994:** *GRP 49657*, 5 Nov, Guayanilla, Bo. Boca, GFR, vicinity of Punta Vaquero, in coastal scrubland on limestone, elev 2-5 m (SJ!). **1990:** *GRP 46473*, 17 Oct, Guayanilla, Bo. Boca, GFR, Guitarra area, 0.5 km northeast of Punta Vaquero, elev 15-25 m (SJ!). **1987:** *GRP 43385*, 19 April, Guánica, Bo. Carenero, GFR, pond area 0.6 km west-northwest of Punta Vaquero, sea level, in exposed sandy soil (SJ!); *GRP 44290*, 9 Dec, Guayanilla, Bo. Boca, GFR, vicinity of Playa Tamarindo, open stony round, elev sea level (SJ!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This grass is common along Road 333 between Bahía de la Ballena and Punta Vaquero, where it occurs among rocks and in soil pockets of exposed limestone. *Bouteloua repens* is a widespread species occurring from the southwest U.S. to northern South America and the Antilles and has been collected from scattered locations, generally at low elevations in Puerto Rico.

****Cenchrus ciliaris*** L.

2006: *OMR 759*, 5 Jun, Guánica, Bo. Carenero, GFR, north of Road 333, at Hoya Honda, entrance to the canyon, elev 27 m (MAPR!). **2006:** *OMR 697*, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333 by sapo concho breeding area, elev 1 m (MAPR!). **1997:** *GJB 5340*, 28 Oct, Guánica, Bo. Carenero, GFR, along Road 333 between km 7.4-7.5, west of Bahía de la Ballena, elev 25 m (MAPR!). **1988:** *MTS 461*, 18 Jan, Guayanilla, Bo. Boca, GFR, Tamarindo Beach at the end Road 333 (US!). (Axelrod, unpublished.) This exotic perennial is invading rocky slopes along the coast. Its spread is primarily due to the roadside fires that burn into the forested areas, killing the native trees and shrubs. **New record for the GFR.**

Cenchrus echinatus L.

2005: *OMR 417*, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 2 m (MAPR!). **1915:** *NLB 4911*, 5-8 Mar, *Guánica, vicinity of Salinas de Guánica (US!). **1913:** *AC 6522*, 14-16 Nov, *Guánica, Ensenada, Guánica Bay (US!). This annual grass is found in sandy coastal areas where it occurs in open, frequently disturbed sites such as paths and parking areas. It is a common weed in much of the Island. **New record for the GFR.**

Cenchrus incertus M.A. Curtis

2006: *OMR 712*, 11 May, Yauco, Bo. Barina, GFR, Road 333 by Punta Ballena, at surfing area, elev 2 m (MAPR!). **1987:** *GRP 43364*, 19 Apr, Guánica, Bo. Carenero, GFR, Road 333 km 3.1, sandy soil at Playa Jaboncillo, sea level (SJ!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) *Cenchrus incertus* is an annual restricted to beaches and adjacent sandy areas in the Preserve. While primarily a beach species it can be found

also more inland in adjacent coastal habitats extending from the southern U.S. to South America and the Caribbean.

***Chloris barbata* Sw.**

2006: OMR 698, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333 by sapo concho breeding area, elev 1 m (MAPR!). **1987:** GRP 43372, 19 April, Guánica, Bo. Carenero, GFR, Playa Jaboncillo, Road 333 km 3.1, near sea level (SJ!). **1954:** BGS 370, 17 Nov, GFR, forest road 1 km (US!). **1899:** CFM 733, 22 Jan, *Guánica (US!). (Quevedo et al., 1990: 144., as *Chloris inflata* Link; Axelrod, unpublished.) This is a common tufted annual grass in open disturbed areas of the forest. It is a widespread species of sandy shores, waste areas and cultivated fields.

****Dactyloctenium aegyptium* (L.) P. Beauv.**

2006: OMR 710, 11 May, Yauco, Bo. Barina, GFR, Road 333 by Punta Ballena, at surfing area, elev 2 m (MAPR!). **2004:** OMR 260, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 1 m (MAPR!). **1899:** CFM 738, 22 Jan, *Guánica (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This old world annual is usually found in sandy soil and around ephemeral ponds in the Forest. It is a widespread common weed of waste areas throughout the warm regions of the world.

***Digitaria ciliaris* (Retz.) Koeler**

1987: GRP 43368, 19 April, Guánica, Bo. Carenero, GFR, Playa Jaboncillo, Road 333 km 3.1, near sea level (SJ!). This weedy grass is very similar in growth habitat to the previous species and often confused with it. **New record for the GFR.**

***Echinochloa colona* (L.) Link**

2006: OMR 747, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, at a valley parallel to the northern forest boundary, elev 45 m (MAPR!). **1899:** CFM 732, 22 Jan, *Guánica (US!). (Axelrod, unpublished.) This weedy annual grass was found in a mesic valley by the northern boundary of the Reserve. It is found throughout the warm regions of the world. **New record for the GFR.**

****Eleusine indica* (L.) Gaertn.**

2006: OMR 705, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, by sapo concho breeding area, elev 2 m (MAPR!). **1899:** CFM 737, 22 Jan, *Guánica (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This annual weedy species of grass occurs in open areas along the coast of the GFR. It is native to the old world, but is now widespread.

****Eragrostis ciliaris* (L.) R. Br.**

2006: OMR 599, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!). **1987:** GRP 44303, 9 Dec, Guánica, Bo. Montalva, GFR, Punta Jorobado, arid limestone, elev 10-25 m (SJ!). **1886:** PS 3649, 7 Feb, *Guánica (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This annual grass is a common weed in open areas in Puerto Rico and of the warm regions of the world in general. It is occasional in soil pockets and in exposed rocky soil along the coast and as a weed in open sites in the forest.

****Eragrostis tenella* (L.) Beauv. ex Roem. & Schult.**

2006: OMR 706, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333 by sapo concho breeding area, elev 2 m (MAPR!). (Quevedo et al., 1990: 144;

Axelrod, unpublished.) *Eragrostis tenella* is a short-lived annual found on open exposed soil, usually in areas disturbed by human activities.

***Eriochloa polystachya* Kunth**

2005: OMR 578, 10 Nov, Guánica, Bo. Carenero, GFR, from Road 333, taking a dirt road to the south by old coconut plantation, area protected by the Puerto Rico Conservation Trust, elev 3 m (MAPR!). This perennial grass was only seen once in the Reserve. It is common and widespread in Puerto Rico and in the New World in general. **New record for the GFR.**

***Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult.**

2005: OMR 533, 6 Oct, Guánica, Bo. Carenero, GFR, from ranger office taking the Dinamita Trail; close to the junction with the main trail, elev 160 m (MAPR!). **2004:** OMR 234, 2 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, Playa Tamarindo at the end of paved Road 333, from the sapo concho pond taking the trail, north to the cave, elev 17 m (MAPR!). **1990:** GRP 46470, 17 Oct, Guayanilla, Bo. Boca, GFR, Guitarra area 0.5 km northeast of Punta Vaquero, weedy grass in clearing (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This perennial grass is locally common in open rocky areas with exposed limestone. It is a common weedy species.

***Lasiacis divaricata* (L.) Hitchc.**

2006: OMR 778, 18 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, trail east to Punta Vaquero, Guitarra Trail, elev 15 m (MAPR!). **2004:** OMR 253, 11 Nov, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, taking canyon to the north, elev 110 m (MAPR!). **2003:** OMR 136, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on the Cobanas Trail, north to Cañon las trichilias, elev 186 m (MAPR!). **2000:** PAR 11429, 6 Sep, GFR (MAPR/ US!). **1991:** FSA 3296, 19 Nov, Guánica, Bo. Montalva, GFR, Manglillo section, jeep road along Monte de la Brea, elev 35-60 m (MAPR/ NY!). **1986:** GJB 3212, 12 Jun, Guánica, Bo. Carenero, GFR, along Fuerte Trail at km 4.8 (MAPR!). **1915:** NLB 4955, 4-8 Mar, Guánica, coastal thicket near lighthouse [GFR] (NY/ US!). **1913:** AC 6521, 14-16 Nov, *Guánica, Ensenada, Guánica Bay, among brush on cleared limestone hill (US!). (Quevedo et al., 1990: 144; Acevedo-Rodríguez, 2005: 440; Axelrod, unpublished.) *Lasiacis divaricata* is a scrambling grass, spreading in shrubs in the semi-shade along the edge of the forest. It is widely distributed in the Reserve, but never occurs in great densities. It is found in dry to mesic forests throughout much of Puerto Rico and is widespread in the Caribbean and the Continental tropics.

***Lithachne pauciflora* (Sw.) P. Beauv.**

2006: OMR 750, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, at a valley parallel to the northern forest boundary, elev 45 m (MAPR!). (Axelrod, unpublished.) This perennial, bamboo-like grass is common in the understory of the evergreen forest in mesic canyons along the northern boundary of the GFR. Its occurrence in the GFR is noteworthy as it usually is found in more mesic areas in Puerto Rico. The species occurs throughout the Caribbean area and from Mexico to South America on the Continent. **New record for the GFR.**

****Megathyrsus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs**

2004: OMR 275, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 7 m (MAPR!). **1997:** GJB 5351, 28 Oct, Guánica, Bo. Carenero, GFR, Road 333, east of Punta Vaquero, elev 5-10 m

(MAPR!). **1990:** BB 9984, 19 Mar, GFR (NY!). **1886:** PS 3366, 21 Jan, *prope* *Guánica, *ad* Punta de la Meseta (US!). (Quevedo et al., 1990: 144, as *Panicum maximum* Jacq.; Axelrod, unpublished.) This exotic is the most common grass within the forest. It is associated with human induced fires along the coast.

****Melinis repens* (Willd.) Zizka**

2005: OMR 423, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 12 m (MAPR!). **1987:** GRP 43369, 19 April, Guánica, Bo. Carenero, GFR, Playa Jaboncillo, Road 333 km 3.1, sandy soil near sea level (SJ!). (Quevedo et al., 1990: 144, as *Tricholaena repens* (Willd.) Hitchc.; Axelrod unpublished.) *Melinis repens* is an annual or short-lived perennial of roadsides and waste places. In the GFR it is typically found on rocky slopes of exposed limestone in full sun or light shade or along rocky roadsides.

***Pappophorum pappiferum* (Lam.) Kuntze**

2006: OMR 717, 11 May, Yauco, Bo. Barina, GFR, Road 333 by Punta Ballena at surfing area, elev 2 m (MAPR!). **1964:** AGM 2716, 2 Oct, GFR (MAPR!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This perennial forms dense clumps on coastal cliffs, occurring from southern Mexico to South America and the Antilles. The species is generally found on rocky soil and Breckon (2000: 204) noted it occupies the same type of habitat as the more common *Paspalum laxum*. In Puerto Rico there are collections of *Pappophorum* from only four localities: GFR, Punta Aguila in Cabo Rojo, Desecheo Island and Mona Island. It has not been seen on Mona since 1944 and it was disappearing from Desecheo in the mid 1990's due to drought. In the GFR it is only known from the one population. While *Pappophorum pappiferum* is a widespread species, for Puerto Rico it is a species at risk.

***Paspalum laxum* Lam.**

2006: OMR 716, 11 May, Yauco, Bo. Barina, GFR, Road 333 by Punta Ballena at surfing area, elev 2 m (MAPR!). **1989:** CMT 9319, 25 Sep, Guánica, shore road between sewage treatment plant and DNR beaches, elev 0-1 m (NY!). **1982:** HAL 33623, 9 Nov, *Guánica, Maruca, coastal thickets (NY!). **1915:** NLB 4909, 5-8 Mar, *Guánica, vicinity of Salinas de Guánica (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This is a common perennial grass that forms open tufts on sandy and limestone soils, typically occurring in full sun. It is endemic to the Antilles.

***Paspalum vaginatum* Sw.**

2005: OMR 414, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 2 m (MAPR!). (Axelrod, unpublished.) This perennial spreads widely by its extensive stolens and rhizomes. It is a coastal species occurring on sand and at the edge of brackish water. It is found throughout the subtropics and tropics of the world. **New record for the GFR.**

***Pharus lappulaceus* Aubl.**

2006: OMR 751, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, at a valley parallel to the northern forest boundary, elev 45 m (MAPR!). This perennial grass occurs in the shady understory of the evergreen forest in the more mesic areas of the Reserve. It is a wide spread, common species both in Puerto Rico and the new world subtropics and tropics. **New record for the GFR.**

Setaria setosa (Sw.) P. Beauv. var. *setosa*

2006: OMR 808, 21 Nov, Yauco, Bo. Barina, GFR, end of Road 334, following Julio Vélez Trail to the east, end of the dirt road by El Vigía, elev 212 m (MAPR!). **2005:** OMR 462, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 165 m (MAPR!). **2003:** OMR 110, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanitas Trail, first turn to the left on the main trail to a small *Trichillia triacanta* population, elev 120 m (MAPR!). **1990:** GRP 46478, 18 Oct, Guánica, Bo. Carenero, GFR, near upper end of Hoya Las Picuas, 1.2-1.5 km due north of Playa Caña Gorda (US!). **1987:** GRP 44297, 9 Dec, Guayanilla, Bo. Boca, GFR, vicinity of Playa Tamarindo, open stony ground, sea level (SJ!). **1987:** GRP 43376, 19 Apr, Guánica, Bo. Carenero, GFR, Playa Jaboncillo, Road 333 km 3.1, near sea level (SJ!). **1982:** HAL 33672, 9 Nov, *Guánica, Maruca, coastal thickets (NY!). **1981:** JDA 1499, 2 Oct, GFR (NY!). **1935:** FHS 646, 19 May, *Guánica (US!). **1913:** NLB 1901, 11-12 Mar, *Guánica and vicinity, sandy coastal thicket (NY! US!); JRJ 1027, 28 Aug, *Guánica, Santa Rita (US!). **1886:** PS 3577, 2 Feb, *Guánica, Montalva (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This perennial grass is generally in found in shadier sites; it is a very common throughout the Reserve. *Setaria setosa* is a widespread grass in the New World and in Puerto Rico in particular.

Setaria utowanaea (Scribn.) Pilg.

2003: OMR 107, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanitas Trail, first turn to the left on the main trail to a small *Trichillia triacanta* population, elev 150 m (MAPR!). **1987:** GRP 44322, 9 Dec, Guánica, Bo. Montalva, GFR, Monte de la Brea, south coast east of Punta Manglillo, elev 2-8 m, shaded humus at scrub woodland, locally frequent (SJ! US!). **1886:** PS 3463, 28 Jan, *Guánica, Cerro de la Ensenada (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This perennial grass is generally found near the coast where it usually occurs in light shade. It is found in south and southwestern sections of Puerto Rico and on Mona, Desecheo, Culebra and Vieques Islands, often, but not exclusively occurring on limestone. It is an Antillean endemic.

Sporobolus jacquemontii Kunth

2005: OMR 429, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 35 m (MAPR!). **1987:** GRP 43373, 19 Apr, Guánica, Bo. Carenero, GFR, Playa Jaboncillo, Road 333 km 3.1, near sea level (SJ!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This slender, tufted perennial has historically been confused with *sporobolus indica* (L.) R. Br. The latter species is less common and found in the wetter areas of the Island. *Sporobolus jacquemontii* is usually found in open sites, often on exposed rocky or sandy soil but can also occur in pockets of clay soil on exposed limestone. While described by Howard as a coastal species, it is found well-inland in Puerto Rico. It is native to warm America.

Sporobolus pyramidatus (Lam.) Hitchc.

2006: OMR 695, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333 by sapo concho breeding area, elev 1 m (MAPR!). **1987:** GRP 43374, 19 Apr, Guánica, Bo. Carenero, GFR, Road 333 km 3.1 at Playa Jaboncillo, near sea level, in sandy soil (SJ!). **1913:** NLB 1862, 11-12 Mar, vicinity of *Guánica (US!). (Quevedo et

al., 1990: 144; Axelrod, unpublished.) This small, tufted perennial is a coastal species for us, occurring on rocky, sandy or alkaline soils, or occasionally in clay in soil pockets of exposed limestone. It is typically found in open, dry sites in full sun. It is scattered throughout the new world from Colorado to Argentina and the West Indies.

****Tragus berteronianus* Schult.**

2005: OMR 301, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 7 m (MAPR!); OMR 427, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 35 m (MAPR!). **1997:** GJB 5348, 28 Oct, Guánica, Bo. Carenero, GFR, small rise on Road 333 between km 7.4-7.5, west of Bahía de la Ballena (US!). **1987:** GRP 44298, 9 Dec, Guayanilla, Bo. Boca, GFR, vicinity of Playa Tamarindo, open stony ground (SJ/ US!); GRP 44325, 9 Dec, Guánica, Bo. Montalva, GFR, south coast of Monte de la Brea, east of Punta Manglillo, elev 2-8 m, open stony ground over limestone (SJ!). **1915:** NLB 4956, 5-8 Mar, vicinity of *Guánica (US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This exotic tufted annual found on open, dry ground and is common in exposed sites in the Forest. Apparently it is native of the old world and is now widespread in warm America.

***Uniola virgata* (Poir.) Griseb.**

2004: OMR 276, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 12 m (MAPR!). **1991:** FSA 3310, 19 Nov, Guánica, Bo. Montalva, GFR, Manglillo section, jeep road along Monte de la Brea, elev 35-60 m (NY!). **1987:** GRP 44319, 9 Dec, Guánica, Bo. Montalva, GFR, interior slopes of Monte de la Brea, elev 40-50 m, dry open stony ground over limestone (SJ!). **1964:** AGM 2714, 2 Oct, GFR (MAPR!). **1954:** BGS 368, 17 Nov, GFR, by forest road 1 km (US!). **1930:** IV 592, 22 Feb, Guánica, Bo. Carenero, [GFR], lighthouse, dry hill (NY!). **1915:** NLB 4890, 5-8 Mar, vicinity of *Guánica, limestone hill (NY! US!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This perennial grass forms dense clumps with tangles of persistent, curled dead leaves around its base. It is found on dry rocky coastal slopes and bluffs in the West Indies. The persistent dead leaves burn readily so that it is often subject to human-set fires. In the GFR it is most common around Monte de la Brea.

***Urochloa adspersa* (Trin.) R.D. Webster**

1990: GRP 46579, 10 Nov, Guánica, GFR, coastal thickets along Road 333, km 4.6-4.7 (US!). (Quevedo et al., 1990: 144, as *Brachiaria adspersa* (Trin.) Parodi.) This small grass is found on moist to dry open, often stony ground. It is widespread in Puerto Rico and occurs from southeast U.S. to southern South America. It is surprising that it is not more common in the Guánica Forest.

Confirmation required before accepting into the flora:

***Anthenantia lanata* (Kunth) Benth.**

(Quevedo et al., 1990: 144, as *Leptocoryphium lanatum* (Kunth) Nees.) This species is known for Puerto Rico from a number of older collections, but there is only a single recent collection made in Cerro Las Mesas in the early 1980's. It is found in Mexico and Central and South America, and in Cuba and Hispaniola in the Antilles. Hitchcock

(1936:163, as *Leptocoryphium lanatum*) reports it as occurring on dry hillsides and in pine barrens.

Antheophora hermaphrodita (L.) Kuntze

(Quevedo et al., 1990: 144.) This annual weed would be expected to be found around areas that are frequently disturbed by human activities. It is widespread in the Americas and Caribbean; in Puerto Rico it is found in dry areas in the southwest in Cabo Rojo and in the south at Santa Isabel and Caja de Muertos, but not in the Guánica-Guayanilla-Yauco area.

Bouteloua americana (L.) Scribn.

(Quevedo et al., 1990: 144; Axelrod, unpublished.) This prostrate-spreading perennial is found primarily in dry, open sites in Puerto Rico at elevations under 550 m. Its occurrence in GFR would not be unexpected.

Cenchrus brownii Roem. & Schult.

1913: AC 6517, 14-16 Nov, *Guánica, Ensenada, Guánica Bay (US!). (Axelrod, unpublished.) *Cenchrus brownii* is a weedy annual grass of open ground, waste land and cultivated fields. It found in scattered locations in Puerto Rico, but never is as frequent as the more common *Cenchrus echinatus*. It would probably have occurred as a weed in the formerly populated areas of the Reserve.

Cenchrus myosuroides Kunth

(Quevedo et al., 1990: 144.) This perennial species of *Cenchrus* is widespread in coastal regions extending from the southeastern U.S. to Argentina and the Greater Antilles. However, in Puerto Rico is apparently is now restricted to Mona Island. There is a Hess collection of it from Cabo Rojo made in 1913/14, but all more recent collections are from Desecheo and Mona Islands. However, the Desecheo population which was collected in 1967-68 was not found in the 1990's (Breckon, 2000: 203.). It may well have occurred in the GFR in the past, but is most certainly extirpated from the Reserve today.

Chloris ciliata Sw.

(Quevedo et al., 1990: 144; Axelrod, unpublished.) This tufted perennial is found primarily in open grasslands on sandy soil. It occurs from the southern U.S. to Argentina and the West Indies and is common in Puerto Rico. It would be expected in the Reserve in open, grassy areas along the coast.

**Cynodon dactylon* (L.) Pers.

(Quevedo et al., 1990: 144; Axelrod, unpublished.) This is a widespread perennial that is cultivated in lawns and pastures and occurs as a weed along roadsides, ditches and wasteplaces. It would be expected around parking areas and frequently used trails today and historically in the formerly occupied areas of the Forest.

**Dichanthium annulatum* (Forssk.) Stapf.

(Quevedo et al., 1990: 144; Axelrod, unpublished.) This perennial stoloniferous exotic is typically found in open, disturbed sites. It occurs in throughout much of Puerto Rico from low to high elevations and under dry to wet conditions. It would be expected in the Forest, especially historically around the formerly populated areas.

**Digitaria bicornis* (Lam.) Roem. & Schult.

(Axelrod, unpublished.) This common annual weed is found primarily in disturbed sites, often on sandy soil. It would be expected to have occurred historically around the formerly populated areas and would not be unexpected in grassy sites today.

Digitaria insularis (L.) Fedde

1989: CMT 9321, 25 Sep, Guánica*, shore road between sewage treatment plant and DNR beaches, elev 0-1 m (NY!). **1913:** FLS 3067, 19 Sep, *Guánica (MAPR!). **1913:** AC 6525, 14-16 Nov, *Guánica, Ensenada, Guánica Bay (US!). (Quevedo et al., 1990: 144.) This erect, coarse perennial is a common weed of waste places and open grounds in Puerto Rico and throughout the tropics and subtropics of the New World. It would be expected to occur in the GFR in disturbed habitats. The location given for CMT 9321 is too vague to tell if it was collected within the Forest boundaries.

Eustachys petraea (Sw.) Desv.

(Quevedo et al., 1990: 144.) This is a widespread grass of open areas, primarily near the coast. It does occur on Mona Island, but is found on the coastal plane rather than on the drier limestone of the plateau. On Puerto Rico it is found on the north and west coasts, but there are no collections of from the south coastal areas. Its occurrence in the Reserve is questionable.

Leptochloa panicea (Retz.) Ohwi subsp. *brachiata* (Steud.) N.W. Snow

1982: HAL 33695, 9 Nov, *Guánica, Maruca, sandy area near the beach (UPR!). **1913:** AC 6516, 14-16 Nov, *Guánica, Ensenada, Guánica Bay (US!). **1886:** PS 3550, 2 Feb, *Guánica, Montalva (US!). (Axelrod, unpublished.) This weedy annual grass is widespread in Puerto Rico, the Caribbean and continental America. It is found on loose disturbed soils and would not be unexpected in disturbed sites in the Forest.

Leptochloa scabra Nees

(Axelrod, unpublished.) As in the previous species of *Leptochloa*, this widespread annual weed would not be unexpected in the GFR.

**Mnesithea granularis* (L.) de Koning & Sosef

(Quevedo et al., 1990: 144, as *Hackelochloa granularis* (L.) Kuntze) This coarse annual is native to the old world, but it is now spread throughout the tropics, occurring on sandy or disturbed soils. Apparently the only recent collection of it for Puerto Rico is from Rincón made by Woodbury, so he was familiar with the species. As Quevedo et al. (1990) is largely based on Woodbury's notebooks, it would appear that the species did occur in the Reserve.

Paspalidium geminatum (Forssk.) Stapf

1913: FLS 2420, 22 Jun, *Guánica (MAPR!). **1913:** NLB 1858, 11-12 Mar, *Guánica (US!). (Axelrod, unpublished.) This widespread perennial forms clumps in open wet sites such as drainage ditches, marshy areas and edges of lakes and streams. It may occur at edges of ephemeral ponds in the Reserve.

Paspalum caespitosum Flügge

(Quevedo et al., 1990: 144; Axelrod, unpublished.) This small tufted grass of dry areas occurs on duff covered limestone, typically in semi-shady conditions. It is found in the Antilles and the southeast U.S. to Central America. It is to be expected in the Reserve.

Paspalum distichum L.

(Quevedo et al., 1990: 144; Axelrod, unpublished.) *Paspalum distichum* is a widely creeping rhizomous perennial of wet sites in the warmer areas of the world. It occurs at lower elevations along the north coast and the southwest of Puerto Rico and in Susúa and Guánica forests according to Axelrod. The last two locations are disjunct and somewhat anomalous in its Puerto Rican range. Its occurrence in Forest is questionable.

Paspalum fimbriatum Kunth

1913: AC 6537, 14-16 Nov, *Guánica, Guánica Bay, Santa Rita (US!). (Axelrod, unpublished.) This annual weed is widespread occurring on the islands of the West Indies and from Mexico to Brazil on the continent. It is sporadic in occurrence and rarely abundant and would be expected in open, disturbed sites in the Reserve.

Setaria parviflora (Poir.) Kerguelen

1913: FLS 2413, 22 Jun, *Guánica (MAPR!). This tufted perennial is widespread throughout the Caribbean and continental tropics and Puerto Rico. It is found in open sunny areas, usually in wetter sites on both exposed soil and in grasslands. It could have occurred in the GFR historically, and would not be unexpected in the Reserve today.

Setaria prardana (León) León

(Axelrod, unpublished.) Based on Axelrod's report this grass is only known for Puerto Rico from the Guánica Forest. It was described in 1946 from Cuba and later found in Hispaniola.

**Sorghum halepense* (L.) Pers.

(Axelrod, unpublished.) This coarse perennial weed is typically found in ditches and along roadsides in Puerto Rico. It generally is found in more mesic districts, but is reported elsewhere from the southern coastal plane of the Island and thus would be expected in the Forest. It is native to the old world, but now found in warm areas of the new world.

Spartina patens (Aiton) Muhl.

(Quevedo et al., 1990: 144.) This rhizomous perennial is typically found on sandy beaches, but is not that common in Puerto Rico. It would be expected to occur on the beaches of the Reserve.

Sporobolus domingensis (Trin.) Kunth

(Quevedo et al., 1990: 144.) This small tufted perennial is often confused with the more common *Sporobolus pyramidatus* (Lam.) Hitchc. It is found on sandy or alkaline soils. In Puerto Rico it is not common, with recent collections from Arecibo, Humacao, and Guayama. Its report from the GFR needs confirmation.

Sporobolus virginicus (L.) Kunth

1913: FLS 2419, 22 Jun, *Guánica (MAPR!). (Quevedo et al., 1990: 144; Axelrod, unpublished.) This is a coastal species found on sandy beaches and in saline areas. It would be expected on the beaches in the Reserve.

Urochloa fusca (Sw.) B.F. Hansen & Wunderlin

1913: AC 6523, 14-16 Nov, *Guánica, Ensenada, Guánica Bay, cleared limestone hill (US!). **1886:** PS 3647, 7 Feb, *prope* *Guánica (US!). *Urochloa fusca* is a widespread weedy annual of that would be expected to occur in the Reserve, especially historically in the formerly populated areas.

**Urochloa mutica* (Forssk.) T.Q. Nguyen

1913: AC 6528, 14-16 Nov, *Guánica, Ensenada, Guánica Bay (US!). **1899:** CFM 727, 22 Jan, *Guánica (US!). (Axelrod, unpublished.) This weedy perennial grass would be expected in open or disturbed sites in the more mesic areas of the Reserve. It is a widespread weed of the tropics and subtropics.

**Urochloa reptans* (L.) Stapf

1915: NLB 4791, 2-4 March, *Guánica, Bo. Montalva (US!). **1913:** AC 6515, 14-16 Nov, *Guánica, Ensenada, Guánica Bay, base of limestone hill (US!). **1899:** CFM 726, 22 Jan, *Guánica (US!). **1886:** PS 3368, 20 Jan, *Guánica, *circa* Hacienda Maria

Antonia (US!). (Quevedo et al., 1990: 144, as *Brachiaria reptans* (L.) Gardn. & C.E. Hubb.) This mat-forming annual grass is found on moist soil in open to semi-shaded sites and often is weedy in behavior occurring in disturbed or cultivated ground. It is found in southern Puerto Rico and would be expected to occur in the GFR, especially in the historically populated areas of the Reserve.

Excluded species:

†*Digitaria sanguinalis* (L.) Scop.

(Quevedo et al., 1990: 144.) According to Howard (1979: 105) this species is probably rare to absent in the subtropics and tropics and that reports of its occurrence in these areas is due to misdeterminations.

POLYGALACEAE

Polygala cowellii (Britt.) S. F. Blake

2006: OMR 625, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 79 m (MAPR!); OMR 671, 16 Mar, Guánica, Bo. Carenero, GFR, Road 334 close to the entrance to La Cobana Trail, elev 157 m (MAPR!). **1992:** GR 72, 7 Oct, Guánica, Bo. Lomas de Seboruco, GFR, tree on south side of Road 334, in front of Las Covanas Trail, elev 170 m (MAPR!). **1950:** ELL 13229, 4 Jul, GFR (US!). (Little and Wadsworth, 1964: 260; Quevedo et al., 1990: 147; Axelrod, unpublished.) This endemic tree is rare within the GFR, occurring as scattered individuals in old secondary forest. The species is becoming rare in Puerto Rico showing a significant loss in individuals and populations over the past 50 years (Rojas, G. M. 1994. Reproductive and population ecology of *Polygala cowellii* (Britton) Blake (Polygalaceae). M. S. Thesis, University of Puerto Rico, Mayagüez Campus. 155 pp.). Rojas also found that the species was an outcrosser, making isolated individuals ineffective for reproduction. This species is listed as a Critical Element by the DNER.

Polygala hecantantha Urb.

2007: OMR 872, 17 Feb, Guánica, Bo. Montalva, GFR, Monte de la Brea, from road #325 following the dirt road to Manglillo, elev 30 m (MAPR!). **2004:** OMR 273, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 7 m (MAPR!). **1995:** GJB 4576, 17 Oct, Guánica. Bo. Montalva, GFR, scattered in open sites along dirt road (MAPR!). **1993:** FSA 5972, 22 Mar, Guánica, Bo. Montalva, Manglillo, GFR, along dirt road (north fork) toward shore (US!). **1913:** FLS 3110, 19 Sep, Guánica (MAPR!). (Quevedo et al., 1990: 147; Axelrod, unpublished.) This annual herb is locally common in openings on Monte de la Brea. It is generally found in dry areas in southern Puerto Rico, but has also been collected in Maricao Forest. The species is endemic to the Greater Antilles. This species is listed as a Critical Element by the DNER.

Polygala penaea L

2005: OMR 337, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334 to the east, close to the ranger office, elev 199 m (MAPR!); OMR 407, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, to the forest main office, along the road, elev 216 m (MAPR!). **2005:** OMR 337, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334 to the east, close to the ranger office, elev 199 m (MAPR!). **1944:**

MC 1156, 2 Apr, Guánica, GFR (MAPR!). (Little et al., 1974: 382; Quevedo et al., 1990: 147; Axelrod, unpublished.) This shrub is rare in the GFR and was only found in a single locality during the field survey. It is common on dry hillsides elsewhere in Puerto Rico and is known from limestone, serpentine and chert derived soils. Its range is the Bahamas and Greater Antilles. This species is listed as a Critical Element by the DNER.

Confirmation required before accepting into the flora:

Polygala paniculata L.

(Quevedo et al., 1990: 147.) *Polygala paniculata* is a small annual herb of wet to mesic areas in Puerto Rico. It would not be expected to occur in the dry southern lowlands of GFR.

POLYGONACEAE

**Antigonon leptopus* Hook. & Arn.

2005: *OMR 440*, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, entrance to the dirt road to sapo concho breeding area in Manglillo, close to Road 325 at forest boundary, elev 23 m (MAPR!). (Quevedo et al., 1990: 145; Axelrod unpublished.) This vine is common along the forest boundaries in Montalva. The species has the potential to become invasive along the northern boundary of the forest. Its ecology deserves further attention.

Coccoloba diversifolia Jacq.

2006: *OMR 685*, 6 Apr, Yauco, Bo. Barina, GFR, end of paved Road 333, taking the trail north to the cave, small mesic canyon to the left of the dirt road, elev 40 m (MAPR!).

2005: *OMR 394*, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, to the forest main office, along the road, elev 159 m (MAPR!). **2003:** *OMR 114*, 12 Sep, Guánica, Bo. Carenero, GFR, from Road 334 to the main trail of Las Cobanas, elev 170 m (MAPR!). **2000:** *PAR 11427*, 6 Sep, GFR (US!). **1994:** *DA 936*, 12 Dec, Guánica, GFR, Vereda Fuerte, off Road 334, elev 140 m (MAPR!). **1992:** *PAR 4774*, 15 Jan, Guánica, GFR (US!). **1991:** *FSA 2923*, 7 Sep, Guánica, GFR, along Murciélago Trail from campamento, elev 50-150 m (MAPR!). **1991:** *FSA 2934*, 7 Sep, Guánica, Bo. Carenero, along dirt road off Road 334 just north of entrance to GFR, elev 150 m (MAPR!). **1990:** *RGG 3359*, 18 Dec, Guánica, Bo. Carenero, GFR, elev 145 m (MAPR!). **1963:** *HAL 9753*, 27 Jun, GFR (US!). **1962:** *HAL 9284*, 28 Jun, *Guánica (MAPR!). **1950:** *ELL 13198*, 13195, 13193, 2 Jul, GFR (US!). **1948:** *RAG 91*, 1 May, GFR (MAPR!). **1944:** *MC 1158*, 2 Apr, Guánica, GFR (MAPR!). (Little and Wadsworth, 1964: 76; Quevedo et al., 1990: 145; Axelrod, unpublished.) This tree may be found in both the low xeric deciduous and more mesic evergreen forests.

Coccoloba krugii Lindau

2006: *OMR 777*, 18 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333; trail east to Punta Vaquero, La Guitarra Trail, elev 15 m (MAPR!). **2005:** *OMR 316*, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 137 m (MAPR!); *OMR 313*, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 9 m (MAPR!). **2004:** *OMR 245*, 30 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, taking the canyon to the north, elev 100 m (MAPR!); *OMR 245*, 20

Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 24 m (MAPR!). **1995:** PAR 7682, 12 Oct, Guánica, GFR, (MAPR!); GJB 4575, 17 Oct, Guánica, Bo. Montalva, GFR (MAPR!). **1982:** JHH 51, 13 Nov, Guánica, GFR, 0.16 km after the end of paved Road 333, low elev (MAPR!). **1964:** HAL 10580, 1 Jan, GFR, on rocks in thickets, elev 100 m (US!). **1962:** HAL 9278, 28 Jun, *Guánica (MAPR!). (Little et al., 1974: 150; Quevedo et al., 1990: 145; Axelrod, unpublished.) This is a common shrub in the Forest, primarily occurring in full sun in undisturbed xeric low forest and scrubland on exposed limestone. It has apparently become much less common in other dry coastal areas of southern Puerto Rico.

***Coccoloba microstachya* Willd.**

2005: OMR 550, 1 Nov, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, from the entrance of the forest to the ranger's office, elev 210 m (MAPR!). **1995:** PAR 7682, 12 Oct, Guánica, GFR, along Road 334, a few km from ranger station (US!). **1990:** RGG 3331, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1979:** HAL 29514, 26 Sep, GFR, in thickets on limestone hill, elev 50 m (US!). **1964:** HAL 10600, 2 Jan, GFR, coastal thickets (MAPR! US!). **1963:** HAL 9759, 27 Jun, *Guánica, coastal thickets (MAPR! US!). **1944:** JIO 863, 2 Apr, Guánica, GFR, hillside (US!). **1940:** LEG 181, 11 Oct, GFR (US!). **1886:** PS 3431, 25 Jan, *Guánica (US!). (Little et al., 1974: 152; Quevedo et al., 1990: 145; Axelrod, unpublished.) This is a common shrub or small tree in the Reserve. Leaf shape is variable among individuals, some with short leaves and some with long.

***Coccoloba swartzii* Meisn.**

1999: GJB 5932, 17 May, Guayanilla, Bo. Boca, GFR, south side of dirt portion of Road 333, beyond Punta Vaquero, elev 5 m (MAPR!). **1964:** HAL 10789, 1 Apr, *Guánica, coastal thickets (MAPR! US!). (Axelrod, unpublished.) *Coccoloba swartzii* is a widespread, variable species. As presently defined it occurs from coastal thickets to high mountain forests. The coastal form in recent years was often treated as a hybrid between *Coccoloba krugii* and *Coccoloba uvifera*. Generally *C. swartzii* grows as a dense shrub in dry coastal thickets, but it can become a small tree further inland. **New record for the GFR.**

***Coccoloba uvifera* (L.) L.**

1984: MEA 10, 6 Oct, Guánica, GFR, around Playa Tamarindo, growing in sandy seashore, elev 5 m (MAPR!). **1981:** FIH 78, 28 Mar, Guánica, along Road 333 km 10, Tamarindo Beach, at edge of sandy beach (MAPR!). **1950:** ELL 13151, 30 Jun, GFR (US!); ELL 13205, 3 Jul, Guayanilla, Bo. Boca, GFR, Tamarindo, Parque de Recreo (US!). (Little et al., 1974: 985; Quevedo et al., 1990: 145; Axelrod, unpublished.) This is a common large shrub or small tree along the coast.

***Coccoloba venosa* L.**

2005: OMR 469, 25 Aug, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail to the north, old campeche plantation (zinc house), elev 56 m (MAPR!). **1913:** NLB 1891, 11-12 Mar, vicinity of *Guánica, (US!). *Coccoloba venosa* is a large shrub or small tree that occurs in more mesic canyons and ravines in dry areas of the Island. It is only known from the single location in the Reserve. **New record for the GFR.**

Confirmation required before accepting into the flora:

Persicaria ferruginea (Weddell) Soják

(Axelrod, unpublished.) This is a wetland species found in full sun in mud or shallow water of periodically inundated areas. It could occur in ephemeral ponds in the Forest.

PONTEDERIACEAE

Confirmation required before accepting into the flora:

**Eichhornia crassipes* (Martius) Solms-Laubach

(Axelrod, unpublished). The occurrence of this floating aquatic herb in the flora of the Reserve is questionable. It is found in lagoons, lakes and ditches on slow-moving to stagnate water. It is native to northern South America and Brazil, but has now spread throughout much of warm America where it is often an invasive pest.

PORTULACACEAE

Portulaca caulerpoides Britton & P. Wilson

1979: HAL 29649, 26 Sep, Guánica, GFR, coastal limestone (UPR!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This small succulent herb is endemic to Caja de Muertos and Mona Islands, where it commonly occurs in full sun in soil pockets of exposed limestone near the coast. Liogier's collection from Guánica Forest is the only known occurrence of it on the island of Puerto Rico. This species is listed as a Critical Element by the DNER.

Portulaca halimoides L.

2006: OMR 722, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, at La Jungla, elev 3 m (MAPR!). **2005:** OMR 435, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, rocky plateau west of sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 35 m (MAPR!). **1982:** VNO 55, 13 Nov, GFR, Road 333, Punta Verracos, near beach, elev 25 m (MAPR!). **1961:** HAL 9011, 30 Dec, GFR, coastal sands (MAPR!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This low, succulent herb is commonly found on coastal slopes in soil pockets on exposed limestone or on sandy soil among rocks. It is restricted to the south and southwestern coastal area of Puerto Rico, but ranges through the Antilles, Mexico, Central America and South America in a similar habitat.

Portulaca oleracea L.

2006: OMR 727, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, at La Jungla, elev 3 m (MAPR!). **2005:** OMR 288, 3 Jun, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, at the end of paved Road 333, by the sapo concho pond, elev 5 m (MAPR!); OMR 420, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 2 m (MAPR!); OMR 580, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south by old coconut plantation, area protected by the Puerto Rico Conservation Trust, elev 4 m (MAPR!). **1996:** GJB 4901, 26 Sep, Yauco, Bo. Barina, GFR, south facing coastal slopes in low limestone hills, on north side of Bahía Ballena, elev 100 m (MAPR!). **1986:** GJB 3195, 17 Apr, Guánica, GFR, limestone hills on north side of Road 333, between Balneario de Caña Gorda and Playa Tamarindo (MAPR!). **1964:** AGM 2603, 16 Apr, *Guánica, road to forest, near sugar cane ditch (MAPR!). **1886:** PS 3562, 25 Jan, *Guánica, *arenosis* (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This succulent herb is common world-wide weed. In the Reserve it is found both in disturbed habitats and in soil pockets of exposed limestone on

dry slopes. Assuming that it is an exotic (its origin is unknown), it undoubtedly has replaced native species of *Portulaca*, *Euphorbia*, *Tephrosia*, *Cyperus* and *Heliotropium* that are also found in shallow soil pockets of exposed limestone.

***Portulaca quadrifida* L.**

2005: OMR 581, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south by old coconut plantation, area protected by the Puerto Rico Conservation Trust, elev 4 m (MAPR!). **1963:** HAL 9733, 28 Jun, *Guánica, dry place at Ensenada (US!). **1916:** JAS 5341, 9 May, *Guánica Centrale (US!). **1915:** NLB 4881, 5-8 Mar, vicinity of *Guánica (US!). (Quevedo et al., 1990: 145.) *Portulaca quadrifida* is an annual succulent herb that occurs in sandy or loose soil in sunny areas along trails and dirt roads. This pantropic weed is sporadic in its occurrence in the dry southern coastal plane and southwest portions of Puerto Rico.

***Portulaca rubricaulis* Kunth**

2006: OMR 701, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333 by sapo concho breeding area, elev 2 m (MAPR!) ; OMR 723, 18 May, Guánica, Bo. Montalva, GFR, end of Road 325, at La Jungla, elev 3 m (MAPR!); OMR 775, 18 Oct, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333, trail east to Punta Vaquero, La Guitarra Trail, elev 8 m (MAPR!). **2005:** OMR 524, 22 Sep, Guánica, Bo. Carenero, GFR, Ballena Trail, from Road 333 to the north, elev 54 m (MAPR!). **2003:** OMR 152, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda to the north of the Road 333 at the entrance of Hoya Honda Canyon, elev 43 m (MAPR!). **1999:** FSA 10900, 3 Jul, Yauco, Bo. Barina, GFR, ridge above Bahía de la Ballena (US!). **1996:** GJB 4695, 1 Feb, Guayanilla, Bo. Boca, GFR, dwarf forest east of Playa Tamarindo, elev 10-20 m (MAPR!); GJB 4902, 26 Sep, Yauco, Bo. Barina, GRF, south facing coastal slopes in low limestone hills on north side of Bahía Ballena, elev 100 m (MAPR!). **1982:** JHH 71, 13 Nov, Guánica, GFR, 1.9 km after the end of paved Road 333, low elev (MAPR!). **1886:** PS 3563, 25 Jan, *Guánica, *sylvia* (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This is a common succulent herb in sunny areas on rocky soil and in shallow soil pockets on exposed limestone. Although collected from the Bahamas, Antilles, Florida, and coastal areas from Mexico to South America, in Puerto Rico today it apparently is only found in the Guánica Forest Reserve and Mona and Vieques Islands. The latter population is small and restricted to the extreme east end of the island.

Confirmation required before accepting into the flora:

***Portulaca pilosa* L.**

(Quevedo et al., 1990: 145.) This succulent herb could possibly occur in sunny openings at the edge of trails and roads in the more mesic northern part of the Reserve.

POTAMOGETONACEAE

Confirmation required before accepting into the flora:

***Ruppia maritima* L.**

(Axelrod, unpublished.) This aquatic herb grows submerged in brackish ponds and lagoons near the coast. It could possibly occur in the ephemeral sapo cho pond at the end of Road 333. This species is listed as a Critical Element by the DNER.

RHAMNACEAE

Colubrina arborescens (Mill.) Sarg.

1992: PAR 4770, 15 Jan, Guánica, GFR (US!). **1983:** SMC 116, 11 Nov, Guánica, GFR, Tamarindo sector (MAPR!). **1982:** JGR 1, 29 Aug, GFR, Don Mundo Vereda, Road 334, elev 135 m (MAPR!). **1982:** FNS 8961, 13 Nov, Guánica, GFR, east part of forest, ca. 20 m from the pool of water (MAPR!). **1959:** GLW 8825, 9 Jul, Guánica, GFR, near seashore east of mouth of Bahía de Guánica (US!). **1950:** ELL 13154, 30 Jun, GFR (US!); ELL 13245, 4 Jul, GFR (US!). **1948:** AGM 122, 1 May, *Guánica (MAPR!). **1932:** GSM 1672, 4 Apr, between Guánica Bay and Salinas (US!). **1915:** NLB 4903, 5-8 Mar, vicinity of *Guánica (US!). **1913:** FLS 3047, 3098, 19 Sep, *Guánica (MAPR!). (Little and Wadsworth, 1964: 316; Quevedo et al., 1990: 147; Axelrod, unpublished.) This small tree is very common throughout the Reserve and is a common element of dry and mesic low elevation forests of Puerto Rico and the new world in general.

Colubrina elliptica (Sw.) Brizicky & W.L. Stern

2003: OMR 158, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda to the north of the Road 333 at the entrance of Hoya Honda Canyon, elev 55 m (MAPR!). **1997:** GJB 5151, 5 Aug, Guayanilla, Bo. Boca, GFR, along Road 333 to west of Punta Vaquero, elev 5 m (MAPR!). **1995:** PAR 7692, 12 Oct, Guánica, south area of GFR, off Road 333, a few km from ranger station (US!). **1994:** DA 724, 8 Nov, *Guánica, Road 333, 8 km east of town of Guánica, south side of road, elev 25 m (MAPR!). **1991:** FSA 2903, 7 Sep, Guánica, GFR, along Murciélago Trail from campamento, elev 50-150 m (MAPR!); FSA 3315, 19 Nov, Guánica. Bo. Montalva, GFR, Manglillo section, jeep road along Monte de la Brea, elev 35-60 m (MAPR!). **1990:** GJB 3709, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); RGG 3349, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1986:** GJB 3196, 17 Apr, Guánica, GFR, limestone hills north side of Road 333, between Balneario de Caña Gorda and Playa Tamarindo (MAPR!). **1962:** HAL 9161, 23 Jun, *Guánica (MAPR!). **1950:** ELL 13210, 3 Jul, GFR (US!). **1915:** NLB 4817, 2-4 Mar, *Guánica, Bo. Montalva (US!). **1886:** PS 3475, 24 Jan, *prope* *Guánica (US!). (Little and Wadsworth, 1964: 318 as *Colubrina reclinata* (L Hér.) Brongn.; Quevedo et al., 1990: 147; Axelrod, unpublished.) This small tree is very common throughout the GFR and is found in the dry forests of Puerto Rico. It occurs throughout the West Indies and much of subtropic and tropic America. Its populations are under pressure in Puerto Rico as its bark is collected to make the drink, mavi.

Colubrina verrucosa (Urb.) M.C. Johnst.

2005: OMR 451, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 144 m (MAPR!). **1995:** PAR 7673, 12 Oct, Guánica, GFR, along trail off Road 334 (MAPR/ US!). **1990:** RGG 3336, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). (Axelrod, unpublished.) This spiny shrub or small tree is relatively common in the forests of the Reserve. In Puerto Rico it is only known from Guánica and Susúa Forests and the Sierra Bermeja. The species also occurs in Hispaniola. **New record for the GFR.**

Gouania lupuloides (L.) Urb.

2005: OMR 540, 27 Oct, Guánica, Bo. Carenero, GFR, Los Granados Trail, at the boundary of the municipalities of Yauco and Guánica, elev 180 m (MAPR!). **2003:** OMR

197, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail from DRNA office east to Mirador El Vigia, junction of Lluveras and Julio Vélez, elev 203 m (MAPR!). (Quevedo et al., 1990: 147, Axelrod, unpublished.) This liana is extremely common in the GFR and in Puerto Rico in general. It most often occurs at forest edges along trails and disturbed forests in the valleys. *Gouania lupuloides* ranges throughout the West Indies and from Florida to northern South America.

***Krugiodendron ferreum* (Vahl) Urb.**

2005: OMR 321, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 150 m (MAPR!); OMR 396, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, to the forest main office, along the road, elev 176 m (MAPR!). **2003:** OMR 194, 7 Nov, Yauco, Bo. Barina, GFR, Julio Vélez Trail from DRNA office east to Mirador El Vigia, elev 218 m (MAPR!). **1990:** GJB 3710, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333 km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); RGG 3354, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1989:** PAR 3028, 7 Oct, Guánica, GRF, along 334 (US!). **1987:** PAR 2239, 29 Sep, Guánica, GFR (US!). **1983:** SMC 98, 8 Oct, GFR, Campamento Borinquen, Lluveras Trail, km 5.6 (MAPR!). **1962:** HAL 9125, 23 Jun, GFR, coastal thickets (MAPR!). **1961:** HAL 9037, 30 Dec, GFR, coastal thickets (MAPR!). **1950:** ELL 13155, 30 Jun, GFR (US!). **1940:** LEG 310, 22 Oct, Guánica, GFR, close to Campamento Borinquen (US!). (Little and Wadsworth, 1964: 320; Quevedo et al., 1990: 147; Axelrod, unpublished.) This tree is very common throughout the GFR. It is found in low elevation forests, especially on well-drained substrate throughout much of Puerto Rico and the West Indies. *Krugiodendron* is very slow growing with possibly the hardest wood in the world. The Puerto Rican population is composed of saplings and smaller trees that have regenerated from seed following the selective cutting of this species for its wood.

***Reynosia uncinata* Urb.**

2005: OMR 500, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, Cactus Forest along a small canyon north of Road 333, before recreative area, elev 8 m (MAPR!). **2005:** OMR 452, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 144 m (MAPR!). **1996:** GJB 4899, 26 Sep, Yauco, Bo. Barina, GFR, south facing limestone hills on north side of Bahía Ballena, elev 100 m (MAPR!). **1992:** FSA 4604, 1 Jun, Guánica, Bo. Montalva, GFR, headland at southwest end of jeep road, near Comunidad Salinas, elev 20 m (MAPR!). **1990:** GJB 3712, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1990:** RGG 3341, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1989:** PAR 3022, 7 Oct, Guánica, GFR, along Road 334 (US!). **1962:** HAL 9167, 23 Jun, GFR, coastal thickets (MAPR!). **1961:** HAL 9036, 30 Dec, GFR, coastal thickets (MAPR!). **1940:** LEG 190, 11 Oct, Guánica, GFR, along Road 333 to Caña Gorda (US!). **1913:** NLB 1914, 11-12 Mar, vicinity of *Guánica (US!). **1886:** PS 3770, 13 Feb, *Guánica (US!). (Little et al., 1974: 502; Quevedo et al., 1990: 147; Axelrod, unpublished.) This Antillean endemic shrub is a characteristic element of the low xeric forest found on dry slopes.

***Reynosia vivesiana* Trejo**

2006: OMR 762, 6 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, between ranger office and the old forest boundary, elev 200 m (MAPR!). **2005:** OMR 448, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 144 m (MAPR!). **1964:** HAL 10791, 1 Apr, Guánica, GFR (US!). (Little et al., 1974: 500, as *Reynosia guama* Urb.; Quevedo et al., 1990: 147, as *Reynosia guama*; Axelrod, unpublished.) This shrub or slender, wand-like tree was recently described from the GFR, where it is apparently endemic. It is only known from a few locations in relatively undisturbed scrub forest and should be treated as rare and considered for listing. In the past the name *Reynosia guama* was misapplied to it; that species is restricted to the Virgin Islands. This species is listed as a Critical Element by the DNER.

****Ziziphus mauritiana* Lam.**

2004: OMR 229, 2 Oct, Guayanilla, Bo. Boca, GFR, Playa Tamarindo at the end of paved Road 333, from the sapo concho pond taking the trail north to the cave, elev 4 m (MAPR!). **1975:** AGM s.n., 10 Nov, *Guánica, coastal thickets (MAPR!). (Little et al., 1974: 506 from *Guánica; Chinea, 1990: 53; Quevedo et al., 1990: 147; Axelrod, unpublished.) This exotic, small spiny tree was introduced to dry areas in Puerto Rico for its fruit. In the Reserve it is mostly found in valleys. It should be monitored in the GFR as it has the ability to become invasive. On Vieques it has been spread by cattle feeding on the fruits and is common in the secondary forest on the western part of that island.

***Ziziphus reticulata* (Vahl) DC.**

2003: OMR 166, 22 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333, trail from Playa Tamarindo, sapo concho pond to Punta Vaquero, dwarf forest, elev 4 m (MAPR!). **1991:** FSA 3282, 19 Nov, Guánica, Bo. Montalva, GFR, Manglillo section, headland at southwest end of jeep road, elev 20 m (MAPR! US!). **1990:** GJB 3691, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1990:** GRP 46578, 10 Nov, Guánica, GFR, coastal thickets along Road 333, km 4.6-4.7 (US!). **1987:** PAR 2233, 29 Sep, Guánica, GFR (US!). **1962:** HAL 9129, 23 Jun, *Guánica (MAPR! US!). **1950:** ELL 13153, 30 Jun, GFR (US!). **1944:** MC 1148, 2 Apr, Guánica, GFR, along roadside (MAPR!). **1915:** NLB 4827, 2-4 Mar, *Guánica, Bo. Montalva (US!). **1913:** NLB 1904, 11-12 Mar, *Guánica (US!). (Little and Wadsworth, 1964: 322 as *Sarcomphalus reticulatus* (Vahl) Urb.; Quevedo et al., 1990: 147; Axelrod, unpublished.) This small, spiny tree is very common in the coastal forests and extends inland on the dry uplands.

Confirmation required before accepting into the flora:

***Gouania polygama* (Jacq.) Urb.**

1886: PS 3566, between Guánica and Yauco (MAPR!). (Acevedo-Rodríguez, 2005: 355.) According to Acevedo-Rodríguez this species can be locally common in disturbed moist areas. In the GFR it would be expected to occur at the edges of young secondary forests in the northern canyons and ravines.

***Reynosia krugii* Urban**

(Axelrod, unpublished.) Much of this endemic tree's range is in more mesic forest on the north coast or at higher elevations in the west and south. However, it is also reported from limestone in Guayanilla, so it should be looked for in the Reserve.

RHIZOPHORACEAE

Rhizophora mangle L.

2005: OMR 412, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 2 m (MAPR!). **1950:** ELL 13152, 30 Jun, GFR (US!). **1913:** FLS 3822, 19 Sep, *Guánica (MAPR!). **1886:** PS 3508, 28 Jan, *Guánica, *paludosis maritimis* (US!). (Little and Wadsworth, 1964: 384; Quevedo et al., 1990: 148; Axelrod, unpublished.) Red mangrove is a common tree in shallow water along the shore.

RUBIACEAE

Catesbaea melanocarpa Krug & Urb. FLS, CE

2006: OMR 670, 16 Mar, Guánica, Bo. Carenero, GFR, Cerro Caprón, close to the end of El Fuerte Trail, northwest slope, elev 84 m (MAPR!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) *Catesbaea melanocarpa* is listed as federally endangered species. Only a single population of this rare spiny shrub was located in the GFR, but there may be a second population in the area of Salinas de Providencia. The only other known population *C. melanocarpa* from Puerto Rico was at Punta Melones in Cabo Rojo. That population was bulldozed in clearing for home construction. The species also occurs on St. Croix in the Virgin Islands and Antigua, Barbuda and Guadeloupe in the Lesser Antilles. This species is listed as a Critical Element by the DNER

Catesbaea parviflora Sw.

2005: OMR 463, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 185 m (MAPR!). **1886:** PS 3786, 17 Feb, *Guánica (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This shrub is rare in the Forest and occurring as scattered individuals in shrubby vegetation. It is known from Susúa Forest and from scattered locations on limestone along the south coast of Puerto Rico. The species extends from southern Florida and the Bahamas through the Greater Antilles.

Chiococca alba (L.) Hitchc.

2005: OMR 339, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, mesic canyon running north close to Susúa Baja, elev 90 m (MAPR!); OMR 391, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail, on the main trail, at old house area close to the entrance, elev 175 m (MAPR!). **1992:** MFQ 498, 10-17 Feb, GFR, Guánica, mahogany plantation (UPR!). **1886:** PS 3421, 23 Jan, *Guánica (US!); PS 3778, 13 Feb, *Guánica (US!). (Quevedo et al., 1990: 150; Acevedo-Rodríguez, 2005: 359; Axelrod, unpublished.) This shrubby vine is most common along the edges of the evergreen forest on north facing slopes along the northern boundary of the GFR. It is a common widespread species in Puerto Rico.

Diodia apiculata (Willd. ex Roem. & Schult.) K. Schum.

2005: OMR 519, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, after Copa Marina Hotel at the edge of Road 333, elev 29 m (MAPR!). **1996:** PAR 7887, 25 Jan, Guánica, GFR, east of end of 333, area beyond Playa Pelicano (US!). **1996:** GJB 4698, 8 Feb, Guánica, Bo. Montalva, GFR, Ensenada sector, dirt road leading to Charco Azul, south of Road 325 to Playa Santa at km 4.4, elev 50 m (MAPR!). (Quevedo et al., 1990: 150, as *Diodia rigida* Cham. & Schlech.; Axelrod, unpublished.) *Diodia apiculata* is a low

suffrutescent herb that typically grows in among rocks and in soil pockets of the exposed limestone. It is found in sunny, dry rocky areas of Puerto Rico and is widespread in the West Indies and tropical America.

***Erithalis fruticosa* L.**

2006: OMR 612, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, entrance to La Jungla, elev 1 m (MAPR!). **2005:** OMR 300, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 7 m (MAPR!). **2003:** OMR 137, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on the Cobanas trail north to Cañon of the Trichillas, elev 186 m (MAPR!). **2002:** GJB 6635, Guánica, Bo. Carenero, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1991:** GRP 47257, 6 Nov, GFR, Guánica, near upper end of Hoya Las Picuas, north of Caña Gorda (UPR!!). **1990:** RGG 3362, 18 Dec, Guánica, Bo. Carenero, GFR, elev 145 m (MAPR!). **1989:** PAR 3017, 7 Oct, Guánica, GFR, Lluveras road, along mahogany plantation (US!). **1982:** JHH 63, 13 Nov, Guánica, GFR, 1.9 km after the end of paved Road 333, low elev (MAPR!); VNO 53, 13 Nov, GFR, Road 333, Punta Verraco, near beach, elev 25 m (MAPR!). **1964:** HAL 10601, 2 Jan, GFR, coastal thickets (MAPR!). **1963:** HAL 9762, 27 Jun, *Guánica, dry coastal thickets (MAPR!). **1961:** HAL 9012, 30 Dec, GFR, coastal thickets (MAPR!). **1948:** RAG s.n., 1 May, GFR (MAPR!). **1944:** MC 1160, 1161, 2 Apr, GFR (MAPR!). **1915:** NLB 4907, 5-8 Mar, vicinity of *Guánica, limestone rocks (US!). **1913:** NLB 1919, 11-12 Mar, vicinity of *Guánica, rocky coastal thicket (US!). **1886:** PS 3525, 25 Jan, *Guánica (US!); PS 3769, 13 Feb, *Guánica (US!). (Little et al., 1974: 930; Quevedo et al., 1990: 150; Axelrod, unpublished.) In the Reserve this common shrub is found in coastal thickets and in the low xeric woodland/forest on exposed limestone. It is a common element of lowland limestone forests in Puerto Rico and the West Indies. This species is listed as a Critical Element by the DNER.

***Ernodea littoralis* Sw.**

2005: OMR 574, 10 Nov, Guánica, Bo. Carenero, GFR, Punta Ballena, from Road 333, taking a dirt road to the south by old coconut plantation, area protected by the Puerto Rico Conservation Trust, elev 3 m (MAPR!). **1996:** PAR 7886, 25 Jan, GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!). **1988:** GRP 44525, 27 Feb, GFR, Guayanilla, Bo. Boca, Punta Berraco (UPR!!). **1961:** HAL 9012, 30 Dec, GFR, coastal thickets (MAPR!). **1913:** NLB 1897, 11-12 Mar, *Guánica (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) *Ernodea littoralis* is a low, mounding to trailing shrub found along rocky trails and on exposed bluffs by the coast and on dunes along the beach. It is found throughout the West Indies and on the coast of Mexico and Central America.

***Exostema caribaeum* (Jacq.) Roem. & Schult.**

2005: OMR 357, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 138 m (MAPR!); OMR 383, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 at the entrance of Las Cobanas Trail, elev 164 m (MAPR!); OMR 541, 27 Oct, Guánica, Bo. Carenero, GFR, Los Granados Trail, at the boundary of the municipalities of Yauco and Guánica, elev 225 m (MAPR!). **1995:** PAR 7687, 12 Oct, Guánica, GFR, along Road 334, a few km from ranger station (US!). **1990:** GRP 46480, 18 Oct, GFR, Dinamita Trail, southeast of Campamento Borinquen (UPR!); RGG 3330, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1984:** MEA 2, 6 Oct, Guánica, GFR, along jeep trail opposite km 4.9,

0.7 km on road from campamento Borinquen towards La Luna, elev 195 m (MAPR!). **1964:** AGM 2221, 2 Oct, GFR (MAPR!). **1950:** ELL 13184, 1 Jul, GFR (US!); ELL 13214, 3 Jul, GFR (US!). **1948:** EAI s.n., 1 May, GFR (MAPR!); HVB s.n., 7 Aug, GFR (MAPR!). (Little and Wadsworth, 1964: 508; Quevedo et al., 1990: 150; Axelrod, unpublished.) This is a common deciduous tree throughout the GFR. It is found in lower elevation forests on well drained substrates in much of Puerto Rico. *Exostema caribaeum* is a West Indian species that also occurs along the coast of Mexico and Central America.

***Guettarda elliptica* Sw.**

2005: OMR 399, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, to the forest main office, along the road close to the communication tower, elev 195 m (MAPR!); OMR 501, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, Cactus Forest along a small canyon north of Road 333, before the recreative area, elev 8 m (MAPR!). **2003:** OMR 144, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on the Cobanas Trail north to Cañon Las Trichillas, elev 129 m (MAPR!). **1990:** GJB 3707, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); RGG 3358, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1989:** PAR 3014, 7 Oct, Guánica, GFR, south of Lluveras road to El Vigia (US!). **1983:** SMC 130, 20 Dec, Guánica, GFR, Campamento Borinquen, Lluveras Trail, km 6.0 (MAPR!). (Little et al., 1974: 934; Quevedo et al., pg 150; Axelrod, unpublished.) This is a common shrub or small tree throughout the Reserve. It is wide spread in the new world occurring in Florida and the Bahamas, the Greater Antilles, and from Mexico to northern South America.

***Guettarda krugii* Urb.**

2005: OMR 303, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 12 m (MAPR!); OMR 377, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, on the main trail, elev 137 m (MAPR!). **2004:** OMR 222, 10 Sep, Guánica, Bo. Carenero, GFR, Faro de Guánica to the north of Road 333, behind the lighthouse building, elev 24 m (MAPR!). **2003:** OMR 145, 1 Oct, Guánica, Bo. Carenero, GFR, from Road 334 on the Cobanas Trail north to Cañon of the Trichillas, elev 129 m (MAPR!). **1999:** FSA 10969, 4 Sep, Guánica, Bo. Carenero, GFR, Road 333 just west of Caña Gorda, quebrada on north side of the road, dry scrub forest, elevation 5-15 m (US!). **1996:** PAR 7884, 25 Jan, GFR, east of end of road, area beyond Playa Pelicano (US!). **1992:** MFQ 502, 10-17 Feb, GFR, Guánica (GFR). **1988:** GRP 44521, 27 Feb, GFR, Guayanilla, Bo. Boca, Punta Verraco (UPR!). **1987:** GRP 44321, 9 Dec, GFR, Guánica, Bo. Montalva, Monte de la Brea, east of Punta Manglillo (UPR!). **1984:** JJ 17, 6 Oct, Guánica, GFR, along jeep trail opposite km 4.9, 0.7 km by road from Campamento Borinquen towards La Luna, elev 195 m (MAPR!). **1964:** HAL 10599, 2 Jan, GFR, dry coastal thickets (MAPR!). **1962:** HAL 9160, 23 Jun, GFR, coastal thickets (MAPR!). **1940:** LEG 302, 23 Oct, GFR, Caña Gorda (US!). **1913:** FLS 3036, 19 Sep, *Guánica (MAPR!). **1886:** PS 3711, 10 Feb, *prope* Guánica, *sylva ad* El Maniel [GFR] (US!). (Little et al., 1974: 936; Quevedo et al, 1990: 150; Axelrod, unpublished.) This endemic tree is common in the forest on dry slopes in the Reserve. Outside the Reserve it is becoming rare due to deforestation and development. The species is found to the east of the Preserve in the low limestone coastal hills and flats, and in Cabo Rojo to the southwest. It is known from Mona Island by two collections made in 1972. The Puerto

Rican population is disjunct as the species otherwise occurs in the Bahamas, Turks and Caicos Islands.

***Guettarda scabra* (L.) Vent.**

2006: OMR 631, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2005:** OMR 353, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, mesic canyon running north close to Susúa Baja, elev 85 m (MAPR!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This shrub or small tree is rare within the GFR, but common elsewhere in typically more mesic Puerto Rican forests. It is a West Indian endemic.

***Machaonia portoricensis* Baill.**

2005: OMR 324, 24 Jun, Yauco, Bo. Barinas, GFR, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 104 m (MAPR!). **2003:** OMR 193, 7 Nov, Yauco, Bo. Barinas, GFR, Julio Vélez Trail from DRNA office east to Mirador El Vigía, elev 198 m (MAPR!). **1998:** PAR 10175, 23 Jan, Guánica, GFR, Caña Gorda (US!). **1995:** PAR 7675, 12 Oct, Guánica, GFR, along trail off Road 334 (US!). **1990:** RGG 3332, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1989:** PAR 3020, 7 Oct, Guánica, GFR, along 334 (US!). **1963:** HAL 9756, 27 Jun, GFR (US!). **1962:** HAL 9166, 23 Jun, GFR, coastal thickets (MAPR!). **1940:** LEG 312, 23 Oct, GFR (US!). **1913:** NLB 1936, 11-12 Mar, *Guánica, rocky slopes at Monte Ensenada (US!). (Little et al., 1974: 950; Quevedo et al., 1990: 150; Axelrod, unpublished.) This spiny shrub is common in the GFR, occurring on dry slopes and flats and coastal thickets. It is endemic to the dry scrub forests of southern and southwestern Puerto Rico.

***Margaritopsis microdon* (DC.) C.M.Taylor**

2006: OMR 651, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). (Acevedo-Rodríguez, 2005: 364 as *Psychotria microdon* (DC.) Urb.; Axelrod, unpublished) This shrub which sometime clambers into surrounding trees and shrubs is extremely rare within the GFR. It was found once in mesic, shaded forest in El Cedro. It is not a common species in Puerto Rico, being found in disturbed dry forests at low to mid elevations around the Island. It occurs in the Antilles and from Mexico to northern South American on the continent.

***Mitracarpus maxwelliae* Britton & P.Wilson**

2007: OMR 871, 17 Feb, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 following the dirt road to Manglillo, elev 30 m (MAPR!). **2004:** OMR 281, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 34 m (MAPR!). **1995:** GJB 4577, 17 Oct, Guánica. Bo. Montalva, GFR, scattered in open areas next to dirt road (MAPR!). **1992:** FSA 4595, 1 Jun, Guánica. Bo. Montalva, GFR, jeep road along Monte de la Brea, elev 10-50 m (MAPR!). **1991:** FSA 3301, 19 Nov, Guánica, Bo. Montalva, GFR, Manglillo, jeep road along Monte de la Brea (US!). **1987:** GRP 44318, 9 Dec, Guánica, Bo. Montalva, GFR, interior slopes of Monte de la Brea (US/ UPR!). **1925:** NLB 8319, 8 Mar, *Guánica, Salinas de Guánica (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This small herb or suffrutescent herb at least today is endemic to the GFR. It is not known

which of the “Salinas de Guánica” Britton was referring to in his type collection. The species is relatively common within its highly restricted range, occurring in rocky, sunny areas along dirt roads and in clearings on Monte de la Brea. It is listed as endangered by the U.S. Fish and Wildlife Service and as a Critical Element by the DNER.

***Mitracarpus polycladus* Urb.**

2007: OMR 889, 15 Aug, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 333 following the trail from Playa Tamarindo to the cave (north), elev 20 m (MAPR!).

2006: OMR 780, 18 Oct, Guayanilla, Bo. Boca, GFR, end of paved Road 333; trail east to Punta Vaquero, elev 12 m (MAPR!). **2005:** OMR 521, 22 Sep, Guánica, Bo. Carenero, GFR, Ballena Trail, from Road 333 to the north, elev 61 m (MAPR!); OMR 563, 4 Nov, Guánica, Bo. Carenero, GFR, from Road 333 at the entrance of Ballena Trail to the north, elev 30 m (MAPR!). **1999:** GJB 5851, 3 May, Guayanilla, Bo. Boca, along trail on dirt Road 333 just est of Punta Vaquero, elev 10-15 m (MAPR!); GJB 5965, 29 Dec, Guánica, Bo. Carenero, GFR, Fuerte Trail, ca. 100 m from trail head off Road 334, elev 180-200 m (MAPR!). **1996:** PAR 7878, 25 Jan, GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!). **1995:** GJB 4574, 17 Oct, Guayanilla, Bo. Boca, GFR, exposed coastal plain with low wind pruned shrubs and small trees, elev 10 m (MAPR!). **1992:** GRP 47506, 5 Jan, GFR, Guánica, near upper end of Hoya Las Picuas, north of Caña Gorda (UPR!); GRP 49655, 5 Nov, GFR, Guayanilla, Bo. Boca, Punta Vaquero (UPR!). **1991:** GRP 47178, 22 Sep, Guayanilla, Bo. Boca, GFR, vicinity of Punta Vaquero (US!). **1982:** SMC 59, 13 Nov, GFR, dwarf forest section along Caña Gorda Beach (MAPR!). **1964:** HAL 10795, 1 Apr, *Guánica (US!). **1961:** HAL 9038, 30 Dec, GFR, coastal thickets (MAPR!). **1913:** FLS 3038, 19 Sep, *Guánica (MAPR!).

(Quevedo et al., 1990: 150; Axelrod, unpublished.) This small subfrutescent herb occurs scattered in the exposed rocky soil and in soil pockets along the trail from the sapo conco pond to the trail's end at Punta Vaquero. It is most frequent among the rocks with the stunted plants on the bluff at the dwarf forest. The species is also known from Anegada Island in the Virgin Islands and from Saba Island in the Lesser Antilles. It is listed as an Endangered species by the U.S. Fish and Wildlife Service and as a Critical Element by the DNER.

***Psychotria nervosa* Sw.**

2005: OMR 390, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail, on the main trail, at old house area close to the entrance, elev 175 m (MAPR!). **2004:** OMR 238, 30 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, at the junction with other trail taking the canyon to the north, elev 110 m (MAPR!). **1886:** PS 3759, 13 Feb, Guánica, Bo. Carenero, *ad* Monte Cobana [GFR] (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This small shrub is rare in the Reserve, being restricted to the shady forest understory in the more mesic canyons. It is a common understory species of dry to mesic forests throughout the Island. It is widespread in the West Indies and tropical America.

***Psychotria pubescens* Sw.**

2006: OMR 637, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). (Axelrod, unpublished.)

This understory shrub was found once in El Cedro canyon in a relatively mesic area.

New record for the GFR.

***Randia aculeata* L.**

2004: OMR 247, 30 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, at the junction with other trail taking the canyon to the north, elev 100 m (MAPR!). **2003:** OMR 160, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda to the north of the Road 333 at the entrance of Hoya Honda Canyon, elev 51 m (MAPR!). **1973:** AGM 4047, 1 Apr, *Guánica, Playa Santa (MAPR!). **1950:** ELL 13231, 4 Jul, GFR (US!). **1935:** FHS 358, 4 May, *Guánica (US!). **1935:** FHS 198, 11 Mar, *Guánica, dry ground (US!). **1886:** PS 3608, 2 Feb, *Guánica (US!); PS 3733, 7 Feb, *Guánica (US!). (Little and Wadsworth, 1964, pg 520; Quevedo et al., 1990: 150.) *Randia aculeata* is a spiny, widespread, highly variable species found in dry to mesic forests throughout the GFR, Puerto Rico and the West Indies. Its leaves range from small and coriaceous to relatively large and soft and the mature berries can be white, red or black.

***Randia portoricensis* (Urb.) Standl.**

2006: OMR 744, 1 Jun, Yauco, Bo. Barina, GFR, from old campeche plantation taking a canyon to the north, elev 50 m (MAPR!). **2006:** OMR 629, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 77 m (MAPR!). **2005:** OMR 498, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, Cactus Forest along a small canyon north of Road 333, before the recreative area, elev 8 m (MAPR!). **2003:** OMR 135, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita from DRNA office south to Cañon de los Murciélagos to a small Palo de Rosa population, elev 76 m (MAPR!). **1886:** PS 3744, 13 Feb, *Guánica, *ad* Barina (US!). (Quevedo et al., 1990: 150.) *Randia portoricensis* is an endemic shrub known from four small populations in the GFR and one from Yauco and a small one at Peñón de Ponce in Peñuelas. The Yauco site is slated for development and the population has been seriously reduced by cutting. The Peñuelas site is under pressure for housing. This species is listed as a Critical Element by the DNER.

***Rondeletia inermis* (Spreng.) J.C. Krug & Urb.**

2005: OMR 347, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail on a mesic canyon running north close to Susúa Baja, elev 70 m (MAPR!); OMR 358, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 138 m (MAPR!). **1995:** PAR 7691, 12 Oct, Guánica, GFR, south area of forest off Road 333 (US!). **1994:** GRP 39359, 20 Jul, GFR, Guánica, Bo. Montalva, interior slopes of Monte de la Brea (UPR!). **1983:** GRP 39359, 20 Jul, GFR, Road 333, east of Caña Gorda (UPR!). (Little et al., 1974: 974; Quevedo et al., 1990: 150; Axelrod, unpublished.) This endemic shrub is relatively common in Puerto Rico and in the GFR. It is highly variable in leaf size and growth form depending on whether it is in the understory of a mesic forest on the west coast or on an exposed hillside in Guánica.

***Scolosanthus versicolor* Vahl**

2006: OMR 689, 6 Apr, Guánica, Bo. Carenero, GFR, from Road 334 taking El Fuerte Trail. Close to the end of the trail, northwest slope, elev 84 m (MAPR!). **1991:** GRP 47262, 6 Nov, GFR, Guánica, Bo. Carenero, near upper end of Hoya Las Picuas, north of

Caña Gorda (UPR!). **1886:** *PS 3441*, 25 Jan, *Guánica (US!). (Quevedo et al, 1990: 150; Axelrod, unpublished.) This shrub is rare within the forest; a single individual was found in the low xeric forest in a dry ravine.

Spermacoce confusa Rendle

2006: *OMR 601*, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!). **2005:** *OMR 376*, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 137 m (MAPR!); *OMR 458*, 18 Aug, Guánica, Bo. Carenero, GFR, Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, junction with the trail to Hoya Honda, elev 157 m (MAPR!); *OMR 520*, 22 Sep, Guánica, Bo. Carenero, GFR, Ballena Trail, from Road 333 to the north, elev 61 m (MAPR!). **2003:** *OMR 127*, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita from DRNA office south to Cañon de los Murciélagos to a small Palo de Rosa population, elev 127 m (MAPR!). **1997:** *GJB 5346*, 28 Oct, Guánica, Bo. Carenero, GFR, along Road 333 between km 7.4-7.5, west of Bahía de la Ballena, elev 25 m (MAPR!). **1990:** *GRP 46468*, 17 Oct, GFR, Guayanilla, Bo. Boca, Guitarra Trail, northeast of Punta Vaquero (UPR!); *GRP 46481*, 18 Oct, GFR, Guánica, Dinamita Trail, southeast of Campamento Borinquen (UPR!). **1987:** *GRP 44289*, 9 Dec, Guayanilla, Bo. Boca, GFR, vicinity of Playa Tamarindo (US!). **1886:** *PS 3768*, 13 Feb, *Guánica, *litoralibus* (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This is a common herb in sunny open areas or semi-shade at the edge of the forest. It can be found on dry exposed soil or in open grassy roadsides. The species is common throughout the dry areas of Puerto Rico and the Caribbean and much of continental tropical America.

Spermacoce remota Lam.

2006: *OMR 663*, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to El Cedro, elev 137 m (MAPR!). (Quevedo et al., 1990: 150, as *Borreria laevis* (Lam.) Griseb., misapplied; Axelrod, unpublished.) This is a rare herb within the GFR, but it is found widely scattered on the Island in both mesic and dry areas. It is a widespread species in the West Indies and warm America.

Stenostomum acutatum DC.

2006: *OMR 600*, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!). **2005:** *OMR 382*, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, on the main trail, elev 149 m (MAPR!). **2004:** *OMR 205*, 4 Sep, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo at the area of sapo concho new ponds, elev 12 m (MAPR!). **2003:** *OMR 115*, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 to the main trail of Las Cobanas, elev 150 m (MAPR!). **1994:** *DA 721*, 8 Nov, Guánica, Road 333, 8 km east of town of Guánica, south side of road, elev 25 m (MAPR!). **1991:** *FSA 2904*, 7 Sep, Guánica, GFR, along Murciélago Trail from campamento, elev 50-150 m (MAPR!). **1990:** *RGG 3346*, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1989:** *PAR 3021*, 7 Oct, Guánica, GFR, along Road 334 (US!). **1987:** *PAR 2240*, 29 Sep, Guánica, GFR (US!). **1986:** *GJB 3185*, 17 Apr, Guánica, GFR, limestone hills on north side of Road 333 between Balneario de Caña Gorda and Playa Tamarindo (MAPR!). **1984:** *JJ 19*, 6 Oct, Guánica, GFR, around Playa Tamarindo, elev 5 m (MAPR!). **1964:**

HAL 10606, 2 Jan, GFR, near shore (MAPR! US!). **1963:** *HAL 9758*, 27 Jun, *Guánica, coastal thickets (MAPR! US!). **1962:** *HAL 9148*, 23 Jun, *Guánica (MAPR! US!). **1961:** *HAL 9013*, 9032, 30 Dec, GFR, coastal thickets (MAPR!). **1959:** *GLW 8826*, 9 Jul, Guánica, GFR (US!). **1940:** *LEG 197*, 10 Oct, Guánica, Bo. Carenero, Caña Gorda, GFR, near the beach (US!). **1925:** *NLB 8291*, 7 Mar, *Guánica, Salinas de Guánica (US!). **1915:** *JAS 2833*, 13 Jul, *Guánica, Ensenada (US!). **1915:** *NLB 4819*, 2-4 Mar, *Guánica, limestone hill at Punta Peñones (US!). **1913:** *NLB 1909*, 11-12 Mar, *Guánica (US!). **1886:** *PS 3376*, 4 Jan, Guánica, Bo. Carenero, [GFR], Monte Puerco (US!); *PS 3480*, 25 Jan, *prope* *Guánica, Salinas (US!). (Little et al., 1974: 916; Quevedo et al., 1990: 150, as *Antirhea acutata* (DC.) Urb.; Axelrod, unpublished.) This is one of the most common trees in the xeric forests of the Reserve. It occurs in dry forest in the south and southwest portions of Puerto Rico and on the islands of Mona and Vieques. It is widespread in similar dry habitats, usually on limestone throughout the Antilles.

Stenostomum lucidum (Sw.) C.F. Gaertn.

2005: *OMR 359*, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, on the main trail, elev 149 m (MAPR!). **2000:** *JS 489*, 27 Sep, GFR, Guánica, Road 334 due to the forest (US!). **1990:** *GJB 3702*, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). (Little et al., 1974: 920; Quevedo et al., 1990: 150, as *Antirhea lucida* (Sw.) Hook.f.; Axelrod, unpublished.) This tree is rare within the Reserve, primarily being found in the relatively more mesic dry forest along Las Cobanas Trail.

Strumpfia maritima Jacq.

2006: *OMR 598*, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!). **2005:** *OMR 507*, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, along a cactus forest from a small canyon north of Road 333, up to a rocky plateau, before the recreative area, elev 23 m (MAPR!). **2003:** *OMR 173*, 22 Oct, Guayanilla, Bo. Boca, GFR, trail from Playa Tamarindo, sapo concho pond to Punta Vaquero, dwarf forest, at the end of paved Road 333, elev 15 m (MAPR!). **1996:** *PAR 7877*, 25 Jan, GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!); *GJB 4696*, 1 Feb, Guayanilla, Bo. Boca, GFR, dwarf forest east of Playa Tamarindo, elev 10-20 m (MAPR!). **1994:** *DA 719*, 8 Nov, Guánica, Road 333, 8 km east of town of Guánica, south side of road, elev 25 m (MAPR!). **1988:** *MTS 440*, 16 Jan, Yauco, Bo. Barina, GFR, Tamarindo Beach to Jacinto Point, along shoreline by Road 333 (US!). **1982:** *VNO 51*, 13 Nov, GFR, 1.9 km after the end of paved Road 333, Punta Verraco, elev 25 m (MAPR!). **1966:** *WRS 3177*, 1 Jul, Guayanilla, Bo. Boca, GFR, several miles east of end of paved Road 333, dry rocky area of very low windswept growth on top of coastal cliffs (US!). **1962:** *HAL 9144*, 23 Jun, GFR (MAPR!). **1961:** *HAL 9015*, 30 Dec, GFR, coastal thickets (MAPR!). **1915:** *NLB 4906*, 5-8 Mar, vicinity of *Guánica (US!); *JAS 2839*, 13 Jul, *Guánica, Ensenada (US!). **1886:** *PS 3478*, 25 Jan, *Guánica (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) *Strumpfia maritima* is a small, dense shrub characteristically found on dry limestone bluffs and slopes along the coast. It can occur more inland, but rarely away from the effect of coastal winds and airborne salt. It is a West Indian species that extends on to the Yucatan Peninsula and the keys of Florida.

Confirmation required before accepting into the flora:

**Genipa americana* L.

(Quevedo et al., 1990: 150.) This fruit tree was widely planted in the West Indies and continental tropical America in pre-Columbian times and now has a broad naturalized range. It probably was planted historically in the populated areas of the Forest.

Guettarda odorata (Jacq.) Lam.

(Quevedo et al., 1990: 150.) This shrub or small tree is rare on the island of Puerto Rico, being known only from a few collections from scattered locations around island, none from the Guánica-Yauco-Guayanilla area. There are recent collections of it from Vieques and Culebra, but it apparently is common in the Virgin Islands and the Lesser Antilles.

Psychotria brownei Spreng.

(Quevedo et al., 1990: 150.) This understory shrub is found in the lowland forest of the northcoast and in the foothills of southeastern Puerto Rico and in the Sierra Bermeja. There is no evidence of its occurrence in the general area of the GFR, but it does occur in mesic canyons in dry forest in the Sierra Bermeja and Vieques. It could be in the understory of the evergreen forest in the more mesic canyons on the northern portions of the Forest. The species is endemic to the Greater Antilles.

Rondeletia portoricensis J. C. Krug & Urb.

(Little et al., 1974: 990.) This report surely is in error. *Rondeletia portoricensis* is only known from mesic to wet montane habitats at elevations above 400 m.

Spermacoce verticillata L.

(Quevedo et al., 1990: 150, as *Borreria verticillata* (L.) G. Mey.) This weedy, suffrutescent herb is widespread in Puerto Rico, but it is not found in the dry southern coastal regions of the Island. The report of its occurrence in the GFR must be considered as questionable at best, if not erroneous.

RUSCACEAE (including DRACAENACEAE)

**Sansevieria concinna* N.E. Brown

2006: OMR 667, 9 Feb, Guayanilla, Bo. Boca, GFR, end of paved Road 333, taking a dirt road to the north from Playa Tamarindo at sapo concho area to the caves, elev 4 m (MAPR!). **2004:** OMR 212, 4 Sep, Guayanilla, Bo. Boca, GFR, Playa Tamarindo, end of paved Road 333, on sapo concho pond, taking a trail north to the cave, elev 10 m (MAPR!). **1998:** GJB 5573, 16 Feb, GFR, by cueva (MAPR!). This exotic herb is very abundant in the area of Tamarindo. Unlike the other species of *Sansevieria* that have naturalized in Puerto Rico, *Sansevieria concinna* regularly produces fruit. I am assuming that it is a cultivated species that has escaped via seed and locally naturalized. (Axelrod, unpublished.) **New record for the GFR and Puerto Rico.**

**Sansevieria cylindrica* Bojer

2006: OMR 666, 9 Feb, Guayanilla, Bo. Boca, GFR, end of paved Road 333, taking a dirt road to the north from Playa Tamarindo by sapo concho area to the caves, elev 4 m (MAPR!). (Axelrod, unpublished.) This exotic herb is restricted to the area of Playa Tamarindo, where it is rare. **New record for the GFR.**

**Sansevieria hyacinthoides* (L.) Druce

2005: OMR 535, 6 Oct, Guánica, Bo. Carenero, GFR, Road 334 close to the ranger office, elev 206 m (MAPR!). **1988:** GRP 44523, 27 Feb, GFR, Guayanilla, Bo. Boca,

Punta Verraco (UPR!). (Axelrod, unpublished.) This herb is locally common throughout the GFR. **New record for the GFR.**

Confirmation required before accepting into the flora:

**Sansevieria trifasciata* Prain

Sterile individuals of this species were observed in a mesic canyon north of Playa Tamarindo. This species is similar to *Sansevieria hyacinthoides*, but is less common on the Island.

RUTACEAE

Amyris elemifera L.

2005: OMR 305, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 12 m (MAPR!); OMR 378, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, on the main trail, elev 137 m (MAPR!). **2002:** GJB 6646, 17 Oct, Guánica, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **2000:** PAR 11432, 6 Sep, GFR (US!). **1996:** PAR 7890, 25 Jan, GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!). **1994:** DA 924, 925, 12 Dec, Guánica, GFR, Vereda Fuerte, off Road 334, elev 140 m (MAPR!). **1991:** FSA 2893, 7 Sep, Guánica, GFR, along Murcielago Trail from campamento (US!). **1990:** RGG 3343, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1976:** MSo s.n., 5 Dec, GFR (MAPR!). **1950:** ELL 13149, 30 Jun, GFR (US!). **1948:** JRF s.n., 7 Aug, Guánica (MAPR!). (Little and Wadsworth, 1964: 216; Quevedo et al., 1990: 146; Axelrod, unpublished.) *Amyris elemifera* is a common to dominant small tree in the GFR and is found in dry to mesic forests on well-drained substrate throughout Puerto Rico and the West Indies, coastal Mexico and Central America.

**Citrus × aurantifolia* (Christm.) Swingle

2006: OMR 681, 30 Mar, Guánica, Bo. Carenero, GFR, end of Road 334, around the ranger house, elev 144 m (MAPR!). (Little et al., 1974: 986; China, 1990: 53; Quevedo et al., 1990: 146; Axelrod, unpublished.) Limón was planted around homes in the formerly occupied areas of the Forest and is still persistent.

**Citrus × aurantium* L.

2006: OMR 682, 30 Mar, Guánica, Bo. Carenero, GFR, end of Road 334, around the ranger house, elev 144 m (MAPR!). (Axelrod, unpublished.) This small tree was planted and is still persistent in the GFR. **New record for the GFR.**

Zanthoxylum flavum Vahl

2005: OMR 389, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail, elev 152 m (MAPR!); OMR 468, 18 Aug, Guánica, Bo. Carenero, GFR, Road 334 to DRNA office, elev 230 m (MAPR!). **1996:** GJB 4706, 13 Feb, Guánica, Bo. Montalva, GFR, Ensenada sector, on south side of Monte de la Brea, between Punta Manglillo and Punta Jorobado at end of south most dirt road that branches east off of dirt road to Punta Jorobado, which junctions with PR 325 at km 4.4, elev 5-10 m (MAPR!). **1990:** RGG 3353, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1950:** ELL 13224, 4 Jul, GFR (US!); ELL 13250, 5 Jul, GFR (US!). (Little and Wadsworth, 1964: 228; Quevedo et al., 1990: 146; Axelrod, unpublished.) This tree is rare in the Reserve, where it is found in evergreen forest. It was extensive cut in the

past for its hard wood, and today only small trees of *Zanthoxylum flavum* are found on the Island. It is generally found in lower elevation forests in Puerto Rico, but does extend to 800 m in Maricao Forest. It is a West Indian species.

***Zanthoxylum martinicense* (Lam.) DC.**

1950: *ELL 13237*, 4 Jul, GFR (US!). (Little and Wadsworth, 1964: 230.) This spiny tree was observed, but not collected along the northern forest boundary, in a mesic valley by La Cobana and would be expected in disturbed valleys and ravines adjacent to the Reserve. It is a common early succession species in mesic lowland forests of the Island, but does extend to higher elevations in places. The species is widespread in the West Indies and onto Continental tropical America.

***Zanthoxylum monophyllum* (Lam.) P. Wilson**

2005: *OMR 473*, 25 Aug, Yauco, Bo. Barina, GFR, from Road 334, taking Las Cobanas Trail to the north, at old campeche plantation (zinc house) taking a canyon to the north of the forest (forest boundary), elev 48 m (MAPR!). **2004:** *OMR 242*, 30 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, at the junction with other trail taking the canyon to the north, elev 110 m (MAPR!). **1950:** *ELL 13249*, 5 Jul, GFR (US!). **1950:** *ELL 13174*, 30 Jun, GFR (US!). (Little and Wadsworth, 1964: 232; Quevedo et al., 1990: 146; Axelrod, unpublished.) This spiny tree is common in the evergreen forest of mesic canyons. It is a common element in dry to dry-mesic forests on the Island and in the Antilles, extending into Central America and northern South America.

***Zanthoxylum spinifex* (Jacq.) DC.**

1940: *LEG 210*, 11 Oct, Guánica, GFR, las Cobanas Trail (US!). (Little et al., 1974: 342; Quevedo et al., 1990: 146.) This is a rare shrub within the GFR and in Puerto Rico in general. According to the forest manager the species is still extant in the Reserve, where it was found in the biodiversity plot. It is otherwise only known in Puerto Rico from the foothills of Salinus and Coamo. It is an Antillean species that extends into Venezuela. The species should be evaluated to see if governmental protection is needed.

Confirmation required before accepting into the flora:

***Zanthoxylum punctatum* Vahl**

(Quevedo et al., 1990: 146.) This Antillean endemic shrub or tree is generally found in more mesic forests than those of the Guánica Reserve. It possibly could occur in the more mesic canyons in the northern portion of the Reserve.

SALICACEAE (including FLACOURTIACEAE)

***Casearia aculeata* Jacq.**

2006: *OMR 655*, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). This shrub was found only in El Cedro canyon. It is an early successional species that will persist in the shady understory. In Puerto Rico it is found in the northern, western and southern regions.

New record for GFR.

***Samyda dodecandra* Jacq.**

2005: *OMR 567*, 10 Nov, Guánica, Bo. Carenero, GFR, from Road 333, taking a dirt road to Jaboncillo beach, elev 27 m (MAPR!). **2004:** *OMR 220*, 10 Sep, Guánica, Bo.

Carenero, GFR, Faro de Guánica to the north of Road 333, behind the lighthouse building, elev 24 m (MAPR!). **1992:** *PAR* 4773, 15 Jan, Guánica, GFR (US!). **1990:** *GJB* 3699, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1932:** *GSM* 1676, 4 Apr, *between Guánica Bay and Salinas (US!). **1913:** *NLB* 1925, 11-12 Mar, *Guánica, Mt. Ensenada (US!). (Little et al., 1974: 590; Quevedo et al., 1990: 148; Axelrod, unpublished.) This Antillean shrub is locally common in the GFR, especially on the southern slopes of the forest. It is a common element of the dry to dry-mesic forests of the Island.

***Xylosoma buxifolium* A. Gray**

2005: *OMR* 352, 2 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, mesic canyon running north close to Susúa Baja, elev 85 m (MAPR!). **2004:** *OMR* 244, 30 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, junction with other trail taking the canyon to the north, elev 110 m (MAPR!). (Little et al., 1974: 592; Quevedo et al., 1990: 148; Axelrod, unpublished.) This tree is restricted to mesic canyons along the northern boundary of the GFR. It is found in lower elevational forests on well-drained substrate in Puerto Rico, the Antilles and Bahamas.

Confirmation required before accepting into the flora:

***Homalium racemosum* Jacq.**

(Little and Wadsworth, 1964: 373.) This is a widespread tree in Puerto Rico, the West Indies and tropical America. It is generally found in more mesic forests than those of the GFR. It is found throughout the Antilles and in continental tropical America.

***Samyda spinulosa* Vent.**

(Axelrod, unpublished.) This shrub typically is found in more mesic forests than the similar, *Samyda dodecandra*. It is possible that it was found in the understory of a relatively mesic canyon on the northern boundary of the Reserve.

SANTALACEAE (including VISCACEAE)

***Dendrophthora brachylepis* Urb.**

2006: *OMR* 605, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 16 m (MAPR!). This epiphytic, parasitic shrub is rare within the Reserve, only being found on the one occasion. (Axelrod, unpublished.) **New record for the GFR.**

***Phoradendron anceps* (Spreng.) M. Gómez**

2005: *OMR* 398, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, to the forest main office, along the road close to the communication tower, elev 195 m (MAPR!); *OMR* 443, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 152 m (MAPR!). **2000:** *PAR* 11426, 6 Sep, GFR (US!). **1995:** *PAR* 7680, 12 Oct, Guánica, GFR, by parking area close to ranger station (US!). **1992:** *VSV* 32, 20 Jan, Guánica, GFR (MAPR!); *FSA* 4571, 1 Jun, Guánica, Bo. Montalva, GFR, jeep road along Monte de la Brea, elev 10-50 m (MAPR!); *VSV* 1, 26 Sep, Guánica, GFR, elev 250 m (MAPR!). **1991:** *FSA* 2929, 7 Sep, Guánica, Bo. Carenero, along Road 334 just north of entrance to GFR, elev 150 m (MAPR! US!); *FSA* 3295, 19 Nov, Guánica. Bo.

Montalva, GFR, Manglillo section, jeep road along Monte de la Brea, elev 35-60 m (MAPR! US!). **1989:** PAR 3026, 7 Oct, Guánica, GFR, along main road to ranger station (US!). **1986:** GJB 3190, 17 Apr, Guánica, GFR, north side of Road 333, km 4.4-4.5, 1 km by road west of Balneario de Caña Gorda (MAPR!). **1964:** HAL 10593, 1 Jan, Guánica, GFR, dry thickets, elev 80 m (MAPR! US!); HAL 10634, 3 Jan, Guánica, GFR, dry thickets near sea-level (MAPR! US!); AGM 2718, 2 Oct, Guánica, GFR (MAPR!). **1915:** NLB 4816, 2-4 Mar, *Guánica, Bo. Montalva (US!). **1913:** FLS 3107, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 145 as *Phoradendron chrysocarpum* Krug & Urb.; Axelrod, unpublished.) This is a common parasitic shrub that usually grows on the branches of *Pisonia albida*. It has been collected in much of Puerto Rico except in the southeast portions. *Phoradendron anceps* is Antillean extending into Venezuela.

***Phoradendron quadrangulare* (Kunth) Griseb.**

1993: FSA 5968, 22 Mar, Guánica, Bo. Montalva, Manglillo, GFR, high area along entrance road, dry limestone ridge (US!). **1964:** HAL 10635, 3 Jan, GFR, near sea-shore, dry thicket (US!). This parasitic shrub is rare within the GFR. It is relatively common over much of the Island and is wide spread in the new world tropics and subtropics. (Axelrod, unpublished. **New record for the GFR.**)

***Phoradendron trinervium* (Lam.) Griseb.**

2003: OMR 186, 7 Nov, Yauco, Bo. Barinas, GFR, Julio Vélez Trail from DRNA office east to Mirador El Vigia, starting the limit between the municipalities of Guánica and Yauco, around km 6.0, elev 198 m (MAPR!). **1992:** VSV 32, 20 Jan, Guánica, GFR (US!). **1989:** PAR 3024, 7 Oct, Guánica, GFR, along main road to ranger station (US!). **1964:** HAL 10631, 3 Jan, Guánica, GFR, dry thickets, elev 70-80 m (MAPR! US!). **1962:** HAL 9122, 23 Jun, *Guánica (MAPR!). **1962:** HAL 9137, 9149, 26 Jun, Guánica, GFR (MAPR!). **1915:** NLB 4814, 2-4 Mar, *Guánica, Bo. Montalva (US!). **1913:** JAS 999, 26 Aug, *Guánica (US!). (Quevedo et al., 1990: 145; Axelrod, unpublished.) This parasitic shrub is locally common throughout the GFR and generally found in dryer areas on the Island. It is found in the Antilles and on the continent.

Confirmation required before accepting into the flora:

***Dendrophthora flagelliformis* (Lam.) Krug & Urb.**

1962: HAL 9143, 23 Jun, *Guánica (MAPR!). **1963:** HAL 9761, 27 Jun, *Guánica (US!). (Axelrod, unpublished.) This parasitic epiphytic shrub was not observed by the author during the field survey. It has been collected in scattered locations around the Island, and is also reported from Hispaniola and Cuba.

***Phoradendron dipterum* Eichler**

(Axelrod, unpublished.) This epiphytic parasite apparently only parasitizes other species of *Phoradendron*. It has been collected from scattered locations around the Island, some of them in dry forest and could well be found in the Reserve. It is a widespread species in the tropical and subtropic new world.

SAPINDACEAE

***Allophylus racemosus* Sw.**

1950: ELL 13236, 4 Jul, Guánica, GFR, elev 60-91 m (UPRRP!). (Little et al., 1974: 484; Axelrod, unpublished.) This tree was not observed by me within the Reserve. In Puerto Rico it generally is found in more mesic habitats. However, it is reported from

southern foothills in Salinas so it is possible that the species could occur along the northern boundary of the GFR. This is a widespread species of the Antilles and continental tropical America.

***Hypelate trifoliata* Sw.**

2005: OMR 388, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, taking Las Cobanas Trail, on the main trail, elev 152 m (MAPR!). **2000:** PAR 11425, 6 Sep, GFR (US!). **1994:** DA 928, 12 Dec, Guánica, GFR, Vereda El Fuerte, off Road 334, elev 140 m (MAPR!). **1990:** GJB 3715, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); RGG 3344, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1989:** PAR 3009, 7 Oct, Guánica, GFR, in front of ranger station (US!). **1944:** MC 1152, 2 Apr, GFR (MAPR!). **1915:** NLB 4828, 2-4 Mar, *Guánica, Montalva (US!). **1886:** PS 3655, 10 Feb, Guánica, Bo. Carenero, *montis* El Maniel [GFR] (US!). (Little et al., 1974: 494; Quevedo et al., 1990: 147; Axelrod, unpublished.) This tree is uncommon but widespread in the Reserve, occurring as scattered individuals. It is a West Indian species apparently restricted to limestone.

****Melicoccus bijugatus* Jacq.**

2006: OMR 652, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2005:** OMR 387, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, at the entrance of the Reserve, elev 130 m (MAPR!). **1915:** JAS 3014, 30 Aug, *Guánica (US!). (Little et al., 1974: 987; Chinea, 1990: 53; Quevedo et al., 1990: 147; Axelrod, unpublished.) This exotic tree is locally abundant in the formerly occupied areas of the Forest. It is spread via seed and is becoming invasion in dry forests in the Sierra Bermeja, Caja de Muertos, and Vieques, and has the potential to become a serious problem in the Reserve.

***Serjania polyphylla* (L.) Radlk.**

2005: OMR 552, 1 Nov, Guánica, Bo. Carenero, GFR, Road 334, from the entrance of the forest to the ranger's office, close to the communication tower, elev 200 m (MAPR!); OMR 589, 22 Dec, Guánica, Bo. Carenero, GFR, from Road 334, taking La Cobana Trail, elev 135 m (MAPR!). **1991:** BB 10022, 6 Jan, GFR, Dry tropical forest (US!). **1990:** GJB 3705, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1985:** PAR 719, 1 Apr, Guánica, GFR, Playa Santa, carretera a Ballena (US!). **1886:** PS 3950, 25 Jan, *Guánica (US!). (Quevedo et al., 1990: 147; Acevedo-Rodríguez, 2005: 376; Axelrod, unpublished.) This is a common liana in secondary forest and along forest margins in the Reserve. It occurs in many areas of Puerto Rico and the Virgin Islands and Hispaniola.

***Thouinia portoricensis* Radlk.**

2005: OMR 502, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, Cactus Forest along a small canyon north of Road 333, before the recreative area, elev 8 m (MAPR!); OMR 566, 10 Nov, Guánica, Bo. Carenero, GFR, from Road 333, taking a dirt road to Jaboncillo beach, elev 27 m (MAPR!). **2003:** OMR 105, 12 Sep, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 on Las Cobanas Trail, first turn to the left on the main trail to a small *Trichilia triacantha* population, elev 150 m (MAPR!). **2000:** PAR 11435, 6 Sep, GFR (MAPR! US!). **1998:** PAR 10178, 23 Jan, Guánica, sector Montalva, GFR (US!). **1996:** PAR 7869, 7895, 25 Jan, Guánica, GFR (US!). **1994:** DA 733, 9 Nov,

*Guánica, Road 333, 8 km east of town of Guánica, south side of road, elev 25 m (MAPR!). **1990:** *RGG* 3334, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1985:** *DCW* 1310, 4 Apr, GFR, dry coastal thicket, near sea level, xerophytic scrub forest (US!). **1976:** *MSo* 83, 5 Dec, Guánica, GFR (MAPR!). **1961:** *HAL* 9030, 30 Dec, Guánica, GFR, coastal thicket (MAPR!). **1950:** *ELL* 13177, 1 Jul, GFR (US!); *ELL* 13228, 4 Jul, GFR (US!). **1948:** *JSP s.n.*, 7 Aug, Guánica, GFR (MAPR!). **1915:** *NLB* 4815, 2-4 Mar, *Guánica, Bo. Montalva, Limestone hill at Punta Peñones (US!). **1913:** *FLS* 3100, 19 Sep, *Guánica (MAPR!). **1886:** *PS* 3758, 13 Feb, GFR, Guánica, Caña Gorda [GFR] (US!). **1886:** *PS* 3651, 10 Feb, *Guánica, between Montalba and Salinas (US!). (Little and Wadsworth, 1964: 310; Quevedo et al., 1990: 147, as *Thouinia striata* Radlk. var. *portoricensis* (Radlk.) Votava & Alain; Axelrod, unpublished.) This endemic tree is widespread throughout the GFR, and is found in the dry forest of southern and southwestern Puerto Rico.

Confirmation required before accepting into the flora:

Cardiospermum corindum L.

1899: *CFM* 264, 22 Jan, *Guánica (NY!). (Acevedo-Rodríguez, 2005: 367.) This annual vine was not observed by the author within the GFR and, except for the historical collection from Guánica, it is not known from the southern portions of the Island. All three species of *Cardiospermum* are found in open, sunny habitats such as roadsides, margins of dry forest, and pastures. *Cardiospermum corindum* does occur on the coastal plain of Mona, and in dry forest in Vieques, so it is possible for it to occur in the Reserve.

Cardiospermum halicacabum L.

1913: *NLB* 1882, 11-12 March, *Guánica, roadside (NY! US!). (Acevedo-Rodríguez, 2005: 370.) As in the previous species, this annual is known today from Mona Island and from the southwestern coastal lowlands of Puerto Rico, but only by Britton's historical collection from Guánica. Its occurrence in the GFR is to be expected.

Cardiospermum microcarpum Kunth

(Quevedo et al., 1990: 147.) This annual vine has a distribution in Puerto Rico similar to that of *Cardiospermum corindum*; and as in that species it is possible for *Cardiospermum microcarpum* to occur in sunny openings in the Reserve.

Exothea paniculata (Juss.) Radlk.

(Little et al., 1974: 492; Quevedo et al., 1990: 147.) It is possible for this tree to occur in the Forest, especially in some of the canyons. Among other places in Puerto Rico, *Exothea paniculata* is found in the dry southwestern coastal lowlands and Mona Island. It also is found on limestone in the mesic northcoast. The species has a West Indian-continental America distribution.

**Sapindus saponaria* L.

(Quevedo et al., 1990: 147.) This exotic tree is planted and naturalized in the dry southern and southwestern portions of Puerto Rico, especially in disturbed or recovering dry forest. It could well have been planted in the formerly populated areas of the Forest, but there is no evidence of its occurrence in the Reserve today.

Thouinia striata Radlk.

(Quevedo et al., 1990: 147.) This endemic tree is typically found in more mesic to dry-mesic forests of Puerto Rico. It could possibly occur in the more mesic canyons on the northern boundary of the Forest.

SAPOTACEAE

Chrysophyllum oliviforme L.

2006: OMR 656, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). This West Indian tree is restricted to the more mesic northwestern slopes of the GFR. It is mostly found in dry to dry-mesic habitats in the western and southern parts of Puerto Rico (Axelrod, unpublished.) **New record for the GFR.**

Manilkara pleeana (Pierre ex Baill.) Cronquist

2004: OMR 249, 30 Oct, Guánica, Bo. Carenero, GFR, Cañon las trichilias, from Road 334 taking Las Cobanas Trail to the north, junction with other trail taking the canyon to the north, elev 90 m (MAPR!). (Axelrod, unpublished.) This tree is restricted to a more mesic valleys along the northern Forest boundary at La Cobana. This species is listed as a Critical Element by the DNER. **New record for the GFR.**

Pouteria multiflora (DC.) Eyma

1886: PS 3860, 23 Feb, Guánica, Bo. Carenero, [GFR], Monte Puerco (US!). *Pouteria multiflora* is a widespread of the Antilles and continental tropical and subtropical America. Sintenis' collection from Guánica is interesting as this tree today is only found in mesic forests in Puerto Rico. It could possibly occur in the most mesic canyons of the Forest. **New record for GFR.**

Sideroxylon foetidissimum Jacq.

2006: OMR 653, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). **2005:** OMR 471, 25 Aug, Yauco, Bo. Barinas, GFR, from Road 334, taking Las Cobanas Trail to the north, at old campeche plantation (zinc house) taking a canyon to the north of the forest, elev 56 m (MAPR!). **1886:** PS 3950, 2 Mar, *Guánica (US!). (Little et al., 1974: 989.) This tree is restricted to mesic canyons in the Reserve. It is found at low elevation from scattered locations on the north, west and southern portions of Puerto Rico, and is general in the Antilles, extending onto the Yucatan Peninsula.

Sideroxylon obovatum Lam.

2005: OMR 406, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, to the forest main office, along the road, elev 216 m (MAPR!); OMR 466, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 185 m (MAPR!). **1992:** FSA 4605, 1 Jun, Guánica, Bo. Montalva, GFR, headland at southwest end of jeep road, near Comunidad Salinas (US!). **1983:** SMC 129, 20 Dec, Guánica, GFR, Campamento Borinquen sector, Lluveras Trail, km 6.1 (MAPR!). **1963:** HAL 9765, 27 Jun, *Guánica, dry coastal thickets (MAPR! US!). **1962:** HAL 9126, 23 Jun, GFR, coastal thickets (MAPR!). **1961:** HAL 9021, 30 Dec, Guánica, GFR, coastal thickets (MAPR!). **1948:** AGM 103, 1 May, *Guánica (MAPR!). **1944:** JIO s.n., 2 Apr, GFR, road to Caña Gorda [Road 333] (MAPR!); MC 1144, 1157, 2 Apr, GFR (MAPR!). **1915:** NLB 4821, 2-4 Mar, *Guánica, limestone hill (US!); NLB 4879, 2-4 Mar, *Guánica, Montalva (US!); NLB 4897, 5-8 Mar, vicinity of *Guánica (US!); NLB 4905, 5-8 Mar, vicinity of *Guánica (US!). **1913:** NLB 1878, 11-12 Mar, *Guánica (US!); NLB 1908, 11-12 Mar,

*Guánica (US!). **1886:** *PS 3400*, 21 Jan, *Guánica, *declivibus ad* Punta de la Meseta (US!); *PS 3546*, 3485, 3476, 25 Jan, *Guánica, *sylvis litoralibus* (US!); *PS 3780*, 13 Feb, Guánica, *sylva montis* Cobana [GFR] (US!). (Little et al., 1974: 778, as *Bumelia krugii* Pierre and as *Bumelia obovata* (Lam.) DC.; Quevedo et al., 1990: 149; Axelrod, unpublished.) This small tree or shrub is very common in sunny areas throughout the GFR. It is an Antillean species found in lowland forests on well-drained substrate.

***Sideroxylon salicifolium* (L.) Lam.**

2005: *OMR 522*, 22 Sep, Guánica, Bo. Carenero, GFR, Ballena Trail, from Road 333 to the north, at the top of a hill to the west of the trail, elev 53 m (MAPR!). **1950:** *ELL 13199*, 2 Jul, GFR (US!). **1944:** *MC 1151*, 2 Apr, GFR, along roadside (MAPR!). **1886:** *PS 3706*, 3640, 10 Feb, *prope* Guánica, *sylva montis* el Maniel [GFR] (US!). (Little and Wadsworth, 1964: 442, as *Dipholis salicifolia* (L.) A.DC.; Quevedo et al., 1990: 149, as *Bumelia salicifolia* (L.) Sw.; Axelrod, unpublished.) This tree is common, but undercollected in the Preserve. It is found in forests around the island, usually on well-drained substrate. *Sideroxylon salicifolium* is a West Indian species that extends onto the Yucatan Peninsula of the continent.

SCHOEPFIACEAE

***Schoepfia obovata* C. Wright**

2006: *OMR 678*, 30 Mar, Guánica, Bo. Carenero, GFR, Cerro Caprón, from Road 334 taking El Fuerte Trail, elev 144 m (MAPR!). **2005:** *OMR 555*, 1 Nov, Guánica, Bo. Carenero, GFR, Road 334, from the entrance of the forest to the ranger's office, close to the communication tower, elev 197 m (MAPR!). **1990:** *RGG 3365*, 18 Dec, Guánica, Bo. Carenero, GFR, elev 145 m (MAPR!). **1964:** *JAD 7486*, 13 Apr, GFR (US!). **1964:** *HAL 10591*, 1 Jan, GFR, dry thickets, elev 80 m (MAPR! US!). (Little et al., 1974: 142; Quevedo et al., 1990: 145; Axelrod, unpublished.) This shrub is locally common in the Reserve, usually occurring on hilltops. It is found in dry to mesic forests on well-drained substrates in the Bahamas and most islands of the Greater Antilles.

SCROPHULARIACEAE

***Capraria biflora* L.**

2003: *OMR 126*, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita from DRNA office south to Cañon de los Murciélagos at a small Palo de Rosa population, elev 127 m (MAPR!). **1982:** *VNO 64*, 13 Nov, GFR, Road 333, Punta Verraco, elev 25 m (MAPR!). **1886:** *PS 3399*, 21 Jan, *Guánica, Punta de la Meseta (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This is an herb in the GFR.

SIMAROUBACEAE

Confirmation required before accepting into the flora:

***Castela erecta* Turpin**

(Quevedo et al., 1990: 146.) This coastal shrub is known from Puerto Rico, St. Croix and several Islands of the Lesser Antilles and northern Venezuela and Columbia in South America. In Puerto Rico, it is apparently rare, with recent collections only from the Pitahaya area of the Boquerón Forest Reserve. There are unconfirmed reports of it from Desecheo, Culebra, and Vieques Islands. This species is listed as a Critical Element by the DNER

SMILACACEAE

Smilax coriacea Spreng.

2005: OMR 404, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, along Road 334, to the forest main office, elev 216 m (MAPR!). **1886:** PS 3798, 13 Feb, *prope* *Guánica (US!). (Acevedo-Rodríguez, 2005: 444.) This spiny vine is rare within the GFR, but not uncommon in dry to mesic forests around the Island. It is a West Indian endemic.

SOLANACEAE

Datura inoxia Mill.

2005: OMR 583, 10 Nov, Guánica, Bo. Carenero, GFR, from Road 333, taking a dirt road to the south by old coconut plantation, area protected by the Puerto Rico Conservation Trust, elev 4 m (MAPR!). **1996:** PAR 7898, 25 Jan, Guánica, along road to entrance of GFR (US!). (Quevedo et al., 1990: 150; Axelrod, unpublished.) This herb is found in disturbed grasslands within the Reserve. It is a widespread weedy species in Puerto Rico and the warm new world.

Solanum bahamense L.

2007: OMR 882, 3 Apr, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 following La Cobana Trail, north forest boundary by La Trichilia Canyon, elev 100 m (MAPR!). **2005:** OMR 369, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, Cañon las Trichilia, mesic canyon, elev 90 m (MAPR!). **1948:** EAI s.n., 2 May, Guánica, GFR (MAPR!). (Quevedo et al., 1990: 150, as *Solanum persicifolium* Dunal; Axelrod unpublished.) This highly variable shrub is rare within the GFR, but relatively common in dry coastal thickets in Puerto Rico and the Caribbean. It is surprising that it is not more common in the Forest.

Solanum elaeagnifolium Cav.

2005: OMR 438, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, dirt road close to the beach at sapo concho breeding area in Manglillo, from Road 325 taking a dirt road to the south, elev 3 m (MAPR!). **1996:** FSA 10023, 30 Nov, Guánica, Bo. Montalva, GFR, beginning of dirt road to Monte La Brea (US!). (Axelrod, unpublished.) This herb is restricted to open disturbed areas along trails in Montalva. It was not observed in the eastern portion of the GFR. It is found in scattered locations on the north and southwestern coastal lowlands of Puerto Rico and in scattered areas throughout the warm new world. **New record for the GFR.**

Confirmation required before accepting into the flora:

Datura metel L.

(Quevedo et al., 1990: 150.) This herb, while quite distinct from *Datura inoxia* has historically been confused with it in our flora, possibly due to the occurrence of purple blotches in the corolla in some populations of the latter species. *Datura metel* may be endemic to the West Indies, but in Puerto Rico it is only known from a relatively few collections. The report of occurrence in the GFR is most likely due to confusion with *Datura inoxia*.

Datura stramonium L.

(Quevedo et al., 1990: 150.) This herbaceous weed of waste and cultivated areas is probably native to Mexico, but is now reported to be widespread in the warm areas of the new world. It is very uncommon in Puerto Rico today, known only from Gurabo and Coamo. It may have occurred in the occupied areas of the Forest in previous times.

Physalis angulata L.

1886: *PS 3916*, 2 Mar, *prope* *Guánica, *inter* Barina *et* La Boca [probably collected between Yauco and Guayanilla] (US!). (Quevedo et al., 1990: 150.) *Physalis angulata* is a pantropical, weedy herb, typically found on disturbed soil in sun. It is common in Puerto Rico and would be expected to have occurred around the formerly populated areas of the Reserve.

Solanum americanum Mill.

(Quevedo et al., 1990: 150, as *Solanum americanum* Mill. var *nodiflorum* (Jacq.) Edm.) *Solanum americanum* is a widespread herbaceous weed found throughout Puerto Rico and the new world. It would be expected in disturbed areas and openings in the formerly occupied areas of the Forest.

Solanum erianthum D. Don

1886: *PS 3560*, 31 Jan, *inter* *Yauco *et* Guánica (US!). (Little et al., 1974: 884; Quevedo et al., 1990: 150; Axelrod, unpublished.) This shrub or small tree is not commonly collected in Puerto Rico and is today known primarily from the mogotes of the north coast. It is also collected sporadically from the coastal plane on Mona Island, so that its occurrence in the Guánica Forest, especially in disturbed wooded sites would not be unexpected.

Solanum torvum Sw.

1935: *FHS 81*, 5 Feb, *Guánica, waste ground (US!). (Quevedo et al., 1990: 150.) This species was observed by me in a disturbed site in a valley along the northern boundary of the GFR by La Cobana. It is a widespread weedy short-lived shrub that is found throughout Puerto Rico and the new world tropics and subtropics.

SURIANACEAE

Suriana maritima L.

2006: *OMR 611*, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!). **2004:** *OMR 264*, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 3 m (MAPR!). **1940:** *LEG 191*, 10 Oct, Guánica, GFR, Beach of Caña Gorda (US!). **1913:** *FLS 3053*, 19 Sep, *Guánica (MAPR!). (Little et al., 1974: 354; Quevedo et al., 1990: 146; Axelrod, unpublished.) This is a common shrub on dunes and around seasonal ponds along the coast. *Suriana maritima* is a widespread beach species found in the subtropics and tropics of the old and new worlds.

TALINACEAE

Talinum fruticosum (L.) Juss.

2006: *OMR 699*, 11 May, Guayanilla, Bo. Boca, GFR, Punta Vaquero, end of paved Road 333 by sapo concho breeding area, elev 1 m (MAPR!). **2005:** *OMR 326*, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 104 m (MAPR!). **1962:** *HAL 9173*, 23 Jun, *Guánica, coastal thickets (MAPR!). **1886:** *PS 3910*, 2 Mar, *inter* *Guánica *et* Barinas *at* vias (US!).

(Axelrod, unpublished.) This succulent herb is locally common in open, sunny areas. It occurs in scattered locations in much of the lowlands of Puerto Rico and is found throughout the West Indies and on continental America.

Talinum paniculatum (Jacq.) Gaertn.

2005: OMR 330, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 82 m (MAPR!). This succulent herb was only found once in the Forest, although it is widespread on the Island, and in the West Indies and continental America. (Axelrod, unpublished.) **New record for the GFR.**

THEOPHRASTACEAE

Bonellia umbellata (A. DC.) B. Ståhl & Källersjö

2006: OMR 658, 26 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). (Axelrod, unpublished.) This shrub is rare within the Forest, being found only once in a relatively mesic canyon near the northern boundary of the Reserve. This species is found on well-drained soils in Puerto Rico and Hispaniola. This species is listed as a Critical Element by the DNER. **New record for the GFR.**

Jacquinia arborea Vahl

2006: OMR 597, 9 Jan, Guánica, Bo. Montalva, GFR, around Salinas de Providencia, end of Road 325, at the entrance to La Jungla, elev 1 m (MAPR!); OMR 688, 6 Apr, Guánica, Bo. Carenero, GFR, from Road 334 taking El Fuerte Trail, close to the end of the trail, northwest slope, elev 84 m (MAPR!). **2005:** OMR 307, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 11 m (MAPR!). **1996:** PAR 7891, 25 Jan, Guayanilla, GFR, east of end of paved Road 333, area beyond Playa Pelicano (US!). **1990:** GJB 3714, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1966:** WRS 3262, 5 Jul, Guánica, GFR, near coast beside Road 333 at km 4 Hm 7 (US!). **1964:** HAL 10602, 2 Jan, GFR (US!). **1961:** HAL 9009, 30 Dec, GFR, coastal thickets (MAPR!). **1959:** GLW 8824, 9 Jul, Guánica, GFR, shrubby woods on dogtooth limestone near seashore east of mouth of Bahía de Guánica (US!). **1944:** MC 1146, 2 Apr, GFR (MAPR!). **1913:** FLS 3050, 19 Sep, *Guánica (MAPR!). **1913:** NLB 1903, 11-12 Mar, *Guánica (US!). (Little et al., 1974: 762; Quevedo et al., 1990: 149; Axelrod, unpublished.) This is a common shrub, at times becoming a small tree that is generally found near the coast. It is a common coastal element in the flora of the West Indies.

Jacquinia berteroi Spreng.

2005: OMR 318, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to the north, to an old campeche plantation, elev 137 m (MAPR!). **2003:** OMR 116, 12 Sep, Guánica, Bo. Carenero, GFR, from Road 334 to the main trail of Las Cobanas, elev 130 m (MAPR!). **1995:** PAR 7678, 12 Oct, Guánica, GFR, along Road 334, few km from ranger station (US!). **1994:** DA 929, 12 Dec, Guánica, GFR, Vereda Fuerte, off Road 334, elev 140 m (MAPR!). **1990:** RGG 2848, 8 Mar, in the divisory line between the municipalities of Yauco and Guánica, at La Joya, 500 m south of a landfill, elev 100 m (MAPR!); RGG 3211, 22 Sep, in the divisory line

between the municipalities of Yauco and Guánica, at La Joya, 500 m south of a landfill, elev 100 m (MAPR!); *RGG* 3342, 18 Dec, Guánica, Bo. Carenero, GFR, elev 140 m (MAPR!). **1986:** *GJB* 3148, 24 Mar, Guánica, GFR, between km 5.6-5.7 on Fuente Trail, elev 110-130 m (MAPR!). **1983:** *SMC* 126, 11 Nov, Guánica, GFR, Playa Tamarindo sector (MAPR!). **1963:** *HAL* 9751, 27 Jun, GFR, coastal thickets (MAPR!). **1962:** *HAL* 9147, 23 Jun, GFR, coastal thickets (MAPR!). **1948:** *JRF* s.n., 7 Aug, *Guánica (MAPR 18410). **1886:** *PS* 3486, 25 Jun, *circa* *Guánica, Salinas (US!). (Little et al., 1974: 764; Quevedo et al., 1990: 149; Axelrod, unpublished.) This is a widespread shrub within the GFR. It is a West Indian species that occurs in scattered locations, generally on well-drained soils at lower elevations in Puerto Rico.

Excluded species:

†*Bonellia stenophylla* (Urban) B. Ståhl & Källersjö
(Quevedo et al., 1990: 149; as *Jacquinia stenophylla* Urb.) According to Axelrod (unpubl.) Liogier and Martorell (1985) and Liogier (1995) citation for this species was probably based on a Cuban collection at UPR whose label had a map of Puerto Rico on it. Axelrod rejects the species from the flora.

TURNERACEAE

Piriqueta racemosa (Jacq.) Sweet

2005: *OMR* 328, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 86 m (MAPR!). This is an herb that grows in disturbed areas along the trails in the GFR. It has a scattered distribution in the lowlands of the western part of Puerto Rico, and is also scattered on some of Antillean Islands and on the continent. **New record for the GFR.**

Turnera diffusa Willd. ex Schult.

2003: *OMR* 117, 12 Sep, Guánica, Bo. Carenero, GFR, from Road 334 to the main trail of Las Cobanas, elev 130 m (MAPR!). **1992:** *FSA* 4568, 1 Jun, Guánica, GFR, Bo. Montalva, jeep road along Monte de La Brea, (US!). **1991:** *FSA* 2902, 7 Sep, Guánica, GFR, along Murciélago Trail from Campamento, elev 50-150 m (MAPR!). **1915:** *NLB* 4825, 2-4 Mar, *Guánica, Bo. Montalva, limestone hill Punta Peñones (US!). **1913:** *FLS* 3101, 19 Sep, *Guánica (MAPR!). **1886:** *PS* 3434, 25 Jan, *Guánica, *ad pratis* (US!). (Quevedo et al., 1990: 148; Axelrod, unpublished.) *Turnera diffusa* is a low, suffrutescent shrub of open, sunny sites, generally along trails or in low brush-lands. It is found on well-drained soils in the southwest and southern portions of Puerto Rico and on Vieques and Mona Islands. The species occurs in the West Indies and on continental America.

URTICACEAE (Including CECROPIACEAE)

Cecropia schreberiana Miq. subsp. *schreberiana*

2007: *OMR* 879, 3 Apr, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 following La Cobana Trail, north forest boundary by La Trichilia Canyon, elev 75 m (MAPR!). (Quevedo et al., 1990: 145, as *Cecropia peltata* L.) This tree is very rare and only occurs as scattered individuals in mesic canyons in the Forest. This Antillean is a common early successional species in mesic areas of the Island.

Confirmation required before accepting into the flora:

Pilea microphylla (L.) Liebm.

(Quevedo et al., 1990: 145.) This small succulent herb is a relatively widespread species in Puerto Rico and does occur in soil pockets of limestone in the understory of dry woods on Mona Island. However, it is not found on limestone along the south coast of Puerto Rico. Its absence is puzzling. It also occurs commonly as a weed in pots and gardens and could have occurred in the formerly occupied areas of the Forest.

VERBENACEAE

Bouchea prismatica (L.) Kuntze.

2003: OMR 128, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita from DRNA office south to Cañon de los Murciélagos to a small Palo de Rosa population, elev 127 m (MAPR!). **1992:** FSA 5416, 22 Nov, Guánica, Bo. Montalva, *GFR, along north slope of Monte Las Pargas, up from dirt road along Bahía de Guánica (US!). **1935:** FHS 67, 17 Feb, *Guánica (US!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This suffrutescent herb or small shrub is locally common in along trails in more mesic areas of the Forest. It is reported from scattered locations around the Island, and is general in the warm new world.

Citharexylum spinosum L.

2005: OMR 317, 24 Jun, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 137 m (MAPR!); OMR 408, 16 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, along Road 334, to the forest main office, elev 216 m (MAPR!). **1950:** ELL 13176, 30 Jun, GFR (US!). **1940:** LEG 196, 10 Oct, Guánica, Bo. Carenero, GFR, Hoya Honda Well (US!). (Little and Wadsworth, 1964: 489, as *Citharexylum fruticosum* L.; Quevedo et al., 1990: 149, as *Citharexylum fruticosum* L.; Axelrod, unpublished.) This tree occurs as scattered individuals within the GFR. It is a common widespread species, often seen in early secondary forests on the Island. It is widespread in the West Indies and in continental America.

Duranta erecta L.

2004: OMR 223, 10 Sep, Guánica, Bo. Carenero, GFR, Road 333 close to Faro de Guánica, elev 6 m (MAPR!). **1962:** HAL 9130, 23 Jun, GFR (MAPR!). **1961:** HAL 9009, 30 Dec, *Guánica (MAPR!). **1913:** FLS 3057, 19 Sep, *Guánica (MAPR!). (Little et al., 1974: 864, as *Duranta repens* L.; Quevedo et al., 1990: 149, as *Duranta repens* L.; Axelrod, unpublished.) This shrub is rare in the GFR where it occurs mostly along the coast. It is found in dry areas of southern Puerto Rico and on Desecheo, Mona and Vieques Islands. The species is found in the West Indies and on continental America.

Lantana camara L. subsp. *portoricensis* (Moldenke) R. W. Sanders

2005: OMR 386, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, Road 334, at the entrance of the Reserve, elev 130 m (MAPR!); OMR 442, 11 Aug, Guánica, Bo. Montalva, GFR, Monte de la Brea, entrance to the dirt road to sapo concho breeding area in Manglillo, close to Road 325, elev 23 m (MAPR!); OMR 460, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, after the junction with Hoya Honda Trail, elev 155 m (MAPR!); OMR 514, 9 Sep, Guánica, Bo. Carenero, GFR, Caña Gorda, entrance of Hoya Honda at a mesic canyon, north of Road 333, elev 20 m (MAPR!).

This shrub grows as scattered individuals along some trails of the GFR. The material under this name was formerly treated as *Lantana urticifolia* Mill. This is a widespread, weedy shrub found in much of the warm new world.

Lantana camara* L. subsp. *portoricensis* (Moldenke) R. W. Sanders x *L. strigocamara

R. W. Sanders

2005: OMR 329, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 86 m (MAPR!). **2004:** OMR 227, 2 Oct, Guayanilla, Bo. Boca, GFR, Playa Tamarindo at the end of paved Road 333, from the sapo concho pond taking the trail north to the cave, elev 4 m (MAPR!). **1986:** MV s.n., Dec, Guánica, GFR, Caña Gorda, Road 333, between km 7.7-8.0 (MAPR!). **1913:** FLS 3099, 19 Sep, *Guánica (MAPR!). This hybrid is apparently common in Puerto Rico.

***Lantana exarata* Urb. & Ekman**

2005: OMR 381, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 137 m (MAPR!); OMR 562, 4 Nov, Guánica, Bo. Carenero, GFR, from Road 333 at the entrance of Ballena Trail to the north, elev 30 m (MAPR!). **1997:** GJB 5149, 5 Aug, Guayanilla, Bo. Boca, GFR, along Road 333 to west of Punta Vaquero, elev 5 m (MAPR!). **1913:** FLS 3039, 19 Sep, *Guánica (MAPR!). (Axelrod, unpublished.) This shrub typically grows in the low xeric forest on exposed limestone slopes. *Lantana exarata* is an Antillean species; in Puerto Rico it is restricted to limestone on the south coast, where it apparently is not common. **New record for the GFR.**

***Lantana involucrata* L.**

2005: OMR 299, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 7 m (MAPR!). **2004:** OMR 277, 20 Nov, Guánica, Bo. Montalva, GFR, Monte de la Brea, from Road 325 taking a dirt road south to Punta Manglillo, elev 12 m (MAPR!). **2003:** OMR 130, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita from DRNA office south to Cañon de los Murciélagos to a small Palo de Rosa population, elev 127 m (MAPR!). **2002:** GJB 6636, 17 Oct, Guánica, Bo. Carenero, GFR, Camino Los Granados, elev 150-200 m (MAPR!). **1987:** PAR 2136, 8 Sep, Guánica, GFR, Playa Ballena (US!). **1948:** MS s.n., 1 May, GFR (MAPR!). **1915:** NLB 4812, 2-4 March, *Guánica, Bo. Montalva, Punta Peñones, limestone hill (US!). **1913:** FLS 3097, 19 Sep, *Guánica (MAPR!). **1886:** PS 3410, 3409, 25 Jan, *prope* *Guánica, *fruticetis litoralibus ad salinas* (US!); PS 3669, 3668, 10 Feb, Guánica, *sylva montis* El Maniel [GFR] (US!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This is a very common shrub throughout the GFR, especially in open low xeric forest. It is a common species, especially in sunny sites on well-drained soils at low to middle elevation and is found in the West Indies and continental America.

***Lantana splendens* Medik. x *L. camara* L. subsp. *portoricensis* (Moldenke)**

R.W.Sanders

1948: MPV s.n., 1 May, GFR (MAPR!). Due to the difficulty in determining possible parentage in the hybrid *Lantana*'s it is hard to evaluate the occurrence of this taxon in the Forest. *Lantana splendens* is native to the Bahamas, so the collection is an escape hybrid cultigen, which is common in the section *Lantana* (Sanders, 2006).

***Lantana strigosa* (Griseb.) Urb.**

1995: PAR 7671, 12 Oct, Guánica, GFR, along trail off main road to ranger station (US!). This shrub was not observed by the author during the field survey. It is only known from Puerto Rico by this one collection; otherwise it is native to Cuba. (Axelrod, unpublished.) **New record for the GFR.**

***Stachytarpheta jamaicensis* (L.) Vahl**

1989: PAR 3008, 7 Oct, Guánica, GFR, in front of ranger station (US!). **1984:** SJD 22, 6 Oct, Guánica, GFR, along jeep trail opposite km 4.9, 0.7 km by road from Campamento Borinquen towards Luna, elev 195 m (MAPR!). **1935:** FHS 36, 3 Mar, *Guánica (US!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This herb occurs in open, sunny sites, often on bare soil. It is widespread in Puerto Rico and found throughout much of the West Indies and warm America.

***Stachytarpheta strigosa* Vahl**

2005: OMR 379, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334 taking Las Cobanas Trail, elev 137 m (MAPR!). **2003:** OMR 125, 17 Sep, Guánica, Bo. Carenero, GFR, Camino Dinamita from DRNA office south to Cañon de los Murciélagos, to a small Palo de Rosa population, elev 127 m (MAPR!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) *Stachytarpheta strigosa* is common in sunny sites along trails in the Reserve. It is a widespread weedy species in Puerto Rico and also occurs in Hispaniola and the Virgin Islands.

***Tamonea boxiana* (Mold.) Howard**

2005: OMR 447, 18 Aug, Guánica, Bo. Carenero, GFR, El Fuerte Trail from DRNA office always taking the trails to the north-northeast leading to Road 334 close to El Maniel, elev 152 m (MAPR!). **2003:** OMR 200, 21 Nov, Guánica, Bo. Carenero, GFR, Caña Gorda area at the entrance to the forest by a small canyon to the north of Road 333, just before Caña Gorda recreative area, elev 40 m (MAPR!). **1996:** GJB 4896, 26 Sep, Yauco, Bo. Barina, GFR, south facing, coastal slopes in low, limestone hills on north side of Bahía Ballena, elev 100 m (MAPR!). **1994:** DA 732, 9 Nov, Guánica, Road 333, 8 km east of town of Guánica, elev 25 m (MAPR!). **1981:** FIH 55, 7 Mar, Guánica, GFR, along path at the end of paved Road 333 by the shore at Playa Tamarindo (MAPR!). **1964:** HAL 10612, 2 Jan, Guánica, GFR, dry thickets near sea level (MAPR!). **1913:** FLS 3037, 19 Sep, *Guánica (MAPR!). (Quevedo et al., 1990: 149, as *Tamonea spinosa* Sw.; Axelrod, unpublished.) This shrub is common in scrubland forest along Road 333. It is found in the arid regions of southern and southwestern Puerto Rico, the Virgin Islands and Antigua and Barbuda in the Lesser Antilles.

Confirmation required before accepting into the flora:

***Lantana reticulata* Pers.**

1935: FHS 67, 17 Feb, *Guánica (US!). (Quevedo et al., 1990: 149; Axelrod, unpublished.) This shrub was not observed during the field survey. It is reported from Cayey and Aibonito and from Cabo Rojo and the GFR in Puerto Rico and does not appear to be a common species. It is found in the West Indies and continental America. This species is listed as a Critical Element by the DNER.

***Phyla fruticosa* (Mill.) K. Kenn. ex Wunderlin & B.F. Hansen**

1914: JAS 2251, 8 Sep, *Guánica, Santa Rita (US!). (Axelrod, unpublished.) This creeping herb occurs in sunny sites on wet to dry mud of freshwater ponds, canals and lakes. It could possibly occur around the margins of ephemeral ponds in the Reserve. In

Puerto Rico, it is most often collected in the southwestern and southern coastal lowlands. The species is found in the West Indies and continental tropical and subtropical America.

Phyla nodiflora (L.) Greene

(Quevedo et al., 1990: 149, as *Lippia nodiflora* (L.) Michx.) This stoloniferous herb occurs in sun to semishade on a number of substrates ranging from dry sand and limestone to wet mud and even will extend in shallow water, but generally in areas of higher rainfall than found on the south coast of Puerto Rico, where it is absent. It is not expected to occur in the Reserve. The species is widespread in the West Indies and continental warm to tropical America.

Phyla stoechadifolia (L.) Small

1886: PS 3364, 21 Jan, *Guánica, *narum* (US!). **1886:** PS 3856, 24 Feb, *prope* *Guánica (US!). This stoloniferous herb is only known for Puerto Rico in recent times from two collections made at San Sebastián. It is reported from the West Indies and continental America. This species is listed as a Critical Element by the DNER.

Priva lappulacea (L.) Pers.

(Quevedo et al., 1990: 149.) This is a common, widespread weedy herb that does occur in the southern coastal plane of Puerto Rico and could have been found around buildings in the formerly occupied areas of the Forest. It is found throughout the West Indies and in continental America.

Stachytarpheta cayennensis (Rich.) Vahl

(Quevedo et al., 1990: 149.) The occurrence of this shrubby species in the GFR is very doubtful. It is only found in areas of higher rainfall in Puerto Rico. It is widespread in the West Indies and tropical continental America.

Excluded species:

†*Priva portoricensis* Urb.

1886: PS 3597, 2 Feb, *Guánica, *prope* Guánica *ad* Montalva (US!). (Axelrod, unpublished.) This endemic suffrutescent herb is known only from the type specimen. Breckon (pers. com., Appendix I), who has studied the isotype considers it conspecific with *Priva lappulacea*.

VIOLACEAE

Confirmation required before accepting into the flora:

Hybanthus linearifolius (Vahl) Urb.

1886: PS 3625, 5 Feb, *Guánica, *umbrosis* (US!). This herb is generally found on sunny to semi-shaded banks with good drainage. In Puerto Rico, it appears to occur under more mesic conditions than found in the Reserve. It may have grown in sunny openings in the northern, previously occupied part of the Forest.

VITACEAE

Cissus obovata Vahl

2006: OMR 638, 19 Jan, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, first small trail to the left on Road 334, when you enter to the forest by La Luna, following the trail north-northwest to a canyon, El Cedro, elev 60 m (MAPR!). (Quevedo et al., 1990: 147, as *Cissus caustica* Tuss.; Acevedo-Rodríguez, 2005: 399.) I only found this succulent

vine once in the GFR. It is a West Indian species that is found from scattered locations around the Island and on Mona. It is generally found in sunny locations in forests.

***Cissus trifoliata* (L.) L.**

2005: OMR 312, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 9 m (MAPR!). **2003:** OMR 150, 15 Oct, Guánica, Bo. Carenero, GFR, Caña Gorda to the north of the Road 333 at the entrance of Hoya Honda Canyon, elev 43 m (MAPR!). **1962:** HAL 9152, 23 Jun, GFR, coastal thickets (MAPR!). **1948:** AML s.n., 7 Aug, GFR (MAPR!). (Quevedo et al., 1990: 147; Acevedo-Rodríguez, 2005: 399; Axelrod, unpublished.) This is a very common succulent vine in the low, xeric forest on exposed slopes. The species is found in dry locations at low elevations in Puerto Rico. It occurs in the West Indies and extends into Mexico and Florida.

***Cissus verticillata* (L.) Nicolson & C.E. Jarvis**

2005: OMR 585, 10 Nov, Guánica, Bo. Carenero, GFR, along Road 333, close to the Ochoa pier, elev 17 m (MAPR!). (Quevedo et al., 1990: 147; Acevedo-Rodríguez, 2005: 401.) This is a rare succulent vine within the GFR, but is a common, widespread weedy species in more mesic areas of Puerto Rico. It is widespread in the tropical and subtropical New World.

ZYGOPHYLLACEAE

***Guaiacum officinale* L.**

2005: OMR 306, 10 Jun, Guayanilla, Bo. Boca, GFR, Punta Vaquero, at the end of paved Road 333, dirt road east to dwarf forest area, elev 12 m (MAPR!); OMR 384, 12 Jul, Guánica, Bo. Carenero, GFR, Lomas de Seboruco, from Road 334, entrance to Las Cobanas Trail, elev 164 m (MAPR!). **1994:** DA 926, 12 Dec, Guánica, GFR, Vereda Fuerte, off Road 334, elev 140 m (MAPR!). **1990:** GJB 3722, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!). **1988:** GC 510, 17 Mar, GFR, Guánica Forest (US!). **1987:** PAR 2234, 29 Sep, Guánica, GFR (US!). **1982:** JGR 4, 29 Aug, GFR, Road 334 after Campamento Borinquen, first vereda, elev 178 m (MAPR!); JGR 7, 29 Aug, GFR, Road 334, in front of the *plazoleta*, elev 178 m (MAPR!); SMC 17, 15 Sep, Guánica, GFR, elev 200 m (MAPR!). **1977:** JLL 5142, 7 Jul, GFR, Reserva Forestal Guánica (US!). **1973:** AGM 4046, 1 Apr, Guánica, GFR, Playa Santa (MAPR!). **1964:** AGM 2606, 16 Apr, Guánica, Bo. Carenero, GFR, near forester house (MAPR!). **1950:** ELL 13197, 2 Jul, GFR (US!). **1950:** ELL 13169, 30 Jun, GFR (US!). **1948:** EAI s.n., 1 May, Guánica, GFR (MAPR!); LL s.n., 8 Aug, *Guánica (MAPR!). **1944:** MC 1159, 2 Apr, Guánica, GFR (MAPR!). **1913:** FLS 3019, 19 Sep, *Guánica (MAPR!). **1886:** PS 3939, 3 Mar, *Guánica (US!). (Little and Wadsworth, 1964: 213; China, 1990: 53; Quevedo et al., 1990: 146; Axelrod, unpublished.) This tree was cut in the past for charcoal production; however it still is a common species within the Reserve. It is found in the southern and southwest districts of Puerto Rico, Culebra and Vieques. *Guaiacum officinale* is a West Indian species that extends into Venezuela. This species is listed as a Critical Element by the DNER.

***Guaiacum sanctum* L.**

2006: OMR 756, 5 Jun, Guánica, Bo. Carenero, GFR, north of Road 333, at Hoya Honda, entrance to the canyon, elev 27 m (MAPR!). **2005:** OMR 508, 9 Sep, Guánica, Bo.

Carenero, GFR, Caña Gorda, along cactus forest from a small canyon north of Road 333, up to a rocky plateau, before the recreative area, elev 23 m (MAPR!). **1999:** *FSA 10972*, 4 Sep, Guánica, Carenero, GFR, end of Road 334, head of Fuerte Trail (US!). **1996:** *PAR 7873*, 25 Jan, Guánica, GFR (US!). **1990:** *GJB 3720*, 11 Dec, Guánica, Bo. Carenero, GFR, Jaboncillo sector, south of Road 333, km 3.1, 100 m from Bahía de Guánica, elev 10-20 m (MAPR!); *RGG 3366*, 18 Dec, Guánica, Bo. Carenero, GFR, elev 145 m (MAPR!). **1966:** *WRS 3335*, 8 Jul, Guánica, GFR, northeast of Caña Gorda beach (US!). **1950:** *ELL 13256*, 6 Jul, GFR (US!). **1913:** *NLB 1917*, 11-12 Mar, *Guánica (US!). (Little and Wadsworth, 1964: 214; Quevedo et al., 1990: 146; Axelrod, unpublished.) This tree is locally common on the southern slopes of the GFR. It is found in the arid southern and southwestern districts of Puerto Rico and on Mona and Vieques Islands. This species is listed as a Critical Element by the DNER.

***Kallstroemia maxima* (L.) Hook. & Arn.**

1985: TBC 60992, 4 Apr, [Guayanilla], GFR, along Road 333, SE of Guánica, along trail near ocean, East of parking area, near sea level (NY!). (Quevedo et al., 1990: 146; Axelrod, unpublished.) This widespread weedy species is primarily found in open, sunny dry sites on well-drained and typically bare soil in Puerto Rico and the warm new world in general. It is to be expected as a weed on trails and roads in the Reserve.

***Kallstroemia pubescens* (G.Don) Dandy**

2005: *OMR 325*, 24 Jun, Yauco, Bo. Barina, GFR, from Road 334 taking Las Cobanas Trail to the north to an old campeche plantation, elev 104 m (MAPR!). **2003:** *OMR 171*, 22 Oct, Guayanilla, Bo. Boca, GFR, trail from Playa Tamarindo, sapo concho pond to Punta Vaquero, dwarf forest, end of paved Road 333, elev 11 m (MAPR!). (Quevedo et al., 1990: 146, as *Kallstroemia pubens* (G.Don) Dandy) This decumbent herb is common along open trails. It is known from scattered locations in the dry southern and southeastern portions of the Island and from Culebra and Vieques. It is found in the Antilles and continental North America.

Confirmation required before accepting into the flora:

****Tribulus cistoides* L.**

(Quevedo et al., 1990: 146.) This prostrate exotic weed is known from a few locations on the island of Puerto Rico and from Mona Island. On Mona, it is found on sandy soil in light shade in disturbed areas on the coastal plane. It could possibly occur on sandy beaches in Guánica Forest.

Appendix IV. Table of acronyms for the collectors of the Guánica Forest Reserve flora.

Acronym	Collector
AAG	Ana Adela Gautier Bayer
AC	Agnes Chase
AGM	Arturo González Más
AML	Ana M. Lozada
BB	Brian M. Boom
BF	Beth Farnsworth
BGS	B.G. Schubert
CFM	C.F. Millspaugh
CFR	Concepción Freyre Rivera
CMP	Carmen M. Pagán
CMT	Charlotte M. Taylor
DA	Daniel Atha
DCW	D.C. Wasshausen
DRB	Donald R. Blasini
EAI	Elsie Asencio Irizarry
ELL	Elbert L. Little, Jr.
EMG	Esther María González del Valle
ESV	Eugenio Santiago Valentín
FSA	Frank S. Axelrod
FHS	F.H. Sargent
FIH	Fermín I. Hernández
FLS	Frank L. Stevens
FNS	Felipe N. Soto Adames
GC	Guillermo Castilleja
GJB	Gary J. Breckon
GLW	G.L. Webster
GR	Gloria Rojas
GRP	George R. Proctor
GSM	G.S. Miller
GVA	Gladys Vázquez A.
HAL	Henri Alain Liogier
HI	Hugh Iltis
HTC	H.T. Cowles
HVB	Hugo Velazco Bacó
ISR	Ilza S. Román
IV	Ismael Vélez
JAC	José A. Cedeño Maldonado
JAD	J.A. Duke
JAR	J.A. Ramos
JAS	J.A. Stevenson
JCT	J.C. Trejo-Torres
JDA	James D. Ackerman
JES	Jorge E. Saliva

JGR	José G. Rodríguez
JHH	Jessimine H. Hernández
JJ	Jacqueline Justiniano
JLL	J.L. Luteyn
JIO	J.I. Otero
JR	Julie Román
JRF	José Roberto Fumero
JRG	J.R. Grant
JRJ	J.R. Johnston
JS	José Sustache
JSM	Jeannette Silva Miranda
JSP	José Angel Segana Pérez
LEG	L.E. Gregory
LL	Lucía Luciano
LMO	Luis Manuel del Olmo Ordoñez
LR	Lilian Ramírez
LRH	Leslie R. Holdridge
LS	L. Struwe
MAP	Miguel A. Pérez
MC	M. Cobin
MCO	Marcos Caraballo Ortíz
MDB	M.D. Bier
MEA	María E. Alvey
MFQ	Martin F. Quigley
MPV	Marina Pagán Velázquez
MR	Marcolina Rodríguez
MRT	Milagros Ramírez Trabal
MS	María Sierra
MSo	Migdalia Sotomayor
MTS	Mark Strong
MV	Miguel Vives (Papo)
NLB	Nathaniel L. Britton
OD	Olga Delgado
PAR	Pedro Acevedo Rodríguez
PPM	P. Pardo Morales
PS	Paul Sintenis
RAG	Rosita Acosta García
RDM	R. Delgado Montano
RGG	Ricardo García García
RNG	Rosa Nieto García
ROW	Roy O. Woodbury
RP	Rosalina Padilla
SDM	Suzzette Delgado Mendoza
SG	Sandra Guzmán
SJD	Sara J. Dent Acosta
SMC	Sandra Molina Colón

SP	Stella Padrá
SRR	Socorro Rovira Rosado
TBC	Thomas B. Croat
VNO	Vivian Negrón Ortiz
VSV	Vivian Santiago Vélez
WRS	W.R. Stimson
