

Plants of Conservation Concern: Herbs and Plants of the United States Virgin Islands



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Cover photo of *Lyonia rubiginosa*, a St. Thomas endemic, by Kevel Lindsay at Hawk Hill, 2015

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Kevel Lindsay, for the entire project team

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Overview

The Territory of the United States Virgin Islands (USVI), an insular part of the United States of America, is located about 64km (40 miles) east of Puerto Rico. There are three main islands, namely St. Croix (the largest), St. Thomas and St. John, and a number of minor cays (outer islands). The total land area of the Territory is 346.4km² (133.73 sq. miles).

The islands are home to a number of indigenous and unique plants and habitats, many of which are under severe threat, mainly as a result of habitat loss, fragmentation and ecological decline. It is with this in mind that Island Resources Foundation (IRF) worked with its U.S. Virgin Islands partners to initiate efforts to focus on the long-term conservation of these native species and their dependent ecosystems.

This project focuses on conservation of native trees in the U.S. Virgin Islands, particularly rare and endangered species and their habitats, in order to help ensure sustainable populations.

The purpose of the project was:

To identify and map the U.S. Virgin Islands' most critical native tree species, understand the threats to these species, and develop long-term, on-the-ground conservation and management options.

The objectives were:

1. To establish an updated baseline list of the native tree species of the territory.
2. To identify the Territory's most critical rare and endangered tree species and develop a short list of priority species for conservation.
3. To identify and GPS known locations of the critical species, including those on private lands.
4. To develop conservation options for rare and endangered species.

Working with Urban and Community Forestry Program, the IRF team:

- updated the list of native and naturalized species of trees of the Territory;
- identified key areas of remaining relatively pristine forests for native flora;
- provided GPS locations of critically rare and endangered species (where possible);
- produced a set of conservation options for their long-term sustainability; and
- worked with local and regional experts to devise an effective approach for determining species and habitat health/ecological status.

This is part of a longer-term vision for ensuring sustainable populations and habitats of the Territory's native wild plants. By developing much needed information tools about

the native species, we inform ourselves about what is present, what the threats are, the status of the species and habitats, and what options are possible for their management and conservation.

The following report outlines the results of field efforts and research, including a comprehensive list of the species of plants on all three major islands, a list of the rare and endangered trees and shrubs, a brief profile of these species, a list of critical habitats and sites that are important to native plants, locations for these species, a list of the minor islands of the Territory and a summary overview of the conservation options that would be useful as a way forward for their conservation and management.

Note that for the purposes of this report, in the use of the terms “invasive” and “introduced” species, the writers have opted to for the latter term. Across the region and throughout the world, some authorities prefer to use the term invasive to define those plants and animal species that may or are having some form of deleterious effect on the survival and success of other species and the functions of ecosystems.

The Islands

The United States Virgin Islands, is an *insular* area—an unincorporated territory—of the United States, located at 17°40"N – 18°30"N latitude and 64°30"W – 65°10"W longitude, about 64km (40 miles) east of the island of Puerto Rico, and about 200km (124 miles) southwest of Anguilla in the Leeward Islands.

The USVI Territory is made up of the three main islands and several smaller nearshore and out cays. The largest island is St. Croix at about 218km² (84 miles²), with a population of 50,601 (2010 US Census). The second largest is St. Thomas at about 83km² (32 miles²), population of 51,634 (2010 US Census). It is also holds the Territory's capital, Charlotte Amalie. The third island, St. John is 52km² (20 miles²), with a population of just over 4,000 (2010 US Census).

There are about 100 cays situated off of the three islands, with St. Thomas having the highest number within its waters. The names, sizes and ownership of the cays are provided in **Appendix III**. This list compiled by the project team is not complete but represents an ongoing effort to document all of the Territory's cays and their biodiversity.

St. John has the highest proportion of forest cover in the Territory, much of which is inside the boundaries of the Virgin Islands National Park (VINP). The Park covers about 2/3, some (2,023 ha) of the island. Most lands within the Park are federally held, but there are also a number of private inholdings. Also included within the Park is most of Hassel Island in the harbor of Charlotte Amalie, St. Thomas. The VINP was also designated a Biosphere Reserve in 1976, one of the first in the Caribbean.

The Territory's two other major protected areas include: 1) **Buck Island National Wildlife Refuge** two miles off the entrance of St. Thomas Harbor. The island is 18.21 ha (45 acres), and is mainly low scrub, cacti and grasslands.

2) **Buck Island National Monument** is located off the northeast coast of St. Croix. The terrestrial center of the Monument is Buck Island at 71.22 ha (176 acres). The island consists of cliffs, scrub, dry woodland and grasslands.

Most VI protected areas include extensive marine protected habitats.



[Map from <http://www.nps.gov/>]

The Forests and Plants of the U.S. Virgin Islands

Settlement, Colonization, and Transformation

Much of the forest and woodland cover of the Virgin Islands of today are secondary, with regeneration starting primarily in the 1950s. The first settlers of these islands were Amerindians whose presence here dates back to about 1,500 B.C. These first peoples made up several ethnic groups and periods of first arrival in the region. They often moved amongst the islands, setting up temporary settlements where food, shelter, climate, weather and peace and stability were adequate.

The Amerindians depended on the forests for timber to build homes and for fuel, and for hunting, medicine, spiritual and religious practices and wellbeing, landscape integrity and to provide refuges from ethnic tensions and warfare. However, they likely introduced many species of plants and animals to the Caribbean from their original homelands in South and Central America. This practice of species and ecosystem alterations was likely an ongoing habit that occurred over many hundreds of years. It is also likely, that after about 3,000 years of human occupation and activities on the islands of the region, the forest ecosystem incorporated new and dynamic shifts in species compositions and ecological evolution.

In the 1490s, Europeans arrived, and thus began the post-Columbian age of conquests, colonization, and major ecological and environmental change in these islands. Below, Professor Olasee Davis, Virgin Islands historian, ecologist, naturalist, environmentalist and cultural icon provides a pre-Columbian and post-Columbian overview of the human influences on the vegetation and landscape of what we now know as the Virgin Islands.

AN HISTORICAL PERSPECTIVE OF VIRGIN ISLANDS' TROPICAL FORESTS

*By Olasee Davis, Professor, Ecologist/Extension Specialist Natural Resources,
University of the Virgin Islands/Cooperative Extension Service*

Before the first humans inhabited the Virgin Islands, these lands had extensive and luxuriant tropical dense forests with flowing streams, small rivers and springs, especially on the island of St. Croix. The lush green mountains, valleys, and hillsides literally touched the coastlines with mangrove forests and inlet bays surrounding the archipelago of the Virgin Islands. These were a tropical paradise in their most virgin state.

According to archaeologists, the Amerindians—with several culturally distinct groups—were the first inhabitants of the Virgin Islands, their arrival dating back to at least four millennia. At different periods in Caribbean (the term “Caribbean” is of European derivative and not an actual Amerindian name for the region) history, distinct groups of these First Peoples migrated from the Orinoco Delta in South America around 5,000 B.C. This migration continued for several decades northward and westward through the Lesser Antilles, arriving as far as Ay Ay (St. Croix), Las Virgenes, Culebra, Bike (Vieques) and to Boriquen (Puerto Rico) by 2,000 B.C.

Irving Rouse, a prominent archaeologist called these people, the earliest inhabitants of the Caribbean, the Archaic or Archaic Age people. However, their migration came to a halt around 1,000 B.C. in western Puerto Rico at the Mona Passage according to Rouse. He believed this occurred

“...because the next islands in their path, Haiti (Espanola), was already occupied by people who had arrived considerably earlier from Central America by way of Yucatan and Cuba. The culture of that Archaic Age aceramic people has been termed Casimiroid by Rouse.”

These early Amerindians lived a subsistence existence with the islands forests and marine ecosystems and were in isolation over a period of centuries. According to historians, the Ortoiroid people, one of the first Amerindians, practiced no cultivation of any substance. However, they lived off the islands’ abundance of sea life, such as fish, crustaceans, mollusks, as well as from the islands’ forests, and wild native fruits.

The Ortoiroid people made use of fire for land clearing, and made tools from bone, shell, and wood. For some unknown reason, according to historians, these people disappeared from the Caribbean archipelago around 200 B.C.

Other groups of Amerindians also migrated into the Caribbean waters from South America, introducing pottery and practicing agriculture, particular in the cultivation of cassava and tobacco. This was the time when the Virgin Islands native forest was cleared to some extent for agriculture. Nonetheless, the islands’ native forests remained mostly intact, although agriculture was practiced by the native population who lived for the most part with the forests and marine environment.

The Tainos, one of Amerindians groups whose civilization was very sophisticated with its religious practices, had a relatively large population. At the time of Columbus' arrival at the entire Greater Antilles, scholars of different viewpoints estimated their population at 550,000—with 60,000 in Puerto Rico, Jamaica, and Cuba each, and 350,000 on Haiti.

These population numbers are just estimates made by scholars, but the Tainos far outnumbered the Archaic peoples who also inhabited the Antillean chain of islands. On Christopher Columbus' second voyage in 1493, he encountered Amerindians in the eastern Caribbean islands (what is today, Trinidad, Tobago, the Lesser Antilles and the Virgin Islands) who were ethnically distinct from the first group of people he met in the Greater Antilles on his first voyage. These people have become to be known as the "Island Caribs", although they referred to themselves Kalinagos.

On November 14, 1493, on his second voyage to the Americas, Christopher Columbus encountered the island of Ay Ay after sailing from the island of Guadeloupe in what is now the Lesser Antilles. Upon his arrival at Salt River Bay, he saw the hillsides of the northeast forests of St. Croix cultivated with crops. He then sent a small boat of 25 men to the Bay, including a black man, to explore the seashore of Salt River Bay west bank. On the western side of the bay, his men encountered a Kalinagos settlement. The encounter with these native people brought about a confrontation between them and the Spanish, which resulted in an injury and death for a member of each party.

With this Salt River Bay conflict, the door was opened to colonialization, Christianization, and European forms of agriculture as a result of Columbus' first and second voyages to the Caribbean region. Nonetheless, during the Spanish's excursion at Salt River Bay, he claimed St. Croix as a Spanish possession changing the name of the island from Ay Ay (A Carib name for St, Croix) to Santa Cruz (Holy Cross).

With the rush of other European colonial powers into the West Indies, the islands of the Virgin Islands became part of the agriculture revolution for European countries thirst of power. Thus, the written history of the Virgin Islands' native forests as we now know it today came about through the colonialization by different European powers as they fought to possess the islands of the Caribbean.

In 1672, Denmark acquired St. Thomas, the first colony of the Danish West Indies to be developed. Forests were cleared to make way for plantation development. Over a period of time, top soil succumbed to the perils of widespread deforestation, as the thick woods fell to the axe of early planters. As a result, the ecological balance of the forest ecosystems was affected as never before. The roots of plants could no longer hold the top soil together, and the result was that the island's streams and bays collected exacerbated amounts of sediment washed down from mountainsides and hills by torrential rains and storms, leaving the streams, bays and sea water brown like never before.

The late Michael Paiewonsky wrote:

“In the 1690s, the rivers we now know as the ‘Guts’, one runs through ‘Goat Street;’ one separates Knongens Quarter from Dronningens Quarter at Kommendant Gade, and another, ‘Fireburn Gut’, divides Dronningens Quarter and Keonprindsens Quarter at Guttet Gade—were just beginning to dry up because of the attempts to farm the hills above town without terracing.” He further stated, “The destruction and loss of topsoil was so serious that most farming moved to St. John in 1716, and then to St. St. Croix after 1733. As late as 1950, the Fireburn Gut ran year round with fresh water. It was common to see buckets of fresh water being carried towards home by women early each morning. In all cases, early homes were built near existing flowing fresh water. Wells were dug as the surface water disappeared.”

Johan Lorentz Carstens, a native of St. Thomas (1705-1747) made notes and gave later generations some insight to the development of the island, describing the early Danish effects on the native forest ecology of that island. He noted:

“[S]lave life was particularly harsh in the first several decades of the colony, what with the work of clearing the forests which covered the steep slopes of the rugged, mountainous island and constructing the first buildings on the plantations.”

In other parts of his notes, Carstens mentioned that even the highest peak on St. Thomas fell to fire and cutlass to make way for roads and plantations—in his account, he referred to Crown Mountain where the forests fell to axe and fire by planters. This, the island’s highest peak, with an elevation of 472 meters (1,550 feet), with its thick forest, was a source of firewood for ships.

According to Carstens, “[T]he mountain is overgrown with various tall, thick, colored trees and with scarcely penetrable undergrowth. Consequently, it is from this mountain, and from the brick-constructed well located at the foot of the mountain in a rounded valley by the “Bennen Watter” or the river, that all of our arriving ships and vessels, as well as those of other nations, supplied themselves with firewood and fetched their water, a practice not all that convenient relative to the ships’ needs.”

Carstens also mentioned how the beautiful Water Island’s forest were (it is the fourth largest of the sister cays of the US Virgin Islands). He stated, “[T]he island is mountainous and rich in forests, as well as in fish in the surrounding waters”. He also spoke about some of the other vegetation communities that surrounded cays and inlets of St. Thomas. During the Danish West Indies rule, one of these cays was called Ost-Passat. Today, we know the island as Great St. James off the northeast coast of the island. And a quote:

“The first of these is called Ost-Passat, which is located at the eastern end of St. Thomas. It is a small, uninhabited island that may measure some two miles in circumference. It has a thick bush and large forests, as well as beautiful pastures and fodder for livestock” Carstens notes.

The planters didn’t learn from the deforestation of mountains and hillsides of St. Thomas. As St. Thomas’ soil became depleted and unproductive, planters turned their attention to St. John. Carstens also wrote in his note book:

“Whatever is lacking on St. Thomas is available on St. John. The latter island has such large, thick trees that slaves can be put to hollowing them out into canoes, which are a kind of fishing boat. Also to be found there are tall, straight trees which can serve as ships’ masts and other necessary equipment.”

On March 25, 1718, about 42 soldiers, with few enslaved Africans, planters and Governor Eric Bredal along with other government personnel, disembarked at Coral Bay to claim the island officially for Denmark. The purpose of this bold move, was taken in defiance of Spain and Great Britain, both whom had competing claims to the island of St. John. But the underlining reason of St. Thomas planters was to expand their plantation system onto virgin soil on St. John. This scheme of colonization of that island originated with the St. Thomas planters who proposed it to then Governor Mikkel Crone, who in turn, recommended it to the Directors of the Danish West India Company:

“.....as a means of realizing the greatest profits.”

The settlers who came to St. John faced a hard task to deforest the native tropical forest of the island to establish a plantation system to grow crops. St. John is very mountainous even much so then St. Thomas. Despite millennium of Amerindians cultivation, the island remained heavily in forest stretching for miles seem like no end in sight. In 1717, Governor Hamilton noted:

“.... the island was heavily wooded.”

However, most St. Thomas planters had a limited amount of capital to clear forestland on St. John and against an inhospitable environment. The planters also faced two major setbacks during this period of clearing forestland on the island. A hurricane in 1733 and the slave rebellion of 1733-1734 severely limited the planters to bring the land into production.

Enslaved Africans were given the task to clear the forest where the traditional slash and burn method was implemented, first felled by axe or cutlass and then set afire. In 1728, Governor Suhm reported:

”.... All of the large timber trees had been cut down.” But he added that much of the island remained covered by smaller trees.” Local historian George F. Tyson claimed that the “Accounts of the slave rebellion make it clear that much of St. John was still heavily wooded in 1733-1734, a situation which greatly impeded the suppression of the uprising. Most likely the clearing of native vegetation had been only partially accomplished by 1740.”

The history of St. Croix’s forests is a fascinating one which attracted Europeans since the first time they arrived in the Caribbean. The Spaniards claimed St. Croix in 1493, but never really attempted to settle the island. They valued the island for its natural resources such as the fisheries, timber, and particularly the abundance of sea turtles. They fished regularly in the waters of these islands and knew the commercial and military interests of the shipping lanes, especially the area they called “*the passage*”. For this and for other reasons, the Spaniards from Puerto Rico protected St. Croix’s natural resources from other competing European powers that might have been interested in settling the island.

As a result, St. Croix remained unsettled and undeveloped for about two thirds of the 16th century and well into the 1620's according to Dr. Arnold R. Highfield. He also stated that:

“Mariners in search of fresh water, timbers and food made occasional stops there, as did pirates in need of a place to hide or a secluded cove along which to careen a vessel for repairs.”

In 1621, a party of Frenchmen briefly stopped on St. Croix in order to cut wood for the building of a long-boat. However, they were captured by the Spaniards of Puerto Rico, and were punished for their intrusion onto the Spanish possession, and subsequently executed.

However, this didn't deter foreign vessels from visiting St. Croix. In 1629, Monsieur de Cahusac, General de L'Armee Navale of France made a stop on the island for the purpose of taking fresh water. He found three or four “belles riviere” there, which supplied his ship with needed water. He noted also that:

“The island of Sainte Croix is very beautiful with a length of 14 to 16 leagues and beautiful rivers. The land is low and ends to the west with a vast plain of beautiful low land; {the island} is uninhabited. Before reaching this island, one passes to the north, the isles of Les Vierges, which number about 80 or 100, as many large as small. They were also uninhabited. The Spaniards of Saint Jean de Porto Rico went there to catch fish and turtles. The eastern shore of the island of Sainte Croix is about 25 leagues from Saint Eustache, and extends east to west and west northwest. The isle of Moution {Vieques}, similarly uninhabited, lies to the north of Sainte Croix and to the west of Les Vierges.”

St. Croix had several competing European nations fighting for its possession and control, until in 1650 when the French battled and defeated the Spanish. The French started cultivating tobacco and subsistence crops of sweet potatoes, cassava, maize, melons and so on. Eventually, sugar became the major crop, and several plantations were scattered throughout the island. However, the French settlement had problems adjusting to the climate and weather conditions of St. Croix. They felt that the flat island, covered with old dense forests, and which they believed allowed the winds to sweep the noxious vapors from the swamp into the atmosphere, was causing them to get sick

Bland quoted Rev. John P. Knox in his paper “Historical Account of St. Thomas” (New York, 1852):

“In order to arrest the mortality which was so rapidly thinning their numbers, a mortality which arose from the dense and aged forests that covered the island, scarcely affording an opportunity for the winds to carry off the poisonous vapors whose morasses clogged the atmosphere, the colonists who remained set fire to the woods, and going on board their ships, became spectators of the conflagration. They returned on shore after the flames were extinguished.”

Rev. John P. Knox claimed that the French burnt down part of St. Croix's dense forests due to their superstitious belief.

However, Baron Eggers discredited Rev. John Knox and claimed that the French did not destroy the forests on the island. Eggers said when he visited St. Croix in the 1700s after it was abandoned by the French in 1676. He found the island entirely covered with forests, and also the first Danish settlers who, in 1739, went over there to recover their plantations. The French, however, did cut some of the virgin forests down to make way for the planting of tobacco, and subsequently, sugar cane fields. Enslaved Africans were thus imported to work alongside the French bondmen in the cane as well as the tobacco fields.

Father Jean-Baptiste Labat made a comment about St. Croix forests, reporting that around 1700 the island was still:

“...covered with the most beautiful trees in the world: the red cedar (*Cedrela odorata*), the bay rum (*Pimenta recemosa*), the mastwood (*Sideroxylon foetidissimum*), bulletwood (*Manikara bidentata*), and red trees of all sorts are there in abundance.” From all indication, the island of St. Croix constituted great resources of native trees. Labat continued to comment, “Hardwood trees flourished on all sides, including species of the mangrove family (*Rhizophorace*), long with the sea grape tree (*Coccoloba uvifera*), the gri-gri tree (*Bucida buceras*), the genip tree (*Genipa Americana*), and the lignum vitae (*Guaiacum officinale*). Softwood trees were present in abundance also, namely the candlewood tree (*Amyris balsamifera*), the turpentine tree (*Bursera simaruba*), the mahot or hait-haita tree (*Thespesia populnea*), and the mampoo tree (*Torrubia fragrans*). Finally, the useful native palm family was represented by the royal palm (*Roystonea borinquena*) the Port Rico hat palm (*Sabal causiarum*), and the silver palm (*Coccothrinax argentea*).”

Additionally, a Dr. Highfield said that:

“Although Sanite Croix seems to have been extensively cultivated during the 1640s with a population as high as a thousand, from all accounts, the island was still heavily forested when French settlers arrived in the late 1650.”

However, it was customary, Dr. Highfield said, to reduce pestilence in order to cultivate the land. However, some early colonists’ reports about the forest being burnt for months were a bit of an exaggeration. Nonetheless, there was some burning of the forest to make way for planting crops.

Beside the cultivation of crops, St. Croix was known for its rich native hardwood trees, which could be exported as a timber. One of the highly prized hardwood trees on St. Croix was lignum vitae (*Guaiacum officinale*), which the king, Louis XIV himself requested.

In 1692, 1694, and 1695, LaSaulaye sent Louis XIV three shipments of hardwood timber. It was used at “*Versilles for marquetry, clock, gears, and water works*”. Mastwood was another commercial hardwood—a valuable and abundant tree growing on St. Croix. This wood was employed primarily for boat repairs, and also to make spars and planking. During the colonial history of St. Croix, it was known for its hardwood boards, which were being sold for three pounds of sugar per foot. The lumber was also sold to make sugarcane rollers, which were commonly fabricated from the trunk of the lignum vitae tree. Bulletwood (*Manilkara bidentata*) was also used for this purpose as well. These woods, at that time, were exported mostly to Saint Christophe at the going price of 3,000 pounds of sugar per roller.

However, La Saulaye objected to the exportation of St. Croix lumber, especially by “*these Messieurs of Saint Christophe* (now St. Kitts),” who were absentee owners of large tracts of land on Sainte Croix, Highfield stated. La Saulaye believed that the lumber from valuable trees on St. Croix should be used for the development of the island. He proposed a lumber export tax on St. Croix hardwood trees. It was said also that he proposed a $33\frac{1}{3}$ percent export tax on St. Croix. It never amounted to anything, because it was contradictory to Colbert’s doctrine of free trade within the French West Indies colonies. Since St. Croix was French, the proposed tax on lumber was done away with.

Subsequently, while St. Croix was abandoned by the French, the island was a retreat for pirates. With numerous anchorages on the island beside Le Bassin Harbour in Christiansted, pirates supplied themselves with timber, food, and fresh water which attracted them in the first place, and used the island as a base for their operation.

Poor Anguillans, under the leadership of Governor Howell of that island wrote to English Governor Hamilton in 1716 that they should settle St. Croix for the island is very fertile, with very fine large bays, plenty of timber and a great many of wild cattle on the land, these previously abandoned by the French. That same year, English settlers from Tortola and Virgin Gorda, headed by Charles Darcy and others, asked for a commission to enable them to settle St. Croix legally. However, they did not receive the commission they requested.

Around this time, the English islands of the region experienced an economic boom fuelled by large investments, reconstruction and expansion of sugar production. These English possessions became so developed that they exhausted their stocks of timber and looked to St. Croix supplies, for it was known for its abundance of lignum vitae and other hardwood. By then the island was under the rule of Governor La Saulaye in the 1680s and 1690s. Thus, it was only a matter of time before woodcutters from other Leeward Islands were willing to take risks in poaching on the hardwoods trees of St. Croix. On March 5, 1727, Governor John Hart of Saint Christophe wrote a letter that:

“...many of the inhabitants of the Leeward Islands, labouring men and the poorer sort, resort thither {Sainte Croix} to cut wood, but chiefly fustick and lignum vitae. The number of these woodcutters is computed at about 150 and a good labourer will earn from 8 to 10 shillings a day...”

If these Englishmen did go to St. Croix, they put their lives at risk because they were not granted permission from the French who at the time still owned the island. Nonetheless, the English settlers didn’t attempt to settle St. Croix again. However, the woodcutters living in temporary camps continued to exploit the valuable hardwood trees, which were still in abundance.

The French settlers abandoned St. Croix again in 1696, and departed to St. Domingue, later known as Haiti. During that period, the original French plantations on St. Croix fell into ruins, and the forests gradually reclaimed the cultivated fields. At the same time, the island’s rich stands of timber attracted English colonists from the British Virgin Islands (BVI), who came searching for land, and found woodcutters. By the 1730s, there were hundreds of Englishmen, their families and enslaved Africans illegally living on this island.

By the time that the Danes arrived on St. Croix in 1743, which they purchased from France the previous year, the island was far from pristine or untouched (it having seen various European powers who once ruled the island for a time, and previous to that, the Amerindians). In fact, the Danes met English people, probably remnants of woodcutters living on the island illegally. Reimert Haagensen mentioned in his notes about St. Croix in the mid-1700s:

“Otherwise the land is quite pleasant what with the beautiful green woods to be seen on all sides, brought to full blossom by the summer climate.”

He further stated, "... the island numerous forests containing very large trees that are both useful and pleasant to see."

From Haagensen's notes, although St. Croix was not pristine in terms of who got there first, the island still had thousands of hectares of native woods.

He described how the forest had to be cut down for there was too much wood, and at that period of time, there were no shipbuilders, craftsmen brewers and tradesmen on the island, stating:

"[T]he amount of valuable timber and rare trees that were destroyed by fire and by the axe when the Danes initially started to develop the islands is unbelievable. At that time, there was a great deal of forest and little else."

Haagensaen reported that those who purchased land sold wood for a profit 10, 20 or even 30 times the price they brought their land for. Haagensaen, who arrived on St. Croix in the early 1730s, mentioned that for thirteen to sixteen years, the timber business on St. Croix was active. He said that it was badly done for everyone sought the richest land just to make money by selling the timber. He said also, he had seen pieces of timber lying on the beach, sold for 30, 40, 50, 60 rixdaler. Individuals he said earned 100 percent to 150 percent on their investments, after all costs.

As the timber economy of St. Croix continued to boost during the Danish early settlement, the fact that timbers were shipped to some English possessed islands such as Montserrat, St. Christopher, Nevis, St. Martins, Tortola, and others is testament to the significant timber export and industry of the island. Because of this, the Danish government tried to pass laws to slow down the cutting of trees during the early period of the Danes rule of St. Croix.

The majority and the better quality of wood of horse-mills, windmills, great houses, etc., are constructed from St. Croix timber as well as the most beautiful houses in the Caribbean and in Europe. Great houses, slave quarters, manager houses, windmills, sugar mills and so on, made the island of St. Croix the Danish's richest possession. Today, the island has hundreds of ruins from the days when sugar was King. There is a lot more that I can talk about St. Croix native forest and timber trading. According to Haagensen, a tree or a length of timber of some 2.7 to 3 meters (about 9 to 10 ft.) and about 10 to 12 centimeters (4 by 5 in) width sold for 1 rixdaler, indeed sometimes for 7 Marks.

Haagensen continues:

"...the many rare trees there are found in such quantities there. They have all kinds of names, such as Mahogany... Fustick (fustic), and Packwood (lignum vitae). Not a great deal of this wood has been burned because anyone who clears his forest either lets the wood lie on the side or leaves it standing. In a forest, such trees are considered practically as good as money in the bank..."

From these trees furniture were made such as chests, drawers, writing desks, to cabinets with mirrors. According to Haagensen samples of the furniture were sent to Copenhagen, Denmark. He further stated that:

"...two species, particularly Fustick and Pockwood brought many planters thousands and thousands of rixdalers from the outset changing his fortunes to that of a capitalist."

One of the reasons these two species were such in high demand is because Fustick's yellow wood was used in dye works, while Pockwood, whose center is blue, was used for ship's blocks, wheels, and the like.

Many of these trees apparently were situated on several mountain ranges of St. Croix, mainly in the west, northwest, northeast on dangerously steep slope, where he mentioned their base extended directly into the sea. Haagensen in any case he said, it was very difficult to bring down such large trees from the mountain forests to the flat land of the island.

Captain Frederik Moth was appointed the first governor of St. Croix. In 1734, he sailed to the island, landing on the West End. He wrote, that he:

"...found the land on the West End quite lovely and walked about a mile inland to take a look at the famous plantation Le Grange, which is accounted to be the best in the land. The walls of all the buildings are still visible and in part sound, a fine river runs by all through the year. He also observed various plants that had been most likely introduced by the French and which since had been growing in the wild, as he noted the presence of numerous fruit trees of lemons, oranges, etc."

There is a lot more I can share about the native forest of St. Croix. It was well known for its sugar production, being the fourth producer in the world for a small island. The island was also known for its hardwood forests world-wide where six European countries fought over the island for its natural resources and fertile land.

Today, St. Croix's landscape doesn't resemble anything like it once was—possessing one of the most beautiful forests in the West Indies during the colonial time. The streams and small rivers of the island no longer run perennially. The disappearance of our native forest had a tremendous hydrological change on streams on the islands. This is evidenced by many historical records written by those who recorded the early colonial history of St. Croix. For example, Mr. Alfred Edmund Ricksecker, a botanist by profession, who collected plant specimens in the 1890s, spoke about the drying up of streams when he visited the island in the summer of 1895. He stated:

"[T]he forest that once covered the hills of the east end have disappeared and the young trees which would naturally spring up are injured by the goats, so that no forests are likely to exist there. The effect of this forest disappearance on the rainfall has been marked. Some of the guts (small streams) near Bassin that were perennial fifty years ago are now dry during the greater part of the year."

In Baron Eggers works of 1879, he wrote about St. Croix forests, hardwoods, lumber, and so on:

"[T]he cultivated section which extends to a considerable part of the highlands in the west, is confined here to the north by the forest vegetation, the last remnants of the once widespread forests which are now found only in the above mentioned northern part of the western highlands and a few forest valley areas in the east, whereas in a few sections of the southern part of the island a forest area is found the make-up of which later on will be referred to as creating a transition between the actual forest and the brush-like croton vegetation in the eastern part of the island."

As late as 1918, the late George A. Seamen said:

"...there were a number of perennially running streams on the land, and the Lower Love and Bethlehem Guts were really small rivers. On my way to school as a boy from Lower Love, we

crossed five running guts en route Frederiksted. The Harden Gut just outside of town (West End) was a gurgling and vivacious body of clear, clean water in which the town's laundry was washed."

Over time, the landscape of the Virgin Islands dramatically changed—with too much pumping of our underground water supply, surface water dropping, more vegetation removed, especially forest, these all having far-reaching effects on the forest ecology in relationship to wildlife, quality of life, the marine environment and or just the natural beauty of the islands. Whatever forests now remain, must be managed in such a way that rare, threatened, or endangered species of plants must be protected and conserved, which will add value to the Virgin Islands community as a whole. Native trees are our heritage too. They remind us that they are part in biodiversity, and create a more sustainable living environment. This brief history of the Virgin Islands native forests is a reminder of how mankind has destroyed what was loaned to him by nature, and that future generations also have the right to enjoy it. Let us not look at the forests, but at the trees in the forest.

It was not until European arrival that wholesale forest clearing and severe landscape changes began. To grow sugar, cotton, indigo and to process the crops, large areas of the islands needed to be cleared. By the late 1700s and early 1800s, much of St. Croix was cleared, as well as large parts of St. Thomas and St. John. However, small tracts of forests and woodlands remained in isolated areas, including much of the coastal mangroves and wetlands.

By the late 1800s, agriculture was largely abandoned or was on severe decline in most of the US Virgin Islands. With the transfer of the islands to the United States in the early 20th Century, there began a period of economic shift, expansion, and change not seen since the first European settlements. Though secondary forests, woodlands and other vegetation communities began to return, residential infrastructure began an expansion up to the steep slopes of St. John and St. Thomas (something that did not occur during the colonial period), and on the lowland fields of St. Croix. This resulted in any remaining farming to be abandoned, and simultaneously, tourism began to take hold.

By the 1960s, US residents began to acquire lands and properties across the Territory, helping to further transform the landscapes, thereby increasing the demands for services and economic opportunities, including the building of roads, major harbor infrastructures, marinas, hotels, supermarkets, social and cultural facilities, power generation, utility services and related physical and modern human needs. Whatever controls the Amerindians had on the landscape quickly broke down, and many of the habitats and species that depended on their presence quickly declined or disappeared. Photo 1 shows *Bixa orellana* or Roucou, a species that was very significant to their cultural, gastronomic and spiritual practices, and which was dependent on their actions for survival in the islands. It is now confined mostly to a handful of home gardens on St. John, which is a major decline in its former presence across the region. It naturally grows in sunlit marginal moist forest habitats and grasslands edges, and opens along wet streams.

With these new widespread landscape and ecosystems alterations came declines in native species, habitats, unique ecosystems, ecological frameworks and landscapes, and these continue even today. Added to the historical and ongoing landscape changes, Global Climate Change, Sea Level Rise, hurricanes, tropical storms, floods

and increasingly severe and frequent droughts pose enormous challenges and risks to the islands' ecosystems, ecological frameworks, landscapes and species. The natural forests and woodlands of the region have been severely reduced or compromised over the years—cleared, fragmented, retarded, and with many introduced species and the extinction of others—the changing climate, shifting weather patterns, increasing storm surges and coastal waters are magnifying past changes and events. This will make conservation efforts far more challenging and urgent.



Photo 1. *Bixa orellana* or Roucou (small tree, center), important to Amerindian culture, now rare in the USVI. Photo Kevel Lindsay, 2014, Hawk's Nest, St. John.

Status of Virgin Islands Vegetation and Plants Today

The vegetation of the USVI was classified and mapped by the Conservation Data Center (CDC) in 2000 and in 2004. However, this effort did not qualify the state of these communities, in that it doesn't provide the status of the species, the quality, rarity and conservation status. The classification approach used by the CDC focuses on ecological zones, and is based primarily on aerial photo and map interpretation.

Kennaway *et al*, 2008, in *Mapping Land Cover and Estimating Forest Structure using Satellite Imagery and Coarse Resolution Lidar in the Virgin Islands*, mapped the islands' land cover, forest types and forest structure using Landsat images, and tree

classification software. This approach is employed because there is a lack of on-the-ground extensive long-term forest research and management throughout the region (there are a few permanent forest monitoring plots, for example, on St. John and on St. Croix, but few on St. Thomas, and in the nearby British Virgin Islands, which this mapping assessment also covers), which could be used to classify vegetation communities based on species composition, tree height, tree age, species associations, humidity, rainfall and other factors, the Kennaway team took this approach to allow for a more dynamic and easy way to update the mapped classes whenever major changes have occurred and after a number of years have passed.

In 2009, the United States Forest Service published a report on the U.S. Virgin Islands Forests, that gave an assessment of the state of the forest resources of the Virgin Islands, by analyzing permanent plots and other data, giving details on growth, mortality, stand structure, species composition, forest health, biomass, secondary forest growth, forest cover, forest types, ownership and other issues and factors. The report also provides a great deal of data and statistical analysis and interpretation, much of this based on research done in the Virgin Islands and in nearby Puerto Rico.

The Virgin Islands Forestry Division updated the status of the Territory's forest resources in the report entitled "U.S. Virgin Islands Statewide Assessment of Forest Resources - A comprehensive Analysis of Forest-related Conditions, Trends, Threats, and Opportunities" published in 2010. The assessment focuses on state of the Territory's forest, species and ecological resources, and involved several levels and periods of engagements with various stakeholders and interests. The authors also looked at land issues, human and environmental effects, natural disaster issues, population growth and effects, as well as some geospatial analysis of current and future issues and concerns. It also provided a summary of the vegetation communities and land cover, somewhat similar to the Kennaway et al, 2008, classification.

Also in 2010, the Virgin Islands Department of Agriculture published: Assessment of Need - Forest Legacy Program, U.S. Virgin Islands. It assesses the forest resources of the USVI, gives an overview of the types of activities, uses of forests, forest products, the forest types, protected areas and the socioeconomic conditions of the islands.

Tom Brandeis, research forester at the US Department of Agriculture, also updated the 2004 publication *The Status of U.S. Virgin Islands' Forests, 2004*. However, due to technical difficulties, this report was not accessible by the project team during the final preparation of this report. Brandeis' team also conducted similar assessments of the US Virgin Islands forests in 2014, but the results of this latter assessment are not yet available.

There is no similar assessment of non-forested vegetation communities, including those on the nearshore and outer cays, and on the grasslands, cactus associations, forb habitats, shrublands and so on.

St. John has the largest tracts of forest cover, with about 4,403 ha (about 87% of the island), much of this within the boundaries of the St. John National Park, and forming fairly extensive and contiguous expanses. Nearby St. Thomas, the most populated of the major islands, has about 5,180 ha (about 65% of the island), much of it in small patches scattered across the island, but the largest areas on the northwest side; St.

Croix, the largest island with about 11,096 ha (about 51%), with some extensive tracts on the northwest hilly region, from just west of Christiansted to Prospect Hill.

The vegetation communities of the US Virgin Islands are a mix of tall canopy types, lower forest and woodland with an open canopy, and without the three-tiered structure of taller forests, then woodlands and shrublands, grasslands, open habitats, bare and semi-bare areas, and micro-flora communities. However, micro-flora habitats are not defined in existing vegetation community assessments done for the region.

Micro-flora and their communities are those that consist of diminutive plant species, algae, mosses, bacteria, viruses, fungi and lichens, either singly or in various combinations. These may dominate small patches less than a few centimeters or large tracts covering square meters. Their obscure and often small community situations are reasons for their little-studied and limited coverage in reports and assessments. The species and species-dynamics, ecological frameworks and overall importance to the islands' macro-ecosystems are little understood and under-appreciated.

The vegetation communities of the US Virgin Islands are summarized in table 1 (note that this does not include micro-floral communities). The classification is based on the Kennaway *et al*, 2008 system. We have chosen this arrangement because detailed geospatial vegetation community maps are associated with each type (which allows the team to cross-reference with rare and endangered species, habitats and other issues), and since it is also now being used in the nearby BVI. It also provides a broad and simplified approach that is easily understood by most readers. The Kennaway classification differs in a few minor ways to the one outlined in the VI Forestry Division's 2010 report. However, these two approaches can easily be reconciled in a more expansive and future thesis.

Table 1. Vegetation Communities of the US Virgin Islands.

Vegetation Community Type	Island		
	STJ	STT	STX
Forest including Forest/Shrub Land			
Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents (Volcanic, Alluvial or Limestone Substrates)			
Drought Deciduous Forest/Shrub (in Puerto Rico, Drought Deciduous Dense Woodland)			
Semi-Deciduous and Drought Deciduous Forest (includes Semi-Evergreen Forest)			
Semi-Deciduous and Drought Deciduous Forest on Karst or other Limestone (includes Semi-Evergreen Forest)			
Seasonal Evergreen and Evergreen Forest			
Seasonal Evergreen Forest with Coconut Palm			
Rangeland, Natural Grassland, Natural Shrubland			
Drought Deciduous Open Woodland			
Semi-Deciduous Forest, Lowland or Sub-montane (Dry, Dry-Moist)			
Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents (Volcanic, Alluvial or Limestone Substrates)			
Semi-Deciduous and Drought Deciduous Forest (includes Semi-Evergreen Forest)			
Wetland			
Non-forested Wetland			
Forested Wetland			
Water			
Water - Permanent			
Agricultural Land, Pasture, Hay, Abandoned Agriculture, Grass			
Herbaceous Agriculture - Cultivated Land			
Woody Agriculture - Other Classes			
Pasture, Hay or other Grassy Area			
Pasture, Hay or Inactive Agriculture (e.g. abandoned sugar cane)			
Barren Land			
Coastal Sand and Rock			
Quarry			
Seasonally Flooded Savannah and Woodland			
Mangrove			
Salt or Mud Flat			
Bare Soil (including bulldozed land)			
Urban or Built-up Land			
Low Density Built-up Land (Rural or Residential)			
High-Medium Density Urban or Built-up Land			

There are about 1,272 species of plant recorded from the islands. Table 2 provides a detailed breakdown of the physiognomic, origin and status of the species by each major island. The list has been developed by first consulting Flora of the West Indies, put together by the Smithsonian Institution (see <http://botany.si.edu/antilles/WestIndies/catalog.htm>), and with additional input from Eleanor Gibney, Toni Thomas, Kevel Lindsay and from review of plant species lists and reports pertaining to the British Virgin Islands.

There are about 48 West Indian endemics: with nine found only in the USVI, six species endemic to the Virgin Islands (US and BVI), 32 found only on the Puerto Rico Bank (which includes Puerto Rico, Culebra, Mona, Vieques, the USVI and BVI). **Appendix I** provides a list of these sub-regional endemics.

Table 2. Physiognomic, origin and status breakdown of USVI plants.

Growth Habitat	St. John	St. Thomas	St. Croix
Herb	274	350	384
Tree	210	217	257
Shrub	143	167	191
Vine	100	129	118
Total	727	863	950
Native species	594	693	666
Introduced	141	170	305
Origin in Question	1	3	4
Extinct	0	7	3
<i>Families</i>	<i>106</i>	<i>115</i>	<i>123</i>
Total	727	863	950

For more detailed analysis and evaluation of the USVI forests and ecological issues related to vegetation, mapping and assessment please refer to ***U.S. Virgin Islands Statewide Assessment of Forest Resources***, published in 2009, by the USVI Forestry Division of the Virgin Islands Department of Agriculture.

Importance of Conserving Native Plants and Habitats

Under natural conditions, plants, their related habitats and the ecological frameworks are constantly in flux, changing in a dynamic evolution as weather, climate, geology, droughts, water, species, and other factors and events influence, and affect the framework in complex and myriad ways.

In the Caribbean context, humans were a relatively new and recent influence when Amerindian peoples first arrived about 2,000 years ago (or maybe as much as 3,000 years or more), but their roles and ecological effects may have been relatively limited overall, though they could possibly have helped to push a number of major mammalian and reptile species extinct within the last 1,000 to 2,000 years or so.

However, with the subsequent arrival of Europeans, and then the import of African slaves, humans became the environment's most influential change-agents. Consequently, today, we have to find ways to reduce the effects of our actions, and save many of the remaining native species in these islands.

Native plants define each island—in context, aesthetic, uniqueness, richness, culture, and natural balance. Intervening to save native species is not just a matter of moral and ethical responsibility, but is of important social, economic, political, medicinal and ecological value. We work to save native plants and their habitats because:

1. Our actions over the past 500 years have caused considerable environmental disruption, imbalance and harm and we need to reverse these effects;
2. Native plants play key roles in defining the distinctiveness of the Virgin Islands' landscapes, aesthetics and situation, and fundamentally characterize our humanity;
3. They are valuable in their own right, in that they have a fundamental right to exist without human justification, valuation and economic and financial validation;
4. They enrich human lives by providing space, company, context, value, research opportunities, economic, medicinal, emotional, social, cultural and other values and an everyday visual and contextual context and backdrop to daily life;
5. They provide possible support against (natural) disaster effects (or, just “natural effects”, including climate change, sea level rise and increasing levels and ferocity of storm surges, major storms, high winds tsunamis, coastal erosion, floods, by mitigating the effects and protecting the land;
6. They maintain ecological processes and biodiversity;
7. Wildlife diversity depends upon habitat health; and
8. So much more.

Approach and Methodology

This project constitutes Phase I of a longer-term program. This phase focused on:

- updating the list of native and naturalized species of trees of the Territory;
- identifying key areas of remaining relatively pristine forests for native flora;
- providing Geographic Positioning System (GPS) locations of critically rare and endangered species (where possible);
- producing a set of conservation options for their long-term sustainability; and
- working with local and regional experts to devise an effective approach for determining species and habitat health/ecological status.

To begin, the project team started to develop much needed information tools about the native plants, to inform ourselves about what is present, what the threats are, the status of the species and habitats, and what options are possible for their management and conservation.

Identifying the Virgin Islands' species and habitats and then distilling this information to highlight species and areas that need more narrowed focus and intervention were important first steps. As the project builds this information and knowledge capacity for the Territory, it is expected that future steps would evolve, including collecting genetic material for propagation, monitoring of species and habitats, working with private landowners to protect plants and their habitats, securing a site within the territory to propagate species of concern for repatriation to the wild, and possibly restoring certain areas to improve the viability of plant populations and ecosystem functions.

The project collaborated with the UVI Cooperative Extension Service on St. Thomas, in order to reach out to different stakeholders, to build community support and active involvement, and to develop local capacity for rare plants conservation, including long-term opportunities for training and the potential development of a Territorial Herbarium (currently, there are single small herbaria on each of the three islands).

Over the course of the project, the team members also worked to further develop activities and funding for Phase II of the larger program, which will focus on the implementation of conservation option outcomes of Phase I.

The project activities during Phase I included:

1. Updating the list of native and naturalized trees of the USVI, by undertaking a desktop review of literature and other material on the flora of the islands, as well as discussions with local and regional experts on the current taxonomy of species and possible locations.
2. Developing a comprehensive list of the Territory's most critical native species in need of conservation intervention (list developed from updated native and naturalized plant list and field research). This was accomplished through consultations with local and regional experts, engaging private land and public land owners and other interests, and field surveys (where possible, though current

- funding limits the amount of time and resources available for a detailed and comprehensive survey).
3. Identifying key areas of remaining relatively pristine forests for native flora and GPS-mapped these locations.
 4. Producing GPS locations of critical rare and endangered native plant species. The project team, where possible, took GPS coordinates of plants in their habitats, identified populations and numbers, as well as threats, determined whether on private and/or public lands, and took photographs.
 5. Partnering with UVI's Extension Service and other local experts to establish a network of volunteer support.
 6. Working with local and regional experts to develop an effective local approach toward the development of a species and habitat health/ecological status.

The maps produced for the species profiles (maps are excluded for cacti species to help protect rare populations), were done using Google Earth and the GPS coordinates obtained during fieldwork and from key local experts.

The project lacked the funds to use major GIS software and technicians. However, the use of a public mapping platform has a number of advantages, including its simplicity of manipulation and application, open access, its cost and the option for its employment in engaging the public in citizen science, research and conservation activities.

However, a major downside of using a public-access mapping system is that the products and outputs are not integrated into a central database system that is archived and managed by a professional authority, allowing for longer-term use and manipulation. In the future, plant conservation efforts will need to take this into account and to find ways to bring various options together to ensure that field data is centrally stored and available to conservation, research and policy specialists and interests.

Fortunately, UVI's Extension Service has confirmed that Dr. Avram Primack, GIS Data Specialist with UVI's GeoCas Center is interested in geo-referencing the project's plant GPS locations. According to the department's website, "GeoCAS is an active online repository for geographic and other geographically locatable data for the Virgin Islands and the larger Caribbean Region and partnerships with many US federal agencies to serve data." See <http://geocas.uvi.edu/>. Dr. Primack indicates additional forms of future collaboration are possible with the UVI GeoCas Center.

Native Plant Species of Priority Concern

The primary focus of this phase is on a small group of the US Virgin Islands' rare and endangered native trees, shrubs and two herbaceous plants. The decision to focus on these 20 species (listed in table 3) was because resources did not allow us to expand the study to include all groups of plants (see **Appendix I**, which provides a comprehensive list of the plant species of secondary conservation concern), and it would have also taken at least two years to complete a more comprehensive approach.

The project team decided on the 20 species, profiled in this report, after several rounds of consultations, debates and research, these spread across 13 families. The list includes one "herbaceous" plant, the **St. Croix Agave**, and a vine, the **G. eggersii**. The reason for including these species is both their rarity and the threats to their continued existence. Note that for this report, cacti are herein considered shrubs and trees, according to botanical precedent set by such authorities as Richard Howard, the eminent botanist (*Flora of the Lesser Antilles*, 5 volumes).

The priority species are listed in table 3 below.

Table 3. Priority Species of Concern for the US. Virgin Islands.

Family	Species	St. John	St. Thomas	St. Croix	Puerto Rico
Asparagaceae	<i>Agave eggersiana</i> Trel.			X	
Buxaceae	<i>Buxus vahlii</i> Baill.			X	X
Cactaceae	<i>Mammillaria nivosa</i> Link ex N.E. Pfeiffer	X	X	X	X
	<i>Rhipsalis baccifera</i> (Sol. ex J.S. Muell.) Stearn	?	X		X
	<i>Stenocereus fimbriatus</i> (Lam.) Lourteig	X			
Celastraceae	<i>Maytenus cymosa</i> Krug & Urb.		?	X	X
Ericaceae	<i>Lyonia rubiginosa</i> (Pers.) G. Don		X		
	<i>Lyonia stahlia</i> var. <i>stahlia</i> Urb.		X		X
Euphorbiaceae	<i>Croton fishlockii</i> Britton	X			
Fabaceae	<i>Erythrina eggersii</i> Krukoff & Moldenke	X	X	X	X
	<i>Galactia eggersii</i> Urb.	X	X		
Malvaceae	<i>Bastardiopsis eggersii</i> (Baker f.) Fuertes & Fryxell	X			
Myrtaceae	<i>Calyptanthes thomasi</i> Berg	X	X		

Family	Species	St. John	St. Thomas	St. Croix	Puerto Rico
	<i>Eugenia earhartii</i> Acev.-Rodr.	X			
	<i>Mosiera xerophytica</i> (Britton) Salywon	X			X
Rubiaceae	<i>Catesbaea melanocarpa</i> Krug & Urb.			X	X
	<i>Machaonia woodburyana</i> Acev.-Rodr.	X			
Rutaceae	<i>Zanthoxylum thomasianum</i> (Krug & Urb.) Krug & Urb. ex P. Wilson	X	X		X
Solanaceae	<i>Solanum conocarpum</i> Dunal	X			
Zygophyllaceae	<i>Guaiacum officinale</i> L.	X	?	X	X

The one species that is non-endemic, but nevertheless included here is *G. officinale*. It is not only an iconic species of the Caribbean Basin and northern South America, but it is also one that has suffered enormously from over-exploitation and habitat loss, and near-extinct in the wild in some areas.

Each species listed above is described in greater detail below.

For cacti, the team carefully considered the possibility that by revealing the exact location and site description, there is a possibility that this may increase the potential danger to the remaining plants and the population—by encourage theft, increasing vandalism and over-collecting—the team has opted for redacting that information.

Where possible, the team has tried to locate plants in local USVI settings to photograph or source photos from local stakeholders and experts. If local photos were not available, images of plants of the very same species occurring in nearby British Virgin Islands have been substituted. If images from the Virgin Islands were not possible, photos from other West Indian populations are used. In such instances, the choice is noted in the profile.

For the stats provided for each of the species profiled below, the data was derived from field work, discussion and feedback from local experts, official reports and assessments of the species, and from archival research. Whenever this information is not yet available, it is specifically stated that there is a gap in information.

Introduced Pests and Diseases

There are several introduced pests and diseases that are affecting or pose significant risks to the plants of the Virgin Islands, and these pose present and future challenges for native plant conservation and management. There is a priority need for a detailed survey, assessment, and reporting on the introduced species of the USVI. Some of these plant pests include:

1. The **Agave Borer Weevil** (*Scyphophorus acupunctatus*), also known as the Agave Snout Weevil, and the Yucca Weevil, native of Mexico, but introduced widely throughout the world including the Virgin Islands, through the trade in Agave and Yucca species and products. It is believed to have first arrived in the USVI via St. Thomas, probably in the late 1980s, and then the species was transported to Tortola in imported plants. From there, it spread to St. John and eventually reached St. Croix (Eleanor Gibney, pers. comm., 2015). The Weevil causes mortality of plants, sometimes wiping out large colonies when the larvae borrows into the stem and sometimes the flowering stalk, giving access to various secondary infection by micro-organisms, including bacteria, viruses and fungi. As a result, native Agave species has sharply decline across the Virgin Islands. See the species listing in the **Global Invasive Species Database** at http://www.issg.org/database/species/impact_info.asp?si=1586&fr=1&sts=&lang=EN. Photo 2 shows a plant at Table Bay area on Anegada that was killed by the Weevil.
2. The **Cactus Moth** (*Cactoblastis cactorum*) or South American Cactus Moth, or Nopal Moth is native to Argentina and nearby countries in South America, but was introduced to Australia and South Africa to help control introduced *Opuntia* species. From there, it eventually spread to Antigua (around the 1950s) and to other Lesser Antillean islands. From there, the insect spread to many parts of the Caribbean Basin, and then to warmer parts of North America and to Mexico and Central America. The larvae burrow into the pads of many species of *Opuntia* and sometimes on *Pilosocereus*. This causes death of parts of the plant, retarded growth, low productivity, secondary infections, deformity and sometimes death.
3. The **Tabebuia Gall Thrip** (*Holopothrips tabebuiae*). First discovered in Puerto Rico by Alex Segarra and Irma Cabrera, entomologists, in 2007, on the native *Tabebuia heterophylla* plants, this insect borrows into the leaf tissue, causing numerous galls and lesions, resulting in a crinkled look to the leaf. The young leaf and nearby stems become deformed as a result, although the plant survives and continues to produce flowers and fruit, as well as viable seeds. Where this species originally came from is currently unknown, but it is believed to be introduced since it or its effects were never reported before its discovery on that island in 2007. It has since spread to all of the Virgin Islands, the Lesser Antilles, the Greater Antilles, and to Florida, and continues to spread to other countries. Source: David A. Jenkins, Entomology Lab, Puerto Rico, 2013.



Photo 2. *Agave missionum* attacked and killed by the Agave Snout Weevil, Table Bay, Anegada, BVI, 2012. Photo Kevel Lindsay.

4. The **Lobate Lac Scale** (*Paratachardina pseudolobata*). Believe to be native to Southeast Asia, though there is still some argument that its origins are unknown. This insect infests members of the Myrtaceae, including the Virgin Islands endemic *Calyptranthes thomasiana*. It causes stem death, leaf deformity, reduced productivity, and attracts a sooty mold to cover much of the plants leaves and stems, reducing the area available for photosynthesis and biological defense. It is reported that much of the *Calyptranthes* at Hawk Hill on St. Thomas are heavily infested with this pest.

Excluded from this list of introduced species that have or may have major effects or influence native plants, habitats and ecology is the **Pink or Hibiscus Mealy Bug** (*Maconellicoccus hirsutus*). Since the Pink Mealy Bug primarily infests introduced cultivated plants, especially members Malvaceae, and that it is confined to gardens, it has been excluded from the list of primary pests. However, the species may prove a threat to the native *Bastardiopsis*, so studies are needed to determine if this is the case, and if so, how to counteract the potential effects on the native tree.

In addition to the species listed above, several threats are on the horizon, and the US Virgin Islands are constantly on watch for the possible and potential introduction of these species. These include:

1. The **Harrisia Cactus Mealy Bug** (*Hypogeococcus pungens*), is an insect species native Argentina, parts of Brazil, Peru, Chile and Paraguay. It was first noted in Puerto Rico at Guanica Forest Reserve in 2005 and is now found over a large area of the southern coast of the island and is rapidly spreading. How it first arrived on Puerto Rico is unknown, but it is believed that it likely came via the horticultural trade. It affects columnar cacti species on the island, including

Harrisia, *Hylocereus*, *Leptocereus*, *Pilosocereus* and *Stenocereus*. It has also been found on *Melocactus*, *Mammillaria* and other native species. The insect causes major deformation of the plant, reduces productivity, causes secondary infections and may even cause death. Photo 3 shows an infected *Pilosocereus royenii* at Guanica Forest. It is feared that that it is only a matter of time before it arrives in the Virgin Islands, since it can also travel across the ocean on strong winds. It is also now known from several states on the United States mainland. Treatment and control of this introduced and destructive pest is very difficult. Also see <http://www.dontmovefirewood.org/gallery-of-pests/harrisia-cactus-mealybug.html> for more details and references on this pest species.



Photo 3. *Harrisia* Cactus Mealy Bug infecting *Pilosocereus royenii* at Guanica Forest Reserve, Puerto Rico. Photo by Kevel Lindsay, 2012.

- The Food and Environment Research Agency (FERA) in the UK, has been working with the Botanical Garden at Kew, to assist in the identification of introduced pest species from the British Virgin Islands (BVI). According to Martin Hamilton of Kew (2015), via email, preliminary results provided by FERA include the following species (work is ongoing):

Native Plants Affected	Pest Species
<i>Eugenia sessiliflora</i>	<i>Saissetia coffeae</i> - hemispherical scale

<i>Erythrina eggersii</i>	<i>Mesostigmata</i> (order)
	Araneae (order)
	<i>Pseudaulacaspis</i> spp.
	Cicadellidae (family)
	Flatidae (family)
	Gastropoda (class)
	<i>Tetraleurodes</i> spp.
	Psocoptera (order)
<i>Mitracarpus polycladius</i>	Chalcidoidea (family)
	Phlaeothripidae (family)
	<i>Planchonia stentae</i> - South African pit scale
Dead tree	Curculionidae: <i>Brentinae</i> - Primitive weevil
<i>Varronia rupicola</i>	Pyralidae
	<i>Cryptorhophalum</i> sp.
<i>Psychotris</i> sp.	Flatidae ? <i>Petrusa epilepsis</i> - seagrape flatid

Given the proximity of the BVI to the USVI, the strong inter-island trade and movement of people as well as products, and the wind patterns, it is likely that these are also found throughout much of the Virgin Islands or will spread across borders soon. The effects of these pests have not yet been fully explored and detailed.

Primary Species of Concern

ASPARAGACEAE

Agave eggersiana Trel.

Egger's Century Plant/St. Croix Agave



Photo courtesy Rudy O'Reilly, 2015, taken, along road at Estate Spring Gut.

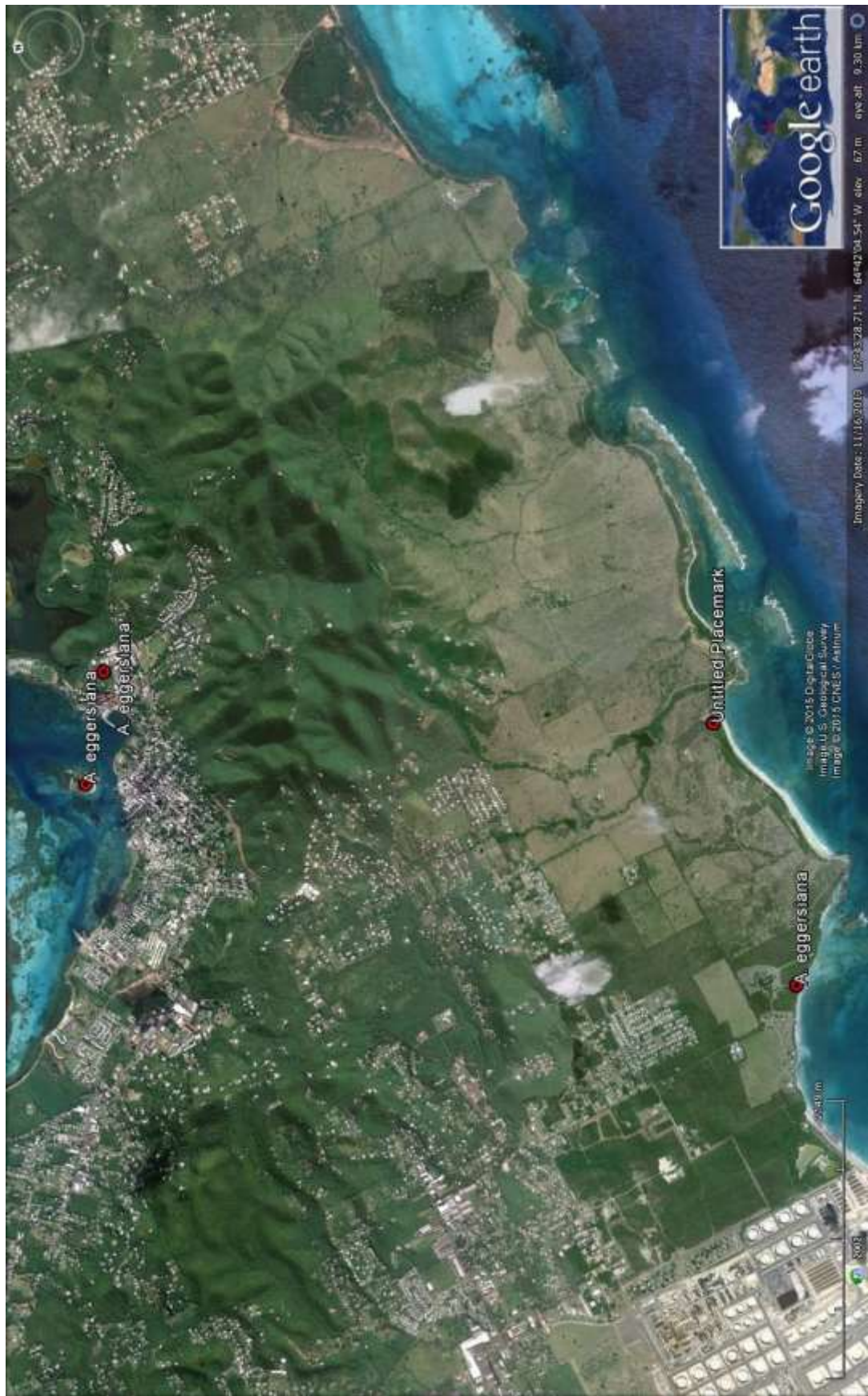
Habitat: Dry exposed hillsides and bottomlands on the eastern end of St. Croix.

Distribution: Endemic to St. Croix.

Population: The number of adult plants remains unknown, however, Michael Morgan, Agroforestry Research Specialist with the University of the Virgin Islands (UVI), is now surveying and assessing the species to determine population numbers. Colonies exist at the St. George Village Botanical Garden, and according to Rudy O'Reilly (2015) populations also exist on the Judith's Fancy side of Salt River, Protestant Cay, Half Penny Bay, Cane Garden, Gallows Bay, along the Jacks and Isaac's Bay trail, and in various local home gardens and landscapes. US Fish and Wildlife also reports populations at South Shore, Vagthus Point and Manchineel Bay.

Conservation Status: Federally listed as **Endangered** as of September 2014, under the United States' Endangered Species Act of 1973. It will now receive federal protection, and it has been proposed that about 20.5 hectares (50.6 acres) be designated for its safeguard.

Threats: Threats include feral pigs and other animals (they eat seedlings), the development of its habitat for housing and tourism, fires, and the introduced Agave Borer Weevil (*Scyphophorus acupunctatus*).



BUXACEAE*Buxus vahlii* Baill.

Vahl's Boxwood



Photo courtesy Rudy O'Reilly, 2015, taken at Estate Mount Welcome.

Habitat: In the understory of semi-evergreen woodland.

Distribution: Endemic to Puerto Rico and St. Croix.

Population: About 400 plants are known from three populations — Sandy Point National Wildlife Refuge, which is on federal land managed by the U.S. Fish and Wildlife Service; at Seven Flags Hill and at Spy Glass Hill, both of which are private lands. Coordinates provided by Rudy O'Reilly, 2015.

Conservation Status: This species is Red Listed as Critically Endangered by the International Union for the Conservation of Nature (IUCN). It is also listed under the US Federal Register as an **Endangered** species under the Endangered Species Act (1973), effective September 12, 1985.

Threats: Populations of this species have been reduced as a result of deforestation and human activities, including road and home construction.

Comments: The species is reported from four populations, two of which are on St. Croix, one of these being in the Sandy Point Wildlife Refuge.



CACTACEAE

Mammillaria nivosa Link ex N.E. Pfeiffer

Woolly Nipple Cactus



Photo taken on Tortola, courtesy Kevel Lindsay, 2014.

Habitat: Open bare, grassy or dwarf shrublands on dry coastal cliffs, rocky shores and rocks, including offshore cays.

Distribution: The Bahamas, Puerto Rico, the Virgin Islands and northern Leeward Islands.

Population: Unknown. Most of the plants are now limited to the outer cays of the USVI, and these have not been assessed.

Conservation Status: This species is Red Listed as **Least Concern** by IUCN. However, in the US Virgin Islands it should be considered Threatened due to the loss of populations, especially on the main islands.

Threats: This species has seen declines due to collecting for local gardens and for export to northern countries where this and many species have been in relatively high demand by cacti enthusiasts. It has also declined due to coastal development, the clearing of its habitat, feral animals and because of vandalism.

Comments: This and other species of cacti are listed as “*Trade controlled to avoid use incompatible with species survival - Global*” under Convention on International Trade in Endangered Species (CITES) Appendix II, and it should not be collected, damaged or removed without the explicit formal permit and supervision of the United States Virgin Islands Division of Fish and Wildlife, Department of Natural Resources.

CACTACEAE*Rhipsalis baccifera* (Sol. ex J.S. Muell.) Stearn

Mistletoe Cactus



The photo above is of a wild plant on Antigua, courtesy Kevel Lindsay, 2014.

Habitat: An epiphytic species that grows on large old trees or on cliffs where it hangs in festoons, often forming very large colonies.

Distribution: Florida, Greater Antilles, Lesser Antilles, Mexico, Central and South America. In the Virgin Islands, it is recorded only from St. Thomas.

Population: Unknown. The species may be extinct in the USVI.

Conservation Status: This species is Red Listed as **Least Concern** by IUCN. In the Virgin Islands, it is rare, if not extinct, since it has only been recorded from St. Thomas. Locally, it should be considered as Critically Endangered.

Threats: It is not known why this species declined/disappeared from St. Thomas, but on other islands, habitat loss and feral animals can cause rapid declines.

Comments: Like other species of cacti, this species is listed as "Trade controlled to avoid use incompatible with species survival - Global" under CITES Appendix II, and it should not be collected, damaged or removed without the explicit formal permit and supervision of the United States Virgin Islands Division of Fish and Wildlife, Department of Natural Resources.

This species should be looked for on St. John where habitat exists, though it has never been recorded for that island.

CACTACEAE

Stenocereus fimbriatus (Lam.) Lourteig
Fringed Stenocereus/Spanish Stenocereus



Photo above by Jean-Pierre Bacle, St. John east end, 2015.

Habitat: Dry coastal cliffs, headlands and hillsides, often in grassy to scrubby habitats, but may occur in low coastal woodlands. It is known only from dry coastal areas on eastern St. John.

Distribution: BVI—Buck Island(?), Dead Chest, Eustatia Island, Ginger Island, Great Camanoe, Great Tobago, Little Tobago, Norman Island, Peter Island, Cooper Island, Prickly Pear Island, Salt Island, Tortola(?), Virgin Gorda. Also found on Puerto Rico, Hispaniola, Jamaica, Cuba, and on St. John in the USVI.

Population: On St. John, there are about 20 known adult plants remaining.

Conservation Status: Internationally listed as **Least Concern** by IUCN given its overall wide distribution in Greater Antilles and stable populations through much of its range. However, in the Virgin Islands, this species is limited in distribution, found on the outer islands of the British Virgin Islands, and with small relict and declining populations on St. John and possibly one location on Tortola. In the Virgin Islands, it would be Critically Endangered locally.

Threats: This species has declined due to coastal development, the clearing of its habitat, feral animals and because of vandalism.

Comments: To prevent vandalism and theft, the exact locations of this species has been redacted from the report.

It is listed as "*Trade controlled to avoid use incompatible with species survival - Global*" under CITES Appendix II, and it should not be collected, damaged or removed without the explicit formal permit and supervision of the United States Virgin Islands Division of Fish and Wildlife, Department of Natural Resources.

CELASTRACEAE

Maytenus cymosa Krug & Urb.

Caribbean Mayten



Photo by Kevel Lindsay of plant on Virgin Gorda, 2012.

Habitat: Evergreen, seasonal and moist forest and woodland.

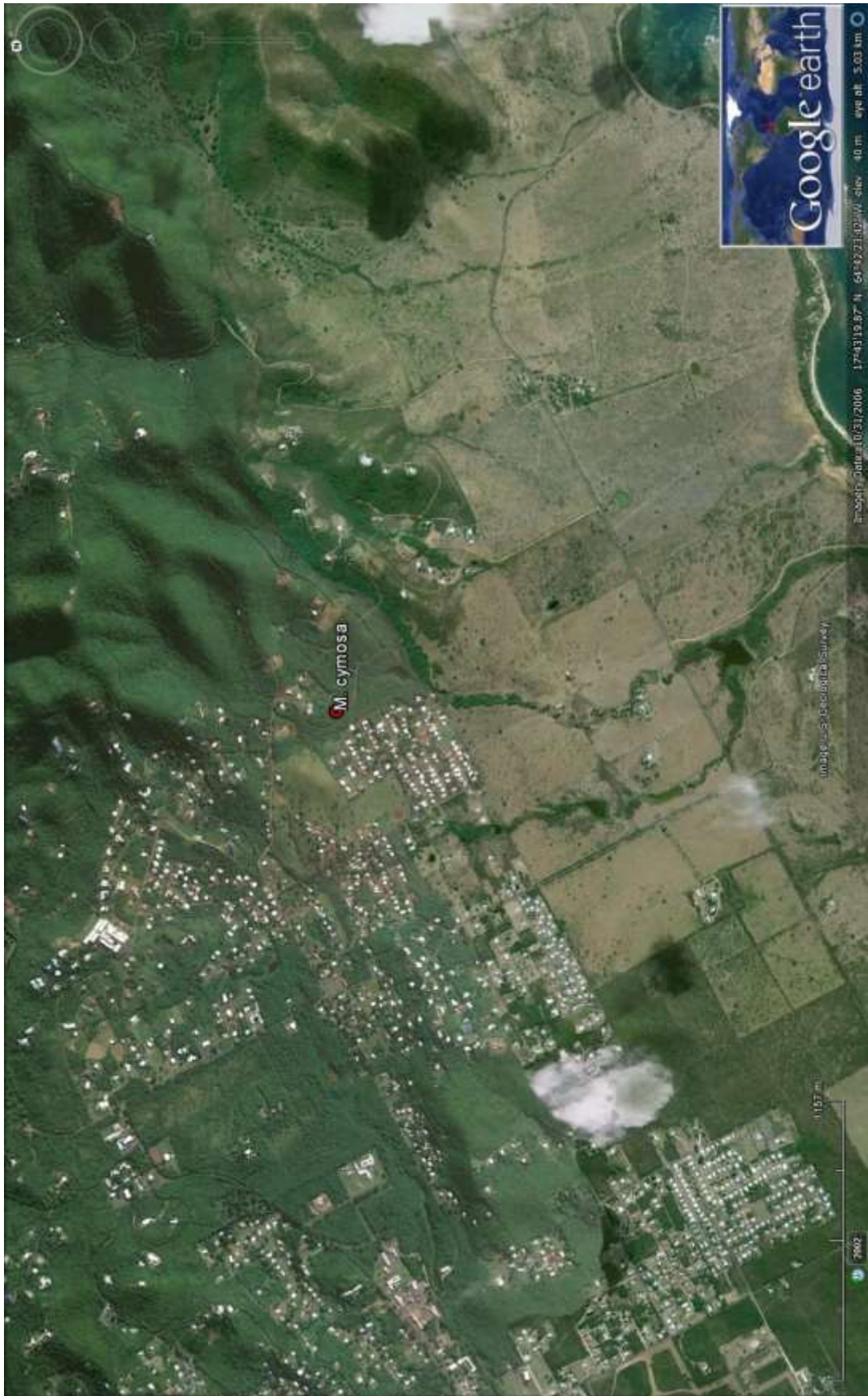
Distribution: Endemic to Puerto Rico, Vieques, St. Croix, St. Thomas, and Virgin Gorda.

Population: Less than 10 adult plants. The last plant observed was by Rudy O'Reilly and eventually, Eleanor Gibney along a gut in Estate Bugby Hole in 2010. It was an old plant in decline along the eroding side of the gut. The heavy rains and floods that occurred during that year may have had a severe effects on the plant and the habitat. The status of the species on St. Croix remains in question. (Rudy O'Reilly, 2015)

Conservation Status: It is Red Listed as **Endangered** by IUCN. Populations throughout its range have declined over the years. The population on Gorda Peak, Virgin Gorda is considered the largest and most viable.

Threats: Habitat fragmentation, deforestation, forest fires, habitat decline and development are all factors in its decline.

Comments: It is critical and urgent that there is an effort to survey the last reported habitat and the first recorded location for this species to determine its status and if it is still present, to implement emergency conservation measures.



ERICACEAE

Lyonia rubiginosa (Pers.) G. Don
St. Thomas Staggerbush



Photo at Hawk Hill, St. Thomas (2015).

Habitat: In dry open woodland, at an elevation of about 340 meters.

Distribution: Endemic to St. Thomas.

Population: Known only from one location at Hawk Hill, and may be less than 300 adult plants.

Conservation Status: This species has not been assessed by IUCN for the Red List, or by any other formal authorities, despite its unique distribution and importance. It should be considered **Critically Endangered**, representing one of the USVI's most critical native trees. It is threatened with extinction since the population is on private lands and is surrounded by roads and housing, and that is now severely restricted in distribution.

Within the area *Lyonia* is found are other rare and endangered native plants, including *G. eggersii*, *C. thomasiana* and *Z. thomasianum*.

Threats: Habitat loss and fragmentation, especially in modern times for residential and road development, and related facilities, including power lines.

Comments: This species was originally described from St. Thomas, and first found at Bolongo.



ERICACEAE

Lyonia stahlii var. *stahlii* Urb.

Stahl's Staggerbush



Photo above, taken by Kevel Lindsay, 2015, shows habitat where this species was supposed to have been located.

Habitat: As a small tree or shrub in the understory to mid-level of strata of moist forest and woodland above 340 meters.

Distribution: Endemic to Puerto Rico. Believed mistakenly identified for St. Thomas, however, only further field assessment would be able to determine if this is indeed the case.

Population: None known on St. Thomas.

Conservation Status: Virtually nothing is known about this species, and it could not be found in the wild on St. Thomas, though the field survey was not exhaustive.

Threats: Habitat loss for residential development, urban infrastructure and deforestation.

Comments: Eleanor Gibney has contacted Dr. Walter Judd at the University of Florida, the world authority on *Lyonia*, and he has concluded that there is no question that *L. stahlii* var. *stahlii* is found only in the high moist elevation of Puerto Rico, and *L. rubiginosa* is endemic to St Thomas.

However, only a comprehensive field survey would be able to determine if this species, or one similar, but different to *L. rubiginosa*, is present on St. Thomas. There are several hills and tracts of forests/woodlands on St. Thomas that urgently need careful surveys for this and other rare and endangered species.

EUPHORBIACEAE*Croton fishlockii* Britton

Fishlock's Croton



Photo by Kevel Lindsay, of a plant on Virgin Gorda, 2012.

Habitat: Dry coastal headlands and dry forests and woodlands on hillsides.

Distribution: Endemic to the Virgin Islands — Anegada, Beef Island, Great Camanoe, Guana Island (introduced), Tortola, Virgin Gorda, and St. John in the USVI.

Population: Population on St. John is estimated to be about 100 adult and sapling plants (Eleanor Gibney, personal communication).

Conservation Status: Pollard and Clubbe (2003) considered this **Endangered** under the BVI IUCN Red List of native plants.

Threats: Coastal residential, hotel and infrastructure developments are all contributing to the decline of dry coastal savannas, cliffs, rock strata, woodlands and forests, and affect the stability of this species on St. John. Other threats include feral animals, human traffic, droughts and habitat fragmentation.

Comments: Easily overlooked, this species sometimes goes unnoticed. It should be looked for in viable habitats on St. John.



FABACEAE*Erythrina eggersii* Krukoff & Moldenke

Egger's Cock Spur



Photo taken on Jost Van Dyke, BVI, 2008 by Kevel Lindsay.

Habitat: Dry coastal woodlands and forests, and the slopes of dry coastal hills.

Distribution: Endemic to Puerto Rico, Jost Van Dyke, Tortola(?) and St. John.

Population: Less than 75 plants in all of its range. Known from Fish Bay, Botany Bay, the northwest coastal area, Turtle Bay, Hawksnest Bay, Bordeaux, near Bordeaux Mountain, Great Lameshur Bay, and near Centerline Road east of Mamey Peak.

Conservation Status: This species is listed as **Endangered** in the Red List of IUCN. According to the Center for Plant Conservation (2002), a US-based non-government organization at the Missouri Botanical Garden, it is believed that less than 75 plants survive in the wild in all of its entire range. On St. John, it is known from four locations.

Threats: Habitat loss, fragmentation and decline, as well as feral goats, pigs and donkeys all threaten this species.

Comments: This species produces flowers after most or some of the leaves fall, though it may not always flower after leaf-fall. It is also often difficult to observe because it is usually a relatively small tree hidden amongst other trees and shrubs.



FABACEAE*Galactia eggersii* Urb.

Egger's Milkpea



Photo above taken by Kevel Lindsay at Estate Concordia, St. John, 2010.

Habitat: Coastal woodlands, mangroves, grasslands, scrub habitats, upland dry to seasonal and evergreen forests and woodlands, and in upland moist forests and woodlands. It is a species with a very wide range of habitat tolerance, though it is nowhere common.

Distribution: Endemic to Guana Island, Tortola, Virgin Gorda, St. John and St. Thomas.

Population: From field knowledge and experience, Eleanor Gibney suggests that the population on St. John number only a few hundred. Plants are ephemeral and sporadic in nature. Populations on St. Thomas remain little studied.

This species should be searched for in the remaining dry woodland and forest habitats on the southeastern and southern areas of St. Thomas where it potentially could exist.

Conservation Status: This species is listed as **Endangered** by Pollard and Clubbe (2003) of the Kew Botanic Garden, UK (see references and citations).

Threats: Feral and free-roaming animals, and coastal residential and tourism developments, including those for infrastructure.

Comments: Plants on St. John tend to be less "hairy" and more glabrous than those on Virgin Gorda and Tortola.



MALVACEAE

Bastardiopsis eggersii (Baker f.) Fuertes & Fryxell
Egger's Indian Mallow/Jost Van Dyke's Indian Mallow



Photo, Eleanor Gibney, 2015, take at Cobb Gut, St. John.

Habitat: Coastal seasonal and upland forest and woodland, dry open hillsides and shrublands, especially on southern-facing hillslopes.

Distribution: Endemic to Puerto Rico, Culebra, Dead Chest, Guana Island, Jost Van Dyke, Tortola, Ginger Island, Norman Island, Great Thatch and St. John, Cobb Gut, in the area called Cobb Flat.

Population: In the USVI, the population is 25 to 30 sapling and adult plants.

Conservation Status: This species is listed as **Endangered** by Pollard and Clubbe (2003) of the Kew Botanic Garden, UK (see references and citations)..

Threats: Coastal road development, residential and hotel development, habitat loss and fragmentation, feral animals and perhaps rats that eat young shoots, seeds and reproductive parts.

Comments: Gibney reports that the trees seem quite tall; these may represent some of the tallest, and the oldest trees in the Virgin Islands.

Leaves of tall plants above the canopy seem to be vulnerable to damage by high winds, solar radiation and invertebrate attacks. Flower and seed production may be affected by these conditions, and seedling production may be quite low for this population.



MYRTACEAE*Calypttranthes thomasiana* Berg

St. Thomas Lidflower



Photo by Kevel Lindsay, of a "cultivated" plant at Hawk's Nest, St. John, 2015. Notice the dark deposits of sooty mold on upper surface of leaves as a result of scale insects.

Habitat: Moist upland closed-canopy to semi-open canopy evergreen forest and woodland.

Distribution: Endemic to Vieques, Virgin Gorda, St. Thomas and St. John.

Population: The total world population is suggested to be less than 250 (IUCN), with 100 on Bordeaux Mountain, St. John.

Rudy O'Reilly and Eleanor Gibney report a population for Hawk Hill on St. Thomas, though they seem under severe pressure from introduced scale insects and sooty mold. The number of adult plants is unknown.

Conservation Status: This species is Red Listed as **Endangered** by IUCN.

Threats: Habitat loss and fragmentation, feral animals, residential development and inbreeding.

Comments:

Plants are vulnerable to sooty molds and other scale insect and whitefly maladies, which may retard growth, flower and fruit production, and also retard seedling production.



MYRTACEAE*Eugenia earhartii* Acev.-Rodr.

Earhart's Stopper



Photo courtesy Eleanor Gibney, 2009.

Habitat: Dry to seasonal upland forest and woodland on the south coast of St. John. The plants are known from two discrete populations.

Distribution: Endemic to St. John.

Population: The total world population of this species is estimated to be about 400 saplings (Eleanor Gibney and Gary Ray, 2015) and adult plants. This species is believed to be long-lived, especially given the relatively dry conditions of the habitat. Seed production and reproduction are thought to be relatively low and slow.

Conservation Status: This species has not yet been formally declared by any authority, but the National Park and U.S. Fish and Wildlife Services are evaluating the species for listing under the U.S. Endangered Species Act.

Threats: Feral animals, habitat loss and human disturbance.

Comments: The two populations are relatively isolated from each other, and relatively seldom visited by experts and managers. These populations are prone to vandalism, illegal trail development, wildfires, feral livestock and wild deer effects, droughts, insect attacks, and diseases.



MYRTACEAE*Mosiera xerophytica* (Britton) Salywon

Aridland Stopper



Photo by Kevel Lindsay, Virgin Gorda, 2012.

Habitat: Dry coastal and upland woodland and forest, and in dense scrub, especially where the underlying bedrock is exposed and soils are thin.

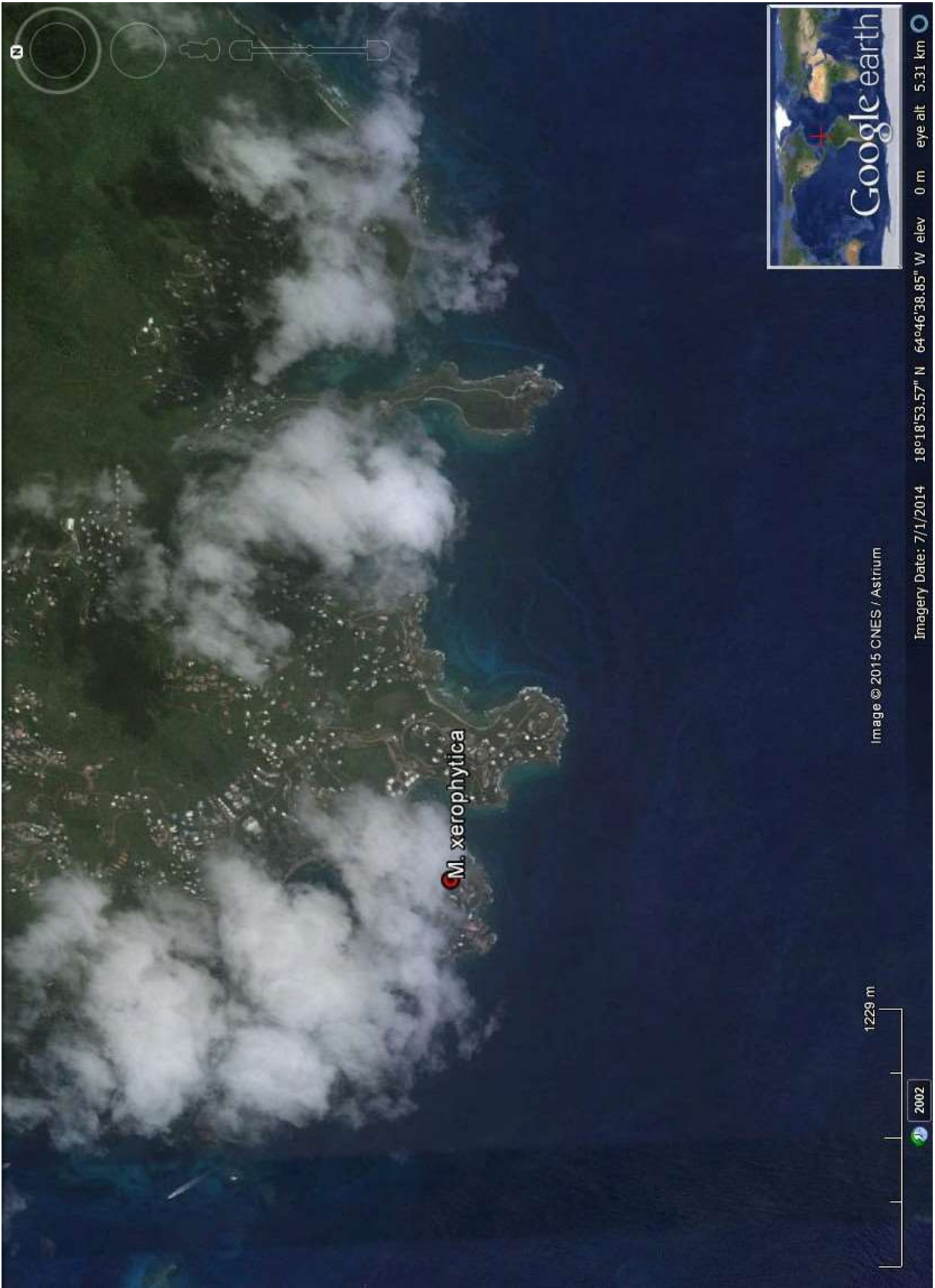
Distribution: Endemic to Puerto Rico, and recently found on Virgin Gorda at Leverick Bay in 2012. Eleanor Gibney also reported the species for St. John, where she observed a single tree about 20 years ago, but a villa has been built on the site, and the plant was destroyed. No other plants are known from St. John.

Population: Only one remaining plant was known from St. John, and this was destroyed in 2011.

Conservation Status: This species possibly extinct on St. John, where the only and last tree was destroyed for a residential development.

Threats: Residential, tourism and infrastructure development on dry coastal and upland areas of its habitat.

Comments: The species is extremely long-lived, so the plant on St. John may be one of the last remaining plants, but it is quite likely that it was the offspring of a locally viable population, which still remains undiscovered. A careful and comprehensive survey of St. John needs to be done to determine if the species continues to exist on the island. This species should be searched for on St. Thomas.



RUBIACEAE

Catesbaea melanocarpa Krug & Urb.

Tropical Lilythorn



Photo of an Antiguan plant, taken by Kevel Lindsay, 2013.

Habitat: Lowland dry woodland, grasslands, seasonal forests and woodlands and scrubland, and upland evergreen and seasonal woodlands.

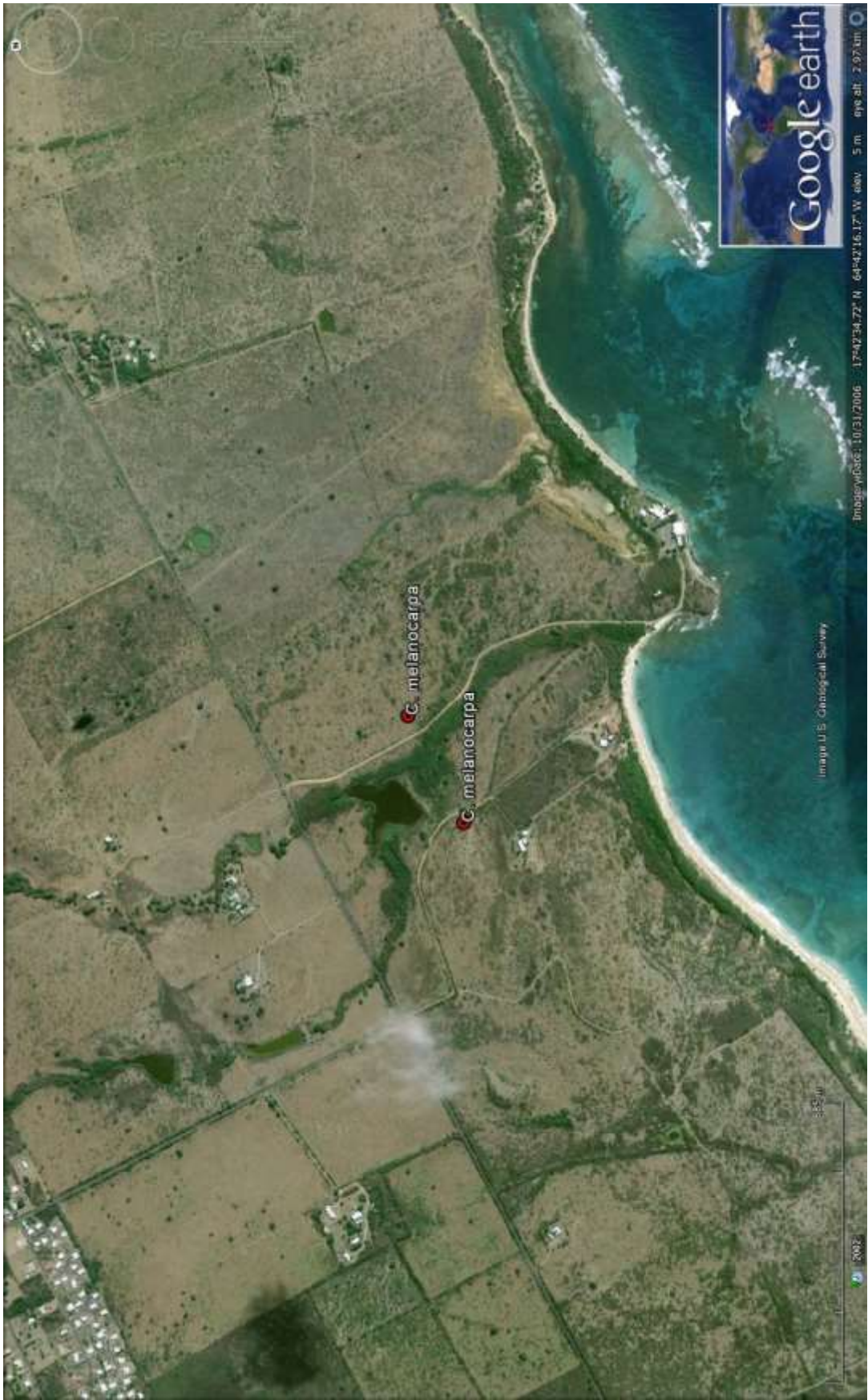
Distribution: Cayman Islands, Mona Island, St. Croix, Antigua, Barbuda and Guadeloupe.

Population: Fewer than 100 adult plants are known from the only site at Ha' Penny where this species is found on St. Croix (Rudy O'Reilly, 2015).

Conservation Status: In 1999, this species was listed as **Endangered** under the U.S. Endangered Species Act (1973), and as **Endangered** under the Red List by IUCN. Recovery plans have been developed for this species in Puerto Rico and St. Croix, and a number of habitat areas have been identified and proposed for protection.

Threats: Fire, habitat loss, feral and free-roaming animals, and land-clearing.

Comments: On Antigua, this species is quite common and fairly widespread, though threatened by feral and free-roaming livestock, fires and habitat loss. On Barbuda, it is far less common.



RUBIACEAE

Machaonia woodburyana Acev.-Rodr.

Alfilerillo



Photo of a Virgin Gorda plant, 2012, courtesy Kevel Lindsay

Habitat: Dry seasonal and evergreen woodlands and in open dry woodland.

Distribution: Endemic to Virgin Gorda in the BVI and to St. John.

Population: Estimated to be about 200 to 300 plants (Eleanor Gibney, pers. comm., 2015), which would include saplings and adults. Plant populations are located at Minna Hill, Privateer Bay and Upper Point Rendezvous, St. John.

Conservation Status: **Critically Endangered** according to IUCN Red List; not formally listed federally or territorially in the USVI.

Threats: Habitat loss, feral and free-roaming animals, residential and tourism developments.

Comments: This species still needs more detailed study on St. John. Some areas from which it has been observed are not yet formally assessed and included into the Territorial analysis for the species..



RUTACEAE

Zanthoxylum thomasianum (Krug & Urb.) Krug & Urb. ex P. Wilson

St. Thomas Pricklyash



Photo taken by Kevel Lindsay at St. Thomas near Hawk Hill, St. Thomas, 2015.

Habitat: Dry forest and woodland, sometimes as a low shrub in scrub woodland in upland and coastal dry area.

Distribution: Puerto Rico, Virgin Gorda, Tortola, St. John and St. Thomas.

Population: Estimated to be about 500 plants, possibly more (Eleanor Gibney, personal communication), which would include saplings and adults. Population locations include Bordeaux Hill, St. John and Hawk Hill, St. John.

Conservation Status: Red Listed as Endangered by IUCN.

Threats: Habitat loss, feral and free-roaming animals, residential and tourism developments.

Comments:



SOLANACEAE*Solanum conocarpum* Dunal

Brown Bacoba



Photo, Hawk's Nest, St. John, (cultivated), K. Lindsay, 2014.

Habitat: Open dry coastal and some upland woodland areas as an understory plant. Usually found on poor soils and disturbed ground.

Distribution: Endemic to St. John.

Population: Reportedly, about 220 plants remain in the wild—about 156 at Nanny Point/Estate Concordia, which was donated to the Virgin Islands National Park Service (VINP) in 2009, and 60 others on other lands of the Park.

Conservation Status: This species has not yet been assessed for the Red List of IUCN. It is currently being assessed and evaluated by the U.S. Fish and Wildlife Service for possible listing under the U.S. Endangered Species Act (1973).

Threats: Habitat loss, fragmentation and decline as a result of developments for residential and tourism infrastructures, and from feral and free-roaming livestock that often alter the landscape and cause ecological decline; it is also vulnerable to inbreeding due to isolated and disconnected populations, and low genetic diversity.

Comments: The Trust for Public Land (TFPL) acquired 0.9 ha (2.2 acres) of land at Nanny Point, which had been donated by Stanley Selengut. The land has since been turned to the National Park.



ZYGOPHYLLACEAE*Guaiacum officinale* L.

Lignum-vitae



Photo, Kevel Lindsay, St. John, 2015.

Habitat: Lowland and coastal dry and seasonal woodland and scrub, and upland dry and seasonal forests and woodland.

Distribution: Bahamas, Jamaica, Cuba, Cayman Islands, Hispaniola, Mona, Puerto Rico, Culebra, Vieques, the BVI, the Lesser Antilles, Central and northern South America. Introduced to North America and much of the Old World. In the USVI, St. John, St. Thomas and St. Croix.

Population: About 60 wild adult plants.

Conservation Status: Lignum-vitae has been Red Listed as **Endangered** by IUCN. International trade in this species is also restricted since it is listed in **Appendix II** of **CITES**.

Threats: Overexploitation for its wood and medicinal products over the last 200 years; other threats—introduced pests and diseases, and “genetic swamping” by introduced cultivars brought in from foreign locations, to landscape hotel, restaurant, commercial properties and residences, in Puerto Rico, the BVI and the USVI. These introduced cultivars seem particularly vulnerable to many pests and diseases, and often are imported with them on the plant itself and in the potting media.

Comments:



Secondary Species of Concern

Though the primary focus of this report is trees and shrubs, and one herbaceous plant and one vine, it is also important to put this in context and to also look ahead and to hope that in due course, all of the Territory's rare and endangered native plants and habitats will receive the attention they need to ensure sustainable and viable populations.

The 20 plants profiled have been selected based on the time-frame for this assessment, their conservation status and the available resources to be able to undertake the surveys, research and studies. But the exercise allowed the team to carefully explore many of the issues and concerns surrounding native plant conservation in the Virgin Islands, and to then extrapolate this outward to then forecast the needs for a wider and more comprehensive assessment and conservation effort.

It would take at least three years to expand the assessment and surveys to include all of the islands' endemic, rare and endangered native plants, a greater amount of funding commitment, as well as more outreach and engagement of local and regional experts to arrive at consensus on the taxonomies, status, names, distributions, population numbers, threats and an effective plan for their conservation.

Appendix I summarizes 203 species that may require careful attention and study in the next two to three years. The following table in **Appendix II** further highlights the Puerto Rico Bank endemics.

Next Steps: Saving Native Plants

For the conservation and management of the rare and endangered native plants and habitats of the U.S. Virgin Islands, we would need to address the underlying issues from four broad standpoints:

Science & Research

Building local institutional capacity and know-how related to:

- Native plant and natural resources conservation;
- Developing long-term natural resources conservation capacity;
- Implementing an ecosystem and species restoration program, including habitat recovery and restoration;
- Conducting native plant population, biology and ecological surveys, which would include germination protocols, seed and germplasm storage protocols, seed viability, what makes the seeds germinate, and early tree care;
- Mapping and geo-referencing of critical species and data storing;
- Securing live genetic materials in habitats and a native plant nursery and arboretums for future native plant and habitat restoration efforts.

Education & Outreach

Increasing and strengthening institutional capacities, both in the public and private sectors through education and outreach efforts that:

- Increase skills, awareness and training related to native plant and critical plant conservation;
- Build local institutional capacity for providing educational services;
- Establish and sustainably maintain native plant gardens and demo sites used for education;
- Initiate a long-term education and awareness campaign that increases local understanding of and value for these species, their habitats, natural landscapes, stable ecological frameworks and processes, and the conservation needs and work being done to save them.

Conservation & Management

Increasing interest in:

- Securing and protecting critical habitats and ecosystems with rare and endangered native plant populations;
- Securing and protecting outer cays which are repositories for native plants, habitats, ecosystems and fauna;
- Establishing a dedicated organization, infrastructure and/or group of people within the Virgin Islands that will be the driving force behind native plant, ecosystem and habitat restoration, protection, management and conservation;
- Increasing funding, financing and land/habitat acquisition.

Legal Protection

Increasing interest and local support for:

- Getting a number of rare native plant species and their habitats recognized as Endangered internationally, locally and federally;

- Improving local policy, legislation, rules and regulations to protect and manage native species, their habitats and wild lands;
Increasing the effectiveness of introduced species and pest control.

One major overall effort that should be taken for saving native plants is to undertake a long-term education and awareness campaign that imparts, instills and increases local understanding of and value for these species, their habitats, the landscapes, stable ecological frameworks and processes, and the conservation needs and work being done to save them.

For the short list of trees, shrubs, the Agave and *G. eggersii*, table 4 outlines a set of conservation actions:

Table 4. Conservation Action for Rare Plant Species of the USVI

Species	Threats/Issue	Future Action
Agave eggersiana	Habitat loss & decline; Agave Borer Weevil & disease; feral animals; low genetic diversity	Secure seed material and store in refrigerated repository for future germination and species restoration; Select wild locations for habitat restoration for future repatriation of species; Control Agave Borer Weevil.
Bastardiopsis eggersii	Habitat loss & decline; habitat disturbance; low germination	Secure seed material and store in refrigerated repository for future germination and species restoration; Germinate seed and cuttings in secure native plant garden for future species restoration; Study distribution throughout the VIs to understand genetic differences between distinct populations;
Buxus vahlii	Habitat loss & decline; habitat disturbance;	Secure seed material and store in refrigerated repository for future germination and species restoration; Select new potential habitat(s) and restore the ecological conditions to allow translocation of new plants there;
Calyptranthes thomasiana	Habitat loss & decline; introduced insect species; road construction;	Study habitat locations on St. John and St. Thomas to understand the ecological and biological conditions and needs of the species; Understand and reduce the effects of the road through critical habitat at Bordeaux Mountain, St. John; Determine effects of introduced scale insects on species and devise

Species	Threats/Issue	Future Action
Catesbaea melanocarpa	Habitat loss & decline	<p>appropriate and effective control measures;</p> <p>Identify appropriate habitats for the restoration of this species; Restore appropriate habitats; Collect seed and cuttings for propagation; Secure seed material and store in refrigerated repository for future germination and species restoration; Germinate seed and cuttings in secure native plant garden for future species restoration; Study distribution in Puerto Rico, St. Croix, Antigua and Barbuda to understand genetic and ecological differences between distinct populations and use these to secure plants in the Virgin Islands; Control feral livestock to prevent their adverse effects on the populations; Implement wildfire control measures to ensure populations are secure;</p>
Croton fishlockii	Habitat loss & decline;	<p>Undertake a comprehensive population and ecological survey of this species on St. John; Secure seeds and cuttings for plantings in native plant garden; Restore seedlings to appropriate habitats sites;</p>
Erythrina eggersii	Habitat loss & decline; feral animals	<p>Conduct comprehensive surveys to determine all populations on St. John; Secure seeds and cuttings for plantings in native plant garden; Restore propagated plants to appropriate habitat sites;</p>
Eugenia earhartii	Habitat loss & decline;	<p>Secure seeds and cuttings for plantings in native plant garden; Restore propagated plants to appropriate habitat sites; Conduct ecological studies of the species' habitat to understand the conditions that are necessary for sustained populations;</p>
Galactia eggersii	Habitat loss & decline;	<p>Secure seeds and cuttings for plantings in native plant garden; Restore propagated plants to appropriate habitat sites; Conduct ecological studies of the species' habitat to understand the</p>

Species	Threats/Issue	Future Action
		<p>conditions that are necessary for sustained populations; Study distribution throughout the VIs to understand genetic differences between distinct populations;</p>
Guaiacum officinale	Habitat loss & decline; overharvesting;	<p>Secure seeds and cuttings for plantings in native plant garden; Restore propagated plants to appropriate habitats sites; Reduce importation of introduced horticultural cultivars of this species, which bring a number of introduced pests and diseases and may swarm the native genetic stock; Undertake an education awareness program about the local cultural, historical and iconic value of this species, and provide local gardens with native stock for plantings; Restore wild populations to appropriate habitats throughout the USVI.</p>
Lyonia rubiginosa	Habitat loss & decline;	<p>Secure the single known location for this species; Urgently undertake comprehensive surveys of nearby hillsides and other appropriate habitats to determine if there are other populations; Undertake ecological studies to understand the biological and other needs of this species; Secure seeds and cuttings for plantings in native plant garden; Restore seedlings to appropriate habitats sites; Recommend to Federal and local authorities to have this species officially listed as Endangered.</p>
Lyonia stahlia var. stahlia	None.	<p>Urgently undertake comprehensive surveys of last reported location and other appropriate habitats to determine and confirm whether this species was indeed listed for St. Thomas in error. This should include an assessment of herbarium collections to determine if specimens were ever collected and whether these represent this species or <i>L. rubiginosa</i>.</p>
Machaonia woodburyana	Habitat loss & decline;	<p>Secure seeds and cuttings for plantings in native plant garden; Restore propagated plants to</p>

Species	Threats/Issue	Future Action
		<p>appropriate habitat sites; Conduct ecological studies of the species' habitat to understand the conditions that are necessary for sustained populations;</p>
Mammillaria nivosa	<p>Habitat loss & decline; overharvesting; vandalism; feral animals;</p>	<p>Urgently undertake population surveys across the USVI to determine the numbers and where these are located; Locally ban the removal, disturbance and trade of and in this species; Remove feral goats and other animals from the habitats of this species; Restore populations and habitats for this species where possible and appropriate.</p>
Maytenus cymosa	<p>Habitat loss & decline;</p>	<p>Undertake surveys of appropriate habitat areas to determine if this species continues to exist on St. Croix. These surveys should be done as soon as possible.</p>
Mosiera xerophytica	<p>Habitat loss & decline;</p>	<p>Undertake surveys of appropriate habitat areas to determine if this species continues to exist on St. John. These surveys should be done as soon as possible.</p>
Rhipsalis baccifera	<p>Habitat loss & decline; feral animals</p>	<p>Undertake surveys of appropriate habitat areas to determine if this species continues to exist on St. Thomas. These surveys should be done as soon as possible.</p>
Solanum conocarpum	<p>Habitat loss & decline;</p>	<p>Much of the needed conservation and ecological work for this species has already been done or is ongoing, and these should be continued until populations are deemed sustainable.</p>
Stenocereus fimbriatus	<p>Habitat loss & decline; overharvesting; vandalism; feral animals</p>	<p>Secure existing populations; Collect seeds and cuttings for propagation and for future restoration of the species to appropriate habitats and locations on St. John, including outer cays; Locally ban the removal, disturbance and trade of and in this species; Remove feral goats and other animals from the habitats of this species; Restore populations and habitats</p>

Species	Threats/Issue	Future Action
Zanthoxylum thomasianum	Habitat loss & decline;	for this species where possible and appropriate. Secure existing populations; Collect seeds and cuttings for propagation and for future restoration of the species to appropriate habitats and locations on St. John, including outer cays.

Unfortunately, for institutional and human capacities, the Territory does not currently have a comprehensive review and understanding of what it needs and will take to effectively address native plant conservation. It requires careful study and engagement to determine what these needs are, and how best to achieve them, and unfortunately, this project is very limited in its capacity to carry out such a review, though it is desperately needed.

In the meantime, the team has provided a series of steps that are needed to ensure viable populations of the 20 profiled species and of critical habitat areas on the islands. Table 5 provides a series of actions that are needed to address many of the threats and issues that affect many of the rare and endangered species.

Table 5. Long-term Collective Action to Protect Rare and Endangered Native Plants and their Habitats

Issue/Threats	Future Action	Time-frame	Expected Outcomes/Results
Need for a Comprehensive Territorial Native Plant Conservation Strategy	Identify a small team of experts to study the issues facing native plants and ecosystems and develop a clear path ahead for the short, long and medium terms, mechanisms, avenues, policies, identified funding pathways and resources for conserving and protecting native plant species.	2 years.	A USVI native plant conservation strategy and plan that complements and builds on ongoing programs and efforts such as the Comprehensive Wildlife Conservation Strategy of the US Virgin Islands (2005).
Habitat Loss & Decline	Identify all habitats for rare and endangered native species, and secure these immediately where and if possible. If longer term action is needed to secure the site, then develop a long-term plan with appropriate agencies and individuals;	1 to 5 years.	A number of critical habit and location sites secured, and where possible, more long-term and comprehensive understanding of the ecological frameworks of target species.
	Undertake ecological studies of habitats and ecosystem areas to understand the needs of each target species and the natural framework needed for sustaining populations;	5 to 15 years	
		5 to 10 years.	Where possible, restoration of

Issue/Threats	Future Action	Time-frame	Expected Outcomes/Results
	Restore habitats for target species where possible and appropriate;		habitats/ecosystems to ensure viable biotas.
Introduced Pests & Diseases	Undertake a comprehensive survey to determine the introduced pests and diseases that are adversely affecting native plants and systems, and determine appropriate measures to control and/or eradicate them; After the comprehensive survey, train key local wildlife, forestry and agricultural agents and agencies as well as horticulturalists, farmers and port inspectors in the identification of, introduced species and pests as well as issues related to plant protection and cross border movement of potential introduced species threats to the national interest of the USVI; Undertake a local education and awareness campaign.	3 to 6 years. 4 to 6 years.	A comprehensive Territory-wide assessment and report on the state of introduced species and pests of the Virgin Islands, the access portals and avenues for the importation of these species and agents, and a detailed exploration of options and response needs for reducing the effects of these factors. The report should include future trends and an assessment of mechanisms and facilities for screening at the main portals of access for products brought into the Virgin Islands
Genetic Swamping from Introduced Cultivars/Vars./Spp. (i.e. hybridization and eventual genetic extinction of local species due to introduced genetic material from cultivated forms of local species, genetically modified forms, and from new but similar species).	Survey key locations to identify populations of these imported cultivars and determine the possibility of genetic swamping and hybridization, and then provide a framework for reducing the adverse effects of these introduced populations; Target horticultural operations, horticulturalist and other key agents and agencies and work with them to reduce the importation of these introduced species, and also to reduce their transfer of genetic material and to prevent them from establishing naturalized populations.	2 to 10 years.	A comprehensive Territory-wide assessment and report on the state of the horticultural industry and the species imported, as well as the screening and plant and pest protection measures in the VIs, and how to improve these. Note that this effort should not demonize the horticultural industry.
Feral & Free-roaming Livestock	Work with local private landowners to control feral animals; Form private-public partnerships to control feral animals; Secure wild populations from feral	Ongoing.	Public support for long-term campaign to control feral and introduced animal species;

Issue/Threats	Future Action	Time-frame	Expected Outcomes/Results
	<p>animals through physical and other options; Undertake an educational campaign to encourage citizen self-policing and increase the awareness about the adverse effects of these animals.</p>		<p>Land and property owners implementing personal measures to control these animals.</p>
Deforestation	<p>Identify critical areas for native plant conservation and protection, and work with public and private interest to secure these sites through legal protection, land acquisition, easements, education and awareness, and public-private conservation partnerships, as well as building public support for plant conservation; Forest Stewardship Management Plans for those landowners that are informed and educated of the presence of these species in their properties and want to get information on proper management practices in those properties to protect those habitats.</p>	1 to 10 years.	<p>Areas under private control and/or bounded and affected by private residential and development interests are definitively secured for the long-term sustainability of the species, ecology, the ecosystem, environmental conservation, and ecosystem/species restoration and repatriation, and these acquisitions are celebrated and an important part of native plant conservation measures; Also, encourage private landowners to work with the Forest Stewardship Program to manage their forested land for native species,</p>
Housing and Hotel Development Effects	<p>Work with hotel and other properties, before and after construction to secure adequate habitats for native plants and for the possibly donation of lands and restoration of habitat areas; Urgently undertake a comprehensive survey to identify locations where rare and endangered plants and habitats/rare ecosystems are located and flag these for needed protection, conservation, research and management.</p>	1 to 5 years.	<p>A systematic approach to working with development projects on saving important and critical ecological and native plant conservation areas from structural and other forms of development and disturbance; A summary of the key areas in the USVI, which are critical for</p>

Issue/Threats	Future Action	Time-frame	Expected Outcomes/Results
			<p>native plant, animal species and ecosystems/ecology and landscapes that need to be protected; and Encourage private landowners to work with the Forest Stewardship Program to manage their forested land for native species,</p>
<p>Limited Research & Understanding</p>	<p>Build local capacities for conducting research and develop broader understanding of native plants, environmental, cultural, social, economic and other issues, including the effects of Climate Change and Sea Level Rise; The established native plant conservation organization would need to work with, engage and coordinate with local, regional and Federal agencies to encourage and to conduct effective research and to create the environment and atmosphere where science and research are welcomed and will inspire.</p>	<p>1 to 10 years.</p>	<p>A USVI platform and framework to allow local students, citizens and experts to obtain financial, government and community support to undertake research, science and technological projects, programmes and efforts; The Virgin Islands Plant Conservation network provides the USVI Territory with an outline of the plant conservation research needs, and then builds a support mechanism for encouraging the needed research and science.</p>
<p>Funding</p>	<p>The native plant conservation organization needs to work with local agents/agencies, including government and private interests to identify and secure funding to carry out surveys of plant populations, conduct outreach, education and awareness, host conferences, conduct science and set up a native plant garden and nursery. The organization must have funding to carry out at least 3 program areas of focus for a minimum of 5 years.</p>	<p>1 to 10 years.</p>	<p>Creation of a USVI plant conservation NGO to focus on native plant, ecosystem and landscape conservation, introduced species control and management and on increasing education and awareness; A sustained program of assessment and research on the Territory's rare and</p>

Issue/Threats	Future Action	Time-frame	Expected Outcomes/Results
			endangered native plants, ecology, habitats and restoration.
Limited & Insufficient Species & Habitat Protection	Identify sites and locations where habitat restoration is possible, flag those areas as critical and where possible, develop a plan and implement a renewal of the area, including repatriating native plant and animal species; Reduce fires, control feral animals and other barriers and limitations to allow these areas to naturally reforest over time.	2 to 15 years.	An Territory-wide assessment of imperiled critical native plant species' habitats, and the remaining native habitats threatened by development and other factors; A related strategy for how to protect these habitats as a direct outcome of the above.
Overharvesting	Implement a Territorial plan to control forest and plant harvests, including, where necessary, a permit system to harvest products from critical species. This approach should not limit cultural values, expressions, and practices that have no effects on the species, habitats, landscapes and systems; Enforce Federal and local laws for those species formally listed; Work with forest users to develop sustainable harvesting and use methods and options. This should be documented and continually monitored.	Within 10 years and ongoing.	An assessment of forest products, harvests/harvesters, uses, their effects, and local livelihoods, in an effort to develop a long-term sustainable use approach to the Territory's forests and natural landscapes.
Theft & Vandalism	For cacti colonies and plants, relocate access trails to allow viewing but not direct contact with specimens; Increase education and awareness about the needs of cacti species, cacti ecology and their conservation needs; Work with landowners, key local individuals, community groups and law enforcement to protect critical native plants and habitats from theft and aggression.	Ongoing.	Restoration of cacti habitat and colonies after reduction of human traffic, theft and vandalism, and a local education and awareness program about the inherent values of these key native species and their unique habitats.
Establish local native plant garden	Develop a conservation site where live specimens will be secured, studied and conserved for future repatriation, restoration and also to	5 to 6 years.	An official garden and nursery where conservation, research and

Issue/Threats	Future Action	Time-frame	Expected Outcomes/Results
	provide a reserve for the Territory's endangered species.		protection of native plant species are carried out. The garden would be linked to local, regional and international botanical gardens and plant conservation initiatives.
Establish local VI plant conservation NGO	Establish a local NGO to specifically focus on native plants and habitat conservation.	2 years.	The launch and establishment of the VI Plant Conservation Network.
Collecting seed and cutting materials for propagation	Seeds of certain species need to be collected ASAP; these need to be stored in appropriate low temperature conditions for future propagation.	Ongoing.	A local seedbank and/or program linked to a mainland or international agency that is able to maintain viable seed and plant material for the long-term.

Without appropriate habitats and functioning ecosystems, plants cannot survive. Even if the plants are saved in private collections and gardens (such as *Agave eggersiana*), these populations will eventually prove to be unsustainable, especially if the collections are traded or the property sold, and owners' attention and priorities shift. Also, a major disturbance or even a minor disaster can have serious effects on these populations and we could lose them. Natural habitats are more resilient and can help protect these plants from such events, and from shifting public and private priorities. Table 6 highlights a number of sites and habitat areas in the USVI that are of priority for native plant conservation, and where urgent action may be necessary to save the species, habitats and the areas' ecology.

Table 6. Conservation Action for Critical Habitat Protection and Management

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
Mary Point	Saint John	About 168 ha	0 to 37 m	Park	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland; Semi-Deciduous and Drought Deciduous Forest; Drought Deciduous Forest/Shrub (in Puerto Rico, Drought Deciduous Dense Woodland; Coastal Sand and Rock.	Undertake a comprehensive field survey to document the cacti populations and status of other native species, habitats and issues on this peninsula.
Ram Head	Saint John	About 54 ha	0 to 85 m	Park	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland; Coastal Sand and Rock.	Reduce human traffic effects on cacti; Remove feral livestock.
Bordeaux & Bordeaux Mt.	Saint John	Unknown. Several private and public tracts of land are involved.	152 to 389 m	Park and private.	Seasonal Evergreen and Evergreen Forest; Drought Deciduous Forest/Shrub; Low Density Built-up Land (Rural or Residential).	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area; Work with landowners to reduce habitat loss, species decline, protect remaining tracts of forests, protect the small Tree Ferns (<i>C. arborea</i>) colonies, and reduce erosion; Encourage private landowners to work with the Forest Stewardship Program to manage their forested land for native species,

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
						Work with local and US agencies including the Forest Legacy Program to acquire lands with tracts of forests in the area, where possible and feasible; Where possible and where land is available, restore rainforest on Bordeaux.
Fish Bay Gut	Saint John	About 272 ha	3 to 213 m	Park and private.	Seasonal Evergreen and Evergreen Forest; Drought Deciduous Forest/Shrub; Seasonally Flooded Savannah and Woodland; Bare Soil; Low Density Built-up Land.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area.
Santa Maria	Saint Thomas	About 128 ha	0 to 208 m	Private	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Semi-Deciduous and Drought Deciduous Forest; Bare Soil; Low Density Built-up Land.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area; Work with local and US agencies, including the Forest Legacy Program, to acquire the lands, where possible and feasible.
Hendrik Bay	Saint Thomas	About 132 ha	0 to 246 m	Private (?)	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Semi-Deciduous and Drought	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
					Deciduous Forest; Bare Soil; Pasture, Hay or Inactive Agriculture; Low Density Built-up Land; High-Medium Density Urban or Built-up Land.	status and characteristics of the area; Work with local and US agencies, including the Forest Legacy Program, to acquire the lands, where possible and feasible; Encourage landowners participate in the Forest Stewardship Program to protect forest, reduce habitat loss, species decline and reduce erosion.
Perseverance	Saint Thomas	About 101 ha	0 to 100 m	Private	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Semi-Deciduous and Drought Deciduous Forest; Mangrove; Seasonally Flooded Savannah and Woodland Bare Soil; Low Density Built-up Land.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area; Work with local and US agencies, including the Forest Legacy Program, to acquire the lands, where possible and feasible; Encourage landowners participate in the Forest Stewardship Program to protect forest, reduce habitat loss, species decline and reduce erosion.
Neltjeberg	Saint Thomas	About 291 ha	0 to 237 m	Private	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland,	Undertake a comprehensive field survey and inventory of

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
					with or without Succulents; Drought Deciduous Forest/Shrub; Semi-Deciduous and Drought Deciduous Forest; Seasonally Flooded Savannah and Woodland; Bare Soil; Pasture, Hay or Inactive Agriculture; Water – Permanent; Low Density Built-up Land; High-Medium Density Urban or Built-up Land.	the forests and woodlands to document the species, conditions, conservation status and characteristics of the area; Work with local and US agencies, including the Forest Legacy Program, to acquire the lands, where possible and feasible; Encourage landowners participate in the Forest Stewardship Program to protect forest, reduce habitat loss, species decline and reduce erosion.
Dorothea	Saint Thomas	Unknown	0 to 301 m	Private	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Semi-Deciduous and Drought Deciduous Forest; Seasonally Flooded Savannah and Woodland; Bare Soil; Pasture, Hay or Inactive Agriculture; Water – Permanent; Low Density Built-up Land; High-Medium Density Urban or Built-up Land.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area; Work with local and US agencies, including the Forest Legacy Program, to acquire the lands, where possible and feasible; Where land is available, restore forest and woodland habitats; Encourage landowners participate in the Forest

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
						Stewardship Program to protect forest, reduce habitat loss, species decline and reduce erosion.
Crown Mountain	Saint Thomas	About 193 ha	473 m	Private	Seasonal Evergreen and Evergreen Forest; Pasture, Hay or Inactive Agriculture; Low Density Built-up Land.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area; Work with landowners to reduce habitat loss, species decline, protect remaining tracts of forests, protect the small Tree Ferns (<i>C. arborea</i>) colonies, and reduce erosion; Work with landowners to promote Forest Stewardship Program and preparation of management plans; Work with local and US agencies, including the Forest Legacy Program, to acquire the lands, where possible and feasible; Where land is available, restore rainforest on the mountain.
Nulliberg Hill Area/Uppe	Saint Thomas	About 165 ha	150 to 258 m	Private	Semi-Deciduous and Drought Deciduous Forest; Pasture, Hay or Inactive	Undertake a comprehensive field survey and inventory of the forests and woodlands to

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
r Frenchman 's Estate					Agriculture; Low Density Built-up Land; High-Medium Density Urban or Built-up Land.	document the species, conditions, conservation status and characteristics of the area, especially for <i>Lyonia</i> , <i>Galactia</i> and <i>Calyptranthes</i> ; Work with landowners to promote Forest Stewardship Program and preparation of management plans; Work with local and US agencies, including the Forest Legacy Program, to acquire the lands, where possible and feasible.
Upper Bovoni Bay/Bovoni Estate	Saint Thomas	About 73 ha	0 to 257 m	Private	Semi-Deciduous and Drought Deciduous Forest; Drought Deciduous Forest/Shrub; Pasture, Hay or Inactive Agriculture; Bare Soil; Low Density Built-up Land; High-Medium Density Urban or Built-up Land.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area, especially for <i>Lyonia</i> , <i>Galactia</i> and <i>Calyptranthes</i> ; Work with landowners to promote Forest Stewardship Program to protect forest, reduce habitat loss, species decline and reduce erosion; Work with local and US agencies, including the Forest Legacy Program, to acquire the lands, where

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
Mariendal	Saint Thomas	About 133 ha	15 to 100 m	Private	Semi-Deciduous and Drought Deciduous Forest; Drought Deciduous Forest/Shrub; Pasture, Hay or Inactive Agriculture; Bare Soil; Quarry; Water – Permanent; Low Density Built-up Land; High-Medium Density Urban or Built-up Land.	possible and feasible. Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area, especially for <i>Lyonia</i> , <i>Galactia</i> and <i>Calyptanthes</i> ; Work with landowners to promote Forest Stewardship Program to protect forest, reduce habitat loss, species decline and reduce erosion; Work with local and US agencies, including the Forest Legacy Program, to acquire the lands, where possible and feasible.
Redhook Hill	Saint Thomas	24.5 ha	84 m	Public (?)	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Mangrove; Coastal Sand and Rock; Salt or Mud Flat; Low Density Built-up Land; High-Medium Density Urban or Built-up Land.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area; Work with the local community to promote Forest Stewardship Program to protect this forest and woodland of the Hill, one of the last few such areas on St.

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
						Thomas.
Magens Bay	Saint Thomas	About 129	0 to 260 m	Public	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland; Semi-Deciduous and Drought Deciduous Forest; Drought Deciduous Forest/Shrub; Drought Deciduous Dense Woodland; Coastal Sand and Rock; Pasture, Hay or Inactive Agriculture; Seasonal Evergreen Forest with Coconut Palm; Mangrove; Low Density Built-up Land; High-Medium Density Urban or Built-up Land.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area.
Sandy Point	Saint Croix	About 237 ha	0 to 4 m	National Wildlife Refuge	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Salt or Mud Flat; Coastal Sand and Rock; Mangrove.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area.
Mount Victory	Saint Croix	127 ha	40 to 165 m	Public?	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Pasture, Hay or Inactive Agriculture; Water – Permanent.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area.
Mount Stewart	Saint Croix	To about 175 m	Unknown	Public?	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland,	Undertake a comprehensive field survey and inventory of

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
					with or without Succulents; Drought Deciduous Forest/Shrub; Semi-Deciduous and Drought Deciduous Forest on Karst or other Limestone; Pasture, Hay or Inactive Agriculture; Bare Soil; Water – Permanent.	the forests and woodlands to document the species, conditions, conservation status and characteristics of the area.
Mount Eagle	Saint Croix	About 60 to 270 m	About 749 ha	Public?	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Semi-Deciduous and Drought Deciduous Forest; Low Density Built-up Land; Water – Permanent.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area.
Long Point	Saint Croix	About 0 to 10 m	About 80 ha	Private?	Drought Deciduous Open Woodland; Pasture, Hay or Inactive Agriculture Drought Deciduous Forest/Shrub; Deciduous, Evergreen Coastal and Mixed Forest or Shrubland; High-Medium Density Urban or Built-up Land; Coastal Sand and Rock.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area.
Seven Hills	Saint Croix	About 0 to 250 m	About 1,295 ha	Public? and private	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Semi-Deciduous and Drought Deciduous Forest;	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of

LOCATION/ SITE	MAJOR ISLAND ASSOCIATION	SIZE (HA)	ELEVATION (M)	OWNERSHIP	HABITAT TYPE	ACTION FOR PROTECTION/MANAGEMENT
					Drought Deciduous Open Woodland; Mangrove; Seasonally Flooded Savannah and Woodland; Water – Permanent; Pasture, Hay or Inactive Agriculture; Coastal Sand and Rock; Low Density Built-up Land; Low Density Built-up Land.	the area.
East End- Point Udall	Saint Croix	About 0 to 183 m	About 506 ha	Public? and private	Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents; Drought Deciduous Forest/Shrub; Semi-Deciduous and Drought Deciduous Forest; Drought Deciduous Open Woodland; Pasture, Hay or Inactive Agriculture; Coastal Sand and Rock; Low Density Built-up Land; Low Density Built-up Land.	Undertake a comprehensive field survey and inventory of the forests and woodlands to document the species, conditions, conservation status and characteristics of the area.

Note: The area and elevation of each site has been estimated.

The table above does not include the outer islands and cays of the US Virgin Islands. This is because the overall numbers of key sites are very numerous and would make the table impractical and unwieldy. All Territorially (public) owned cays and islands need to be assessed to determine the plant species, habitat types, ecology, ecosystems and other issues, including land-use, archaeology and history. Since these are already in public trust, these islands are not listed, but are a priority for research. Table 7 lists the private islands that are a priority for future floral ecological assessment. It is not that

there hasn't been any work done at these locations. There have been some surveys done over the years, but these have not been comprehensive, made public and updated, as well as measured against historical data. The private islands that are a priority for assessment are listed below.

Also, some of the areas/sites listed in tables 6 and 7 would be critical for future habitat and species restoration, and for ensuring long-term population sustainability of the species; these areas are not just important for the maintenance of the species and habitats that currently exist on-site, but may be essential for future repatriation of rare and endangered native plants.

Table 7. USVI Privately Owned Outer Islands and Cays in Need of Extensive and Comprehensive Ecological Assessment.

ISLAND/CAY	MAJOR ISLAND ASSOCIATION
Hans Lollik Island	Saint Thomas
Inner Brass Island	Saint Thomas
Little Hans Lollik Island	Saint Thomas
Little Saint James Island	Saint Thomas
Lovango Cay	Saint John
Mingo Cay	Saint John
Outer Brass	Saint Thomas
Patricia Cay	Saint Thomas
Pelican Cay	Saint Thomas
Thatch Cay	Saint Thomas

For more detailed overview of the outer islands and cays, please see the list in **Appendix III**.

Appendix I: Native Plant Species of Secondary Conservation Concern for the US Virgin Islands

FAMILY	SPECIES	HABIT	STATUS	COMMENTS
Amaryllidaceae	<i>Hymenocallis speciosa</i> (L. f. ex Salisb.) Salisb.	H	N	Native?
	<i>Zephyranthes puertoricensis</i> Traub.	H	N	Native?
Anacardiaceae	<i>Spondias mombin</i> L.	T	N?	Listed as introduced, but likely native?
Annonaceae	<i>Annona glabra</i> L.	T	N	
Apocynaceae	<i>Rauvolfia biauriculata</i> Müll. Arg.	T	N	This species is tentatively listed for St. Thomas. Similarly, a population is also found on Sage Mt., Tortola.
Aquifoliaceae	<i>Ilex urbaniana</i> Loes.	T	N	
Araceae	<i>Dieffenbachia seguine</i> (Jacq.) Schott	H	N	
	<i>Lemna aequinoctialis</i> Welw.	H	N	
	<i>Philodendron giganteum</i> Schott	H	N	
	<i>Philodendron hederaceum</i> (Jacq.) Schott	H	N	
Araliaceae	<i>Schefflera morototoni</i> (Aubl.) Maguire, Steyerl. & Frodin	T	N	
Arecaceae	<i>Acrocomia media</i> O.F. Cook	T	N	In the VIs, only on St. Thomas
	<i>Roystonea borinquena</i> O.F. Cook	T	N	
	<i>Sabal causiarum</i> (O.F. Cook) Becc.	T	N	
Asparagaceae	<i>Agave missionum</i> Trel.	H	N	
Asteraceae	<i>Gnaphalium domingense</i> Lam.	H	N	
Bignoniaceae	<i>Amphitecna latifolia</i> (Mill.) A.H. Gentry	T	N	
	<i>Arrabidaea chica</i> (Humb. & Bonpl.) Verlot	V	N	
	<i>Crescentia cujete</i> L.	T	N	
	<i>Crescentia linearifolia</i> Miers	T	N	
Boraginaceae	<i>Tournefortia filiflora</i> Griseb.	V	N	
Bromeliaceae	<i>Tillandsia x lineatispica</i> Mez	H	N	
Cactaceae	<i>Consolea rubescens</i> (Salm-Dyck ex DC.) Lem.	T	N	
	<i>Hylocereus trigonus</i> (Haw.) Saff.	V	N	

FAMILY	SPECIES	HABIT	STATUS	COMMENTS
	<i>Hylocereus undatus</i> (Haw.) Britton & Rose subsp. <i>undatus</i>	V	N	
	<i>Melocactus intortus</i> (Mill.) Urb. subsp. <i>intortus</i>	S	N	
	<i>Opuntia antillana</i> Britton & Rose	S	N	
	<i>Opuntia repens</i> x <i>O. dillenii</i>	S	N	
	<i>Opuntia triacantha</i> (Willd.) Sweet	S	N	
	<i>Pereskia aculeata</i> Mill.	S/V	N	
	<i>Selenicereus grandiflorus</i> (L.) Britton & Rose	S/V	N	
Campanulaceae	<i>Hippobroma longiflora</i> (L.) G. Don	H	N	
Cannabaceae	<i>Celtis trinervia</i> Lam.	S/V	N	
Cannaceae	<i>Canna indica</i> L.	H	N	
Chrysobalanaceae	<i>Chrysobalanus icaco</i> L.	T	N	
Cleomaceae	<i>Tarenaya spinosa</i> (Jacq.) Raf.	H	N	
Combretaceae	<i>Buchenavia tetraphylla</i> (Aubl.) R.A. Howard	T	N	
	<i>Bucida buceras</i> L.	T	N	
	<i>Conocarpus erectus</i> L. var. <i>erectus</i>	T	N	
	<i>Laguncularia racemosa</i> (L.) Gaertn. f.	T	N	
Convolvulaceae	<i>Cuscuta umbellata</i> Kunth	V	N	
	<i>Evolvulus filipes</i> Mart.	V	N	
	<i>Ipomoea setifera</i> Poir.	V	N	
	<i>Jacquemontia solanifolia</i> (L.) Hallier f.	V	N	
Cucurbitaceae	<i>Melothria pendula</i> L.	V	N	
Cymodoceaceae	<i>Halodule wrightii</i> Asch.	H	N	
	<i>Syringodium filiforme</i> Kütz.	H	N	
Cyperaceae	<i>Bulbostylis pauciflora</i> (Liebm.) C.B. Clarke	H	N	
	<i>Cyperus elegans</i> L.	H	N	
	<i>Cyperus flexuosus</i> Vahl	H	N	
	<i>Cyperus nanus</i> Willd.	H	N	
	<i>Eleocharis geniculata</i> (L.) Roem. & Schult.	H	N	
	<i>Rhynchospora nervosa</i> (Vahl) Boeckeler	H	N	
Dioscoreaceae	<i>Dioscorea pilosiuscula</i> Bertero ex Spreng.	V	N	
	<i>Rajania cordata</i> L. var. <i>cordata</i>	V	N	
Euphorbiaceae	<i>Euphorbia heterophylla</i> L.	H	N	
	<i>Sapium glandulosum</i> (L.) Morong	T	N	
Fabaceae	<i>Calliandra haematomma</i>	T	N	

FAMILY	SPECIES	HABIT	STATUS	COMMENTS
	(Bertero ex DC.) Benth. var. <i>haematomma</i>			
	<i>Canavalia nitida</i> (Cav.) Piper	V	N	
	<i>Dalea carthagenensis</i>			St. John
	<i>Machaerium lunatum</i> (L. f.) Ducke	T	N	
	<i>Vachellia tortuosa</i> (L.) Seigler & Ebinger	T	N	
	<i>Zapoteca portoricensis</i> (Jacq.) H.M. Hern. subsp. <i>portoricensis</i>	S	N	
	<i>Zygia latifolia</i> (L.) Fawc. & Rendle var. <i>latifolia</i>			
Goodeniaceae	<i>Scaevola plumieri</i> (L.) Vahl	S	N	
Hydrocharitaceae	<i>Thalassia testudinum</i> K.D. Koenig	H	N	
Hypoxidaceae	<i>Hypoxis decumbens</i> L.	H	N	
Lamiaceae	<i>Ocimum campechianum</i> Mill.	H	N	
	<i>Salvia micrantha</i> Vahl	H	N	
	<i>Salvia occidentalis</i> Sw.	H	N	
	<i>Salvia serotina</i> L.	H	N	
	<i>Vitex divaricata</i> Sw.	T	N	
Lauraceae	<i>Cinnamomum elongatum</i> (Nees) Kosterm.	V	N	
	<i>Licaria parvifolia</i> (Lam.) Kosterm.	T	N	
	<i>Licaria triandra</i> (Sw.) Kosterm.	T	N	
	<i>Nectandra coriacea</i> (Sw.) Griseb.	T	N	
	<i>Nectandra patens</i> (Sw.) Griseb.	T	N	
	<i>Ocotea floribunda</i> (Sw.) Mez	T	N	
	<i>Ocotea leucoxydon</i> (Sw.) Laness.	T	N	
Lythraceae	<i>Ginoria rohrii</i> (Vahl) Koehne	T	N	
Malpighiaceae	<i>Byrsonima lucida</i> (Mill.) DC.	T	N	
	<i>Byrsonima spicata</i> (Cav.) DC.	T	N	
	<i>Malpighia coccigera</i> L. subsp. <i>Coccigera</i>	S	N	
	<i>Malpighia emarginata</i> Sessé & Moc. ex DC.	T	N?	
	<i>Malpighia infestissima</i> Rich. ex Nied.	T	N	
	<i>Malpighia linearis</i> Jacq.	T	N	
	<i>Malpighia woodburyana</i> Vivaldi	S	N	
	<i>Stigmaphyllon floribundum</i> (DC.) C.E. Anderson	V	N	
Malvaceae	<i>Ceiba pentandra</i> (L.) Gaertn.	T	N	
	<i>Quararibea turbinata</i> (Sw.) Poir.	T	N	
	<i>Wissadula amplissima</i> (L.) R.E. Fr.	S	N	

FAMILY	SPECIES	HABIT	STATUS	COMMENTS
	<i>Wissadula hernandioides</i> (L' Hér.) Garcke	S	N	
	<i>Wissadula periplocifolia</i> (L.) C. Presl ex Thwaites	S	N	
Melastomataceae	<i>Miconia</i> sp.	S	N	A <i>Miconia</i> at Bordeaux St. John needs further study for taxonomic clarification.
	<i>Tetrazygia elaeagnoides</i> (Sw.) DC.	T	N	
Menispermaceae	<i>Hyperbaena domingensis</i> (DC.) Benth.	V	N	
Moraceae	<i>Ficus</i> sp.	T	N?	
Myrtaceae	<i>Psidium amplexicaule</i> Pers.	S	N	
Nyctaginaceae	<i>Neea buxifolia</i> (Hook. f.) Heimerl	S/V	N	
Ochnaceae	<i>Ouratea litoralis</i> Urb.	T	N	
Olacaceae	<i>Ximena americana</i> L.	T	N	
Orchidaceae	<i>Brassavola cucullata</i> (L.) R. Br.	H	N	
	<i>Cranichis muscosa</i> Sw.	H	N	
	<i>Cyclopogon cranichoides</i> (Griseb.) Schltr.	H	N	
	<i>Cyclopogon elatus</i> (Sw.) Schltr.	H	N	
	<i>Epidendrum anceps</i> Jacq.	H	N	
	<i>Habenaria alata</i> Hook.	H	N	
	<i>Habenaria monorrhiza</i> (Sw.) Rchb. f.	H	N	
	<i>Ionopsis utricularioides</i> (Sw.) Lindl.	H	N	
	<i>Liparis nervosa</i> (Thunb.) Lindl.	H	N	
	<i>Oncidium altissimum</i> (Jacq.) Sw.	H	N	
	<i>Ponthieva racemosa</i> (Walter) C. Mohr.	H	N	
	<i>Prescottia oligantha</i> (Sw.) Lindl.	H	N	
	<i>Prescottia stachyodes</i> (Sw.) Lindl.	H	N	
	<i>Prosthechea cochleata</i> (L.) W.E. Higgins	H	N	
	<i>Sacoila lanceolata</i> (Aubl.) Garay	H	N	
	<i>Spiranthes torta</i> (Thunb.) Garay & H.R. Sweet	H	N	
	<i>Tolumnia variegata</i> (Sw.) Braem	H	N	
	<i>Vanilla barbellata</i> Rchb. f.	H	N	
	<i>Vanilla claviculata</i> (W. Wright) Sw.	H	N	

FAMILY	SPECIES	HABIT	STATUS	COMMENTS
	<i>Vanilla mexicana</i> Mill.	H	N?	
	<i>Vanilla planifolia</i> Jacks. ex Andrews	H	N?	
<i>Pentaphragaceae</i>	<i>Ternstroemia peduncularis</i> DC.	S	N	
<i>Phyllanthaceae</i>	<i>Flueggea acidoton</i> (L.) G.L. Webster	T	N	
	<i>Margaritaria nobilis</i> L. f.	T	N	
<i>Poaceae</i>	<i>Andropogon bicornis</i> L.	H	N	
	<i>Anthephora hermaphrodita</i> (L.) Kuntze	H	N	
	<i>Aristida adscensionis</i> L.	H	N	
	<i>Aristida cognata</i> Trin. & Rupr.	H	N	
	<i>Arthrostylidium farctum</i> (Aubl.) Soderstr. & Lourteig	H	N	
	<i>Axonopus compressus</i> (Sw.) P. Beauv.	H	N	
	<i>Digitaria hitchcockii</i> (Chase) Stuck.	H	N	
	<i>Digitaria horizontalis</i> Willd.	H	N	
	<i>Digitaria insularis</i> (L.) Mez ex Ekman	H	N	
	<i>Echinochloa colona</i> (L.) Link	H	N	
	<i>Eragrostis ciliaris</i> (L.) R. Br.	H	N	
	<i>Eragrostis pectinacea</i> (Michx.) Nees ex Steud. var. <i>pectinacea</i>	H	N	
	<i>Eriochloa punctata</i> (L.) Desv. ex Ham.	H	N	
	<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.	H	N	
	<i>Lasiacis divaricata</i> (L.) Hitchc.	H	N	
	<i>Lasiacis ligulata</i> Hitchc. & Chase	H	N	
	<i>Lasiacis sorghoidea</i> (Desv. ex Ham.) Hitchc. & Chase	H	N	
	<i>Leptochloa virgata</i> (L.) P. Beauv.	H	N	
	<i>Melinis repens</i> (Willd.) Zizka	H	N	
	<i>Olyra latifolia</i> L.	H	N	
	<i>Oplismenus hirtellus</i> (L.) P. Beauv. subsp. <i>Hirtellus</i>	H	N	
	<i>Panicum diffusum</i> Sw.	H	N	
	<i>Paspalidium geminatum</i> (Forssk.) Stapf	H	N	
	<i>Paspalum conjugatum</i> P.J. Bergius	H	N	
	<i>Paspalum distichum</i> L.	H	N	
	<i>Paspalum fimbriatum</i> Kunth	H	N	
	<i>Paspalum laxum</i> Lam.	H	N	

FAMILY	SPECIES	HABIT	STATUS	COMMENTS
	<i>Paspalum molle</i> Poir.	H	N	
	<i>Paspalum notatum</i> Flügge var. <i>notatum</i>	H	N	
	<i>Pharus lappulaceus</i> Aubl.	H	N	
	<i>Schizachyrium sanguineum</i> (Retz.) Alston var. <i>brevipedicellatum</i> (Beal) S.L. Hatch	H	N	
	<i>Setaria setosa</i> (Sw.) P. Beauv. var. <i>setosa</i>	H	N	
	<i>Setaria utowanaea</i> (Scribn.) Pilg. var. <i>utowanaea</i>	H	N	
	<i>Spartina patens</i> (Aiton) Muhl.	H	N	
	<i>Sporobolus indicus</i> (L.) R. Br.	H	N	
	<i>Sporobolus tenuissimus</i> (Mart. ex Schrank) Kuntze	H	N	
	<i>Sporobolus virginicus</i> (L.) Kunth	H	N	
	<i>Tragus berterianus</i> Schult.	H	N	
	<i>Uniola virgata</i> (Poir.) Griseb.	H	N	
	<i>Urochloa adspersa</i> (Trin.) R.D. Webster	H	N	
	<i>Urochloa adspersa</i> (Trin.) R.D. Webster	H	N	
	<i>Urochloa fusca</i> (Sw.) B.F. Hansen & Wunderlin	H	N	
	<i>Urochloa reptans</i> (L.) Stapf	H	N	
Polygonaceae	<i>Coccoloba diversifolia</i> Jacq.	T	N	
	<i>Coccoloba krugii</i> Lindau	T	N	
	<i>Coccoloba krugii</i> x <i>uvifera</i> R.A. Howard	T	N	
	<i>Coccoloba microstachya</i> Willd.	T	N	
	<i>Coccoloba pyrifolia</i> Desf.	T	N	
	<i>Coccoloba rugosa</i> Desf.	T	N	
Portulacaceae	<i>Portulaca rubricaulis</i> Kunth	H	N	
Primulaceae	<i>Jacquinia amilaris</i> ???	T	N	
Putranjivaceae	<i>Drypetes alba</i> Poit.	T	N	
Rhamnaceae	<i>Colubrina elliptica</i> (Sw.) Brizicky	T	N	
	<i>Reynosia guama</i> Urb.	T	N	
Rhizophoraceae	<i>Rhizophora mangle</i> L.	T	N	
Rosaceae	<i>Prunus pleuradenia</i> Griseb.	T	N?	
Rubiaceae	<i>Erithalis fruticosa</i> L.	T	N	
	<i>Genipa americana</i> L.	T	N	
	<i>Geophila repens</i> (L.) I.M. Johnst.	H	N	
Ruppiaceae	<i>Ruppia maritima</i> L.	H	N	
Rutaceae	<i>Amyris diatrypa</i> Spreng.	T	N	
	<i>Pilocarpus racemosus</i> Vahl subsp. <i>Racemosus</i>	T	N	
	<i>Zanthoxylum flavum</i> Vahl	T	N	

FAMILY	SPECIES	HABIT	STATUS	COMMENTS
Salicaceae	<i>Casearia sylvestris</i> Sw.	T	N	
	<i>Prockia crucis</i> L.	T	N	
	<i>Xylosma buxifolia</i> A. Gray	T	N	
Sapindaceae	<i>Cupania triquetra</i> A. Rich.	T	N	
	<i>Exothea paniculata</i> (Juss.) Radlk.	T	N	
Sapotaceae	<i>Chrysophyllum pauciflorum</i> Lam.	T	N	
	<i>Manilkara bidentata</i> (A. DC.) A. Chev. subsp. <i>surinamensis</i> (Miq.) T.D. Penn.	T	N	
	<i>Sideroxylon foetidissimum</i> Jacq.	T	N	
	<i>Sideroxylon salicifolium</i> (L.) Lam.	T	N	
Schoepfiaceae	<i>Schoepfia obovata</i> C. Wright	T	N	
Simaroubaceae	<i>Picrasma excelsa</i> (Sw.) Planch.	T	N	
	<i>Quassia amara</i> L.	S	N?	
Verbenaceae	<i>Lantana x aculeata</i> L.	S	N	
Vitaceae	<i>Cissus verticillata</i> (L.) Nicolson & C.E. Jarvis subsp. <i>Verticillata</i>	V	N	
	<i>Vitis tiliifolia</i> Humb. & Bonpl. ex Roem. & Schult.	V	N	

Notes:

H = Herb; I = Introduced; S = Shrub; T = Tree; N = Native.

Appendix II: Puerto Rico—Virgin Islands Bank Plant Endemics

Species	Island					
	USVI	USVI+BVI	PR+USVI	BVI	PR+BVI	PR+VI
<i>Agave eggersiana</i>	StX, StT(☞)					
<i>Erythrina corallodendron</i> var. <i>connata</i>	StX, StT					
<i>Eugenia earhartii</i>	StJ					
<i>Lyonia rubiginosa</i>	StT					
<i>Pilea richardii</i>	StT					
<i>Salvia thomasiana</i>	StT					
<i>Solanum conocarpum</i>	StJ					
<i>Anthurium x selloum</i>		VI				
<i>Bastardiopsis eggersiana</i>		VI				
<i>Calypttranthes kierskovii</i>				VG+Tortola		
<i>Calypttranthes thomasiana</i>		StT, StJ, VG				
<i>Croton fishlockii</i>		VI				
<i>Galactia eggersii</i>		VI				
<i>Machaonia woodburyana</i>		StJ, VG				
<i>Metalastela anegadensis</i>				Anegada		
<i>Pitcairnia jareckii</i>				Guana Is.		
<i>Reynosia guama</i>		VI				
<i>Senna polyphylla</i> var. <i>neglecta</i>				Anegada		
<i>Vachellia anegadadenis</i>				Anegada		
<i>Acalypha portoricensis</i>			PR, StX			
<i>Acrocomia media</i>			PR, StT			
<i>Agave missionum</i>						PR, VI
<i>Argythamnia stahlia</i>						PR, VI
<i>Buxus vahlii</i>			PR, StX			
<i>Chrysophyllum pauciflorum</i>						PR, VI
<i>Coccoloba krugii</i> x <i>uvifera</i>						PR, VI
<i>Coccoloba pyrifolia</i>			PR, StT			
<i>Coccoloba rugosa</i>			PR, StT			
<i>Cordia rickseckeri</i>						PR, VI

Species	Island					
	USVI	USVI+BVI	PR+USVI	BVI	PR+BVI	PR+VI
<i>Cyperus unifolius</i>						PR, VI
<i>Erythrina eggersii</i>						PR, VI
<i>Eugenia sessiliflora</i>						PR, VI
<i>Hohenbergia antillana</i>					PR, Guana Is.	
<i>Ilex urbaniana</i>						PR, VI
<i>Leptocereus quadricostatus</i>					PR, Anegada	
<i>Malpighia woodburyana</i>						PR, VI
<i>Maytenus cymosa</i>						PR, VI
<i>Miconia thomasiana</i>			PR, StT			
<i>Mosiera xerophytica</i>						PR, StJ, VG
<i>Neea buxifolia</i>						PR, VI
<i>Opuntia repens</i>						PR, VI
<i>Ouratea littoralis</i>						PR, VI
<i>Physalis eggersii</i>	StT					
<i>Pilea sanctae-crucis</i>						PR, VI
<i>Piper blattarum</i>			PR, StT(?)			
<i>Piptocoma antillanum</i>						PR, VI
<i>Poitea florida</i>						PR, VI
<i>Psychillis macconnellii</i>						PR, VI
<i>Randia portoricensis</i>					PR, Anegada	
<i>Rondeletia pilosa</i>						PR, VI
<i>Serjania lucida</i>						PR, VI
<i>Stigmaphyllon floribundum</i>						PR+VI
<i>Tillandsia lineatispica</i>						Culebra, Vieques, StJ, StT
<i>Tolumnia prionochillum</i>						PR, VI
<i>Varronia rupicola</i>						PR, Anegada
<i>Zanthoxylum thomasianum</i>						PR, VI

Notes:

Puerto Rico –Virgin Islands endemics, per Smithsonian Institution.

Lyonia stahlii has been omitted since this appears to be an error.

PR = Puerto Rico

StX = St. Croix

StJ = St. John

VG = Virgin Gorda

StT = St. Thomas

VI = Virgin Islands

Appendix III: The Outer Islands and Cays of the USVI

CAY	MAJOR ISLAND GROUP	SIZE (HA)	ELEVATION (M)	LAT	LONG	OWNER	INHABITED	STATUS	VEG?	CRITICAL SPP.	COMMENT
Barrel of Beef	Saint Thomas	0.61	0.9	18.314°	64.915°	VI	No		No	No	
Blinders Rocks	Saint John	?	?	18.344°	64.683°	VI	No		No?	No?	
Booby Rock	Saint John	0.21	10.67	18.302°	64.710°	VI	No		Yes		
Bovoni Cay	Saint Thomas	22.3	23	18.312°	64.872°	VI	No		Yes	Cacti?	
Broken Island	Saint Thomas	?	25	18.275°	64.887°	?	No		Yes		
Buck Island	Saint Croix	360	109.7	17.787°	64.619°	NPS	No		Yes	Cacti?	
Buck Island	Saint Thomas	16.81	38.1	18.277°	64.894°	USFS-NR	No		Yes	Cacti?	
Calf Rock	Saint Thomas	~0.5	~1	18.304°	64.845°	VI	No		No		Half of Co and Calf Rocks.
Capella Island	Saint Thomas	8.9	36.88	18.277°	64.890°	VI	No		Yes	Cacti?	
Carval Rock or Carvel Rock	Saint John	0.163	20.4	18.370°	64.794°	VI	No		No		Three separate islands.
Cas Cay	Saint Thomas	6	22.86	18.307°	64.865°	VI	No		Yes		
Cinnamon Cay	Saint John	0.4	11.89	18.356°	64.757°	Private	No		Yes	Consolea	
Cockroach Island	Saint Thomas	7.7	45.11	18.404°	65.060°	VI	No		Yes		
Coculus Rock/Cuccu Is Cay	Saint Thomas					VI	No		No		Congo Cays
Cocoloba Cay	Saint John	0.4	2.13	18.315°	64.760°	NPS	No		Yes	Melocactus	

CAY	MAJOR ISLAND GROUP	SIZE (HA)	ELEVATION (M)	LAT	LONG	OWNER	INHABITED	STATUS	VEG?	CRITICAL SPP.	COMMENT
Congo Cay	Saint John	10.6	39.01	18.368°	64.803°	VI	No		Yes		
Co Rock	Saint Thomas	~0.5	~1	18.304°	64.847°	VI	No		No	No	Half of Co and Calf Rocks.
Cricket Rock	Saint Thomas	1	11.89	18.408°	65.049°	VI	No		Yes		
Current Rock	Saint Thomas	0.16	10.06	18.315°	64.834°	Private	No		Yes	Melocactus	
Dog Island	Saint Thomas	4.9	6.1	18.296°	64.816°	VI	No		Yes	Mammillaria; Melocactus	
Dog Rocks	Saint Thomas	?	?	18.295°	64.812°	VI	No		No		
Domkirk Rock	Saint Thomas	?	?	18.335°	65.084°	VI	No		No		
Dry Rock	Saint Thomas	?	?	18.301°	65.010°	VI	No		No		
Durloe Cays	Saint John	?	18.9	18.354°	64.793°	Private	Yes		Yes		Multiple rocks/Should be listed per island, as this is inclusive of several islands.
Dutchchap Cay	Saint Thomas	12.9	74.07	18.380°	65.062°	VI	No		Yes	Consolea	
Elephant Rock	Saint Thomas	?	13.11	18.324°	64.952°	?	No		No		
Fish Cay	Saint Thomas	0.14	2.13	18.310°	64.833°	Private	No		Yes		
Flanagan Island	Saint John	8.7	25.91	18.327°	64.650°	VI	No		Yes	Opuntia? Melocactus	Includes several small un-named rocks.
Flat Cay	Saint John	1.2	6.1	18.316°	64.990°	VI	No		Yes	Consolea	How many cays form this unit?

CAY	MAJOR ISLAND GROUP	SIZE (HA)	ELEVATION (M)	LAT	LONG	OWNER	INHABITED	STATUS	VEG?	CRITICAL SPP.	COMMENT
Frenchcap Cay	Saint Thomas	4.2	55.8			VI	No		Yes		
Gorret Rock	Saint Thomas	?	?	18.378°	65.064°	Private	No		No	Cacti?	
Grass Cay	Saint Thomas	19.7	42.98	18.359°	64.833°	VI	No		Yes		with several small rocks.
Great Saint James Island	Saint Thomas	63.54	17.98	18.310°	64.829°	Private	Yes		Yes		
Green Cay	Saint Croix	5.2	7.92	17.767°	64.666°	USFS-NR	No		Yes	Opuntia?	St. Croix Ground Lizards present.
Green Cay	Saint Thomas	0.3	6.1	18.310°	64.908°	Private	No	One possibly unknown.	Yes	Opuntia sp.	
Hans Lollik Island	Saint Thomas	198	214.5	18.398°	64.908°	Private	No	For sale	Yes	6 spp. cacti reported.	For sale
Hansa/Hans Lollik Rock	Saint Thomas	0.045	5.79	18.384°	64.900°	Private	No		No		
Harvey Island	Saint Croix	?	2.13	17.684°	64.762°	?	No		Yes		
Hassel Island	Saint Thomas	56.5	81.3	18.329°	64.935°	NPS/Private	Yes		Yes	Cacti?	
Henley Cay	Saint John	4.6	18.1	18.354°	64.793°	NPS	No		Yes		
Inner Brass Island	Saint Thomas	51.8	78	18.383°	64.971°	Private	No		Yes	Cacti?	
Jack Rock	Saint Thomas	?	3.96	18.325°	64.848°	?	No		No		
Kalkun Cay	Saint Thomas	1.4	11.89	18.351°	65.058°	VI	No		Yes	Cacti?	

CAY	MAJOR ISLAND GROUP	SIZE (HA)	ELEVATION (M)	LAT	LONG	OWNER	INHABITED	STATUS	VEG?	CRITICAL SPP.	COMMENT
Leduck Island	Saint John	5.7	7.01	18.316°	64.688°	VI	No		No	Melocactus	
Limestone Rock	Saint Thomas	?	?	18.318°	64.946°	?	No		No		
Little Flat Cay	Saint Thomas	0.153	6.1	18.318°	64.989°	VI	No		Yes		
Little Hans Lollik Island	Saint Thomas	40.66	62.17	18.409°	64.908°	Private	No		Yes		
Little Saint James Island	Saint Thomas	27.8	24.99	18.300°	64.825°	Private	Yes		No	Mammillaria	
Little Saint Thomas	Saint Thomas	?	?	?	?	?	No		?		
Lizard Rocks	Saint Thomas	?	?	18.386°	64.990°	Private	?		No		
Lovango Cay	Saint John	47.74	56.08	18.362°	64.804°	Private	Yes		Yes		
Mingo Cay	Saint John	19.56	15.85	18.360°	64.820°	Private	No		Yes	Mammillaria; Melocactus	with several small rocks.
Otter Creek Cay	Saint John	?	0	18.3505°	64.6915°	?	No		No		
Outer Brass	Saint Thomas	43.7	125.58	18.395°	64.971°	VI	No		Yes		
Packet Rock/Island	Saint Thomas	?	?	18.300°	64.890°	?	No		No		
Patricia Cay	Saint Thomas	13.5	22.8	18.307°	64.872°	Private	No		Yes	Cacti?	
Pelican Cay	Saint Thomas	1.82	9.1	18.414°	64.908°	Private	No		Yes	Opuntia; Melocactus	
Perkins Cay	Saint John	0.22	7.6	18.354°	64.777°	VI	No		Yes		

CAY	MAJOR ISLAND GROUP	SIZE (HA)	ELEVATION (M)	LAT	LONG	OWNER	INHABITED	STATUS	VEG?	CRITICAL SPP.	COMMENT
Porpoise Rocks	Saint Thomas	?	?	18.309°	64.971°	VI	No		No		Ho many make up this group?
Protestant Cay	Saint Croix	2.9	10	17.750°	64.703°	VI	Yes		Yes	Cacti?; St. Croix Ground Lizard.	
Ramgoat Cay	Saint John	1	9	18.355°	64.789°	NPS	No		Yes	Opuntia; Melocactus	
Rata Cay	Saint John	0.2	4.6	18.356°	64.797°	NPS	No		Yes	Mammillaria; Melocactus	
Rotto Cay	Saint Thomas	0.8	10	18.314°	64.864°	Private	No		Yes		
Rupert Rock	Saint Thomas	?	4.88	18.328°	64.926°	?	No		No		
Ruth Cay/Island	Saint Croix	16.19	0.91	17.684°	64.761°	VI?	No		Yes		Artificially created in mid-1960s
Saba Rock/Island	Saint Thomas	12.3	62.56	18.306°	65.001°	VI	No		Yes	Melocactus	
Sail Rock	Saint Thomas	0.7	7.01	18.283°	65.1007°	VI	No		Yes	Melocactus	
Salt Cay	Saint Thomas	22.5	73.75	18.362°	65.050°	VI	No		Yes		
Salt Pond Bay Cay	Saint John	?	?	?	?	?	No		?		Un-named cay.
Saltater Money Rock	Saint Thomas	?	?	18.345°	65.049°	VI	No		No		
Sandy Point Rock	Saint Thomas	?	11.89	18.329°	64.947°	?	No		No		

CAY	MAJOR ISLAND GROUP	SIZE (HA)	ELEVATION (M)	LAT	LONG	OWNER	INHABITED	STATUS	VEG?	CRITICAL SPP.	COMMENT
Savannah Island	Saint Thomas	70.3	90	18.341°	65.078°	VI	No		Yes		
Shark Island	Saint Thomas	0.5	9.7	18.337°	64.845°	VI	No		Yes	Melocactus	
Skipper Jacob Rock	Saint John	?	?	18.329°	64.805°	?	No		No		
Spratt Bay Estate, ater Island	Saint Thomas	198.9	38.1	18.321°	64.951°	TNC/Private	Yes	Population of ~182 residents.	Yes		
Spratt Point Cay	Saint Thomas	?	?	?	?	?	No		No		
Steven Cay	Saint John	0.83	9.7	18.331°	64.807°	VI	No		Yes	Consolea	
Stump Bay Cay	Saint Thomas	?	?	?	?	?	No		?	Is this Strump Bay or Stump Bay?	Un-named cay found on map.
Sula Cay	Saint Thomas	0.8	22.8	18.403°	65.058°	VI	No		Yes		
Thatch Cay	Saint Thomas	95.9	146	18.359°	64.861°	Private	No	For sale	Yes		
The Stragglers	Saint Thomas	?	?	18.303°	64.835°	?	No		No		
Tip Rock	Saint Thomas	?	?	?	?	VI	No		No		Mentioned in some lists, but cannot be located.
Tombstone Rock	Saint Thomas	?	0?	18.362°	64.936°	?	No		No		

CAY	MAJOR ISLAND GROUP	SIZE (HA)	ELEVATION (M)	LAT	LONG	OWNER	INHABITED	STATUS	VEG?	CRITICAL SPP.	COMMENT
Triangle/Rocks Island	Saint Thomas	~0.3	~1	18.314°	64.917°	VI	No		No		Also include Barrel of Beef and one other rock.
Trunk Cay	Saint John	0.42	14.6	18.355°	64.769°	NPS	No		Yes	Cacti?	
Turtle Back Rock	Saint Thomas	?	?	18.347°	64.858°	?	No		No		
Turtledove Cay	Saint Thomas	1.5	15.2	18.309°	65.001°	VI	No		Yes		
Two Brothers	Saint John	0.14	3.05	18.343°	64.817°	VI?	No		Yes		
Waterlemon Cay	Saint John	0.3	7.6	18.367°	64.723°	Private	No		Yes	Opuntia	Name Watermelon, based on <i>P. laurifolia</i> , which was later corrupted to Waterlemon.
Water Island	Saint Thomas	198.9	89.37			U.S. Gov't	Yes		Yes		
Welk Rocks	Saint Thomas	?	?	18.306°	64.821°	?	No		No		
West Cay	Saint Thomas	16.3	36.8	18.359°	65.046°	VI	No		Yes		
Whistling Cay	Saint John	0.53	61.4	18.370°	64.754°	VI	No		Yes	Cacti?	

Note that many gaps remain in our understanding, of the geography, locations, geology, history, ownership, conservation status, species distributions and other issues and factors with regard to the outer islands and cays of the United States Virgin Islands, and the above list is a work in progress.

[All coordinates are *north* latitude and *west* longitude]

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The Project Team

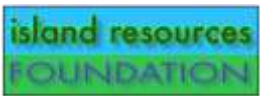
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Island Resources Foundation is a non-profit research and education operating foundation dedicated to assisting the people of small tropical islands to plan and manage sustainable development opportunities while protecting the environmental qualities and unique human cultures and institutions that evolve in island settings. The Foundation was established in St. Thomas in 1972 and completed over 230 projects costing over \$9 million to date. The Foundation is expected to close its doors in December 2015.



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VI U&CF Council



VI Department of
Agriculture



US Department of
Agriculture



US Forest Service