

Assessment of Need - Forest Legacy Program, U.S. Virgin Islands



The Virgin Islands Department of Agriculture
Estate Lower Love, St Croix, USVI



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Forest Legacy – Assessment of Need

Introduction

The USDA Forest Service first introduced the Forest Legacy Program to the U.S. Virgin Islands 2001. The Forest Stewardship Committee of the Virgin Islands Department of Agriculture was named as the lead organization in determining if Forest Legacy was appropriate for the Virgin Islands Territory. After hosting extensive meetings with various local experts, it was recommended that an Assessment of Need (AON) be conducted. The agreement was signed by Governor George Turnbull. The Nature Conservancy was contracted by the U.S.D.A. Forest Service to complete the AON on behalf of the State Forester, who is the commissioner of the Virgin Islands Department of Agriculture.

The Virgin Islands are part of the West Indies, a chain of islands extending from Florida to Venezuela and separating the Caribbean Sea from the Atlantic Ocean. They are located between 17°40"N – 18°30"N latitude and 64°30"W – 65°10"W longitude, between Puerto Rico and the Leeward Islands, approximately 1000 miles (1609 km) southeast of Miami and 40 miles (64 km) east of Puerto Rico. The U.S. Virgin Islands are home to about 110,000 residents and hosts over 2 million visitors annually. The U.S. Virgin Islands span 737 square miles (1910 km²) of which 135 square miles (346 km²) are terrestrial. There are over 230 miles (370 km) of shoreline, with the smaller islands and cays accounting for approximately 25% of the coast.

The U.S. Virgin Islands have a long a rich history of human use of natural resources, starting with the indigenous peoples of the Caribbean. Christopher Columbus visited St. Croix in 1492 and European colonization and development was episodic for the next few centuries. Land use intensity and population density increased sharply during periods of the colonial development period. Large scale timber extraction for export and land clearing for agriculture resulted in wide spread habitat loss that represented the greatest threat to biodiversity during the period. At the height of cotton and sugar cane production in the 1800s forest cover may have been 5% or even less (Little & Wadsworth, 1964). Today the US Virgin Islands are a largely forested landscape comprised of secondary forest stands. The current threats to the territory's natural resources include a complex mix of invasive exotic species, unsustainable land uses,

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habitat degradation, climate change and forest fragmentation. The three main US Virgin Islands are home to over 110,000 residents who are all dependant on the existing natural resources. Expanding urban and residential area is as much a concern as are the methods used to create these developments. The small, steep islands are ringed with fragile coral reefs and coastal marine environments, and erosion from unsustainable building impacts them quickly and severely. Ironically, the islands' growing tourism-based sector is responsible for many recent economic improvements, yet the industry depends upon the beauty and integrity of the islands' natural resources that are currently being degraded.

Natural resources conservation raises complex issues in islands of such intense beauty, diverse culture and high population density. Through careful planning we can concentrate conservation efforts in critical habitats that will provide maximum benefit for the both the natural environment and the people who live in it.

1. THE FORESTS OF THE U.S. VIRGIN ISLANDS

1.1 THE SETTING

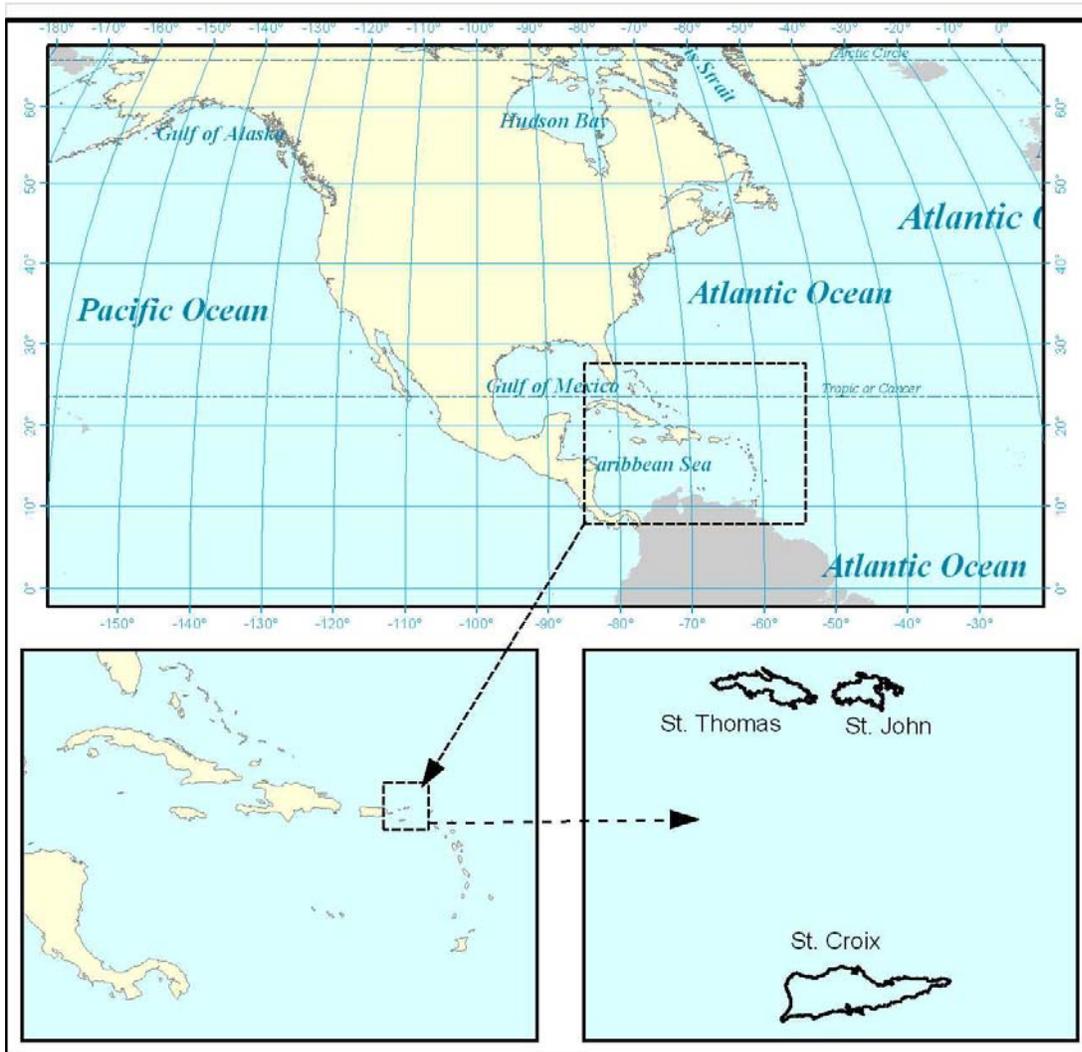


Figure 1: Location of the U.S. Virgin Islands

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The Virgin Islands archipelago consists of more than 90 islands, mainly of volcanic origin. The largest islands are St. Croix, St. Thomas, St. John, Tortola, Virgin Gorda, Anegada, and Jost Van Dyke. While these islands form a geographical unit, they are divided into two dependent territories: the U.S. Virgin Islands (USVI) in the southern and western part of the archipelago and the British Virgin Islands (BVI) to the north and east. The USVI includes St. Croix, St. Thomas, St. John, and Water Island, as well as about 50 other small offshore islets and cays, with a total area of 135 square miles (349 km²). The capital is Charlotte Amalie on St. Thomas.

The many islands that make up the Virgin Islands and Puerto Rico are separated by water today. However, during the ice ages when sea levels were lower, Puerto Rico and most of the Virgin Islands, including St. John, St. Thomas, and the British Virgin Islands, were one landmass called the Puerto Rican Bank (Pregill 1981, in Mac et al. 1998). St. Croix, though, was never connected to the Puerto Rican Bank, as it is separated by channels of deep water. At the end of the last Ice Age (about 8,000 years ago) and after sea levels rose, the Puerto Rican Bank fragmented and separated into Puerto Rico and the Virgin Islands. Because the small islands were connected with most other land masses in the Puerto Rican Bank until fairly recently in evolutionary terms (Pregill 1981, in Mac et al. 1998), none of them have more than a few unique species. In contrast, St. Croix has higher numbers of endemic animals and plants because it has been isolated for longer or may never have been connected to other islands of the Puerto Rican Bank (Mac et al. 1998).

Although the U.S. Virgin Islands are on the same submarine bank as Puerto Rico, they are relatively lower and simpler general topography, have few ecological life zones and receive less rainfall in comparison. As a result, the Virgin Islands also have relatively less diverse flora and fauna than Puerto Rico. In general, the U.S. Virgin islands are mountainous with distinct watersheds draining into small intermittent streams (known locally as guts). Soils in the Virgin Islands are generally molisols derived from volcanic and marine parent material (Davis, 2000). There are no rivers and only very few freshwater streams. Because the guts are intermittent, natural freshwater wetlands are small and ephemeral, expanding and contracting considerably depending on the amount and frequency of rain. Animals and plants that live in these wetlands experience population changes related to the amount of rainfall (Mac et al. 1998). The major wetlands are located along the coastal floodplains, or in shallow estuaries and lagoons (Knowles & Amrani 1991). Coral reefs of all varieties thrive in the shallow waters near the shores of all the islands.

St. Croix is the largest (84 square miles) and most southern of the U.S. Virgin Islands; it is about 40 miles south of St. Thomas and St. John. St. Croix's topography is

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somewhat different from the other two with a broad expanse of low, relatively flat land running along the southern two-thirds of the island. A range of hills runs along the northern coast, varying in elevation from about 500 to more than 985 feet, topped by Mount Eagle at 1,165 feet. In the eastern end of St. Croix another group of slightly lower hills rise to a maximum elevation of about 850 feet (Calvesbert 1970). The flat lowlands have relatively deep topsoil and area best suited for agriculture in the Virgin Islands. St Croix has a centuries long agricultural tradition and is home to the main office of the Virgin Islands Department of Agriculture.

St. John is about 8 miles long, with an area of 20 square miles. Like St. Thomas, St. John has an extremely irregular coastline and very hilly topography. It has a number of peaks over 980 feet, topped by the Bordeaux Mountain at 1286 feet in the eastern portion of the island. Slopes are quite steep all over the island, and there are very few areas of flatlands. There are no permanent rivers or creeks (Calvesbert 1970). This island has a relatively small human population compared with St. Thomas and St. Croix.

St. Thomas is about 12 miles by 3 miles (35 square miles), has an extremely irregular coastline and is very hilly with practically no flatland. The highest hills are generally found near the center of the island, with Crown Mountain at 1,565 feet being the highest point and many others rising above 980 feet. Steep slopes are found throughout the island, so that rainfall runoff is quite rapid and there are no permanent streams or rivers (Calvesbert 1970). Although little agricultural activity has occurred on St. Thomas in the recent past, it does suffer from high urban and tourist developmental pressure.

The Virgin Islands south of the Tropic of Cancer, but the surrounding seas keep the terrestrial climate cooler than tropical mainland Central America. Trade winds blow from the east all year and are most prominent in the winter months (Calvesbert 1970). The warm Caribbean Sea stabilizes air temperatures so that diurnal temperature changes approximate annual fluctuations. The mean annual temperature of the region at sea level is lower than 75°F, the lower limit of the tropical region, so islands are classed as subtropical (Ewel and Whitmore 1973, Mac et al. 1998). There is a pronounced east-west rainfall gradient similar to many of the less mountainous islands of the Lesser Antilles, where the east end receives less than (75 cm) annually and the west end over (150 cm). Rainfall tends to be distributed irregularly throughout the year and between years. The variable rainy season is from September to December but

rainfall can be concentrated during tropical storms and hurricanes. Prolonged periods of drought occur in most years, typically from March to July (Davis, 2000). The hottest months are July to October, which coincides with hurricane season comes during these same months. The U.S. Virgin Islands have been hit by five major hurricanes in recent years: Hugo (1989), Luis and Marilyn (1995), Lenny (1999) and Omar (2008).

1.2 FORESTS IN THE U.S. VIRGIN ISLANDS: PAST AND PRESENT

1.2.1 FOREST RESOURCES IN THE U.S. VIRGIN ISLANDS

Forested areas provide countless benefits to humans and wildlife living in and around them. They provide building materials, wildlife habitat and scenic beauty. They absorb carbon from the atmosphere, prevent soil erosion, reduce noise levels from roadways and stabilize the temperature and moisture of the air around us. In the Virgin Islands they have provided fruits and wildlife to hunter-gatherer societies, timber for the building of ships and towns, fuel for firewood and a tourist attraction for those unfamiliar with their unique beauty. Mangrove forests filter sediment from the waters while providing prime nursery habitat for local fisheries species. Upland forests help recharge aquifers while also protecting coral reefs from run-off. Trees and forests are the defining members of the landscape that surrounds us. As humans, we have become the stewards of forests by merely living in the landscape, whether or not we accept the responsibility.

Forests of the Virgin Islands have undergone dramatic changes over the centuries and have provided a multitude of products and services to the people living within them. Indigenous people of the Caribbean lived in a densely forested landscape. Primarily French, Spanish and British people extracted timber and other raw material during early colonial time. Under Danish rule timber was exported and land was cleared for agriculture on a large scale. The agricultural period reached an apex in the 19th century and created a landscape where forest was found only in isolated pockets, on steep slopes and far from population centers (Weaver, 2006a). Sources estimate that forest cover in the Virgin Islands may have reached a low of roughly 5% (Little & Wadsworth, 1964), which is approximately similar to the clearing experienced in Puerto Rico during that same time period (Grau et al., 2003; Marin-Spiotta et al., 2007). Today, forests have returned to cover 60% or more of the islands (Brandeis & Oswalt, 2007), but are

novel ecosystems with unique species compositions where introduced species now play a prominent role (Lugo & Helmer, 2004; Brandeis et al., 2009).

The following sub-sections are descriptions of five unique forest types that are commonly found in the US Virgin Islands. Together they account for the vast majority of forest types encountered and include information on species assemblages, soil types and rainfall. The descriptions are based largely on classifications presented in The Rapid Ecological Assessment produced by The University of the Virgin Island's Conservation Data Center (2001). Additional data from the more recent Forest Inventory Analysis (conducted in 2004) is also provided.

Moist Forest

These forests are described as lowland tropical or subtropical seasonal evergreen forest (Conservation Data Center, 2001). They include upland moist forest, gallery moist forest and basin moist forest. These ecosystems are evergreen and broadleaf forests generally receiving over 47 inches rainfall/year when they are located upland, but also having a pronounced dry period lasting from 2-4 months. These native forests were likely the wide-spread, exemplary forest cover type of the Virgin Islands and can be found today primarily in the hilly north-west part of St. Croix, western facing hills, and in basins and riparian areas.

When mature, this forest is usually stratified into three layers. Emergent species reach about 80 feet, the main canopy at about 50 feet and the understory at 15-30 feet. Shrubs and vines are usually present and epiphytes more common in upland areas. Roughly 70% of the more than 100 tree species found in this forest are evergreen.

Some of the 100 species of trees found in this forest type that are considered to be indicators include the emergent black olive (*Bucida buceras*), sandbox tree (*Hura crepitans*), and silk-cottonwood (*Ceiba pentandra*). Spanish cedar (*Cedrela odorata*), bay rum (*Pimenta racemosa*), royal palm (*Roystonea borinquena*), West Indian-locust (*Hymanaea courbaril*), and cecropia (*Cecropia peltata*) are among those found in the main canopy (Somberg 1976).

Due to colonial land clearing, and present development, mature examples of this forest type are extremely rare, however, isolated pockets of mature secondary moist forest can be found. On St. Croix roughly 683 acres of these forests are located primarily in the northwest part of the island, west of Salt River. On St. Thomas there are 525 acres of moist forest concentrated also in the west-central north shore. St. John contains over 1,300 acres, most of which already enjoys protection within the National Park's borders.

Dry Forest

Dry forests are lowland semi-deciduous and lowland or sub-montane drought deciduous forest. Included in this description are: gallery semi-deciduous, semi-deciduous, semi-evergreen and drought-deciduous forests. The dry forest is heavily influenced by environmental conditions such as rainfall, slope and aspect, prevailing winds and sea spray and varies widely in structure (Otto 1992). However, dry forests usually have a fairly closed canopy and contain two distinct forest layers. Trees located in or near guts tend to keep their leaves longer or do not lose them at all. A more developed community of shade tolerant epiphytes, shrubs and vines develops beneath the mostly closed canopy. Forest types included in this classification include all lowland tropical/subtropical semi-deciduous forest and lowland tropical/subtropical deciduous forest.

Although dry forest structure can be greatly influenced by wind, salt spray and presence of fresh water, the maximum height is 30-65 feet. It is difficult to distinguish between the four sub-types of dry forest, but many of the typical tree species will demonstrate xeric adaptations such as waxy, pubescent or folding leaves. Some of the indicator tree species of the dry forest are turpentine tree (*Bursera simaruba*), Jamaican caper (*Capparis cynophallophora*), manjack (*Cordia rickseckeri*), lignum vitae (*Guaiacum officinale*), and frangipani (*Plumeria alba*).

Woodland Forest

Lowland tropical/subtropical broad-leaved evergreen woodland, lowland drought deciduous woodland and semi-deciduous woodland compose this vegetative type. Woodlands are more common to St. Croix than any other island and can appear quite similar to dry forests. The origin of this cover type is likely anthropogenic and is often found on abandoned agricultural land. Disturbances (e.g., land clearing, fire, storms, etc.) usually prevent woodlands from maturing further and developing a more closed

canopy or a distinct vegetative sub-layer. This makes grades of woodlands difficult to distinguish and easily confused with dry forest. While many of the same tree species are found in woodlands as in dry forest, woodlands have a more open canopy with lower tree heights. Because the sun is able to penetrate the open canopy there are a few epiphytes and associated vines and shrubs tend to be sun-loving.

Woodland structure is characterized by an open canopy with 25-60% cover and non-adjointing tree crowns. Even more than dry forests, the woodland is highly influenced by climatic conditions and canopy height can vary from 25-65 feet. Previous land use and level of disturbance may be the most important distinction between dry forest and woodland. They are located primarily on abandoned pastures or along the coast.

Some tree species associated with woodlands include: casha (*Acacia marcantha*, *A. farnesiana*), several species of capers (*Capparis* spp.), seagrape (*Coccoloba uvifera*), coconut (*Cocos nucifera*), maidenberry (*Crossopetalum rhacoma*), torchwood (*Jacquinia arborea*), and frangipani (*Plumeria alba*). All of the above mentioned species not only play an important environmental role but also offer great benefits as ornamental species (Jones 1995).

Shrubland and Scrub Forest

Not a commonly used term or clearly defined cover type, shrubland and scrub forest is a classification used to catch many remaining vegetative classifications. These cover types are found in dry locations on all three islands, usually at lower elevations. The vegetation types included under this broad term are: gallery shrubland, thicket/scrub, mixed dry shrubland, sclerophyllous evergreen shrubland, coastal hedge, coastal grassland, mixed grassland pasture scrub and pasture. Severe environmental conditions affect the trees, shrubs and cactus that combine to define this low growing vegetative classification. There is wide variation from dense thorny scrub communities containing a few emergent trees to coastal hedges of trees dwarfed by wind and sea spray. As with many of the previous forest types, human activity, microclimate and environmental conditions greatly affect these plant communities.

Scrub forests are easily overlooked because they do not look like the traditional image of a forest and are often heavily impacted by human use. They are, nonetheless,

extremely important because many of them are disturbed areas in the process of transition and represent future forests of the islands. Scrub forest cover a relatively large area on all three islands. On St. Croix in particular, this may be the dominant forest cover type due to the large amount of abandoned agricultural sites with regenerating secondary forests. Some of these areas may actually be the climax vegetation type, such as in dwarf coastal forest, however most was likely created through human impact. Abandoned pastures in dry areas of the islands, for example, frequently transition into monospecific scrub thickets of uniform height. It is a frequently encountered cover type, especially in St. Croix, and is unique in structure and species composition, which it totally dominated by a single invasive exotic species *Leucaena leucocephala* (tan-tan) (Brandeis & Oswalt, 2007). This often thorny scrub may transition into other cover types if not continually disturbed or may remain in a state of arrested succession. Special attention needs to be given to these areas, not only because they account for so much land in the Virgin Islands, but also because their ability to recover their ecological function and species diversity is uncertain. The majority of Virgin Islands territory is anthropogenically disturbed land in a state of transition. This is not meant to imply that scrub demands more conservation attention than pristine forest, but if these lands cannot demonstrate the ability of successional change it would be a grave indictment of Virgin Islands forest health.

This category is so diverse it would be impossible to list the indicator species without covering each sub-type separately. However, the exotic *L. leucocephala* is the single most common tree species in the Virgin Islands and is frequently the dominant species in young forest and shrubland. All of the most xeromorphic and sclerophyllous plant species are listed here. Noteworthy is that many components of these cover types are weedy exotics, such as: tan-tan (*Leucaena leucocephala*) and casha (*Acacia* spp.). Succulents also play an important role, like the agave (*Agave missionum*, *A. eggersiana*), Turk's cap (*Melocactus intortus*), and dildo-cactus (*Pilocerous royenii*).

Wetlands

This cover type covers a broad spectrum including tidally flooded broad-leaved evergreen closed-canopy forest, seasonally flooded broad-leaved evergreen shrubland, semi-permanently flooded broad-leaved evergreen shrubland and intermittently flooded mudflats. These areas are where water meets land and are known to be the most biologically diverse and ecologically important on the islands. Wetlands include many

different ecosystem types, including mangrove forest, mixed swamp, salt flats, salt ponds and fresh ponds.

Mangrove is a unique forest type composed of trees, which are not necessarily related, but are grouped together because they have developed a unique ability to tolerate extreme conditions such as high salinity. Mangrove forests on depositing shores aid in extending the shoreline by causing sediments to settle out of solution, build up and cause the land to protrude further into the sea (Little and Wadsworth 1964). These areas serve as a nursery and breeding ground for a great many species of marine and terrestrial wildlife as well as the most important commercial species of fish (Ellison and Farnsworth 1996). Mangrove forests are also valuable as a buffer from fluctuating sea level and flooding.

1.2.2 LONG TERM FOREST TRENDS

The native forests of the U.S. Virgin Islands have withstood a series of both anthropogenic and natural disturbances throughout their history. Prior to the 1500's the islands were almost entirely forested (Haagenson 1995). The primary indigenous groups that inhabited the Caribbean islands were the Carib and Taino Indians. They are believed to have subsisted on wild fruits and vegetables, including palms and guavaberries. They also hunted the fish, shellfish, manatees, turtles and waterfowl that were abundant near estuaries, mangrove forests and reefs (Rouse 1992). Modern research and discovery is providing the world with a new picture of types of impacts indigenous people of the western hemisphere may have had on the landscape (Mann, 2006). This new view is one where forest structure and composition was highly modified to suit human needs. Little is known about the species composition or structure of the Virgin Islands forests several centuries ago, but it is understood that the islands were heavily forested.

The arrival of Europeans signaled the start of dramatic change in the landscape of the islands. Early descriptions tell of lands covered in valuable timberland and sporadic timber extraction for both construction and export. The Virgin Islands remained sparsely and sporadically populated until the dawn of Dutch, British and French agriculture from 1630 to 1696 (Haagenson 1995). The Danish purchase of St. Croix in

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1733 hastened the deforestation process as every available acre was cleared of its forest for sugar cane production (Besaw and Ahl 1979). St. Croix was thickly covered with trees whose timber was highly valued by the Danish for local construction and exportation including fustic (*Chlorofora tinctoria*), lignum vitae (*Guaiacum officinale*), Spanish cedar (*Cedrela odorata*), ironwood (*Krugiodendron ferreum*) and mastic (*Mastichodendron foetidissimum*). After partitioning St. Croix into a grid-work of plantations, the Danish either removed or burned almost every accessible tree on the island, exporting timber species. Many land owners who cleared their lots for agriculture during this period earned more money from timber sales than from the crops they planted (Haagenson 1995).

Researchers have observed a similar pattern in many parts of the world where a country or geographic area begins as completely forested, becomes almost completely deforested for a period of time, and then recovers a large percentage of its land-area in a relatively stable forested state. This process of moving from nearly denuded to a forest dominated landscape is referred to as the Forest Transition (Mather, 1992). The pattern is now recognized as common and results from closely related changes in socioeconomics and population density. In the western hemisphere, Forest Transition Theory describes a process of a country moving from agricultural-based economy to a more industrialized economy where workers earn higher wages and frequently migrate to urban areas, which results in the abandonment and reforestation of land previously in agriculture (Mather & Needle, 1998). Forest Transition is well documented on a large scale in New England, Puerto Rico and parts of Brazil, among other places (Rudel et al., 2002; Grau et al., 2003). The pattern can be remarkably similar from country to country and frequently occurs quickly across large areas, but the regrowing forests do little to conserve biodiversity (Rudel et al., 2005). The Virgin Islands is currently experiencing a dramatic Forest Transition. An idealized graph of the changes in total forest area appears in Figure 1.

Figure 1 A graph showing the generalized trend of changes in forest area in the US Virgin Island from pre-colonial times to present. Total forest area appears to be currently stable.

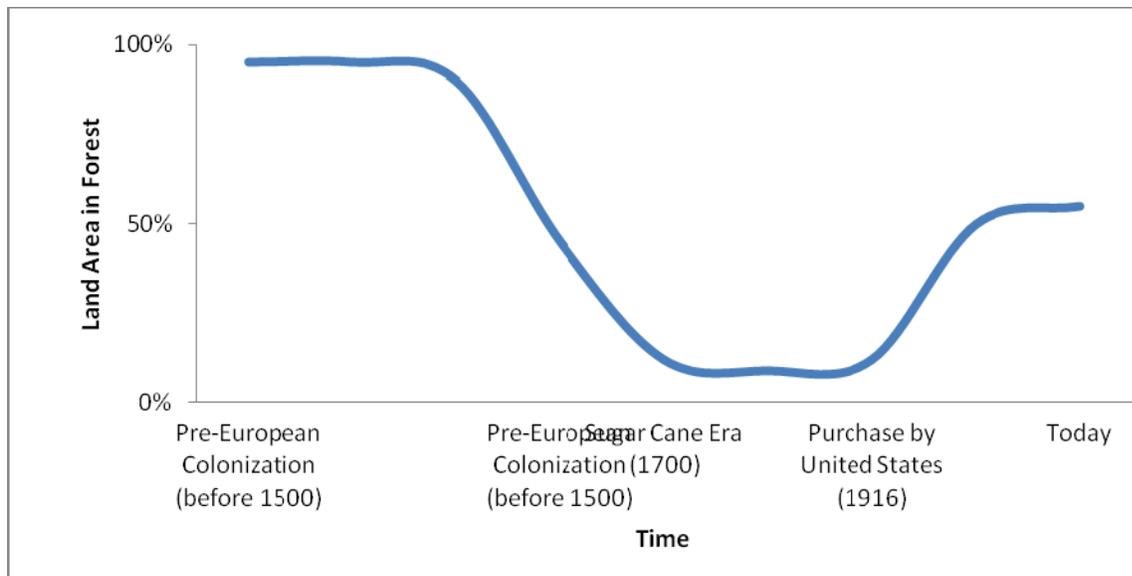


Figure 2: Generalized Trend of Forest Change Since Colonial Times

An analysis of forest area on St. Croix using Landsat satellite data concluded the island was 56% forested in 1992 and had the same total forest area in 2002 (Daley, 2010). This is similar to the 'shifting mosaic' of forest area with no net change described by Forest Transition Theory. The USDA Forest Inventory Analysis reported that the three Virgin Islands were approximately 60% forested on average in 2004 (Brandeis & Oswalt, 2007) with St. John having the highest percent forest cover and St. Croix the lowest.

There is ample evidence that the Virgin Islands have had a substantial increase in forest cover in recent decades, but these young secondary forests are unique and must be differentiated from the mature stands in the territory. Young secondary forests of the Caribbean are known to have a relatively low level of species diversity, relatively simple structure and a heavily influence from exotic species (Brown & Lugo, 1990). They may recover high levels of species diversity in a matter of decades as well as a high degree of their ecological function (Guariguata & Ostertag, 2001). Nonetheless, these new forests have unique species compositions with significant influence from exotic species even after over 100 years of recovery (Ray & Brown, 1995; Lugo & Helmer, 2004). Such forests are believed to require unique management strategies (Quesada et al., 2009) and be subject to unique threats (such as fragmentation, altered disturbance regimes and influence from invasive species).

The current trend for forest in the US Virgin Islands appears to be stable forest area (no net change) but increased levels of fragmentation and disturbance. Between 1992 and 2002 St. Croix lost approximately 3,700 acres of forest area while simultaneously gaining another 3,700 acres, (primarily from abandoned pastures regenerating to scrub forest) resulting in no gross change in forest area (Daley, 2010). However, this large net change also represents a significant reduction in overall forest quality. The FIA created a new type of forest classification to describe these young stands of *Leucaena leucocephala* (tan-tan) and *Cordia alba* (white manjack) that arise after abandonment and results indicate as much as 5% of St. Croix was covered in this forest type, while it was not significantly represented on the other islands (Brandeis & Oswalt, 2007). The forest gains and losses tends to be distributed along edges of large forest areas and the edges of pastures and residential areas (Figure 3). The result is forest fragmentation, where average forest patch size decreases, total number of patches increases while total area remains the same (Daley, 2010). This same trend is likely occurring in St. Thomas and St. John, where conversion of land for development may be even greater, but the research has not yet been conducted.

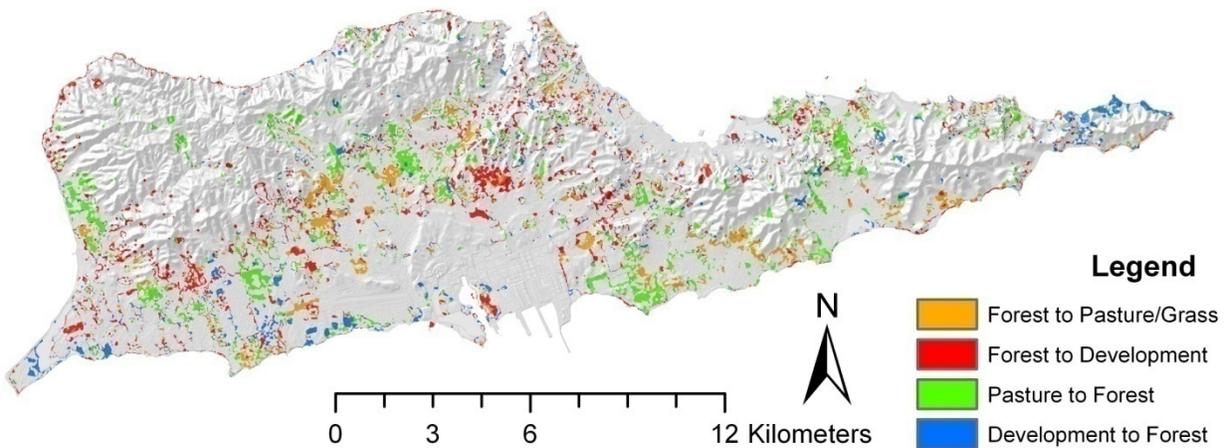


Figure 3: Distribution of Land Cover Change from 1992-2002

Distribution of forest change areas in St. Croix between 1992 and 2002. Orange and red areas represent forest loss to either pasture or conversion to human development. Green patches represent pasture/grassland that regenerated into young secondary forest stands. Blue marks those areas classified as developed that reverted to forest. The “developed” class also includes bare soil, beach sand, tidal mud flats and other

naturally occurring surfaces that have the same spectral qualities as buildings and asphalt.

Hurricanes can be large, fierce storms causing flooding and severe damage to personal property. The effects on forest resources can appear astonishing when fallen trees line roadsides and once green hillsides appear burned by wind and the trees are left leafless. However, the forests of the Caribbean have co-evolved with these disturbances for thousands of years and are well adapted to the disturbance. While whole stands may be defoliated, it does not result in large-scale mortality of trees (Tanner & Kapos, 1991). In fact, hurricanes likely cause less tree mortality than extended droughts, as was observed in St. John when tree mortality rates for the region's most severe storm, Hurricane Hugo, were observed to be lower than for those of a prolonged drought in 1994. However, the storms may alter recovery of secondary forests more than mature forests by killing certain species and not harming others (Flynn et al., 2010). Post-hurricane forest inventories on St. John reveal that storm damage and mortality is highly variable between tree species and can thus alter succession and future stand composition (Weaver, 2006b). In mature stands, the largest emergent trees are the most likely to blow down and create gaps, especially when the soil is saturated by heavy rains. Due to the violent nature of hurricanes and their profound effects on the psyche of humans that experience them, their effects on forest resources have often been overestimated.

1.2.3 FOREST OWNERSHIP

Forest land in the Virgin Island is owned by the Virgin Islands government, the United States government, private individuals and companies and non-profit organizations. When tracts of protected forest land are located, the Forest Legacy Program can be used to acquire adjacent forest land and create larger contiguous areas of healthy forest habitat. Unprotected, private forest land is therefore essential to the success of FLP. Land that is already protected is addressed in section 2.0 of this document.

The United States Forest Service provides an additional program that addresses sustainable forest practices on forested and non-forested private land. The Forest Stewardship Program (FSP) was implemented in the US Virgin Islands in 2000. The program targets owners of privately held forest (or potentially forested land) and offers

them both technical support in achieving their stated land management goals as well as tax incentives for adhering to their management plan. FSP can work in conjunction with other programs to increase the amount of appropriately managed land within specific watershed or other target areas. It targets smaller, private land holdings where owners maintain the deed to the property and practice a wide variety of planned land uses, from timber harvesting to wildlife conservation (**Error! Reference source not found.4**).

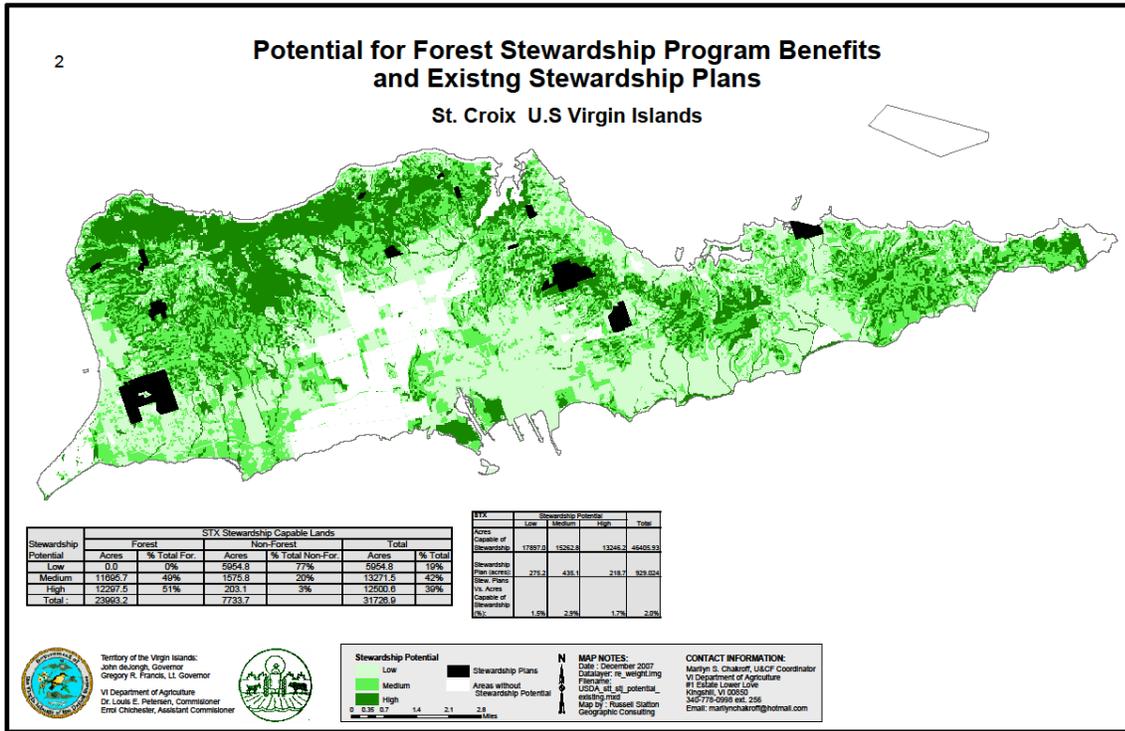


Figure 4: Forest Stewardship Potential, St. Croix (SAP 2008)

Darker green indicates the site has high potential for the program, light green indicates low potential and while areas are not eligible. Sites marked in black were part of the program as of 2007.

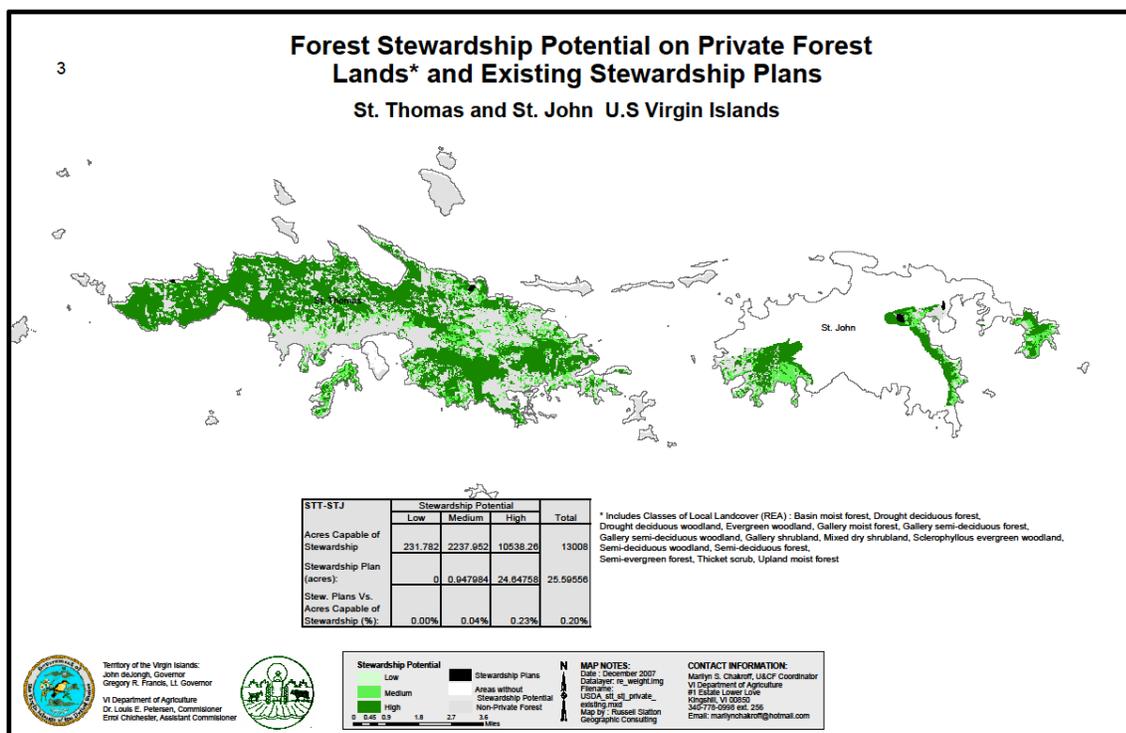


Figure 5: St, Thomas and St. John Forest Stewardship Potential (SAP 2008)

1.2.4 DEMANDS ON FORESTED AREAS

There are few direct demands placed on forested areas in the Virgin Islands in the traditional extraction-based sense of the word, however, there is significant pressure to convert land to a competing land-use. For example, there is no traditional commercial timber harvest, there is no hunting for deer or small game nor is there harvesting of non-timber forest products. There are many pressures placed on forest areas that result in conversion or degradation of forest areas. However, these pressures are distinct from traditional demands and extractions on forested areas and are discussed in detail in other sections of this document.

1.2.5 SOIL AND WATER

All of the U.S. Virgin Islands have steep watersheds, causing rainfall to run off rapidly. Most streams are ephemeral. The non-ephemeral streams that do exist are only small

rivulets during the dry season. The Kingshill Gut on the southern side of St. Croix is an exception, as it forms a few small pools that contain some species of freshwater vegetation (Forman 1974). Streambeds often carry torrents of water after a heavy rain, which can cause flooding in low-lying areas. Most drinking water in the Virgin Islands is obtained from rainfall caught in cisterns. There are a few wells throughout the islands, some of which are used for drinking. The largest concern for well water is bacterial contamination from faulty septic systems, which are common on all islands. No natural freshwater lakes or ponds exist in the U.S. Virgin Islands, though several man-made ponds exist on farms and help to recharge underlying aquifers.

Maintaining forest cover where it is present and restoring degraded lands is integral to catching and holding rainfall in upland areas. Recharge of aquifers is dependent on the presence of vegetation, which allows rainfall time to percolate into the soil. Where forest cover has been eliminated, serious sedimentation and other types of non-point source pollution (NPS) problems have developed. Sediment loading in gullies and ravines can result in the destruction of fish and shellfish spawning habitat downstream and sensitive coral reef systems can be seriously damaged if contaminated systematically with NPS.

The largest areas of St. Croix and St. Thomas and all of St. John support highly erodible soils (Cramer, Isaac, Jacana and Southgate series), further exacerbated by the steep slopes of most watersheds. These soils are moderately fine textured, well-drained and moderately deep and shallow over hard, volcanic rock. The slope gradient is from 2 to 60 percent (Davis, 2000). Soil productivity decreases with the loss of topsoil. Conserving rainfall, preventing further soil erosion and controlling stream flow are necessary in the islands, making permanently forested areas an invaluable resource.

1.2.6 WILDLIFE, RARE AND ENDANGERED SPECIES

Wildlife populations are inexorably linked to forest resources that provide their habitat. Continuous tracts of healthy habitat house robust wildlife populations. Degradation of forest habitat or fragmentation has direct negative effects on wildlife populations due to reduced total area as well as decreased suitability of habitat for some species. Urban sprawl is a commonly cited cause of habitat degradation in the United States and it also

impacts island habitats (Martinuzzi et al., 2007). In the case of the Virgin Islands and other Caribbean islands the forests play an important role outside of their geographic reason because they are home to such a high number and diversity of migratory species such as neo-tropical songbirds.

The US Virgin Islands recognizes species protected under the United States Endangered Species Act of 1973 as well as territorially protected species. The complete list appears in Appendix A. There are currently 7 terrestrial animals and 2 plants on the federal list. The Virgin Islands' list was created in 1990 and has never been modified. It is considered obsolete by many natural resources professionals and revisions have been suggested for both the structure of the listings and the species that appear on the list. A suggested amendment to the avifauna and herpetofauna list describes some of the shortcoming of the current system and proposes using various grades of protection, in a manner in keeping with the listing systems used by most states. To date, no action has been taken on the amendment. A copy of the document appears in Appendix B.

The Theory of Island Biogeography states that an island's (or other isolated geographic area) level of biodiversity increases proportionally with the areas' size and decreases with its distance to a continental land mass (MacArthur & Wilson, 1967). In other words; larger islands have greater diversity because there is more area to house species, while great distances to continents result in lower diversity because it is harder for species to migrate there. Countless tests of the theory of island biogeography have also demonstrated that with increased distance and isolation also comes increased speciation and endemism. Species diversity levels for both plants and animals in the Virgin Islands fall within the predicted levels, having relatively low overall diversity, but high levels of endemism or genetic uniqueness. The territory has many endemic species, such as *Agave eggersiana*, the large century plant that is found only on St. Croix, or *Cordia rickseckeri*, the red flowering laurel tree whose native distribution is only coastal Puerto Rico and the Virgin Island and the recently re-discovered *Solanum conocarpum* a purple-flowered shrub of the nightshade family that was once thought to be extinct and is today known only on St. John.

Biodiversity Hotspots were created in 1988 to acknowledge biodiversity indicators. The US Virgin Islands are part of the Caribbean hotspot, one of the world's five hottest biodiversity hotspots identified by Conservation International, with levels of endemism reaching 58.3% for plant species and 51.3% for non-fish vertebrates (Mittermeier et al. 2000; Myers et al. 2000).

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Additionally, six Endemic Bird Areas (EBAs) have been identified in the West Indies by BirdLife International (Stattersfield et al. 1998). These are areas where the distributions of at least two globally restricted range species overlap (i.e., species whose global range does not exceed 50,000 km²). Puerto Rico and the Virgin Islands are one of those EBAs, classified as an “urgent priority.” This EBA includes 24 globally restricted range species, eight of which are present in the U.S. Virgin Islands - which means that the USVI alone would easily fill the criteria for being classified as an EBA on its own.

Title 12 of the Virgin Islands Code, Chapter 2, “Protection of Indigenous, Endangered and Threatened Fish, Wildlife and Plants” identifies the Virgin Islands Division of Fish and Wildlife as the agency with the responsibility to, “... protect, conserve, and manage indigenous fish, wildlife and plants, and endangered or threatened species for the ultimate benefit of all Virgin Islanders, now and in the future.”

The higher the level of isolation of an island, and the longer that isolation has persisted, the more unique its fauna and flora. In terms of birds, the West Indies have 38 endemic genera and 150 endemic species or 35% endemism (Hedges 1996).

In addition to the high levels of endemism, the West Indies also merit conservation concern due to their strategic position along bird migration routes. The majority of the West Indies avifauna is migratory, meaning that species move between different localities in a systematic way during the course of each year or during their normal life-cycles (Raffaele et al. 1998). Protection of these migratory species has significance not only in the islands, but throughout their ranges.

In the USVI, approximately 59 species of Nearctic landbird migrants have been observed (Platenberg et al 2005). Although almost half of these are considered vagrants, a number of migratory landbirds, especially warblers, winter each year in the USVI. The mature intact forest on St. John appears to be the best available habitat found in the VI for these migrants.

The extinction of several landbirds such as the White necked Crow and the Puerto Rican Woodpecker, has been attributed to the loss of native forest. Other species are either in serious decline or are no longer found in the Virgin Islands, such as the Puerto

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Rican Screech Owl, also due to the loss of native forest. It is generally believed that the primary factor in the decline of migratory landbird populations is the loss, fragmentation, and degradation of habitat in both their breeding and wintering ranges (Platenberg et al 2005).

Overall, wildlife diversity is low in the U.S. Virgin Islands and habitat diversity is the limiting factor. There are only two Holdridge (Ewel & Whitmore, 1973) life zones represented in the U.S. Virgin Islands. These factors coupled with the increasing population/development density significantly confines wildlife diversity in the islands and cays. Past and present land-use has caused wildlife to decline further. Habitat loss through anthropogenic activities is the most significant factor in the declining wildlife populations. The introduction of the mongoose has also had a huge impact on native wildlife, causing the decline of several species.

Estimates of the total number of native vascular plant species vary between 770 to over 1,000 species. However, Pedro Acevedo-Rodriguez (1996) completed a descriptive text of flora for St. John, which listed 747 species of vascular plants, 642 of which were native to St. John.

The avifauna composition of the U.S. Virgin Islands, and of the West Indies in general, is shaped by the combination of species colonization and evolution in the region. The USVI, like most islands in the West Indies, are of volcanic origin and were never connected to the nearby continental landmasses. This means that the organisms that colonized the islands had to arrive by crossing open ocean, sometimes for great distances. The ocean is a highly effective barrier to organism dispersal, and therefore the more isolated an island (the larger the distance from a nearby source of species, either a continent or other island) the smaller the probability of colonization by new species. The vast majority of the attempts fail, which is the reason why individual islands have lower species diversity in relation to comparable continental areas. This explains the relatively low numbers of breeding species in the USVI (see below). Nevertheless, because bird composition changes considerably from island to island, taken together the islands of the West Indies are very diverse. For example, when compared with Madagascar, which has three times the area, there are 60% more vertebrate species in the West Indies, representing about 5% of all known extant vertebrates (Hedges 1996).

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The Division of Fish and Wildlife under the Virgin Islands Department of Planning and Natural Resources (DPNR) has identified forests as an important resource for wildlife and recreation. Despite the fact that a variety of wildlife species rely on forest habitat, little research has been conducted on the specific usage of forest by wildlife. It is known that a number of species of birds and reptiles use the forest for food and shelter, including several endemic lizards. Bats roost in a variety of niches including trees, caves, and man-made structures, and provide important services to certain plants by pollinating flowers and distributing seeds from fruits (Platenberg et al., 2005). Six bat species, the USVI's only native mammals, including the red fig-eating bat (*Stenoderma rufum*), greater bulldog bat (*Noctilio leporinus*), Antillean fruit-eating bat (*Brachyphylla cavernarum*), Brazilian free-tailed bat (*Tadarida brasiliensis*), Jamaican fruit-eating bat (*Artibeus jamaicensis*), and the velvety free-tailed bat (*Molossus molossus*) rely on forest habitats.

The bridled quail dove (*Geotrygon mystacea*), a locally endangered species, lives almost exclusively in the forests of northwestern St. Croix (Valiulis and FWS, 2009, Platenberg et al. 2005). This species' population was dramatically decreased by Hurricane Hugo in 1989 as a result of forest loss. The white crowned pigeon (*Columba leucocephala*) nests in coastal forests and probably feeds in urban forest areas; it is also locally endangered, and in serious decline throughout the Caribbean (Platenberg et al 2005) . The natural habitat for most reptiles is tropical forest. The federally endangered VI tree boa, (*Epicrates granti*), for example, relies entirely on the forests of the east end of St. Thomas (Harvey and Platenberg 2009, Valiulis, personal communication). The St. Croix ground lizard (*Ameiva polops*), also federally endangered, is now limited to the coastal forests of the off shore cays of St. Croix The St. Croix anole (*Anolis acutus*) lives on the trunks and branches of trees and the tiny dwarf geckos (*Sphaerodactylus sp.*) lives in the leaf litter of the forest floor. Local frogs are found in high numbers in the forests, and the smaller tree frogs breed in the tiny puddles of water that accumulate in the tree canopy and in the bromeliads that grow on forest trees.

DFW has recognized the need to focus more of its limited resources on forests, both in terms of monitoring and conservation (Platenberg et al 2005). The first proposed step was to inventory the remaining forest of the VI, particularly the large patches. This objective has been completed in this document. Other DFW program goals include conducting more complete surveys for wildlife in forests and mapping distribution of

forest wildlife. This information will allow for better prioritization of areas for conservation. There has been very little coordination between DFW and the Division of Forestry in the VI, largely due to lack of awareness of each division's respective programs and limited staffing and other resources.

1.2.7 RECREATION AND TOURISM

The Virgin Islands' numerous beaches, coral reefs, scenic mountain roads and breathtaking vistas combined with year-round warm weather make them a prime spot for outdoor recreation. The islands are home to both federal, territorial and privately owned lands, which afford numerous opportunities for outdoor recreation.

The National Park Service property on St. John (approximately 2/3 of the island's total landmass) is home to pristine beaches, fragrant bay-rum forests and extensive hiking trails. There are several camping opportunities both inside and outside the park on St. John. The Cinnamon Bay campground inside the park provides all basic services and the privately owned Maho Bay eco-campground and recreation area offers a popular alternative. The St. John Community Foundation is developing a botanical garden in Coral Bay, which will be accessible to the public. Opportunities for hiking, kayaking, snorkeling, diving, and horseback riding are numerous. St. John is known for its stunning views and lush landscape. The National Park Service as well as the Friends of the Virgin Islands National Park are sources of information about outdoor recreation opportunities on St. John.

The Nature Conservancy owns and manages an area of Magens Bay in St. Thomas for hiking and wildlife viewing. The Magens Bay arboretum offers tourists and locals alike a look at native flora. Other hiking opportunities on St. Thomas exist mostly on territorial government or privately owned lands. Santa Maria gut and Botany Bay are two examples. The Environmental Association of St. Thomas (EAST) offers seasonal whale watches and is a source of information about outdoor recreation on the island. There are numerous well known diving and snorkeling sites. St. Thomas offers spectacular views from scenic drives.

On St. Croix, The Mount Victory Campground and recreation area, located in the “rainforest” in St. Croix’s northwestern quarter, provides platform tents, hiking trails and bathroom facilities for camping. The Sandy Point National Wildlife Refuge on St. Croix is home to a coastal scrub forest, which shelters the federally endangered Vahl’s Boxwood (*Buxus vahlii*), a vast expanse of white sand beach and the Westend Salt Pond, which provides remarkable opportunities for wildlife viewing. Hiking, biking, wildlife viewing and beach access is permitted at specified times at Sandy Point. Turtle watches are seasonally available. The Nature Conservancy-owned Jack and Isaac Bays provide excellent seaside trails on St. Croix’s East End and some of the island’s most impressive beaches. The St. Croix Environmental Association (SEA) recently acquired part of the Southgate Salt Pond. A management and recreation plan has been approved for the land and it will be open to the public for wildlife viewing, environmental education and hiking in the near future. Off the coast of St. Croix lie the Green Cay National Wildlife Refuge and the Buck Island Reef National Monument. Both islands are accessible by boat (many opt for a sea kayak) and both have healthy coral reef systems, which provide excellent opportunities for snorkeling. Buck Island offers a hiking trail, which follows the ridge and affords a wonderful view of St. Croix.

The existing forested areas in the Virgin Islands provide a needed respite for residents and tourists alike. The valuable terrestrial and marine resources that attract tourists to these islands are directly affected by deforestation and development. Excellent opportunities for biking, hiking, wildlife viewing, horseback riding and water sports exist on all three islands. Some of the best opportunities are found on forested, privately owned lands.

1.2.8 SCENIC AND CULTURAL RESOURCES

Scenic beauty exists everywhere in the U.S. Virgin Islands. The islands and cays surrounded by the Caribbean Sea make up one of the most attractive and unique areas of the world. Obviously beaches and other marine-related areas are abundant. Views of the sea can be seen from almost anywhere in the islands. Each of the three large islands (St. Croix, St. Thomas and St. John) has distinctly different cultural and natural resources. St. Thomas is rugged, with hills up to 1,500 feet in elevation giving expansive views. St. John is largely unpopulated. Forested areas are still in relatively

good condition on St. John and vary from moist subtropical forests on the northwestern slopes to the arid East End. St. Croix offers a wealth of scenic beauty, including a small “rainforest” (moist subtropical forest) on the northwest end. Toward the end of the 18th century there were 114 sugar cane mills and 14 oxen mills during Danish rule. Most of these mills still remain relatively intact and can be accessed by driving and walking. Scenic Drive rambles atop St. Croix’s northwestern hills and provides spectacular vistas. St. Croix was the main agricultural island in past years (and even today) because of its flat central plain.

Important archeological sites have been found in forested areas on all three of the larger islands but may also be present on the cays and Water Island. Some sites have uncovered relics dating back to pre-Columbian times. Most archeological finds are connected to the Amerindians (Arawak, Carib and Taino), who inhabited the islands before they were settled by Europeans in the 1600’s. Historic sites are plentiful throughout the Virgin Islands, most dating back to the Danish occupation when sugarcane and cotton were farmed and exported extensively. The St. Croix Landmarks Society maintains Estate Whim and Estate Little LaGrange as living museums. The Salt River National Historical Park and Ecological Preserve is thought to be the site of Columbus’ first landing in the islands in 1493.

1.2.9 RESEARCH OPPORTUNITIES

The sub-tropical dry and sub-tropical moist forests of the U.S. Virgin Islands have been studied in the past by the International Institute of Tropical Forestry (IITF), a branch of the U.S. Forest Service. Forest research has been more prevalent on St. Croix than on any of the other islands due to the varied topography and larger landmass. The 147-acre Estate Thomas Experimental Forest was established by IITF in the 1950’s and remains under the ownership of the U.S. Forest Service today. Experiments on timber management with a variety of tropical hard-wood timber species were conducted in situ from its acquisition through the 1970s (Weaver, 2006a). The species included traditional species such as *Swietenia mahagoni*, *S. macrophylla*, and *Tectona grandis* and non-traditional native species like *Guaiacum officinale*. The University of the Virgin Islands Agricultural Experiment Station established a forest enrichment experiment in Estate Thomas in 2006. Today the site is also being considered for use in environmental education and community outreach projects.

Secondary forest regenerating on abandoned agricultural land have become the focus of scientific research on forest succession in the past several decades (Brown & Lugo, 1990; Guariguata & Ostertag, 2001; Marin-Spiotta et al., 2007). The role of invasive exotic plant species is of particular interest to both scientists exploring the mechanisms of succession as well as land managers caring for properties with secondary forest. The large-scale deforestation of the Virgin Islands and their subsequent transition to a forested landscape make the setting ideal for the study succession in Neotropical secondary forests. Research conducted in St. John suggests that regenerating forest may go through three distinct phases lasting approximately 50 years each as secondary forests increase in structural complexity native diversity (Ray & Brown, 1995). Results from a study in St. Croix suggest that severely impacted sites may experience arrested succession and remain dominated by two or three exotic species after over 50 years of regeneration (Daley, 2010).

Agroforestry systems that combine trees and tree crops with other agricultural production could play a role in the economics of agriculture. Studies which integrate the socio-economic concerns of the area with natural resource conservation are needed and could reasonably be applied throughout the Caribbean. A spatially explicit inventory of St. Croix's tree crops was merged with soil data and other information to assist in establishing future agroforestry project in the territory (Ellis et al., 2004). Wildlife populations and their habitats need to be more extensively studied in the islands. The impacts of development on wildlife are bound to be dramatic, but so far few studies have been conducted to validate this concern. Recent research point to the possibility of using agroforestry systems as a temporary phase in a process that produces crops and income for a period, but also stimulates natural forest recovery and eventually transitions to natural forest restoration (Vieira et al., 2009). Additional applications of diverse agroforestry systems may be appropriate land-uses for recently abandoned traditional agriculture sites in transition.

The impact of forests on water resources is another critical research need in the U.S. Virgin Islands, and throughout the entire Caribbean. Terrestrial water resources are severely limited in the islands. Forested watersheds are known to filter and hold water, allowing it to gradually re-charge aquifers. Forests also slow the movement of storm-water, lessening the "sheet effect" and reducing run-off, which is the primary cause of Non-Point Source Pollution (NPS). NPS is a major factor in the health and vitality of sensitive aquatic habitats such as freshwater pools, coral reef systems and seagrass

beds. “Ridge to Reef” research is a holistic approach examining the interconnectedness of terrestrial and marine systems. The Forest Legacy sites suggested in this document offer unique opportunities for comparative studies of developed and natural watersheds.

The relationship of wildlife and forest habitat has been severely under-researched in the Virgin Islands. Wildlife research has been conducted primarily in wetland and marine habitats. A few recent studies have been conducted on the endangered tree boa (Platenberg 2009) and guts (Daley 2009), but further work is definitely necessary. The V.I. Division of Fish and Wildlife has recognized this data gap, but with limited funding and personnel, does not currently have the capacity to adequately address this need.

The International Institute of Tropical Forestry has maintained its interest in the U.S. Virgin Islands as a site for future research and public outreach. The focus has shifted from commercial timber production to the issues mentioned above. This reflects a nation-wide trend in forestry. The resources available here in a United States territory make the USVI a prime site for pilot projects in forest restoration, agroforestry, the socio-economic value of forest resources, wildlife habitat and watershed conservation and management. Research conducted here would be applicable throughout the Caribbean and lands enrolled in the Forest Legacy Program could add significantly to the pool of available sites for research. Currently, the Estate Thomas Research Forest is the only formal site for forest research in the Virgin Islands. With the appropriate resources, the opportunity exists in the Virgin Islands to enhance past research, continue present research and spearhead future research.

1.2.10 FOREST PRODUCTS

Non-timber forest resources are currently more important than timber production in the U.S. Virgin Islands. More than 40% of the land is covered with woodlands whose primary use is for watershed protection, recreation and wildlife habitat (Conservation Data Center 2000). Timber harvesting once occurred on a very limited basis and the U.S. Forest Service, International Institute of Tropical Forestry conducted research on timber production in the area, although the development of a timber industry in the islands is limited by the land-base and the climate conditions.

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There is a fairly active forest products industry in the Virgin Islands, although there is significant room for growth and development. The Virgin Islands Resource, Conservation and Development Council commissioned a forest products survey which showed roughly \$600,400 total gross income generated from forest products in 1996 and 188,500 board feet consumed (Pierce et al. 2000). These findings indicate that forestland conservation and long-term forest management is likely the best option for the USVI. For example, the University of the Virgin Islands has recently begun sponsoring an annual Wood Workers Expo that has grown every year since 2003. The vast majority of the pieces shown at the expo are made from locally collected material. The infrastructure and interest exists locally to further develop forest products industry.

2. THE FOREST LEGACY PROGRAM: PRACTICAL APPLICATION

The Cooperative Forestry Assistance Act (CFAA) of 1978, as amended, provides authority for the U.S. Secretary of Agriculture to provide financial, technical, educational, and related assistance to states, territories, communities, and private forest landowners. The 1990 Farm Bill amended the CFAA and allows the Secretary to establish the FLP, as stated in the amendment, for “the purposes of ascertaining and protecting environmentally important forest areas that are threatened by conversion to non forest uses and through the use of conservation easements and other mechanisms, for promoting forest land protection and other conservation opportunities. Such purposes shall also include the protection of important scenic, cultural, fish, wildlife, and recreational resources, riparian areas, and other ecological values.” Under the 1996 Farm Bill, the Secretary is authorized, at the request of a participating State, to make a grant to the State to carry out the FLP in the State, including the acquisition by the State of lands and interests in lands.

The FLP provides an instrument for the citizens of the U.S. Virgin Islands to protect the important terrestrial and marine resources that have historically been exploited and continue to be threatened by both commercial and residential land development. Under the U.S. Virgin Islands Forest Legacy Program, the fee title or conservation easement can be purchased and held by the U.S. Forest Service as the designated agency within the Department of Agriculture, or the U.S. Virgin Islands can select the State Grant Option and the title can be held by the Virgin Islands Territorial Government (see section 2.6.2 of this document for a description). Land trusts can be the vehicle for doing much of the work and can purchase the land as an intermediary owner before selling the interests to the federal or territorial government, or serve as the facilitator of the negotiations. Also, on-the-ground management, or monitoring of easements, can be delegated to other federal agencies, territorial government, or NGO’s by whoever owns the title or conservation easement. The lands cannot be purchased and managed by the National Park Service as the authority by law designates only the Secretary of Agriculture. A state cannot use eminent domain to acquire lands. All landowners that join must volunteer. No more than 80% of total payments can be paid by the Federal government for the Forest Legacy Program (Federal Programs require a 75% match). Federal appraisal standards and acquisition rules must be followed for the acquisition of

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lands or interests in lands. Interests in lands primarily consist of donated or purchased easements which allow landowners to continue using their forests in traditional ways while preventing the conversion of these forests to residential areas or commercial developments. While easements established under the Forest Legacy Program may not require public access, a landowner may allow public recreation on his or her land as long as it does not conflict with the Forest Legacy Program goals and management objectives for the property.

Conservation easements and the Forest Legacy Program offer an alternative to outright government ownership of land while protecting private forestland from conversion to non-forest uses. Under FLP, environmentally important forestlands are identified and easements used to retain and maintain these forests. Under the State Grant Option, the Territory shall transact all Forest Legacy Program acquisitions. When a conservation easement is purchased using Forest Legacy funding, the Territory must hold the easement. Landowner participation will be entirely voluntary. Forest Legacy funds may be used to support eligible conservation organizations for activities related to donations of conservation easements. When a conservation easement is donated on behalf of the Forest Legacy Program (to receive credit as a match) to an eligible non-governmental conservation organization, that organization may hold the easement.

Protected land that it already owned or managed by the territorial government or federal government is not eligible for inclusion in the FLP program in the US Virgin Islands. Ideally, FLP will work in conjunction with other already existing areas in order to create larger continuous tracts of intact forest area. Figure 3 shows the spatial distribution of all known protected areas in the US Virgin Islands, private and public.

Figure 3 The distribution and ownership of protected forest land in the US Virgin Islands based data collected for the 2010 USVI Gap Analysis Project for (Figure 6 St. Croix, Figure 7 St John and Figure 8 St. Thomas) and the surrounding minor islands and cays.

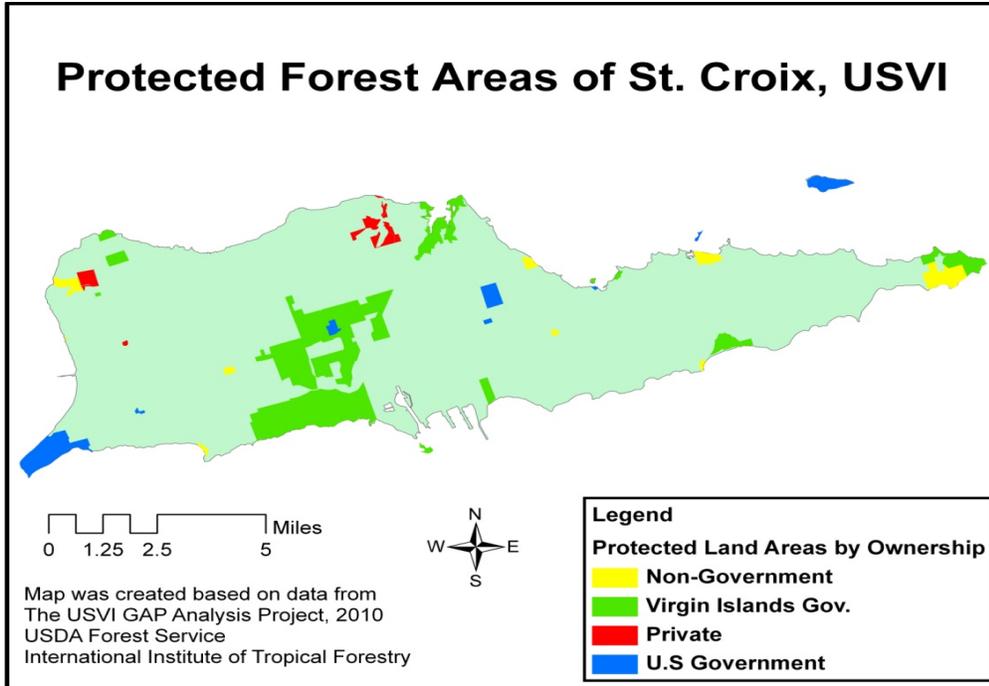


Figure 6: A St. Croix Pprotected Areas

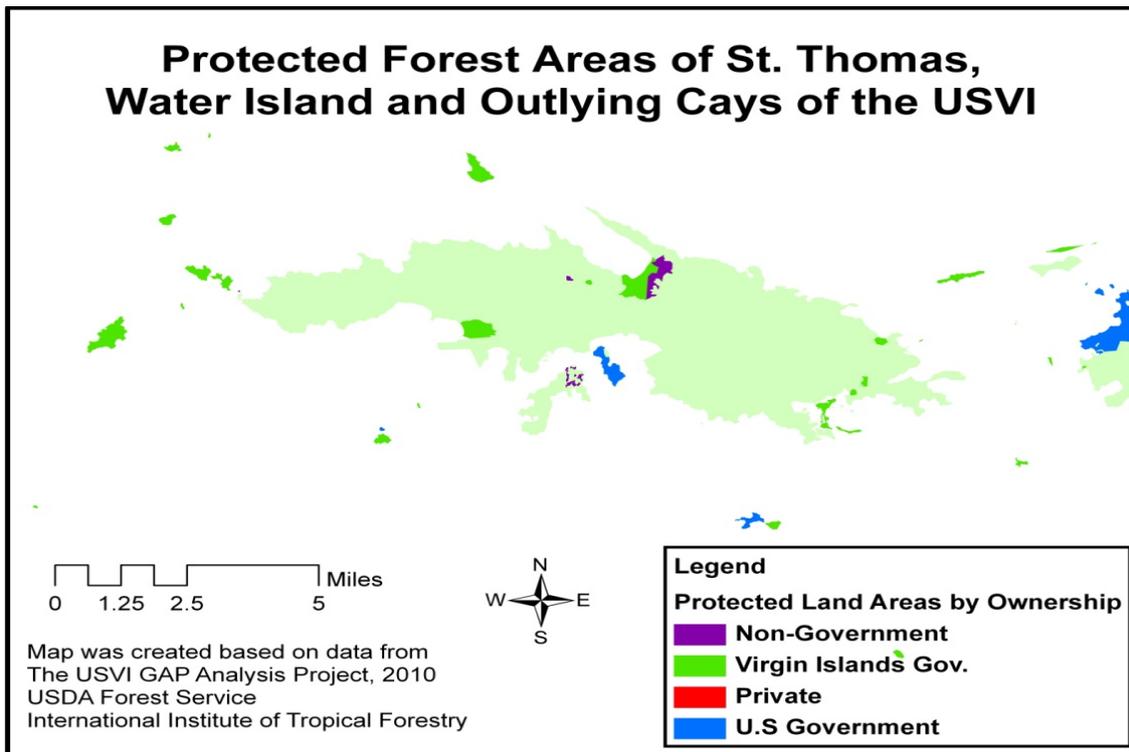


Figure 7: St. Thomas Protected Areas

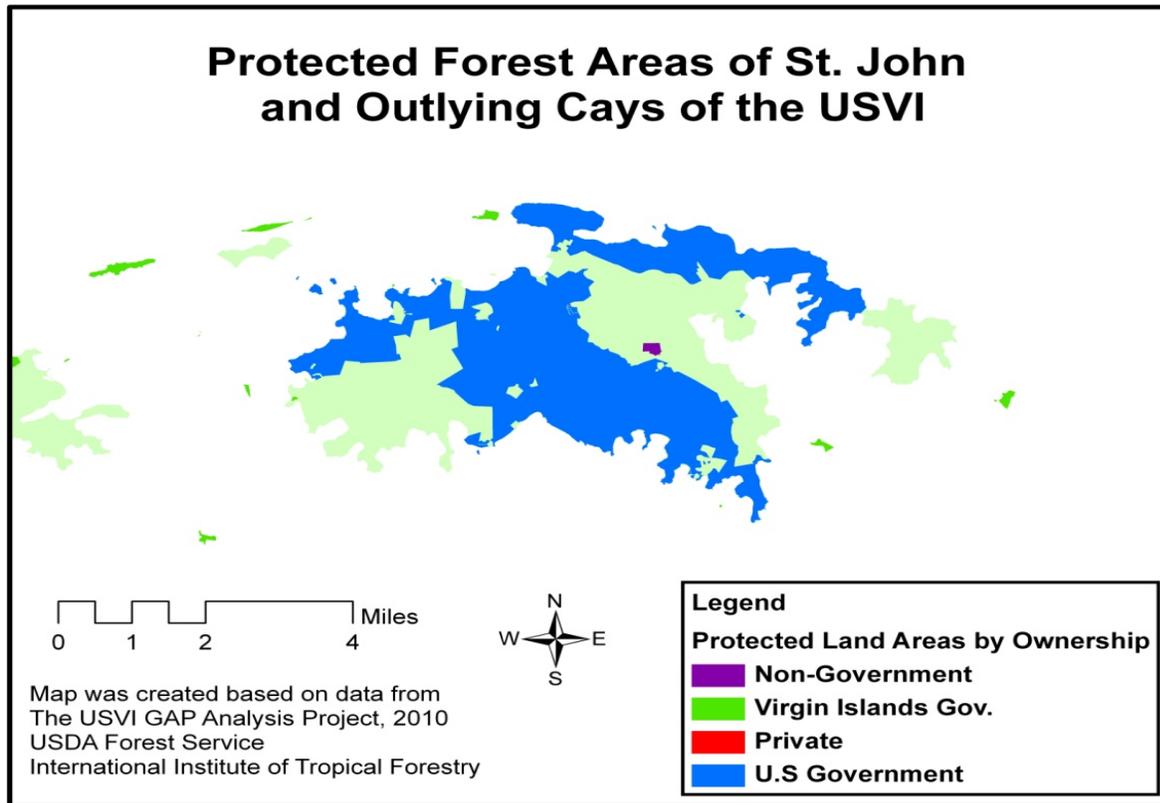


Figure 8: St. John Protected Areas

In addition to protecting significant tracts of forested land, FLP will benefit multiple natural resources, including the highly sensitive marine communities in the coastal waters that surround the U.S. Virgin Islands. Run-off from unvegetated, eroded lands has been identified as one of the greatest threats to near-shore marine habitat. Minimizing further erosion by protecting lands that would otherwise be developed will help preserve these marine communities.

The Forest Legacy Program ultimately provides an opportunity to protect both land and sea. Because the marine resources are so closely tied to the terrestrial resources of the U.S. Virgin Islands, a watershed approach was taken in identifying tracts of land and applying the criteria. Consequently, a preliminary list of watersheds, as delineated by the Department of Planning and Natural Resources' Division of Environmental Protection, was developed. These areas were then subjected to the criteria developed and prioritized.

2.1 GOALS AND OBJECTIVES FOR THE VIRGIN ISLANDS LEGACY PROGRAM

As populations and the popularity of coastal living continue to increase, the remaining undeveloped lands in the Virgin Islands become more vulnerable to exploitation and extinction of forest and forest species. The key priority of the Virgin Islands Forest Legacy Program (VIFLP) is to identify both areas that are critical components of a healthy, resilient environment and also those most susceptible to development. Considering the connectivity between land and sea will be essential to successfully protect the suite of natural resources in the Virgin Islands for future generations. Currently, the natural resources of the Virgin Islands are at serious risk of further exploitation and degradation, and it is imperative that action be swift and effective. The VIFLP is one of many tools that addresses this problem and will specifically aim to accomplish the following goals:

- To identify and protect environmentally important forested lands threatened by conversion to non-forest use.
- To reduce continued fragmentation of forest resources.
- To provide environmental benefits through the protection and restoration of wetland areas.
- To provide watershed and water supply protection.
- To protect marine resources through reductions in non-point source pollution from denuded land.
- To maintain valuable scenic resources of the Virgin Islands.
- To protect rare and endangered flora and fauna.

Prioritizing lands with healthy and continuous forests is fundamental to the Virgin Islands Forest Legacy Program, thus the northwest coast of St. Croix is a high priority, as it comprises a 6000-acre stretch of forest, the largest unprotected forest anywhere in the U.S. Virgin Islands. However, lands that do not necessarily have extensive forest canopy but have other important natural resource values such as proximity to marine

resources, will also be included in the VIFLP. The weighted ranking system utilized for categorizing watersheds by importance is outlined in Appendix C. Approaching land protection in the U.S. Virgin Islands from a watershed perspective highlights the connectivity between land and sea and allows for other values beyond forested land. In considering the marine communities of the U.S. Virgin Islands in the VIFLP, the scope of conservation effort is increased and natural resource protection is maximized.

2.2 ELIGIBILITY CRITERIA

In order to evaluate areas for inclusion in the Forest Legacy Program, both environmental and socioeconomic criteria were used. These criteria were weighted and ranked during community expert workshops in order to prioritize Forest Legacy Program activities. However, the final priorities will be determined by the Forest Stewardship Committee. This body will be reviewing and recommending priority projects. General criteria were applied prior to workshop meetings to ensure inclusion of all potential areas. The criteria are listed below in their respective categories. Sub-criteria are outlined in the next section. A separate threat analysis was also included and is also listed below. A more detailed description of the ranking system can be found in Appendix C.

General Criteria

Presence of substantial forested or vegetated land

Threatened by present or future conversion to non forest uses

Environmental Criteria

Connectivity

Watershed Characteristics

Influence on Critical Habitats

Socioeconomic Criteria

Cultural/Historical

Aesthetic Characteristics

Recreation/Economic Characteristics

A separate Threat Inventory was developed and is intended to be used when prioritizing Legacy Areas (see D).

2.3 CRITERIA EVALUATION FACTORS

General Criteria

Prior to workshops, general criteria were applied to all unprotected lands in the U.S. Virgin Islands in order to identify the suite of watersheds that should be considered for eligibility. This method allowed for inclusion of all watersheds that had substantial portions of forested or vegetated land. Areas that were already heavily developed were not considered for eligibility in the VIFLP. The specific criteria applied to watersheds prior to the workshops include the following categories:

- ✓ Presence of substantial forested or vegetated land
- ✓ Threatened by present or future conversion to non forest uses.

Workshop participants were given the opportunity to identify additional watersheds for inclusion in the VIFLP and no other watersheds were identified. It was agreed that the list was inclusive of all appropriate areas.

The following categories were applied to watersheds by workshop participants and will be the basis for decision-making with regard to future Forest Legacy Program activities in the Virgin Islands.

Environmental Criteria

┌ *Connectivity* (Overall weight of 25%)

This eligibility factor is meant to identify areas with low degrees of habitat fragmentation and areas that are partially or completely surrounded by other forested areas. Areas that have greater proximity to already protected land or water also meet this criteria.

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This criteria emphasizes the importance of protecting continuous tracts of land to provide wildlife corridors as well as proximity to a seed source. When applying these criteria to watersheds the following sub-categories were used:

- ✓ Degree of fragmentation
- ✓ Proximity to a protected area
- ✓ Proximity to other forested areas.

┌ *Watershed Characteristics* (Overall weight of 25%)

This eligibility factor refers to the “intactness” of the watershed and is based primarily on the percentage of forest cover and the characteristics of such forested areas. This factor also considers the slope of the land which would have implications for nearby marine communities. The more extreme the slope, the more influence it may have on benthic habitat. When applying these criteria to watersheds the following sub-categories were used:

- ✓ Percent forest cover
- ✓ Presence of wetlands
- ✓ Slope
- ✓ Habitat diversity.

┌ *Influence on Critical Habitats* (Overall weight of 30%)

This eligibility factor refers to the relationship of the watershed to downstream critical marine and coastal habitats, such as mangroves, salt ponds, seagrass beds, or coral reef systems. Any protected areas downstream from the watershed should also be considered. Additionally, any endangered or threatened species that inhabit the watershed or that frequent the watershed or downstream systems should also be considered. When applying these criteria to watersheds the following sub-categories were used:

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- ✓ Drains into marine areas such as sea grass or coral reef communities
- ✓ Presence of endangered, threatened, or important migratory species
- ✓ Presence of rare or endemic species
- ✓ Presence of keystone species.

Socioeconomic Criteria

┌ *Cultural/Historical* (Overall weight of 10%)

This eligibility factor captures the cultural and historical characteristics of the watershed. This includes both present cultural values that may include areas commonly used for specific activities and past cultural values. This factor also captures the presence of archeological sites in the watershed. When applying these criteria to watersheds the following sub-categories were used:

- ✓ Archeological features
- ✓ Historical features.

┌ *Aesthetic Characteristics* (Overall weight of 5%)

This eligibility factor refers to the scenic values of the watershed. This includes areas that are locally important panoramic views and areas adjacent to designated scenic roads. When applying these criteria to watersheds the following sub-categories were used:

- ✓ Natural beauty
- ✓ Scenic overlook/views.

┌ *Recreation/Economic Characteristics* (Overall weight of 5%)

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This eligibility factor refers to recreational activities that occur within the watershed. These activities may have economic implications if they are part of a business or livelihood. This also includes areas that are critical for access to other recreational areas. When applying these criteria to watersheds the following sub-categories were used:

- ✓ Hiking
- ✓ Biking
- ✓ Camping
- ✓ Horseback riding
- ✓ Snorkeling/SCUBA diving
- ✓ Fishing
- ✓ Kayaking/Boating

2.4 QUALIFICATIONS PROPOSED ACQUISITIONS MUST MEET

The acquisition of property, including pre-acquisition work, must meet the following:

1. Federal appraisal standards;
2. The landowner must be informed of the market value and that sale of the property is strictly voluntary;
3. The landowner must be notified in writing that the property will NOT be purchased if negotiations do not result in amicable agreement;
4. Payment to the landowner for lands or interest in lands is not more than market value determined in item 1;
5. Assure title is free and unencumbered or that title insurance is secure for the full value of the encumbered property;

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6. The tract must be located within an approved Forest Legacy Area;
7. The tract must include a forested land threatened by present or future conversion to a non forest use (areas not in vegetal cover typical of forests can qualify if they belong to geographical areas not adequately represented (diversity), contain resources deemed unique by the VIFLP and/or constitute areas targeted for reforestation for water basin protection);
8. Be nominated by the landowner in writing or with the written permission of the landowner;
9. Have a Forest Stewardship Plan in place at the time of the closing if a landowner is retaining the right to harvest timber or the right to conduct other resource management activities. A multiple use management plan will be required if a fee interest is being acquired. Preparation of the plan is the responsibility of the landowner with the help of the Department of Agriculture's Forest Stewardship Program, or by the agency with management responsibility when there is a fee purchase.

2.5 ACQUISITION METHODS AND TOOLS

The Territory of the U.S. Virgin Islands elects the Department of Agriculture for the implementation of the program. The following activities are eligible uses under the VIFLP:

1. Purchase lands or interests (conservation easements) in lands from willing sellers for inclusion in the VIFLP.
2. Facilitation of donations of lands or interests in lands to a qualified and willing recipient for VIFLP purposes.
3. Lands or easements purchased by the local government or land trusts are considered part of the Forest Legacy Program by contributing to the minimum of 25% non-Federal share of program costs. Such lands must be maintained and managed to meet the Forest Legacy Program goals and objectives.
4. Zoning, term easements and other incentives or methods may further Forest Legacy goals, but are not part of the Federal Forest Legacy Program. Local

government and land trusts may pursue these methods outside of the Federal Forest Legacy Program.

2.6 PROGRAM IMPLEMENTATION CONSIDERATIONS

2.6.1 CONTRIBUTION OF VIRGIN ISLANDS FOREST LEGACY PROGRAM TO THE INSTITUTIONAL FRAMEWORK OF THE TERRITORY OF THE U.S. VIRGIN ISLANDS

The U.S. Virgin Islands institutional framework addressing forest protection and conservation combines Federal and Territorial government agencies. Federal government agencies provide technical and financial assistance to local government agencies through established forest-related programs and some agencies directly manage forested areas, such as the National Park Service that manages the Virgin Islands National Park in St. John.

In the U.S. Virgin Islands, the Department of Agriculture is the agency that has been given the responsibility over the conservation and management of forested areas. Some of these responsibilities are also shared by the Department of Planning and Natural Resources.

The Department of Agriculture is in charge of implementing the Forest Stewardship and Urban and Community Forestry Assistance Programs that provide technical and financial assistance to rural and urban landowners. These programs have been established with the support and sponsorship of the USDA Forest Service. The Forest Legacy Program will be implemented as well by the USVI Department of Agriculture.

Outside the governmental arena, there are several private institutions that carry out environmental protection programs. The Nature Conservancy and St. Croix Environmental Association are non-profit organizations that currently own and administer properties of environmental and cultural significance for conservation programs. Other organizations such as the St. John Land Trust are currently developing similar programs to protect land through fee simple purchase and donations.

Within this existing institutional framework, the Virgin Islands Forest Legacy Program would have several important contributions to make to the U.S. Virgin Islands Territory:

- Conservation easements constitute a legally binding commitment in perpetuity with property owners. At present, the Virgin Islands Senate is solely responsible for all rezoning requests. The Virgin Islands has not adopted a comprehensive land and water use plan for the Territory. The Territory, via studies under the auspices of DPNR, identified Areas of Particular Concern (APCs) nearly 20 years ago. The majority of the lands within APCs are held in private hands. To date the Virgin Islands Senate has been more than willing to override public sentiment and rezone properties within APCs for hotel development. A recent example of the precarious situation for APCs are Botany Bay and Great Pond.
- The conservation easement, which is locally very limited for protection purposes, potentially reduces the cost of acquiring land control. Uncertainties in funding acquisitions are one of the basic limitations of existing conservation programs. The Forest Legacy Programs addresses forest value conservation through the acquisition of property control using conservation easements. The easement reduces the cost of acquiring control because only the transfer of specific rights is negotiated.
- Holding conservation easements can propitiate(?) the direct involvement of landowners and/or easement overseers in forest conservation efforts, supplementing the limited surveillance capability of government agencies.

2.6.2 CONSERVATION EASEMENT LEGISLATION

Environmental law is a relatively new addition to the Virgin Islands legal system. Many aspects of environmental protection and conservation are still being modified through amendments to the Virgin Islands Code. In July of 2005 Title 12 of the Virgin Islands Code was amended to include Chapter 15 “The Uniform Conservation Easement Act. It was developed in 1981 by the National Commission of Uniform States Laws, has been approved by the American Bar Association and enacted in dozens of states and territories. The act enables durable restrictions and affirmative obligations to be attached to real property for the purpose of protect natural and historic resources. The act ends impediments to the use of easements and promotes non-cumpulsory,

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voluntary solutions to land-use problems. The complete language to Title 12 Chapter 15 and a detailed description appear in Appendix E of this document.

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3. FOREST LEGACY AREAS IN THE U.S. VIRGIN ISLANDS

The following areas have been identified as Forest Legacy Areas for the Virgin Islands Forest Legacy Program. Multiple watersheds make up each Forest Legacy Area and are noted in the list below. These watersheds were delineated by the Department of Planning and Natural Resources' Division of Environmental Protection. Because the names of individual watersheds also correspond to smaller areas such as embayments or other natural features, watershed maps should be referenced to avoid confusion. It is also important to note that all cays under private ownership are also included as Legacy Areas, but because there are approximately 50 cays with at least 18 under private ownership, they have not been described in this document. A list of the cays to be included is at the end of this section.

St. Croix

<i>Legacy Area</i>	<i>Northwest St. Croix</i>	<i>East End St. Croix</i>
<i>Watersheds</i>	Salt river	Teague Bay
	Barron Bluff	Turner Hole
	Northside	Madam Carty
	Hams Bluff	Southgate
	Creque Dam	Great Pond
	Hams Bay	Laprey Valley
	Prosperity	
	Annaly Bay	

St. Thomas

<i>Legacy Area</i>	<i>West End St. Thomas</i>	<i>North Shore, St. Thomas</i>
<i>Watersheds</i>	Botany Bay	Dorothea Bay
	Fortuna Bay	Santa Maria Bay
	Perseverance Bay	Magen's Bay

St. John

<i>Legacy Area</i>	<i>East End St. John</i>	<i>South Shore, St. John</i>
<i>Watersheds</i>	Coral Bay	Rondezvous Bay
	Menneback Bay	Fish Bay

3.1 ST. CROIX FOREST LEGACY AREAS

3.1.1 NORTHWEST ST. CROIX LEGACY AREA

General Location

The Northwest St. Croix Legacy Area is located on the north shore of St. Croix. It begins just east of Salt River extending up to the peak of the mountain ridge and continuing west along the shoreline and ridgeline around the western tip to just north of Mahogany Road. The size of the area is approximately 12,000 acres. This Legacy Area includes an approximate 6,000 acre contiguous forest, and the majority of St. Croix's mature dry and moist tropical forest. For this reason, this Legacy Area is a priority area for the VIFLP.

Summary of Important Environmental Values

The Northwest St. Croix Legacy Area contains the following significant resource areas:

Salt River Mangroves

Annaly Bay

Creque Dam

Caledonia Gorge

Prehistoric Archeological Sites

Scenic Drive

Primary Habitat for Endemic Birds

Several unnamed guts

Maroon Cave

Conservation and Protection Methods:

Fee simple acquisition and/or conservation easements. Conservation easements for tracts should address:

1. Development rights
2. Management of land for traditional forest uses, recreational purposes and wildlife habitat and scenic resources
3. Public access
4. Protection of rare and endangered species
5. Protection of benthic habitat and wetland areas

List of Objectives

1. Protection of endangered species habitat
2. Protection of scenic quality
3. Public access for recreation
4. Conservation of wildlife habitat
5. Continuation of traditional forest uses
6. Protection of water supply systems
7. Protection of benthic habitat and wetland areas

Public Benefits to be Derived

1. Enhancement and maintenance of biodiversity
2. Enhance and maintain natural elements for ecotourism activities
3. Enhancement of general quality of life
4. Provide traditional forest products
5. Provide reliable sources of good water quality

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The Forest Service may assign monitoring and/or management responsibilities to any of the following agencies under interagency agreements:

Territory of the Virgin Islands

St. Croix Environmental Association

National Park Service

The Nature Conservancy

U.S. Forest Service

Watershed Data

Salt River

STRUCTURE	Acres	Percent
Shrubland	1751	42
Sparse Vegetation	3	0
Herbaceous	644	15
Developed Areas	848	20
Woodland	401	10
Wetland	74	2
Dry Forest	388	9
Cropland	55	1
Moist Forest	0	0
Total	4165	100

Baron Bluff

STRUCTURE	Acres	Percent
Shrubland	353	28
Sparse Vegetation	6	1
Herbaceous	294	23
Developed Areas	104	8
Woodland	126	10
Wetland	26	2
Dry Forest	288	23
Cropland	6	1
Moist Forest	71	6
Total	1275	100

Northside

STRUCTURE	Acres	Percent
Shrubland	84	9
Sparse Vegetation	10	1
Herbaceous	42	5
Developed Areas	45	5
Woodland	49	5
Wetland	0	0
Dry Forest	495	53
Cropland	0	0
Moist Forest	204	22
Total	929	100

Hams Bluff

STRUCTURE	Acres	Percent
Shrubland	168	17
Sparse Vegetation	26	3
Herbaceous	68	7
Developed Areas	13	1
Woodland	10	1
Wetland	0	0
Dry Forest	573	58
Cropland	0	0
Moist Forest	136	14
Total	993	100

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Creque Dam

STRUCTURE	Acres	Percent
Shrubland	424	35
Sparse Vegetation	6	1
Herbaceous	285	23
Developed Areas	91	7
Woodland	49	4
Wetland	0	0
Dry Forest	243	20
Cropland	0	0
Moist Forest	116	10
Total	1213	100

Prosperity

STRUCTURE	Acres	Percent
Shrubland	460	52
Sparse Vegetation	0	0
Herbaceous	239	27
Developed Areas	52	6
Woodland	74	8
Wetland	0	0
Dry Forest	65	7
Cropland	0	0
Moist Forest	0	0
Total	890	100

Hams Bay

STRUCTURE	Acres	Percent
Shrubland	236	22
Sparse Vegetation	3	0
Herbaceous	120	11
Developed Areas	26	2
Woodland	61	6
Wetland	0	0
Dry Forest	472	43
Cropland	0	0
Moist Forest	175	16
Total	1094	100

In addition to these watersheds, there are several other watersheds with lands that fall within the boundaries of the Northwest St. Croix Legacy Area. The higher undeveloped areas of these watersheds are included as delineated on the Legacy Area Map. However, because the majority of these watersheds do not fit the criteria for inclusion, only the areas noted on the map, which correspond to the forested sections of the watershed, are part of the VIFLP.

Additional Watersheds

La Grange

STRUCTURE	Acres	Percent
Shrubland	1453	45
Sparse Vegetation	0	0
Herbaceous	631	19
Developed Areas	576	18
Woodland	243	7
Wetland	6	0
Dry Forest	346	11
Cropland	3	0
Moist Forest	0	0
Total	3259	100

Long Point

STRUCTURE	Acres	Percent
Shrubland	1213	49
Sparse Vegetation	3	0
Herbaceous	123	5
Developed Areas	890	36
Woodland	217	9
Wetland	13	1
Dry Forest	16	1
Cropland	13	1
Moist Forest	0	0
Total	2488	100

Bugby Hole

STRUCTURE	Acres	Percent
Shrubland	579	23
Sparse Vegetation	0	0
Herbaceous	1450	58
Developed Areas	285	11
Woodland	97	4
Wetland	23	1
Dry Forest	55	2
Cropland	13	1
Moist Forest	0	0
Total	2501	100

Bethlehem

STRUCTURE	Acres	Percent
Shrubland	1611	25
Sparse Vegetation	0	0
Herbaceous	1809	28
Developed Areas	1534	23
Woodland	372	6
Wetland	71	1
Dry Forest	783	12
Cropland	349	5
Moist Forest	26	0
Total	6556	100

Diamond

STRUCTURE	Acres	Percent
Shrubland	1534	52
Sparse Vegetation	3	0
Herbaceous	227	8
Developed Areas	702	24
Woodland	165	6
Wetland	6	0
Dry Forest	197	7
Cropland	87	3
Moist Forest	0	0
Total	2922	100

3.1.2 EAST END ST. CROIX LEGACY AREA

General Location

The East End St. Croix Legacy Area is located at the east end of St. Croix, beginning just west of Southgate Pond on the north shore and continuing east to the eastern tip (Point Udall) of the island. The area extends west on the south shore to just west of Surlaine Point. The size of the area is approximately 7,000 acres. This area includes approximately 6,000 acres of tropical xeric scrub forest.

Summary of Important Environmental Values

The East End St. Croix Legacy Area contains the following significant resource areas:

Great Pond APC

East End APC

Coral Reef APC

Southgate Pond

Coakley Bay Pond

Turner Hole Pond

Turtle Nesting Beaches

Prehistoric Archeological Sites

Jack and Isaac Bay Preserve

East End Marine Park (Territorial Park)

Primary Habitat for Endemic Birds

Conservation and Protection Methods:

Fee simple acquisition and/or conservation easements. Conservation easements for tracts should address:

1. Development rights

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2. Management of land for traditional forest uses, recreational purposes and wildlife habitat and scenic resources
3. Public access
4. Protection of rare and endangered species
5. Protection of benthic habitat and wetland areas

List of Objectives

1. Protection of endangered species habitat
2. Protection of scenic quality
3. Public access for recreation
4. Conservation of wildlife habitat
5. Protection of water supply systems
6. Protection of benthic habitat and wetland areas
7. Protection of fisheries resources

Public Benefits to be Derived

1. Enhancement and maintenance of biodiversity
2. Enhance and maintain natural elements for ecotourism activities
3. Enhancement of general quality of life
4. Provide reliable sources of good water quality
5. Enhancement of fisheries resources

The Forest Service may assign monitoring and/or management responsibilities to any of the following agencies under interagency agreements:

Territory of the Virgin Islands

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St. Croix Environmental Association

The Nature Conservancy

National Park Service

U.S. Forest Service

Watershed Data

Teage Bay

STRUCTURE	Acres	Percent
Shrubland	375	37
Sparse Vegetation	6	1
Herbaceous	155	15
Developed Areas	194	19
Woodland	256	25
Wetland	0	0
Dry Forest	29	3
Cropland	0	0
Moist Forest	0	0
Total	1016	100

Turner Hole

STRUCTURE	Acres	Percent
Shrubland	421	59
Sparse Vegetation	6	1
Herbaceous	94	13
Developed Areas	133	19
Woodland	55	8
Wetland	3	0
Dry Forest	0	0
Cropland	0	0
Moist Forest	0	0
Total	712	100

Madam Carty

STRUCTURE	Acres	Percent
Shrubland	780	76
Sparse Vegetation	0	0
Herbaceous	162	16
Developed Areas	3	0
Woodland	71	7
Wetland	16	2
Dry Forest	0	0
Cropland	0	0
Moist Forest	0	0
Total	1032	100

Southgate

STRUCTURE	Acres	Percent
Shrubland	573	41
Sparse Vegetation	3	0
Herbaceous	324	23
Developed Areas	372	27
Woodland	29	2
Wetland	49	3
Dry Forest	42	3
Cropland	3	0
Moist Forest	0	0
Total	1395	100

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Great Pond			Laprey Valley		
STRUCTURE	Acres	Percent	STRUCTURE	Acres	Percent
Shrubland	421	21	Shrubland	275	24
Sparse Vegetation	6	0	Sparse Vegetation	3	0
Herbaceous	1162	58	Herbaceous	728	64
Developed Areas	217	11	Developed Areas	3	0
Woodland	65	3	Woodland	123	11
Wetland	133	7	Wetland	0	0
Dry Forest	0	0	Dry Forest	0	0
Cropland	0	0	Cropland	0	0
Moist Forest	0	0	Moist Forest	0	0
Total	2003	100	Total	1133	100

3.2 ST. THOMAS FOREST LEGACY AREAS

3.2.1 WEST END ST. THOMAS LEGACY AREA

General Location

The West End St. Thomas Legacy Area is located on the west end of St. Thomas. It begins just west of the airport at Brewers Bay on the south shore extending up to the peak of the mountain ridge and continuing west along the shoreline and ridgeline around the western tip to just west of Santa Maria Bay on the north shore. The size of the area is approximately 2,400 acres. This area includes 2,100 acres of mostly contiguous dry and moist tropical forest.

Summary of Important Environmental Values

The West End St. Thomas Legacy Area contains the following significant resource areas:

Botany Bay APC

Little St. Thomas Preserve

Perseverance Salt Ponds

Prehistoric Archeological Sites

Primary Habitat for Endemic Birds

Conservation and Protection Methods:

Fee simple acquisition and/or conservation easements. Conservation easements for tracts should address:

1. Development rights
2. Management of land for traditional forest uses, recreational purposes and wildlife habitat and scenic resources
3. Public access
4. Protection of rare and endangered species
5. Protection of benthic habitat and wetland areas

List of Objectives

1. Protection of endangered species habitat
2. Protection of scenic quality
3. Public access for recreation
4. Conservation of wildlife habitat
5. Continuation of traditional forest uses
6. Protection of water supply systems
7. Protection of benthic habitat and wetland areas

Public Benefits to be Derived

1. Enhancement and maintenance of biodiversity
2. Enhance and maintain natural elements for ecotourism activities
3. Enhancement of general quality of life
4. Provide traditional forest products
5. Provide reliable sources of good water quality

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The Forest Service may assign monitoring and/or management responsibilities to any of the following agencies under interagency agreements:

Territory of the Virgin Islands

Environmental Association of St. Thomas

The Nature Conservancy

National Park Service

U.S. Forest Service

Watershed Data

Botany Bay			Fortuna Bay		
STRUCTURE	Acres	Percent	STRUCTURE	Acres	Percent
Sparse Vegetation	43	5	Sparse Vegetation	31	4
Developed	69	8	Developed	121	15
Shrubland	60	7	Shrubland	40	5
Dry Forest	590	67	Dry Forest	606	76
Woodland	40	5	Woodland	1	0
Moist Forest	47	5	Moist Forest	0	0
Wetland	2	0	Wetland	2	0
Cropland	2	0	Cropland	0	0
Herbaceous	25	3	Herbaceous	1	0
Total	879	100	Total	802	100

Perserverance Bay		
STRUCTURE	Acres	Percent
Sparse Vegetation	5	1
Developed	65	9
Shrubland	35	5
Dry Forest	555	78
Woodland	2	0
Moist Forest	36	5
Wetland	13	2
Cropland	0	0
Herbaceous	1	0
Total	711	100

3.2.2 NORTH SHORE ST. THOMAS LEGACY AREA

General Location

The North Shore St. Thomas Legacy Area is located on the north shore of St. Thomas, beginning at the western boundary of Santa Maria Bay (from shoreline to ridgeline) and continuing to just east of the Peterborg peninsula. The size of the area is approximately 3,600 acres. This area includes more than 2,800 acres of mostly contiguous dry and moist tropical forest.

Summary of Important Environmental Values

The North Shore St. Thomas Legacy Area contains the following significant resource areas:

Magens Bay Preserve (and APC)

Prehistoric Archeological Sites

Mangrove Wetlands

Virgin Islands National Park

Primary Habitat for Endemic Birds

Conservation and Protection Methods:

Fee simple acquisition and/or conservation easements. Conservation easements for tracts should address:

1. Development rights
2. Management of land for traditional forest uses, recreational purposes and wildlife habitat and scenic resources
3. Public access
4. Protection of rare and endangered species
5. Protection of benthic habitat and wetland areas

List of Objectives

1. Protection of endangered species habitat
2. Protection of scenic quality
3. Public access for recreation
4. Conservation of wildlife habitat
5. Continuation of traditional forest uses
6. Protection of water supply systems
7. Protection of benthic habitat and wetland areas

Public Benefits to be Derived

1. Enhancement and maintenance of biodiversity
2. Enhance and maintain natural elements for ecotourism activities
3. Enhancement of general quality of life
4. Provide traditional forest products
5. Provide reliable sources of good water quality

The Forest Service may assign monitoring and/or management responsibilities to any of the following agencies under interagency agreements:

Territory of the Virgin Islands

Environmental Association of St. Thomas

The Nature Conservancy

National Park Service

U.S. Forest Service

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Watershed Data

Magens Bay

STRUCTURE	Acres	Percent
Sparse Vegetation	22	2
Developed	175	16
Shrubland	56	5
Dry Forest	723	66
Woodland	29	3
Moist Forest	66	6
Wetland	22	2
Cropland	4	0
Herbaceous	7	1
Total	1104	100

Santa Maria

Sparse Vegetation	21	3
Developed	118	15
Shrubland	23	3
Dry Forest	536	68
Woodland	8	1
Moist Forest	72	9
Wetland	1	0
Cropland	0	0
Herbaceous	9	1
Total	789	100

Dorothea Bay

STRUCTURE	Acres	Percent
Sparse Vegetation	16	1
Developed	371	22
Shrubland	45	3
Dry Forest	984	58
Woodland	41	2
Moist Forest	211	13
Wetland	3	0
Cropland	3	0
Herbaceous	8	0
Total	1682	100

3.3 ST. JOHN FOREST LEGACY AREAS

3.3.1 EAST END ST. JOHN LEGACY AREA

General Location

The East End St. John Legacy Area is located on the east end of St. John and includes everything outside of the Virgin Islands National Park in the Coral Bay and Menneback Bay watersheds. The size of the area is approximately 2000 acres. This area includes more than 1900 acres of mostly contiguous dry and moist tropical forest.

Summary of Important Environmental Values

The East End St. John Legacy Area contains the following significant resource areas:

Virgin Islands National Park

Virgin Islands Coral Reef National Monument

Prehistoric Archeological Sites

Southside Pond

New Found Bay Pond

Primary Habitat for Endemic Birds

Conservation and Protection Methods:

Fee simple acquisition and/or conservation easements. Conservation easements for tracts should address:

1. Development rights
2. Management of land for traditional forest uses, recreational purposes and wildlife habitat and scenic resources
3. Public access
4. Protection of rare and endangered species
5. Protection of benthic habitat and wetland areas

List of Objectives

1. Protection of endangered species habitat
2. Protection of scenic quality
3. Public access for recreation
4. Conservation of wildlife habitat
5. Continuation of traditional forest uses
6. Protection of water supply systems
7. Protection of benthic habitat and wetland areas

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Public Benefits to be Derived

1. Enhancement and maintenance of biodiversity
2. Enhance and maintain natural elements for ecotourism activities
3. Enhancement of general quality of life
4. Provide traditional forest products
5. Provide reliable sources of good water quality

The Forest Service may assign monitoring and/or management responsibilities to any of the following agencies under interagency agreements:

Territory of the Virgin Islands

St. John Land Trust

Virgin Islands National Park

The Nature Conservancy

National Park Service

U.S. Forest Service

Watershed Data

Coral Bay			Mennebeck Bay		
Characteristics	Acres	Percent	Characteristics	Acres	Percent
Sparse Vegetation	55	2	Sparse Vegetation	16	2
Woodland	31	1	Woodland	24	3
Dry Forest	1189	40	Dry Forest	417	51
Shrubland	1042	35	Shrubland	325	40
Wetland	54	2	Wetland	16	2
Developed	163	5	Developed	0	0
Moist Forest	348	12	Moist Forest	12	1
Herbaceous	123	4	Herbaceous	0	0
Cropland	1	0	Cropland	0	0
Total	3007	100	Total	810	100

3.3.2 SOUTH SHORE ST. JOHN LEGACY AREA

General Location

The South Shore St. John Legacy Area is located on the south shore of St. John, beginning just east of Great Cruz Bay and continuing west to the western border of Fish Bay. The size of the area is approximately 1000 acres. This area includes more than 900 acres of mostly contiguous dry and moist tropical forest.

Summary of Important Environmental Values

The South Shore St. John Legacy Area contains the following significant resource areas:

Mangrove wetlands

Salt Ponds

Fish Bay

Rendezvous Bay

Prehistoric Archeological Sites

Primary Habitat for Endemic Birds

Conservation and Protection Methods:

Fee simple acquisition and/or conservation easements. Conservation easements for tracts should address:

1. Development rights
2. Management of land for traditional forest uses, recreational purposes and wildlife habitat and scenic resources
3. Public access
4. Protection of rare and endangered species
5. Protection of benthic habitat and wetland areas

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List of Objectives

1. Protection of endangered species habitat
2. Protection of scenic quality
3. Public access for recreation
4. Conservation of wildlife habitat
5. Continuation of traditional forest uses
6. Protection of water supply systems
7. Protection of benthic habitat and wetland areas

Public Benefits to be Derived

1. Enhancement and maintenance of biodiversity
2. Enhance and maintain natural elements for ecotourism activities
3. Enhancement of general quality of life
4. Provide traditional forest products
5. Provide reliable sources of good water quality

The Forest Service may assign monitoring and/or management responsibilities to any of the following agencies under interagency agreements:

Territory of the Virgin Islands

St. John Land Trust

Virgin Islands National Park

The Nature Conservancy

National Park Service

U.S. Forest Service

Watershed Data

Fish Bay			Rendezvous Bay		
Characteristics	Acres	Percent	Characteristics	Acres	Percent
Sparse Vegetation	7	0	Sparse Vegetation	26	6
Woodland	9	1	Woodland	0	0
Dry Forest	966	65	Dry Forest	64	15
Shrubland	254	17	Shrubland	235	55
Wetland	16	1	Wetland	12	3
Developed	44	3	Developed	78	18
Moist Forest	161	11	Moist Forest	9	2
Herbaceous	28	2	Herbaceous	1	0
Cropland	0	0	Cropland	0	0
Total	1484	100	Total	425	100

3.1.7 SMALL ISLANDS AND CAYS

Below is a listing of small islands and cays in the U.S. Virgin Islands that are privately owned or partially in private ownership. These cays are to be included in the Forest Legacy Program in addition to the areas described in this chapter.

Island/Cay	Ownership	Inhabited	Acres
Bovoni Cay	Private	no	49.9
Cinnamon Cay	Private	no	1.0
Current Rock	Private	no	0.4
Fish Cay	Private	no	0.4
Great St. James Island	Private	yes	156.0
Green Cay, St. Thomas	Private	no	0.8
Hans Lollick Island	Private	no	489.2
Hassel Island	Private	yes	139.5
	U.S Government		
Inner Brass Island	Private	no	128.0
Little Hans Lollick Island	Private	no	100.5
Little St. James Island	Private	yes	68.7
Lovango Cay	Private	yes	118.0
Mingo Cay	Private	no	48.4

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Patricia Cay	Private	no	33.4
Pelican Cay	Private	no	4.5
Rotto Cay	Private	no	2.0
Thatch Cay	Private	no	237.0
Two Brothers	Private (no record)	no	0.4
Water Island	U.S. Government	yes	491.6
	V. I. Government		
	The Nature Conservancy		
	Private		
Waterlemon Cay	Private	no	0.7

3.1.8 MAPS OF THE VIRGIN ISLANDS

In this section, vegetation maps delineate the Forest Legacy Areas for the VIFLP. These maps are provided to give an overview of the areas of interest, however, smaller scale maps will be used when identifying parcels during the land or easement acquisition process.

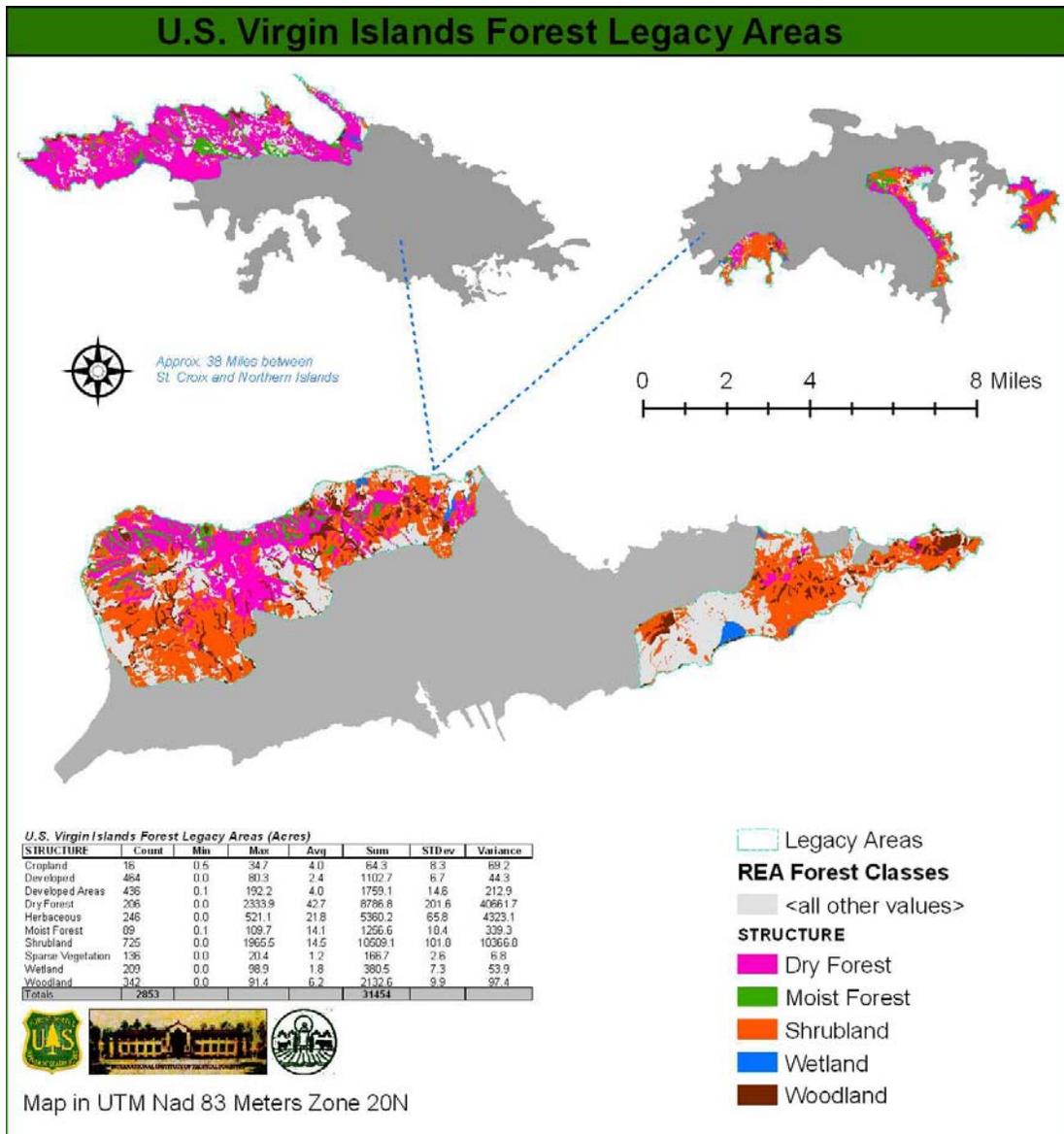


Figure 9: U.S. Virgin Islands Legacy Areas

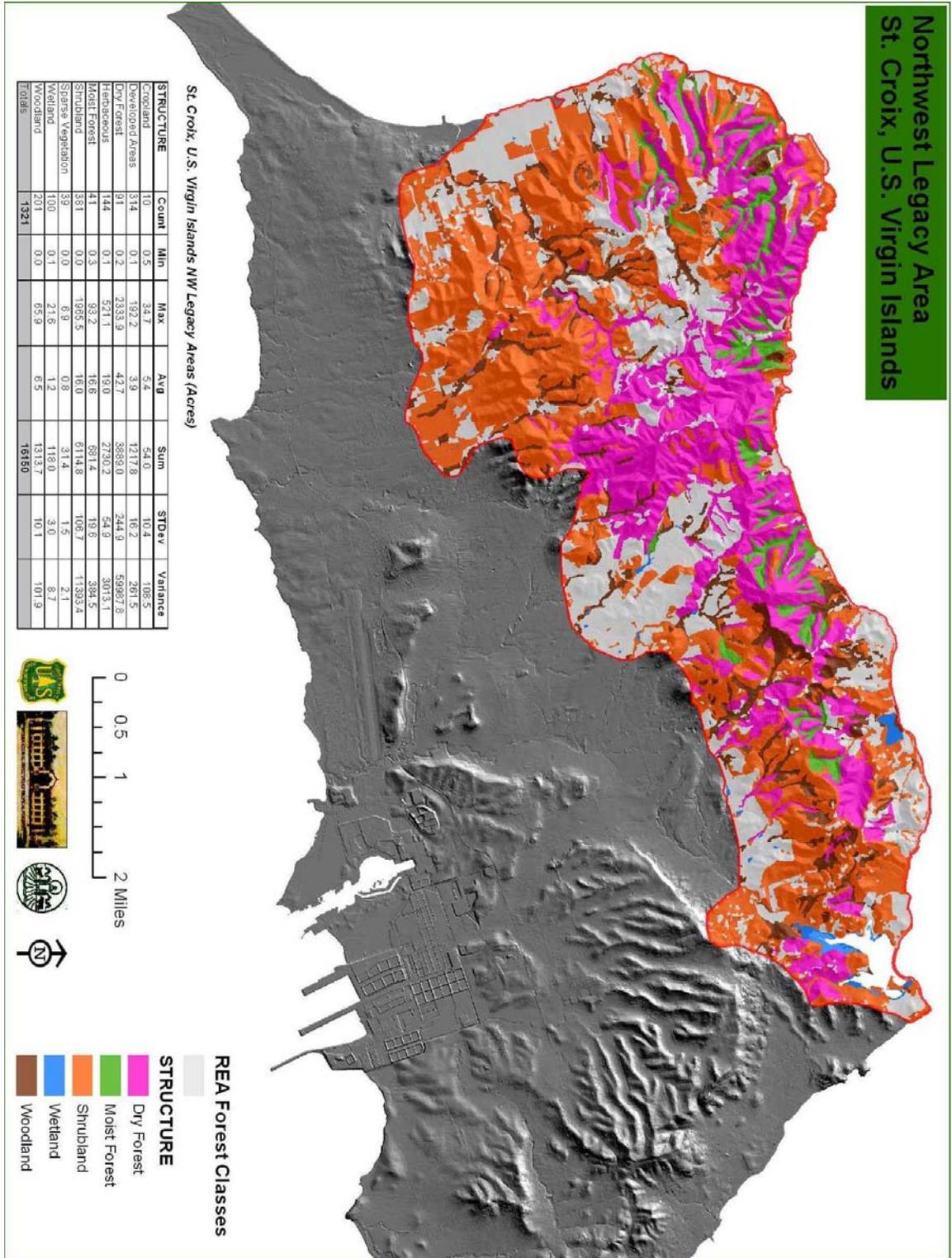


Figure 10: St. Croix, Northwest Legacy Areas

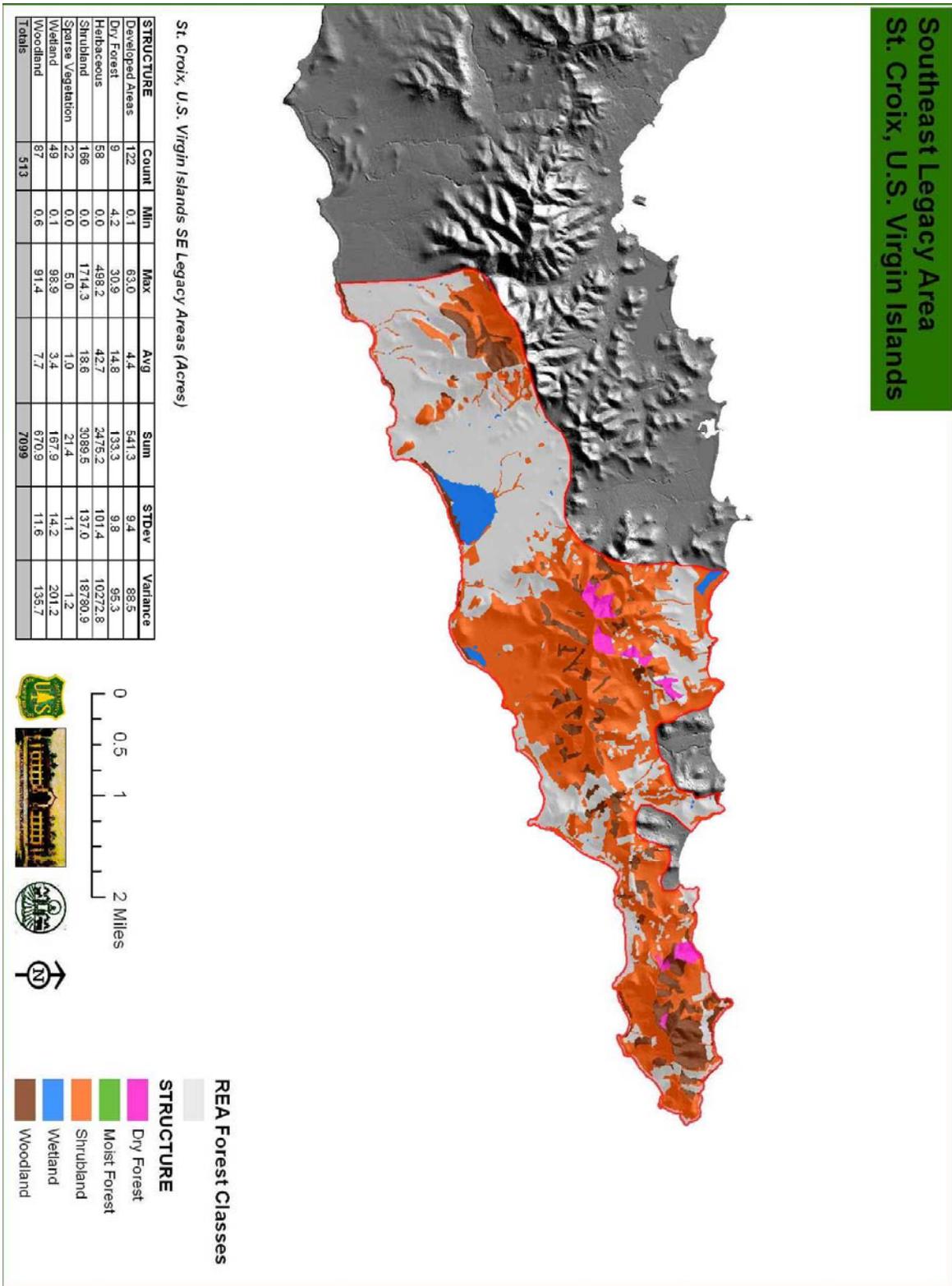


Figure 11: St. Croix Southwest Legacy Areas

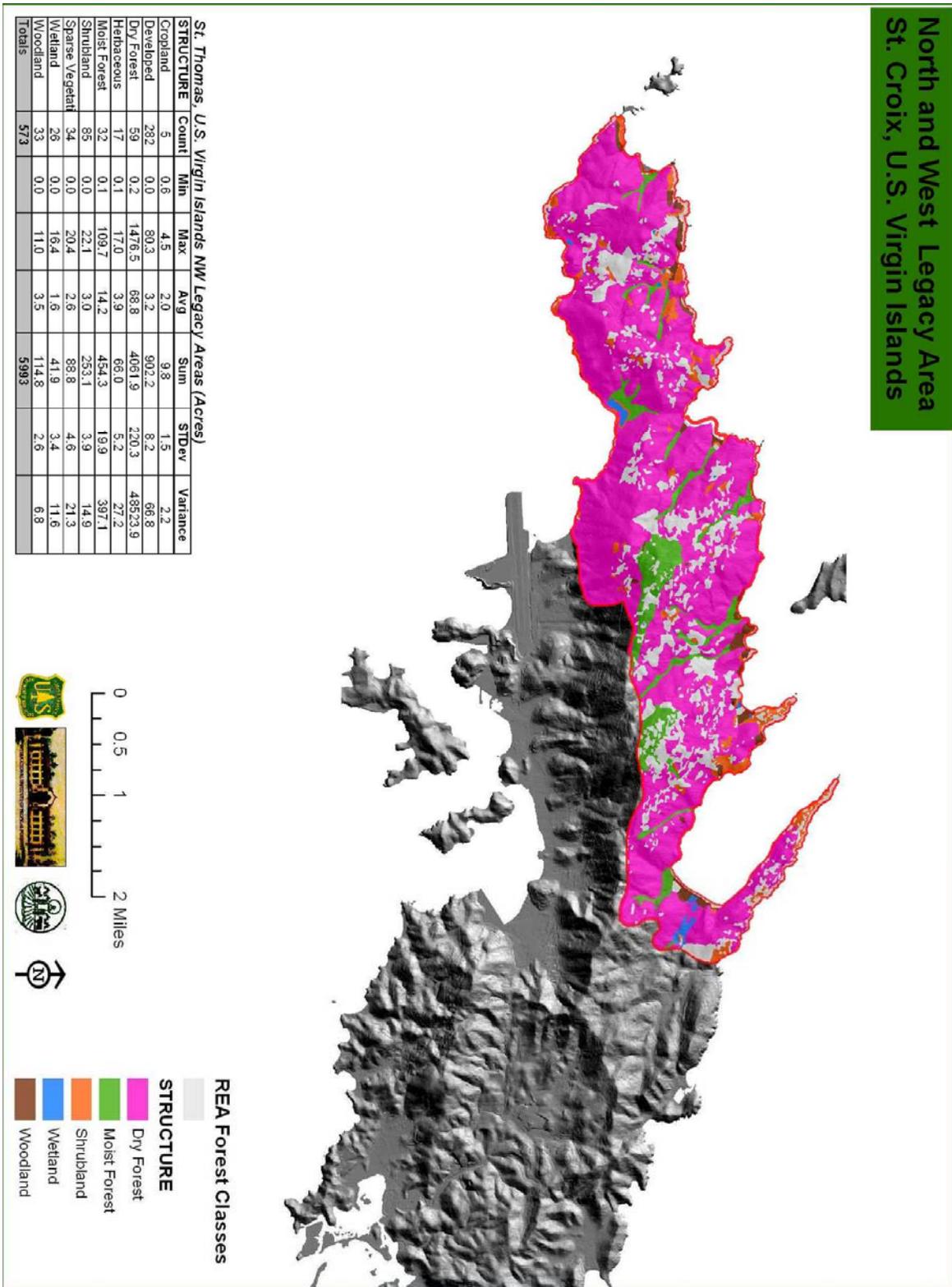


Figure 12: St. Thomas North and West Legacy Areas

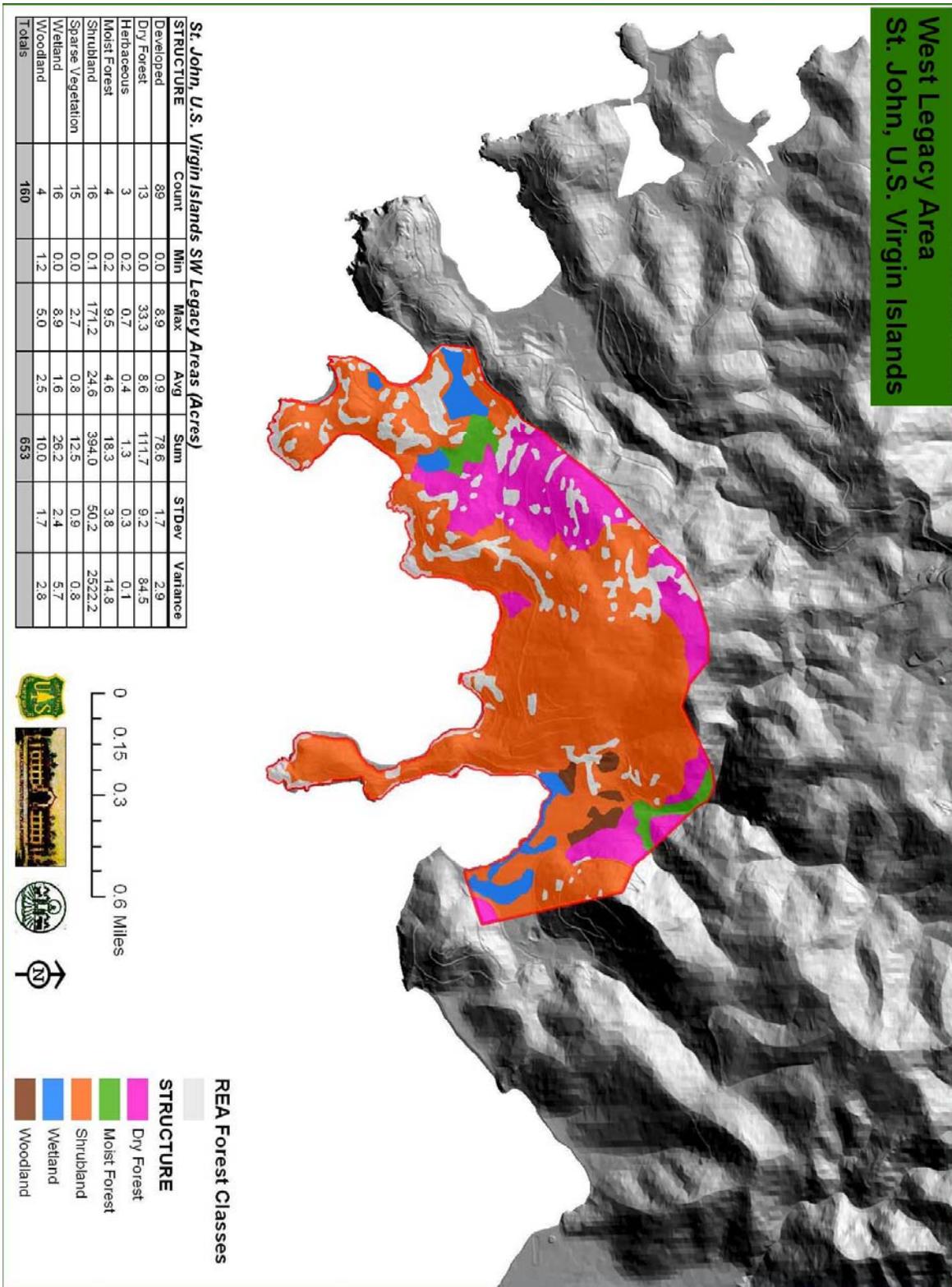


Figure 13: St. John West Legacy Areas

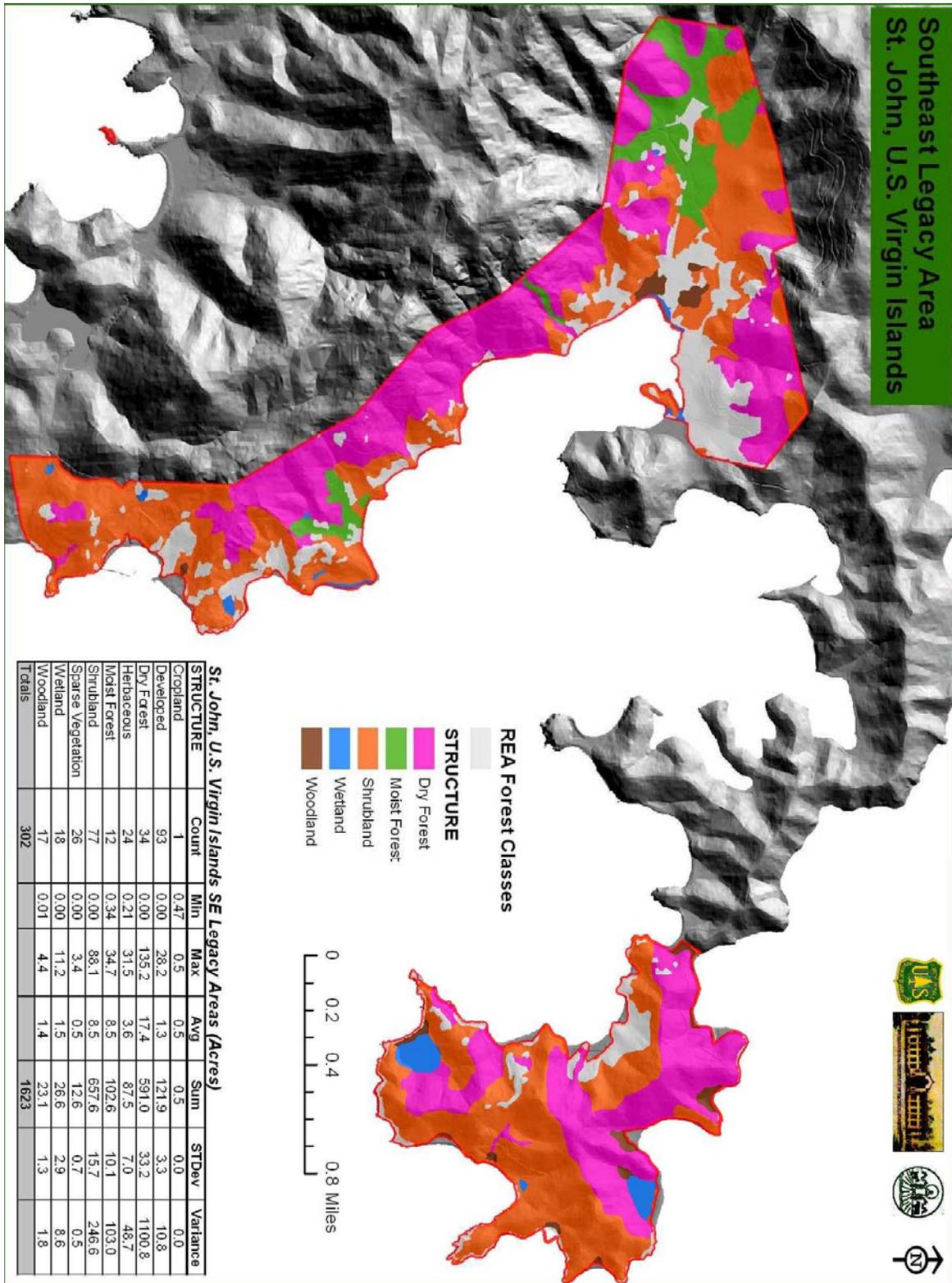


Figure 4: St. John Southeast Legacy Areas

3.4 Setting Priorities

In addition to identifying Legacy Areas for the VIFLP, workshop participants also assisted in determining the initial priorities for the VIFLP. The final priorities will be determined by the Forest Stewardship Committee. In order to guide VIFLP activities, a weighted ranking system was designed that provides quantifiable measures to decision-makers. This system is intended to assist in identifying the most critical pieces of land for inclusion in the VIFLP. This focuses VIFLP activities and directs decision-makers to areas that are highly susceptible to conversion and environmentally important. It is important to note that the ultimate goal is to protect all lands in Forest Legacy Areas, and therefore, areas lower on the list are still important and should be considered when opportunities arise. This list is merely intended to provide guidance, not a direct course of action. See Appendix C for a detailed description of the weighted ranking system.

Table 1 The names and ranks of the top six areas identified by the general public and Virgin Islands experts. The rankings are based on the scoring system described in detail in Appendix C of this document.

Rank	Legacy Area
1	Northwest St. Croix
2	East End St. John
3	East End St. Croix
4	South Shore St. John
5	West End St. Thomas
6	North Shore St. Thomas

Table 2 The names and ranks of the water sheds receiving the highest ranking for the Forest Legacy Program in the US Virgin Islands. Ranking is based on the system described in Appendix C of this document.

Rank	Individual Watersheds
1	Coral Bay
2	Hams Bay
3	Menneback
4	Botany
5	Madam Carty
6	Barron Bluff
7	Salt River
8	Great Pond
9	Southgate
10	Fish Bay

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The highest ranking watersheds from highest to lowest were:

In addition to these areas, Hans Lollick and Little Hans Lollick have been identified as priority cays due to their importance to nesting seabirds as well as unique vegetation communities (e.g., tyre palm forest).

As previously mentioned, the Northwest St. Croix Legacy Area with its approximately 6,000 acre contiguous dry and moist tropical forest, is the first priority for protection.

4 PUBLIC INVOLVEMENT IN THE ASSESSMENT PHASE

The Forest Legacy Program was first introduced to the Virgin Islands Forest Stewardship Committee on March 2, 2001. It was determined that a sub-committee should be formed to review the program and determine whether it was appropriate for the Virgin Islands. The sub-committee met twice in the spring of 2001 and reviewed concerns about the logistics of the program and clarified any further questions. The sub-committee voted unanimously to conduct an Assessment of Need and forwarded this recommendation to Commissioner Henry Schuster of the Virgin Islands Department of Agriculture. Governor Charles Turnbull approved the plan and the assessment phase began. The Nature Conservancy was tasked with the production of the Assessment of Need document.

Consultations began in early fall of 2001 with local foresters and research scientists to determine how to conduct the Assessment of Need. A series of workshops were planned and a list of community members was developed. This list included local botanists, land trust members, university scientists, local government agency personnel including the Department of Planning and Natural Resources and Department of Agriculture, historians, naturalists, and marine biologists. These groups were assembled on two separate occasions in March of 2002, and were asked to finalize the list of watersheds to be included in the VIFLP, to finalize the weighting and ranking system used for prioritization, and were then asked to apply this system to the agreed upon watersheds. In applying the criteria to the watersheds, participants were asked to also provide justification for their responses in the form of detailed notes. Following these workshops, further consultations with local experts were conducted to ensure a comprehensive assessment of the Virgin Islands resources and needs. The findings of these workshops and consultations were presented in public meetings in May 2002, August 2002, and September 2002, with further comments being incorporated into this Assessment of Need.

The public response to potential implementation of a Virgin Islands Forest Legacy Program was entirely supportive and most concerns were related to how residents could become involved in the program. Additional concerns included exactly how

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VIFLP funds would be spent and what agencies would be involved in the process. It is clear that the public recognizes the need for a program with such potential to protect the dwindling natural resources of the U.S. Virgin Islands.

APPENDIX A: PROTECTED SPECIES OF THE VIRGIN ISLANDS.

USVI Endangered Species

Statutory list of protected species under federal (USFWS Endangered Species Act 1973) and territorial (VI Endangered and Indigenous Species Act of 1990) legislation, as it currently appears (taxonomy has been updated from the original). **Federally Endangered (E) or Threatened (T)**

Animal

<i>Ameiva polops</i>	St. Croix Ground Lizard (E)
<i>Chelonia mydas</i>	Green turtle (T)
<i>Dermochelys coriacea</i>	Leatherback (E)
<i>Epicrates monensis granti</i>	VI Tree Boa (E)
<i>Eretmochelys imbricata</i>	Hawksbill Turtle (E)
<i>Charadrius molodus</i>	Piping Plover (T)
<i>Sterna dougallii</i>	Roseate Tern (T)

Plant

<i>Buxus vahlii</i>	Vahl's Boxwood (E)
<i>Zanthoxylum thomasianum</i>	Prickly Ash (E)

Territorially Endangered**Animal**

<i>Mabuya mabouia</i>	Slipperyback Skink
<i>Megascops nudipes</i>	Puerto Rican Screech Owl
<i>Chordeiles gundlachii</i>	Antillean Nighthawk
<i>Anthracothorax dominicus</i>	Antillean Mango
<i>Trachybaptus dominicus</i>	Least Grebe
<i>Sterna antillarum</i>	Least Tern
<i>Phaethon lepturus</i>	White-tailed Tropicbird
<i>Ardea herodias</i>	Great Blue Heron
<i>Ardea alba</i>	Great Egret
<i>Egretta thula</i>	Snowy Egret
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron
<i>Ixobrychus exilis</i>	Least Bittern
<i>Anas bahamensis</i>	White-cheeked Pintail
<i>Oxyura jamaicensis</i>	Ruddy Duck
<i>Rallus longirostris</i>	Clapper Rail
<i>Fulica caribaea</i>	Caribbean Coot
<i>Charadrius alexandrinus</i>	Snowy Plover

APPENDIX B: PROPOSED AMENDMENT TO THE VIRGIN ISLANDS PROTECTED SPECIES LIST

Proposed Amendment to the United States Virgin Islands Indigenous and Endangered Species Act of 1990: Revision of the List of Endangered Species

The territorial lists of animals (and plants) are maintained by the Division of Fish and Wildlife under the Department of Planning and Natural Resources which is allowed by the United States Virgin Islands Indigenous and Endangered Species Act of 1990 (Act No. 5665, Section 104g) under Administrative Code Title 12, Chapter 2. This act (hereafter, Act) has not been changed since it was adopted by the territorial legislature on 18 December 1990 and approved by the Governor on 28 December 1990. The Act (Section 104g) gives the Commissioner of the Department of Planning and Natural Resources the authority to promulgate territorial lists of animals (and plants). The current (and only) list was promulgated by former Commissioner Roy Adams in 1991. A revised list of endangered and threatened species may be promulgated as new information becomes available.

The list is outdated, and suffers from a number of errors of omission and commission. Furthermore, the Act relies too much on federal rules, regulations, and acts (adoption of Endangered Species Act of 1973, Section 104a; listing of species consistent with federal criteria and rules, Sections 104b,c). Definitions of endangered and threatened species in the Act (Sections 102d,k) allow acceptance of federal listing but do not define these terms for territorial listing. Nonetheless, the Act explicitly allows listing of species by territorial criteria. All species listed by the territory are classified as endangered, not threatened, but the basis for this decision is unknown. Too much reliance on federal rules and regulations also highlights one more shortcoming of this Act, the failure to provide categories for species of lesser conservation concern. States have generally adopted 5-7 categories in their listing process but the territory still only has two categories, with an over-emphasis on up-listing species from threatened to endangered (Section 104c), rather than an emphasis on down-listing or de-listing species. Inclusion of categories for species of lesser conservation concern focuses the listing process and action plans developed therefrom to help prevent these species from being up-listed as threatened or endangered.

The Endangered Species Preservation Commission, constituted in Section 103, has the power and duty to identify and preserve endangered and threatened species in the territory (Section 104a). Before this Commission, the Wildlife Bureau of the Division of Fish and Wildlife, using the best scientific data (Section 104d) which has been thoroughly evaluated, proposes to change the current list for vertebrate animals in the Act through promulgation of a revised list by the Commissioner. This proposed change, that would require an amendment to the Act and hence changes to various sections thereto, would include seven (not just two) categories, in order of diminishing conservation concern (except for the last category). These seven categories would apply where warranted to all listed taxa. These territorial categories would be titled Endangered, Threatened, Special Concern, Peripheral, Controlled, and Unprotected species plus a seventh category called Data Deficient. All current or proposed categories use or require broad yet explicit criteria for listing that are appropriate for the small geographic scale of

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the United States Virgin Islands. Most species or subspecies considered herein reproduce (or formerly reproduced) in the United States Virgin Islands. Exceptions include some non-reproducing species that have declined locally and which also are at risk throughout a significant portion of their entire range (for species primarily in the Special Concern and Peripheral categories). If adopted, this revision from two to seven categories of conservation concern would constitute a formal amendment to the United States Virgin Islands Indigenous and Endangered Species Act of 1990. If adopted, the revised territorial list proposed herein would be the second promulgated list for vertebrate animals in the United States Virgin Islands.

The proposed territorial definitions for each of the seven categories are as follows:

Endangered: Any species, subspecies, or isolated population of a species or subspecies that is so few or depleted in number or so restricted in range or habitat due to any man-made or natural factors that it is in imminent danger of extinction or extirpation in the United States Virgin Islands. This includes many species or subspecies that have become extirpated or nearly extirpated in the United States Virgin Islands. Other species or subspecies populations usually will have also undergone a pronounced long-term decline. As a general recommendation for birds, species or subspecies populations usually will have become reduced to less than 15 breeding pairs if a non-colonial species, to less than 125 breeding pairs if a colonial species, or if not breeding (one proposed species, a shorebird) to less than 30 individuals. These general recommendations can be selectively broken, depending upon species-specific factors such as imminent threats or particular vulnerabilities in their life-history strategies.

Threatened: Any species or subspecies that is likely to become an endangered species or subspecies within the foreseeable future throughout all or a significant portion of its range in the United States Virgin Islands. Most species or subspecies populations have undergone a long-term decline, whereas a few species or subspecies populations have undergone a short-time decline or even appear to be stable but their numbers nonetheless remain critically low. As a general recommendation for birds, species or subspecies populations usually will have become reduced to less than 50 breeding pairs if a non-colonial species, to less than 250 breeding pairs if a colonial species, or if not breeding to less than 100 individuals. These general recommendations can be selectively broken, depending upon species-specific factors such as imminent threats or particular vulnerabilities in their life-history strategies.

Special Concern: Any species or subspecies that may become a threatened or endangered species within the foreseeable future throughout all or a significant portion of its range in the United States Virgin Islands. Most species or subspecies that may be declining will nonetheless have larger populations than threatened or endangered species, whereas some species with stable, or even increasing populations have always occurred in low numbers. Protection and conservation is warranted to prevent the serious depletion of these indigenous species. This list of special concern species constitutes an early warning system for wildlife biologists and the public.

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Peripheral: Any species or subspecies that is near or at the edge of its range in the United States Virgin Islands, and occurs in low numbers yet frequently enough to warrant assessment of its status as a possible special concern species. Peripheral species are worthy of protection and conservation, even though most of them are unlikely to be elevated in rank. Collection of peripheral species, as well as species of higher conservation concern, is prohibited except under permit for approved scientific projects (see Act, Section 105a).

Controlled: Any indigenous species or subspecies that while not listed as “Vermin” (Section 102n), is considered, at least under some circumstances to be a pest species. Under such circumstances, these native species or subspecies can only be killed with a federal permit. The Pearly-eyed Thrasher (*Margarops fuscatus*) is currently classified as “Vermin”, but does not satisfy the stated criteria. Thus, this native species should be removed from the “Vermin” list. The Pearly-eyed Thrasher, however, is eligible for placement on the controlled list if a future assessment warrants this decision.

Unprotected: Any exotic species or subspecies that can be killed year-round without a permit.

Data Deficient: Any species or subspecies for which insufficient information is available on population status across all main islands and cays, or a significant portion thereof. Lack of regular observations, actual or potential habitat loss and degradation, and other extinction or extirpation pressures suggests species could be in decline.

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**Proposed Promulgated Territorial List for Vertebrate Animals
of the US Virgin Islands**

Scientific Name English Name

Herpetofauna List¹

Endangered (*n* = 6)

Eleutherodactylus schwartzi Virgin Islands Bo-peep²
Eretmochelys imbricata Hawksbill Turtle
Dermochelys coriacea Leatherback Turtle
Ameiva polops St. Croix Ground Lizard
Epicrates monensis granti Virgin Islands Tree Boa
Alsophis sanctaecrucis St. Croix Racers³

Threatened (*n* = 3)

Chelonia mydas Green Turtle
Mabuya sloanii complex Slipperyback Skink⁴
Alsophis portoricensis Puerto Rican Racers⁵

Data Deficient (*n* = 6)

Eleutherodactylus lentus Mute Frog
Amphisbaena fenestrata Virgin Islands Amphisbaena
Anolis pulchellus Grass Anole
Anolis stratulus Barred Anole
Arrhyton exiguum Ground Snake
Typhlops richardi Blindsnake

Unprotected (*n* = 3)

Bufo marinus Cane Toad
Osteopilus septentrionalis Cuban Treefrog
Trachemys scripta Red-eared Slider

¹ Within each proposed territorial category, species nomenclature follows the sequence, taxonomy, and English names of the annotated checklist of West Indian amphibians and reptiles (Powell et al. 1996) and the two subsequent addendas (Powell and Henderson 1999, 2003) except for sea turtles which follows Philibosian and Yntema (1977).

² Formerly present on St. John, now extirpated.

³ Presumably extinct.

⁴ Present on some cays; likely extirpated on the three main islands.

⁵ Present on some cays; likely extirpated from St. John and St. Thomas.

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- PHILIBOSIAN, R., AND J. A. YNTEMA. 1977. Annotated checklist of the birds, mammals, reptiles, and amphibians of the Virgin Islands and Puerto Rico. Information Services, St. Croix, U.S. Virgin Islands. 48 pp.
- POWELL, R., R. W. HENDERSON, K. ADLER, AND H. A. DUNDEE. 1996. An annotated checklist of West Indian amphibians and reptiles. Pages 51-93 in Contributions to West Indian herpetology: a tribute to Albert Schwartz (Powell, R., and R. W. Henderson, editors). Society for the Study of Amphibians and Reptiles Contributions to Herpetology Volume 12. Ithaca, New York. 457 pp.
- POWELL, R., AND R. W. HENDERSON. 1999. Addenda to the checklist of West Indian amphibians and reptiles. Herpetological Review 30:137-139.
- POWELL, R., AND R. W. HENDERSON. 2003. A second set of addenda to the checklist of West Indian amphibians and reptiles. Herpetological Review 34:341-345.

Avifauna List₁

Endangered (n = 15)

- Dendrocygna arborea* West Indian Whistling-Duck
Tachybaptus dominicus Least Grebe
Puffinus iherminieri Audubon's Shearwater
Sula dactylatra Masked Booby
Fregata magnificens Magnificent Frigatebird₂
Ixobrychus exilis Least Bittern
Phoenicopterus ruber Greater Flamingo
Rallus longirostris Clapper Rail
Fulica caribaea Caribbean Coot
Charadrius alexandrinus Snowy Plover
Calidris canutus Red Knot
Megascops nudipes newtoni Puerto Rican Screech-Owl
Anthracothorax dominicus Antillean Mango
Myiarchus antillarum Puerto Rican Flycatcher
Corvus leucognaphalus White-necked Crow

Threatened (n = 9)

- Phaethon lepturus* White-tailed Tropicbird
Sula sula Red-footed Booby
Fulica americana American Coot₂
Haematopus palliatus American Oystercatcher
Catoptrophorus semipalmatus Willet
Numenius phaeopus Whimbrel
Columba leucocephala White-crowned Pigeon
Geotrygon mystacea Bridled Quail-Dove
Chordeiles gundlachi Antillean Nighthawk

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Special Concern (n = 14)

Pelecanus occidentalis Brown Pelican^{2,3}
Phaethon aethereus Red-billed Tropicbird
Anas bahamensis White-cheeked Pintail²
Oxyura jamaicensis Ruddy Duck
Egretta thula Snowy Egret
Falco peregrinus Peregrine Falcon
Charadrius wilsonia Wilson's Plover
Calidris minutilla Least Sandpiper
Limnodromus griseus Short-billed Dowitcher
Sterna dougallii Roseate Tern⁴
Sterna antillarum Least Tern
Progne dominicensis Caribbean Martin
Protonotaria citrea Prothonotary Warbler
Wilsonia citrina Hooded Warbler

Peripheral (n = 14)

Ardea herodias Great Blue Heron²
Egretta tricolor Tricolored Heron
Nycticorax nycticorax Black-crowned Night-Heron²
Sterna nilotica Gull-billed Tern²
Coccyzus americanus Yellow-billed Cuckoo²
Sphyrapicus varius Yellow-bellied Sapsucker
Dendroica coronata Yellow-rumped Warbler
Dendroica dominica Yellow-throated Warbler
Dendroica palmarum Palm Warbler
Helmitheros vermivorum Worm-eating Warbler
Seiurus motacilla Louisiana Waterthrush
Oporornis formosus Kentucky Warbler
Geothlypis trichas Common Yellowthroat
Loxigilla noctis Lesser Antillean Bullfinch⁵

Controlled (n = 2)

Bubulcus ibis Cattle Egret⁶
Larus atricilla Laughing Gull⁶

Unprotected (n = 2)

Columba livia Rock Pigeon
Passer domesticus House Sparrow

¹ Within each proposed territorial category, species nomenclature follows the sequence,
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taxonomy, and English names of the 7th edition of the American Ornithologists' Union Check-list (1998) and subsequent supplements (A.O.U. 2000, Banks et al. 2002, 2003, 2004).

2 Breeding populations only.

3 Breeding and non-breeding populations that occur in the United States Virgin Islands are listed by the federal government as endangered.

4 Population that occurs in the United States Virgin Islands is listed by the federal government as threatened.

5 The origin (introduced or natural range expansion) is in dispute.

6 Protected by the Migratory Bird Treaty Act of 1918. A depredation permit issued by the United States Fish and Wildlife Service is required to control its population in the United States Virgin Islands, even when lethal take will reduce depredation on species of conservation concern.

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Terrestrial Mammalian Fauna

Unprotected (*n* = 4)

Rattus rattus Roof Rat

Rattus norvegicus Norway Rat

Mus musculus House Mouse

Herpestes javanicus Small Indian Mongoose

Data Deficient (*n* = 4)

Noctilio leporinus Greater Bulldog Bat

Stenoderma rufum Red Fig-eating Bat¹

Brachyphylla cavernarum Antillean Fruit-eating Bat²

Tadarida brasiliensis Brazilian Free-tailed Bat³

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- ¹Recently recorded on St. John and St. Croix.
- ²Data deficient on St. Thomas only (and cays).
- ³Only recorded on St. John.

WILDLIFE BUREAU, DIVISION OF FISH AND WILDLIFE

Judy J. Pierce Wildlife Chief

Douglas B. McNair Wildlife Biologist III, St. Croix

Renata J. Platenberg Wildlife Biologist III, St. Thomas
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APPENDIX C: WEIGHTED RANKING SYSTEM

The table below details the weighting system developed for the VIFLP criteria. This system provided a quantitative method of prioritizing potential Forest Legacy Areas and will be used when identifying individual tracts of land for acquisition or conservation easements.

	Weight of Component	Weight within Component	Overall Weight
<i>Environmental</i>	80%		
Connectivity		30%	25%
Watershed Characteristics		30%	25%
Influence on Critical Habitat and Wildlife		<u>40%</u>	<u>30%</u>
<i>Subtotal</i>		100%	80%
<i>Socioeconomic</i>	20%		
Cultural/Historical		50%	10%
Recreational		25%	5%
Aesthetics		<u>25%</u>	<u>5%</u>
<i>Subtotal</i>		100%	20%
Total	100%		100%

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The table below provides an example of the worksheets used to rank individual watersheds. Watersheds that receive higher rankings are considered higher priorities. A highly fragmented watershed would receive a low score, and would therefore be a lower priority than a watershed that has stretches of continuous undeveloped land.

Connectivity --Rank 1-5 with 5 being highest. This item account for 25% of the total score

Rank:	Fish Bay	Rendezvous Bay	Coral Bay	Menneback Bay
Fragmentation	4	2	4	5
Proximity to protected area	4	3	5	5
Proximity to other forested are	4	3	5	5

APPENDIX D: THREAT INVENTORY

Workshop participants were asked to assess the level of threat of conversion to non-forest uses for each of the watersheds under consideration. This information will serve as an additional tool for decision-makers when prioritizing protection efforts. The index provided to workshop participants is below, followed by the actual results from this work.

Threat Index	
Level of Threat	Threat Rank
existing & high	6
existing & low	5

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existing	4
high	3
medium	2
low	1

**Note, "high" or "low" refers to the potential for such activity.

St. Thomas							
Watershed	Residential (one home)	Residential (group)	Commercial	Resort	Industrial	Road Building	Unpaved Roads
Magens Bay	3	3	1	1	0	3	4
Botany Bay	1	6	4	4	0	3	5
Perseverance Bay	3	1	1	1	0	1	4
Fortuna Bay	1	1	1	4	0	4	4
Santa Maria	3	3	1	1	0	4	4
Dorothea Bay	6	6	3	1	0	3	4
Threat Factor	2.8	3.3	1.8	2	0	3	4.17

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St. John							
Watershed	Residential (one home)	Residential (group)	Commercial	Resort	Industrial	Road Building	Unpaved Roads
Fish Bay	4	1	1	3	0	4	6
Rendezvous Bay	4	3	4	4	0	4	5
Coral Bay	6	6	6	6	0	6	6
Menneback Bay	6	1	1	1	0	3	5
Threat Factor	5	2.75	3	3.5	0	4.25	5.5

St. Croix							
Watershed	Residential (one home)	Residential (group)	Commercial	Resort	Industrial	Road Building	Unpaved Roads
Teague Bay	6	6	1	1	1	1	6
Turner Hole	6	6	1	6	1	1	5
Madam Carty	6	6	1	6	1	3	4
Southgate	6	6	2	3	1	3	6
Great Pond	6	6	2	6	1	3	5
Laprey Valley	1	1	1	1	1	1	4
Salt River	6	6	6	2	3	2	6
Baron Bluff	6	6	1	1	1	5	5
Northside	6	6	1	1	1	5	6
Hams Bluff	1	1	1	3	1	1	6
Creque Dam	5	6	1	1	1	6	6
Prosperity	6	6	1	3	1	2	6
Hams Bay	5	5	5	1	4	1	4
Threat Factor	5.1	5.2	1.8	2.7	1.4	2.6	5.3

APPENDIX E. THE UNIFORM CONSERVATION EASEMENT ACT

**COMMITTEE ON ECONOMIC DEVELOPMENT,
PLANNING AND ENVIRONMENTAL PROTECTION**

JULY 15, 2005

To amend title 12 Virgin Islands Code to enact the Uniform Conservation Easement Act

Senators Craig Barshinger, and Louis Patrick Hill

Co-Sponsor: Pedro "Pete" Encarnacion

BE IT ENACTED by the Legislature of the Virgin Islands:

SECTION 1. Title 12 Virgin Islands Code, is amended by adding chapter 15 to read as follows:

"CHAPTER 15 UNIFORM CONSERVATION EASEMENTS

§601. Short title.

This chapter shall be known and may be cited as the Uniform Conservation Easement Act.

§602 Applicability.

(a) This chapter applies to any interest created after its effective date which complies with this chapter, whether designated as a conservation easement or as a covenant, equitable servitude, restriction, easement or otherwise.

(b) This chapter applies to any interest created before its effective date if it would have been enforceable had it been created after its effective date unless retroactive application contravenes the constitution or laws of this State or the United States.

(c) This chapter does not invalidate any interest, whether designated as a conservation or preservation easement or as a covenant, equitable servitude, restriction, easement, or otherwise, that is enforceable under other law of this State.

§603. As used in this chapter, unless the context otherwise requires:

(a) 'Conservation easement' means a nonpossessory interest of a holder in real property imposing limitations or affirmative obligations the purposes of which include retaining or protecting natural, scenic, or open-space values of real property, assuring its availability for agricultural, forest, recreational, or open-space use, protecting natural resources, maintaining or enhancing air or water quality, or preserving the historical, architectural, archaeological, or cultural aspects of real property.

(b) 'Holder' means a governmental body empowered to hold an interest in real property under the laws of this State or the United States; or

(1) a charitable corporation, charitable association, or charitable trust, the purposes or powers of which include retaining or protecting the natural, scenic, or open-space values of real property, assuring the availability of real property for agricultural, forest, recreational, or open-space use, protecting natural resources, maintaining or enhancing air or water quality, or preserving the historical, architectural, archaeological, or cultural aspects of real property.

(c) 'Third-party right of enforcement' means a right provided in a conservation easement to enforce any of its terms granted to a governmental body, charitable corporation, charitable association, or charitable trust, which, although eligible to be a holder, is not a holder.

§604. Creation, conveyance, acceptance and duration.

(a) Except as otherwise provided in this chapter, a conservation easement may be created, conveyed, recorded, assigned, released, modified, terminated, or otherwise altered or affected in the same manner as other easements.

(b) No right or duty in favor of or against a holder and no right in favor of a person having a third-party right of enforcement arises under a conservation easement before its acceptance by the holder and a recordation of the acceptance.

(c) Except as provided in section 605(b), a conservation easement is unlimited in duration unless the instrument creating it otherwise provides.

(d) An interest in real property in existence at the time a conservation easement is created is not impaired by it unless the owner of the interest is a party to the conservation easement or consents to it.

§605. Judicial actions.

(a) An action affecting a conservation easement may be brought by:

- (1) an owner of an interest in the real property burdened by the easement;
- (2) a holder of the easement;
- (3) a person having a third-party right of enforcement; or

(4) a person authorized by other law.

(b) This chapter does not affect the power of a court to modify or terminate a conservation easement in accordance with the principles of law and equity.

§605. Validity. A conservation easement is valid even though:

(a) it is not appurtenant to an interest in real property;

(b) it can be or has been assigned to another holder;

(c) it is not of a character that has been recognized traditionally at common law;

(d) it imposes a negative burden;

(e) it imposes affirmative obligations upon the owner of an interest in the burdened property or upon the holder;

(f) the benefit does not touch or concern real property; or

(g) there is no privity of estate or of contract.

§607. Uniformity of application and construction.

The Uniform Conservation Easement Act enacted under this chapter shall be applied and construed to effectuate its general purpose to make uniform the laws with respect to the subject of the Act among states enacting it.

BILL SUMMARY

The Uniform Conservation Easement Act was drafted by the National Conference of Commissioners of Uniform State Laws in 1981. The Act has been approved by the American Bar Association and has been adopted in Alabama, Alaska, Arizona, Arkansas, Delaware, District of Columbia, Idaho, Indiana, Kansas, Kentucky, Maine, Minnesota, Mississippi, Nevada, New Mexico, Oregon, South Carolina, South Dakota, Texas, Virginia, West Virginia and Wisconsin.

In its prefatory note the Drafting Committee of the National Conference of Commissioners on Uniform State Laws (NCCUSL drafting Committee) explained:

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“The [Uniform Conservation Easement] Act enables durable restrictions and affirmative obligations to be attached to real property to protect natural and historic resources. The Uniform Conservation Easement Act provides a simple, limited way to end impediments to the use of easements under the common law. It permits the acquisition of easements as limited interests in land with the minimum disturbance of other interests and uses.”

As the National Conference explained, the Uniform Conservation Act does not compel anybody to do anything, but if it appears advantageous as a matter of gift, sale or other conveyance for the property owner to transfer an easement, the Act assures the validity of the easement. The Act promotes non-compulsory, voluntary solutions to land use problems.

Section 601 of the new chapter 15 of title 12 sets forth the short title, the Uniform Conservation Easement Act. The NCCUL Drafting Committee states the following concerning section 602, applicability:

“There are four classes of interests to which the Act might be made applicable: (1) those created after its passage which comply with it in form and purpose; (2) those created before the Act's passage which comply with the Act and which would not have been invalid under the pertinent pre-Act statutory or case law either because the latter explicitly validated interests of the kind recognized by the Act or, at least, was silent on the issue; (3) those created either before or after the Act which do not comply with the Act but which are valid under the state's statute or case law; and (4) those created before the Act's passage which comply with the Act but which would have been invalid under the pertinent pre-Act statutory or case law.

It is the purpose of Section 602 to establish or confirm the validity of the first three classes of interests. Subsection (a) establishes the validity of the first class of interests, whether or not they are designated as conservation or preservation easements. Subsection (b) establishes the validity under the Act of the second class. Subsection (c) confirms the validity of the third class independently of the Act by disavowing the intent to invalidate any interest that does comply with other applicable law.

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Constitutional difficulties could arise, however, if the Act sought retroactively to confer blanket validity upon the fourth class of interests. The owner of the land ostensibly burdened by the formerly invalid interest might well succeed in arguing that his property would be "taken" without just compensation were that interest subsequently validated by the Act. Subsection (b) addresses this difficulty by precluding retroactive application of the Act if such application "would contravene the constitution or laws of (the) State or of the United States." That determination, of course, would have to be made by a court."

Section 603 defines three central elements: What is meant by a conservation easement; who can be a holder; and who can possess a "third-party right of enforcement"

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Section 604 provides that conservation easements are created in the same manner as other easements. It provides procedures for the holder's acceptance of the easement and provides that the easement is of unlimited jurisdiction

Section 605 identifies four categories of persons who may bring actions to enforce, modify or terminate conservation easements, quiet title to parcels burdened by conservation easements, or otherwise affect conservation easements.

Section 606 removes outmoded common law defenses that could impede the use of easements for conservation or preservation ends. It comprehensively identifies these defenses and negates their use in actions to enforce conservation or preservation easements.

Section 607 ensures that the Act will be construed uniformly with the judicial decisions of the jurisdictions that have adopted it."

BR05-0531/May 18, 2005/YLT

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