Sandy Point, Green Cay and Buck Island National Wildlife Refuges

Comprehensive Conservation Plan

U.S. Department of the Interior
Fish and Wildlife Service
Southeast Region

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COMPREHENSIVE CONSERVATION PLAN

SANDY POINT, GREEN CAY AND BUCK ISLAND NATIONAL WILDLIFE REFUGES

United States Virgin Islands
Caribbean Islands National Wildlife Refuge Complex

U.S. Department of the Interior
Fish and Wildlife Service

Southeast Region
Atlanta, Georgia

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Executive Summary

The Fish and Wildlife Service has prepared this Comprehensive Conservation Plan to guide the management of Sandy Point National Wildlife Refuge, Green Cay National Wildlife Refuge, and Buck Island National Wildlife Refuge. All three refuges are in the United States Virgin Islands. Sandy Point Refuge is situated on the southwestern tip of the island of St. Croix. Green Cay Refuge is a small island several hundred yards north of St. Croix and east of the city of Christiansted. Buck Island Refuge is several miles south of the island of St. Thomas and the city of Charlotte Amalie. These three refuges are the only national wildlife refuges in the U.S. Virgin Islands, and are administered by the larger Caribbean Islands National Wildlife Refuge Complex. The Comprehensive Conservation Plan outlines programs and corresponding resource needs for the next 15 years, as mandated by the National Wildlife Refuge System Improvement Act of 1997.

Before the Fish and Wildlife Service began preparing this Comprehensive Conservation Plan, it conducted a biological review of the refuges' wildlife and habitat management programs and a visitor services review of the Sandy Point Refuge's efforts to accommodate public use. (Green Cay Refuge is closed to the public and Buck Island Refuge has no on-site staff and no active visitor services program although visitation is allowed.) The biological review team was composed of biologists from federal and U.S. Virgin Island agencies and non-governmental organizations that have an interest in the refuge. The visitor services review team consisted of Service personnel with expertise in public use.

At the outset of the comprehensive conservation planning process itself, we conducted two public scoping meetings in Charlotte Amalie on St. Thomas and Christiansted on St. Croix, to solicit public opinion of the issues, concerns, and opportunities that the plan should address. Also, a 5-month public review and comment period of the Draft Comprehensive Conservation Plan and Environmental Assessment was provided. Two public meetings were once again held on St. Thomas and St. Croix to give the public an opportunity to comment on the draft document in person.

Sandy Point National Wildlife Refuge

For Sandy Point National Wildlife Refuge, the Fish and Wildlife Service developed and analyzed four management alternatives in the draft plan. Alternative A represented the status quo, that is, no change from current management: wildlife and habitat management, public use, and visitor services would all remain the same as at present. The overall management emphasis of the refuge would continue to be the recovery of populations of threatened and endangered animal species, particularly the endangered leatherback sea turtle.

Alternative B would emphasize expanded visitor opportunities and public use at Sandy Point National Wildlife Refuge. Under this alternative, we would eliminate the refuge's seasonal beach closure – and allow the public to frequent the beach year-round on weekends during daylight hours – but continue saturation tagging of leatherback turtles, though with reduced nest management. there would be no active management of other endangered plants and no active monitoring of sea level rise.

Under Alternative C, the refuge would exclusively emphasize its biological program. Visitor services and public use would be reduced. Except for the headquarters and visitor contact station near the refuge entrance, the refuge would be closed to the public all year, as is the case at Green Cay National Wildlife Refuge, in order to protect highly sensitive species of fauna.

Alternative D would endeavor to enhance both the biological and visitor service programs at Sandy Point National Wildlfe Refuge. This is the Service's preferred alternative and is the basis for the objectives and strategies in Chapter IV of this comprehensive conservation plan.

Green Cay National Wildlife Refuge

For Green Cay National Wildlife Refuge, the Fish and Wildlife Service developed and analyzed two management alternatives in the draft plan. Under Alternative A, current management direction would be maintained at Green Cay National Wildlife Refuge. To promote recovery of the endangered St. Croix ground lizard, we would continue existing programs of reforestation, rat and invasive plant control and population monitoring. The refuge would also maintain closure of the island to public access to avoid the accidental direct mortality and habitat degradation this might cause.

In general, Alternative B for Green Cay National Wildlife Refuge would maintain all programs of Alternative A and build on or expand them. This is the Fish and Wildlife Service's preferred alternative for managing the refuge and is the basis for the objectives and strategies in Chapter IV of this comprehensive conservation plan.

Buck Island National Wildlife Refuge

For Buck Island National Wildlife Refuge, the Fish and Wildlife Service developed and analyzed two management alternatives in the draft plan. Under Alternative A, current management direction would be maintained at Buck Island National Wildlife Refuge. Staff for the refuge would continue to be based out of Sandy Point National Wildlife Refuge on St. Croix.

In Alternative A, there would continue to be no active management of the slipperyback skink, Puerto Rican racer, or other herptiles. Nor would there be active management of the magnificent frigatebird and the red-billed tropicbird. The staff would continue to monitor for rat reinvasions, after having eliminated rats from the island several years ago in an active trapping program. Other than controlling invasive species such as rats, we would not conduct any active habitat restoration on the island. There would be no active control program for invasive plant species.

In general, Alternative B would maintain all programs of Alternative A and build or expand upon them. This is the Fish and Wildlife Service's preferred alternative for managing Buck Island National Wildlife Refuge and is the basis for the objectives and strategies in Chapter IV of this comprehensive conservation plan.

I. Background

INTRODUCTION

This Comprehensive Conservation Plan (CCP) for Sandy Point National Wildlife Refuge (NWR), Green Cay National Wildlife Refuge (NWR), and Buck Island National Wildlife Refuge (NWR) in the U.S. Virgin Islands was prepared to guide management actions and direction for these three refuges. Fish and wildlife conservation will receive first priority in refuge management; wildlife-dependent recreation will be allowed and encouraged as long as it is compatible with, and does not detract from, the mission of the refuges or the purposes for which they were established.

A planning team developed a range of alternatives that best met the goals and objectives of the refuges and that could be implemented within the 15-year planning period. The draft of this plan was made available to territorial and federal government agencies, conservation partners, and the general public for review and comment. The comments from each entity were considered in the development of this CCP, describing the Fish and Wildlife Service's preferred plan.

PURPOSE AND NEED FOR THE PLAN

The purpose of this CCP is to identify the role that these three refuges will play in support of the mission of the National Wildlife Refuge System (Refuge System), and to provide long-term guidance to the refuges' management programs and activities for the next 15 years.

Specifically, the CCP will:

- provide clear statements of the management direction for each refuge;
- provide refuge neighbors, visitors, and government officials with an understanding of the Service's management actions on and around each refuge;
- ensure that the Service's management actions, including land protection and recreation/education programs, are consistent with the mandates of the Refuge System; and
- provide a basis for the development of each refuge's budget requests for operations, maintenance, and capital improvement needs.

U.S. FISH AND WILDLIFE SERVICE

The U.S. Fish and Wildlife Service (Service) traces its roots to 1871 with the establishment of the Commission of Fisheries involved with research and fish culture. The once-independent commission was renamed the Bureau of Fisheries and placed under the Department of Commerce and Labor in 1903.

The Service also traces its roots to 1886 through the establishment of a Division of Economic Ornithology and Mammalogy in the Department of Agriculture. Research on the relationship of birds and animals to agriculture shifted to delineation of the range of plants and animals, so the name was changed to the Division of the Biological Survey in 1896.

The Department of Commerce's Bureau of Fisheries was combined with the Department of Agriculture's Bureau of Biological Survey on June 30, 1940, and transferred to the Department of the Interior as the Fish and Wildlife Service. The name was changed to the Bureau of Sport Fisheries and Wildlife in 1956, and finally to the U.S. Fish and Wildlife Service in 1974.

The Service is responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people through federal programs relating to migratory birds, endangered species, interjurisdictional fish and marine mammals, and inland sport fisheries (142 DM 1.1).

As part of its mission, the Service manages more than 540 national wildlife refuges covering over 95 million acres. These areas comprise the National Wildlife Refuge System, the world's largest collection of lands set aside specifically for fish and wildlife. The majority of these lands, 77 million acres, is in Alaska. The remaining acres are spread across the other 49 states and several United States territories. In addition to refuges, the Service manages thousands of small wetlands, national fish hatcheries, 64 fishery resource offices, and 78 ecological services field stations. The Service enforces federal wildlife laws, administers the Endangered Species Act, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat, and helps foreign governments with their conservation efforts. It also oversees the Federal Aid program that distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

NATIONAL WILDLIFE REFUGE SYSTEM

The mission of the National Wildlife Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997 is:

> *... to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.*

The National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) established, for the first time, a clear legislative mission of wildlife conservation for the Refuge System. Actions were initiated in 1997 to comply with the direction of this new legislation, including an effort to complete comprehensive conservation plans for all refuges. These plans, which are completed with full public involvement, help guide the future management of refuges by establishing natural resources and recreation/education programs. Consistent with the Improvement Act, approved plans will serve as the guidelines for refuge management for the next 15 years. The Improvement Act states that each refuge shall be managed to:

- fulfill the mission of the Refuge System;
- fulfill the individual purposes of each refuge;
- consider the needs of wildlife first;
- fulfill the requirement of developing a comprehensive conservation plan for each unit of the Refuge System, and fully involve the public in the preparation of these plans;
- maintain the biological integrity, diversity, and environmental health of the Refuge System; recognize that wildlife-dependent recreation activities including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation are legitimate and priority public uses; and
- retain the authority of refuge managers to determine compatible public uses.

The following are just a few examples of the Service's national network of conservation lands. Pelican Island National Wildlife Refuge, the first refuge, was established in 1903 for the protection of colonial nesting birds in Florida, such as the snowy egret and the brown pelican. Western refuges were established for American bison (1906), elk (1912), prong-horned antelope (1931), and desert

bighorn sheep (1936) after overhunting, competition with cattle, and natural disasters decimated the once-abundant herds. The drought conditions of the Dust Bowl during the 1930s severely depleted breeding populations of ducks and geese. Refuges established during the Great Depression focused on waterfowl production areas, such as those that protected of prairie wetlands in America's heartland. The emphasis on waterfowl continues today but also includes protection of wintering habitat in response to a dramatic loss of bottomland hardwoods. By 1973, the Service began to focus on establishing refuges for endangered species.

National wildlife refuges connect visitors to their natural resource heritage and provide them with an understanding and appreciation of fish and wildlife ecology to help them understand their role in the environment. Wildlife-dependent recreation on refuges also generates economic benefits to local communities. According to the report, *Banking on Nature 2006: the Economic Benefits to Local Communities of National Wildlife Refuge Visitation*, approximately 34.8 million people visited national wildlife refuges in fiscal year 2006, generating almost $1.7 billion in total economic activity and creating almost 27,000 private sector jobs producing about $542.8 million in employment income (Carver and Caudill 2007). Additionally, recreational spending on refuges generated nearly $185.3 million in tax revenue at the local, county, state, and federal levels (Carver and Caudill 2007). As the number of visitors grows, significant economic benefits are realized by local communities. In 2006, nearly 71 million people, 16 years and older, fished, hunted, or observed wildlife, spending $45.7 billion and generating $122.6 billion (Leonard 2008).

Volunteers continue to be a major contributor to the success of the Refuge System. In 2002, volunteers contributed more than 1.5 million hours on refuges nationwide, a service valued at more than $22 million.

The wildlife and habitat vision for national wildlife refuges stresses that wildlife comes first; that ecosystems, biodiversity, and wilderness are vital concepts in refuge management; that refuges must be healthy and system growth must be strategic; and that the Refuge System serves as a model for habitat management with broad participation from others.

The Improvement Act stipulates that comprehensive conservation plans be prepared in consultation with adjoining federal, state, and private landowners and that the Service should develop and implement a process to ensure an opportunity for active public involvement in the preparation and revision (every 15 years) of the plans.

All lands of the Refuge System will be managed in accordance with an approved comprehensive conservation plan that will guide management decisions and set forth strategies for achieving refuge unit purposes. The plan will be consistent with sound resource management principles, practices, and legal mandates, including the Service's compatibility standards and other Service policies, guidelines, and planning documents (602 FW 1.1).

LEGAL AND POLICY CONTEXT

Legal Mandates, Administrative and Policy Guidelines, and Other Special Considerations

Administration of national wildlife refuges is guided by the mission and goals of the Refuge System, congressional legislation, presidential executive orders, and international treaties. Policies for management options of refuges are further refined by administrative guidelines established by the Secretary of the Interior and by policy guidelines established by the Director of the Fish and Wildlife Service. The treaties and laws relevant to the administration of the Refuge System and management of Sandy Point, Green Cay, and Buck Island NWRs are summarized in Appendix III.

These treaties, laws, administrative guidelines, and policy guidelines assist the refuge manager in making decisions pertaining to soil, water, air, flora, fauna, and other natural resources; historical and cultural resources; research; and recreation on refuge lands. They also provide a framework for cooperation between Sandy Point, Green Cay, and Buck Island NWRs and other local area partners, such as the Virgin Islands Department of Planning and Natural Resources, National Park Service, St. Croix Environmental Association, Nature Conservancy, West Indies Marine Animal Research and Conservation Service, private landowners, and community members.

Refuge System lands are closed to public use unless specifically and legally opened. No use may be allowed on or within the refuge unless it is determined to be compatible. A compatible use is a use that, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge. All programs and uses must be evaluated based on the mandates of the Improvement Act, including those that:

- contribute to ecosystem goals, as well as the purposes and goals of the refuge;
- conserve, manage, and restore fish, wildlife, and plant resources and their habitats;
- monitor the trends of fish, wildlife, and plants;
- manage and ensure appropriate wildlife-dependent visitor uses as those uses which benefit the conservation of fish and wildlife resources and which contribute to the enjoyment of the public; and
- ensure that visitor activities are compatible with refuge purposes.

The Improvement Act further identifies six priority wildlife-dependent recreational uses: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. As priority public uses of the Refuge System, they receive priority consideration in planning and management over other public uses.

Biological Integrity, Diversity, and Environmental Health Policy

The Improvement Act directs the Service to ensure that the biological integrity, diversity, and environmental health of the Refuge System are maintained for the benefit of present and future generations of Americans. This policy is an additional directive for refuge managers to follow while achieving the purposes of each refuge and the mission of the Refuge System. It provides for the consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found on the refuges and their associated ecosystems. When evaluating the appropriate management direction for refuges, refuge managers will use sound professional judgment to determine their refuges' contribution to biological integrity, diversity, and environmental health at multiple landscape scales. Sound professional judgment incorporates field experience; knowledge of refuge resources; the refuge's role within an ecosystem, local and regional; applicable laws; and best available science, including consultation with others both inside and outside the Service.

NATIONAL AND INTERNATIONAL CONSERVATION PLANS AND INITIATIVES

Because many issues affecting the protection and management of natural resources transcend geopolitical boundaries, multiple partnerships have been developed among government and private entities to address the environmental problems affecting regions. A large amount of conservation and protection information defines the role of the refuge at the local, national, international, and ecosystem levels. Conservation initiatives include broad-scale planning and cooperation between affected parties to address the declining trends of natural, physical, social, and economic

environments. The conservation plans and initiatives described below, along with issues, problems, and trends, were reviewed and integrated where appropriate into this CCP.

North American Bird Conservation Initiative. Started in 1999, the North American Bird Conservation Initiative is a coalition of government agencies, private organizations, academic institutions, and private industry leaders in the United States, Canada, and Mexico working to ensure the long-term health of North America's native bird populations by fostering an integrated approach to bird conservation to benefit all birds in all habitats. The four international and national bird initiatives include the North American Waterfowl Management Plan, Partners in Flight, Waterbird Conservation for the Americas, and the U.S. Shorebird Conservation Plan.

North American Waterfowl Management Plan. The North American Waterfowl Management Plan is an international action plan to conserve migratory birds throughout the continent. Its goal is to return waterfowl populations to their 1970s levels by conserving wetland and upland habitats. Canada and the United States signed the plan in 1986 in reaction to critically low numbers of waterfowl. Mexico joined in 1994, making it a truly continental effort. The plan is a partnership of federal, provincial, state, and municipal governments, nongovernmental organizations, private companies, and many individuals, all working towards achieving better wetland habitat for the benefit of migratory birds, other wetland-associated species, and people. The plan's projects are international in scope but implemented at regional levels. These projects contribute to the protection of habitat and wildlife species across the North American landscape.

Partners in Flight Bird Conservation Plan. Growing concern about declines in many land bird species not covered by existing conservation initiatives, primarily nongame species, led to the launching of Partners in Flight in 1990. Partners in Flight is an international, cooperative effort of government agencies, philanthropies, professional organizations, conservation groups, industry, academics, and private individuals. Its initial focus was on neotropical migratory birds—species that breed in North America and winter in Central and South America—but its emphasis has now expanded to encompass most land birds and other species requiring terrestrial habitats. Partners in Flight has a number of initiatives underway, including a North American Landbird Conservation Plan. This plan is voluntary and non-regulatory, and focuses on relatively common species in areas where conservation actions can be most effective, rather than the frequent local emphasis on rare and peripheral populations. Partners in Flight's main premise is that the resources of public and private entities in the Americas, both North and South, must be combined, coordinated, and increased if success in conserving hemispheric bird populations is to be achieved (Partners in Flight, no date).

Partners in Flight has formed bird conservation plans by bird conservation regions that set conservation priorities and habitat and population objectives. The U.S. Virgin Islands and Puerto Rico are within the Southeast Working Group, which also includes states ranging from Texas in the southwest to Maryland in the northeast (Partners in Flight, no date).

U.S. Shorebird Conservation Plan. The U.S. Shorebird Conservation Plan is a partnership effort throughout the United States that works to ensure the protection and restoration of stable and self-sustaining populations of shorebird species. The plan was developed by a wide range of agencies, organizations, and shorebird experts for separate regions of the country. It identifies conservation goals, critical habitat conservation needs, key research needs, and proposed education and outreach programs to increase awareness of shorebirds and the threats they face.

Northern American Waterbird Conservation Plan. The North American Waterbird Conservation Plan provides a framework for the conservation and management of 210 species of waterbirds in 29 nations. Threats to waterbird populations include destruction of inland and coastal wetlands; the introduction of predators and invasive species; pollutants; mortality from fisheries and industries; disturbance; and conflicts arising from over-abundant species. Particularly important habitats of the southeast region include pelagic areas, marshes, forested wetlands, and barrier and sea island complexes. Fifteen species of waterbirds are federally listed, including breeding populations of wood storks, Mississippi sandhill cranes, whooping cranes, interior least terns, and Gulf Coast populations of brown pelicans. A key objective of this plan is the standardization of data collection efforts to better recommend effective conservation measures.

RELATIONSHIP TO ISLAND TERRITORY WILDLIFE AGENCIES

A provision of the Improvement Act, and subsequent agency policy, is that the Service shall ensure timely and effective cooperation and collaboration with other state or U.S. island territory fish and game agencies and tribal governments during the course of acquiring and managing refuges. National wildlife refuges such as Sandy Point, Green Cay, and Buck Island, St. John, as well as national parks such as Buck Island Reef National Monument (BIRNM), St. Croix, and Virgin Islands National Park, provide the foundation for wildlife conservation, and contribute to the overall health and sustainability of fish and wildlife in the Territory of the United States Virgin Islands.

The U.S. Virgin Islands' Department of Planning and Natural Resources (DPNR) was established in 1987, under Act 5265 of the Government Reorganization and Consolidation Act. Among other responsibilities, the DPNR is charged with the administration and enforcement of all laws related to the preservation and conservation of fish and wildlife, trees and vegetation, coastal zones, cultural and historical resources, water resources, and air, water and oil pollution in the U.S. Virgin Islands. The DPNR formulates long-range comprehensive and functional development plans for the human, economic, and physical resources of the territory (DPNR 2005a).

The DPNR's Division of Fish and Wildlife (DFW) is responsible for monitoring, assessing, and implementing public awareness and other activities that help to enhance and safeguard fish and wildlife resources in the U.S. Virgin Islands. The DFW is the primary scientific advisor to the Commissioner of DPNR on the condition and status of the territory's wildlife and marine resources. The Commissioner, in turn, advises the Governor of the U.S. Virgin Islands. Three bureaus comprise DFW: the Bureau of Fisheries, the Bureau of Wildlife, and the Bureau of Environmental Education. Unique within DPNR, the Division of Fish and Wildlife is 100 percent federally funded by the U.S. Department of the Interior's Fish and Wildlife Service, Division of Federal Aid, and by the U.S. Department of Commerce's National Marine Fisheries Service (NMFS) and National Oceanic and Atmospheric Administration (NOAA) (DPNR 2005).

The DFW's participation and contribution throughout the planning process for the Sandy Point, Green Cay, and Buck Island NWRs' CCP will provide for ongoing opportunities and open dialogue to improve the ecological sustainability and recovery of fish and wildlife populations in the Territory of the U.S. Virgin Islands. An essential part of comprehensive conservation planning is the integration of common mission objectives, where appropriate.

II. Overview of the Refuges

INTRODUCTION

The three national wildlife refuges that are the subject of this CCP – Sandy Point, Green Cay, and Buck Island – are all in the U.S. Virgin Islands, in the eastern Caribbean Sea. They are administered by the Service as part of the Caribbean Islands National Wildlife Refuge Complex, which includes the nine refuges shown in Figure 1.

Sandy Point NWR is situated on the southwestern tip of the island of St. Croix. Green Cay NWR is a 14-acre island located less than a half mile offshore of the northeastern side of St. Croix. Buck Island NWR (which is often confused with Buck Island Reef National Monument in St. Croix, administered by the National Park Service) is situated about 2 miles south of St. Thomas (Figure 2). All three refuges constitute a subcomplex of the Caribbean Islands National Wildlife Refuge Complex. They are all managed from an office at Sandy Point NWR, St. Croix, where the refuge staff (refuge manager and refuge biologist) is based. At this time, the Green Cay and Buck Island NWRs do not have onsite facilities.

HISTORY AND PURPOSES OF THE THREE REFUGES

Sandy Point NWR, St. Croix, includes 383 acres without any inholdings (Figure 3). The refuge's establishing purposes were "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species … or (B) plants." The refuge was established in 1984 when 340 acres were purchased from the West Indies Investment Company. The land was purchased specifically to protect nesting habitat of endangered leatherback sea turtles (*Dermochelys coriacea*). An additional 43 acres have been acquired since that time to protect the Aklis pre-historic archaeological site and a stand of the endangered Vahl's boxwood tree (*Buxus vahlii*).

Sandy Point NWR provides crucial nesting habitat for three species of federally threatened and endangered sea turtles. The leatherback sea turtle and the hawksbill sea turtle (*Eretmochelys imbricata*) are federally listed as endangered, and the green sea turtle (*Chelonia mydas*) is federally listed as threatened. These three sea turtle species are also protected under Territory of the U.S. Virgin Islands regulations.

The federally endangered leatherback sea turtle is the largest sea turtle species in the world, and the largest nesting population within U.S. jurisdiction occurs at Sandy Point NWR. The leatherback sea turtle recovery program began on Sandy Point with tagging efforts in 1977, and has since developed into one of the most unique, long-term sea turtle research and recovery efforts in the world. The program is the result of cooperative efforts between partnering agencies, researchers, non-governmental organizations, and volunteers. This work resulted in the establishment of the refuge, which has enabled the nesting leatherback sea turtle population to recover and grow consistently over the last 27 years, and a scientific database that has documented this population growth. This unique database is critical for leatherback sea turtle population recovery world-wide.

Structurally, Sandy Point NWR is a peninsula supported by stable geologic formations. Although the shoreline represents one of the longest sandy beaches in the U.S. Virgin Islands, it is highly dynamic and constantly eroding and re-depositing sand throughout the year. As a result, the refuge beach represents optimal nest habitat for sea turtles and a highly desirable site for public beach recreation.

Figure 1. Location of the Caribbean Islands National Wildlife Refuge Complex, highlighting the Sandy Point, Green Cay and Buck Island NWRs

Figure 2. U.S. Virgin Islands and Sandy Point, Green Cay, and Buck Island NWRs

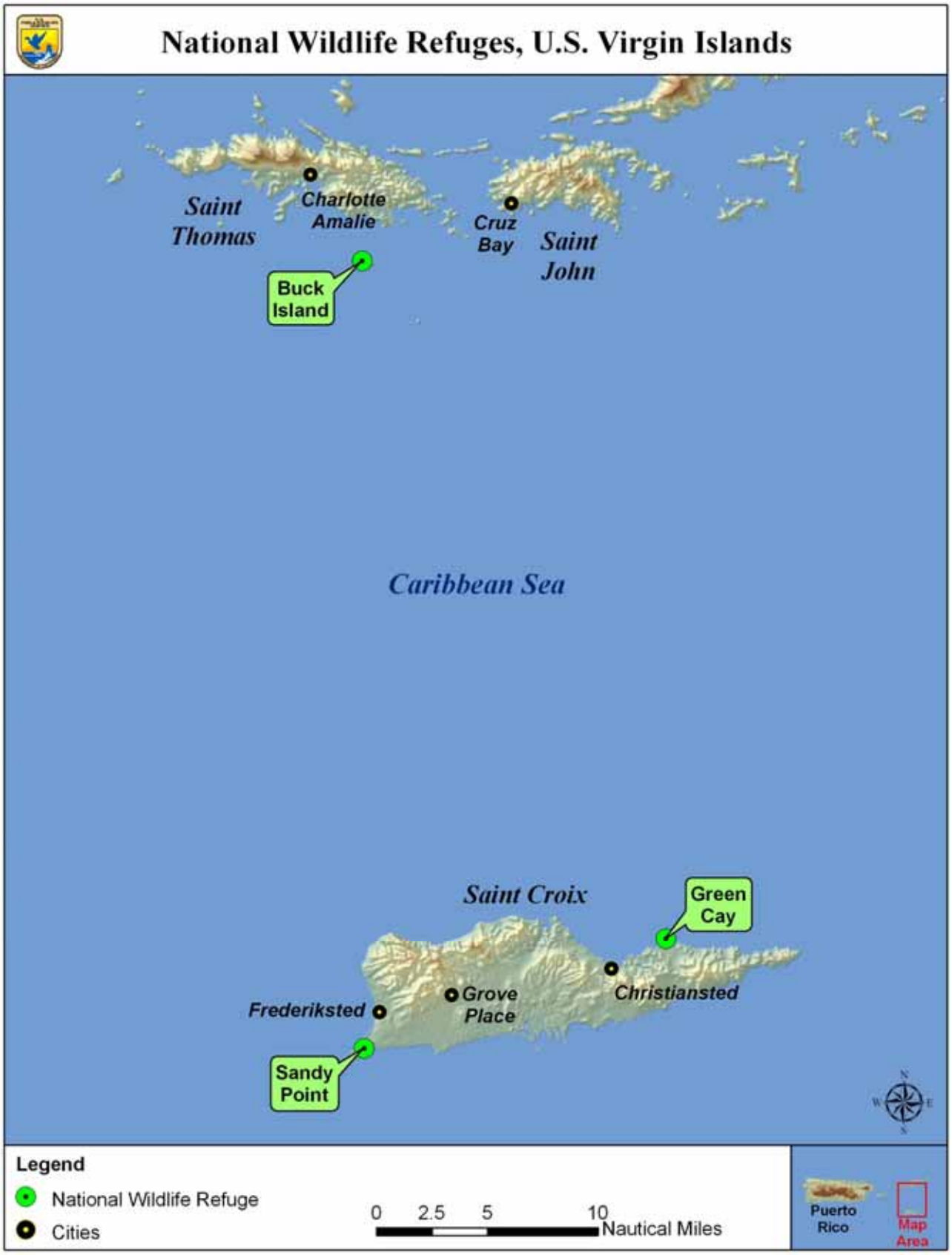


Figure 3. Aerial image and boundary of Sandy Point NWR

The principal management objectives for Sandy Point NWR are to:

- provide habitat and protection for threatened and endangered species, with particular emphasis on the leatherback and other species of sea turtles;
- foster a sense of public commitment and understanding for sea turtles and the need for protection by providing opportunities for environmental education, interpretation, and compatible wildlife-dependent recreation;
- support the Service's commitment to implement and carry out sea turtle recovery plans; and
- protect and restore habitat for a natural diversity of plant and wildlife species.

Green Cay NWR, St. Croix, was established in 1977 to protect the endangered St. Croix ground lizard (*Ameiva polops*). The refuge consists of the entire 14-acre island of Green Cay (Figure 4). The refuge's establishing purpose was to conserve "fish or wildlife which are listed as endangered species or threatened species." The refuge extends only to sea level and does not include any of the submerged marine habitat, including coral reefs which surround the island. Outcrops of lava, tuffs, and breccias are prominent terrestrial geological features. Pre-historic archaeological conch shell middens (discarded conch shells) once occurred on the shoreline. Estimated to contain as many as 33,000 shells, these middens demonstrated 1,000 years of human use or occupancy, dating back to as early as 1020 A.D.

This island refuge provides critical habitat for the largest remaining natural population of the federally endangered St. Croix ground lizard. Its extirpation from the main island of St. Croix, just several hundred yards away, is generally attributed to the modification and loss of shoreline habitat resulting from human activities, and the introduction of predators, such as mongoose, rats, cats, and dogs. The introduction of the exotic Indian mongoose likely completed the elimination of the species from St. Croix. As a result, this species is one of the rarest reptiles in the world and is unique to St. Croix island ecosystems.

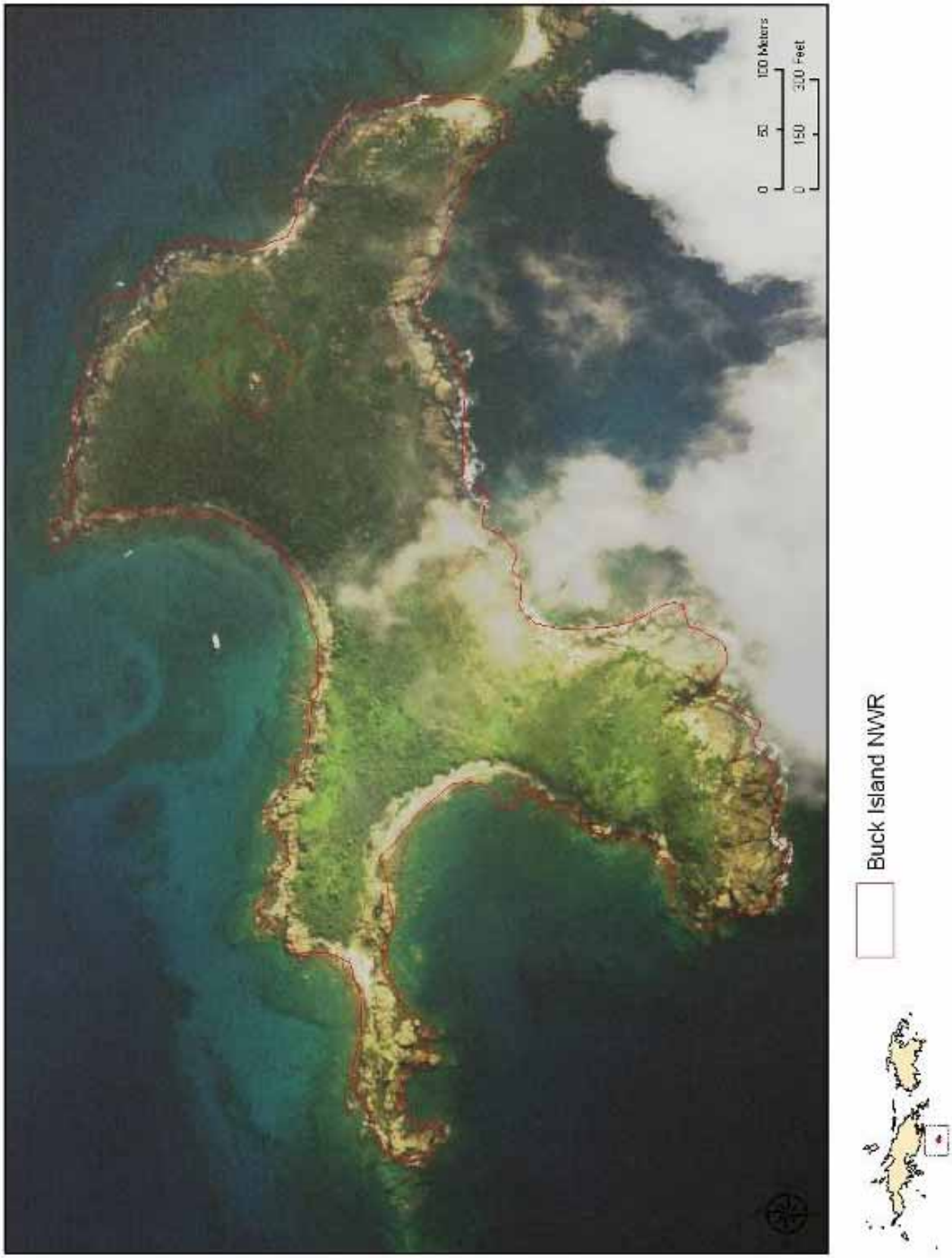
The principal management objective for Green Cay NWR is to maintain the existing population of St. Croix ground lizard at its maximum possible level in order to ensure the viability of the island population and to provide lizards for reintroduction to other suitable sites in its former range. Essential to achieving this objective is the restoration of the island's natural ecosystem, which has been badly degraded by introduced rats, deforestation, and the establishment of exotic, non-native plants. Elimination of rats is critical because rats have reduced native forest cover by eating tree seeds, shoots, buds, and seedlings. Rat elimination is also problematic because of the proximity of the island to the main island of St. Croix; the rats can easily be reintroduced to Green Cay by negligent human activities or natural processes (storms, rafting on floating debris, etc.). Reforestation of the island will also provide needed habitat for a variety of bird species, especially colonial nesting birds such as brown pelicans, egrets, herons, doves, and pigeons.

Buck Island NWR, St. Thomas, was established in 1969. The refuge consists of the entire 45-acre island (Figure 5). The refuge extends to sea level and does not include submerged or marine habitat.

Initially, the Service obtained approximately 35 acres of the island from the U.S. Navy in 1969. An additional 9 acres were obtained from the U.S. Coast Guard in 1981. The final 0.92-acre parcel, which included the historic iron lighthouse, was obtained from the U.S. Coast Guard in 2004. The purpose for establishment of the refuge was its "… particular value in carrying out the national migratory bird management program."

Figure 4. Aerial image and boundary of Green Cay NWR

Figure 5. Aerial image and boundary of Buck Island National Wildlife Refuge.



The offshore islands around St. Thomas support a number of critical seabird and migratory bird roosting, breeding, and nesting sites. Some of these offshore islands have been impacted by varying degrees of development and habitat alteration, making the remaining islands even more critical for use by migratory birds. Although Buck Island NWR's natural plant and wildlife communities have been severely impacted by human activity, the island has major potential for habitat restoration, enhancement, and support of migratory bird populations, and maintenance of existing wildlife populations, both endemic and migratory. The refuge is home to two rare reptiles endemic to the "Puerto Rican bank" (geological area containing Puerto Rico, Culebra, St. Thomas, and the British Virgin Islands): the slipperyback skink (*Mabuya sloanii*) and the Puerto Rican racer (*Alsophis portoricensis*). The island provides nesting or roosting habitat for the magnificent frigatebird (*Fregata magnificens*), red-billed tropicbird (*Phaethon aethereus*), laughing gull (*Leucophaeus atricilla*), and sooty tern (*Onychoprion fuscatus*).

The principal management objective for the refuge is to support migratory bird populations through habitat restoration and management.

While Buck Island NWR's rocky coastline and dry thorn-scrub vegetation offer less recreation potential, the surrounding waters contain coral reefs and a shipwreck that attract many snorkelers, divers, and boaters from nearby Charlotte Amalie. The U.S. Coast Guard maintains a late 1700s to mid-1800s lighthouse on the refuge, adjacent to an historic lighthouse that dates to the Danish colonial period.

SPECIAL DESIGNATIONS

None of the refuges contain special designations such as wilderness areas, wild and scenic rivers, research natural areas, or demonstration areas. The nearshore waters and beach areas of Sandy Point NWR have been federally designated as critical habitat for the leatherback sea turtle.

ECOSYSTEM CONTEXT

The three refuges are located in the Caribbean Ecosystem, as delineated by the Service's national ecosystem mapping project. This ecosystem is home to 78 threatened and endangered species (29 animals and 49 plants), including species of birds, reptiles, and amphibians, as well as unique and diverse habitats ranging from coral reefs, sandy beaches, and mangrove forests to limestone hills and forested mountains. The Caribbean Ecosystem contains nine national wildlife refuges, distributed from near Haiti, across Puerto Rico, to the U.S. Virgin Islands (U.S. Fish and Wildlife Service [USFWS], no date-a). This ecosystem ranges from tropical to subtropical in temperature and climate, borders the Atlantic Ocean in some areas, and is surrounded by the Caribbean Sea in other areas.

Since the end of World War II, human population has increased dramatically on almost every island in the Caribbean region. Existing cities, towns, and communities have dramatically increased in size and new communities have been established. Commercial and subsistence agriculture and fishing, and urban/residential expansion have heavily impacted native flora and fauna, fisheries sustainability, and reduced habitat for wildlife. Much of the economy of the Caribbean region is dependent on tourism, which is directly linked to the natural beauty of Caribbean islands and the quality of the marine ecosystems. Dramatic increases in both resident populations and visitors have resulted in overfishing, poaching, introduction of non-native and invasive species, industrial pollution, deforestation, and terrestrial, aquatic, and marine habitat degradation and destruction. While these human impacts have been accumulating for centuries, negative ecological trends have all accelerated as a result of the demands explosive human growth has placed on the environment.

Within the U.S. Virgin Islands (USVI), the demands for space and land created by a rapidly growing human population of over 100,000 have resulted in extensive loss and degradation of natural ecosystems, especially on densely populated St. Thomas (Seaman 1974). Sprawling residential communities and commercial centers have displaced or fragmented much of the native forest. Hotels, condominiums, and marinas have been constructed on coastal wetlands, and marine recreational activities have damaged fragile mangrove swamps, filled or eliminated salt ponds, and degraded coral reefs and seagrass beds. Development and human activities have led to increased pollution and the introduction of non-native and invasive plant and animal pests. Furthermore, the natural ecosystems are subject to the effects of short- and long-term wet and dry climatic cycles, and to periodic disturbances from hurricanes, including Hurricane Hugo in 1989 and Hurricane Marilyn in 1995 (DFW 2005). Since Hurricane Hugo, St. Croix has endured 5-7 additional tropical storms and hurricanes ranging from Category 1-4, continuing to impact tropical dry forest and nearshore habitats.

REGIONAL CONSERVATION PLANS AND INITIATIVES

In 2005, the DPNR's Division of Fish and Wildlife published *A Comprehensive Wildlife Conservation Strategy for the U.S. Virgin Islands* (DFW 2005). The Conservation Strategy represents a compilation of two separate planning efforts. The first is a strategic management plan for the USVI with funds from a U.S. Fish and Wildlife Service (Service) FW16 grant. The strategic plan focuses on species or species groups that are harvested commercially or recreationally, that is, to animals with "fur" or "feathers" in the USVI. The second planning effort is for a comprehensive wildlife conservation plan with funds from a Service T2 grant under the State Wildlife Grant program. This plan focuses on all non-harvested species or species groups that comprise the wildlife and marine resources of the USVI. The Service provided guidelines for writing the plan in the form of eight specific elements (Table 1).

Table 1. Eight elements of the Comprehensive Wildlife Conservation Strategy for the USVI

Element 1: Inventory	Distribution and abundance of wildlife species
Element 2: Condition	Location and condition of habitats that are vital for conserving important wildlife species
Element 3: Threats	Identification of threats to wildlife species and habitats, and prioritization of research for conservation actions
Element 4: Actions	Prescriptions and priorities for conserving wildlife species and habitats
Element 5: Monitoring	Plans for assessing effectiveness of conservation actions
Element 6: Review	Evaluation of the CWCS at intervals not to exceed ten years
Element 7: Coordination	Involvement of federal, state, and local agencies in conservation plans and actions
Element 8: Public Participation	Involvement of the general public in the development of the conservation plan and resulting actions. This involvement is required by law and is essential for the successful implementation of the CWCS

The Conservation Strategy is divided into four parts: (1) Introduction, which provides background information; (2) Habitats of the USVI, focusing on major ecosystems; (3) Wildlife Species of the USVI, focusing on taxonomic groups and high priority species; and (4) Implementation of the Strategy, addressing the relationships between the DFW and its stakeholders. Within parts 2 and 3, each chapter (a) describes the status of each conservation target, identifies its major threats, and summarizes past efforts at research, management, and conservation; (b) identifies the species of concern; (c) outlines the DFW's strategies for implementing research, management, and conservation of the target; (d) briefly describes current and future needs for assessing conservation status and effectiveness of implemented actions for conservation; and (e) provides pertinent references of previous studies in the USVI. Part 4 of the Conservation Strategy outlines the status and issues for each subject and the priorities for action (DFW 2005).

Each of the eight required elements is addressed within the Conservation Strategy. Distribution and abundance of species of wildlife (Element 1) are treated in parts 2 and 3 (Habitats and Wildlife Species), and the locations and conditions of the key habitats for these species (Element 2) are treated in part 2 (Habitats). For each species or species group and habitat, the species of concern are listed and the conservation threats and action priorities and research required to overcome these threats (Element 3) are addressed. Part 1 presents an overall territory-wide prioritization of conservation effort needed to improve the conditions of wildlife territory-wide (Element 4). Part 4 outlines the monitoring effort required to ensure long-term sustainability of wildlife populations, and to ensure the effectiveness of conservation efforts; it also discusses adaptive management strategies (Element 5), and lists specific monitoring needs for each species group and ecosystem in parts 2 and 3. Part 1 also outlines the procedure for the review of the plan into the future (Element 6). Coordination with other agencies required to develop and implement the plan is addressed in part 1 and part 4 (Element 7). Lastly, public participation (Element 8) is described in parts 1 and 4 (DFW 2005).

ECOLOGICAL THREATS AND PROBLEMS

The inherent beauty of the lands and waters of the Caribbean belies the serious conservation biology challenges facing this region. In the USVI, the threats to wildlife include habitat loss, degradation and alteration, increasing levels of pollution, burgeoning populations of non-native species of plants and animals, increasing human presence and recreational use of marine, shoreline, and terrestrial areas, and a general lack of awareness and understanding of wildlife issues. These threats are increasing in magnitude over time (DFW 2005).

The rising demand for land on which to build housing, roads, and infrastructure to support a growing population of full and part-time residents and develop resorts to accommodate a growing number of tourists generates ever-increasing pressures on wildlife habitat and biodiversity. One-third of densely populated St. Thomas is classified as "developed," and this statistic does not even consider the level of fragmentation or the integrity of the remaining "undeveloped" habitat (DFW 2005).

Existing personnel resources of resource and land management agencies in the USVI are inadequate to provide for effective enforcement. Environmental officers are in short supply, and they often lack sufficient training to identify environmental violations and take appropriate actions. In addition to the scarcity of funding and staff resources for enforcement, cultural issues within the territory make enforcement difficult. Distrust of governmental and other authority figures means violations go unreported or witnesses are not willing to testify. Traditional practices that have long been illegal, such as sea turtle harvesting and bird egg theft, are still occurring. These issues can be addressed only by a combination of judicious enforcement and community outreach and education (DFW 2005).

The incidental, accidental, or deliberate introduction of non-native species of animals and plants to island ecosystems often leads to dramatic adverse impacts on native populations of flora and fauna, not only in the USVI, but around the world. Exotics that are already present on the USVI, especially terrestrial mammals such as the small Indian mongoose (*Herpestes javanicus*), rats (*Rattus rattus and R. norvegicus*), feral domestic dogs and cats, and grazing livestock have had devastating effects on reptile and bird populations as well as plant communities. The mongoose is believed to have been the primary cause in the extirpation (elimination) of the St. Croix ground lizard from the main island of St. Croix. New introductions of plants and animals are occurring too frequently.

Plants sometimes brought in for landscaping purposes may spread rapidly across the islands and out-compete native vegetation. Examples of the most common invasives include tan-tan (*Leucaena leucocephala*) and guinea grass (*Urchloa maximum*). Animals imported as pets and livestock can carry diseases, and can escape and establish feral populations. Some species, such as frogs and lizards transported with produce or landscape vegetation, have been inadvertently introduced (DFW 2005).

Disposal of wastes and refuse is a major problem on heavily populated islands. Accumulation of trash and industrial waste, combined with point and nonpoint source water pollution from cars leaking engine oil or radiator fluid, road spills, excessive exhaust emissions, runoff containing agricultural substances (pesticides, fertilizers, and sediments), and inadequate sewer systems that frequently fail ensure a continual influx of contaminants into the ecosystem. On the USVI, household waste is collected at dumpsters located along main roads. Feral animals congregate around the dumpsters, introducing public health issues and increasing threats to native species through predation or competition for localized resources. The lack of adequate waste containment, overuse of plastic shopping bags, limited recycling opportunities (nonferrous metals), and the general culture of littering all ensure that trash finds its way into the sea to create hazards for sea turtles and other marine organisms. Infractions of dumping regulations and industrial and transportation pollution are rarely enforced. Noise pollution from aircraft, seaplanes, motorboats, and motor vehicles is also a serious nuisance, especially on overcrowded St. Thomas (DFW 2005).

The Service's conservation efforts in the Caribbean respond to these various threats (USFWS 2002). The Service lists its greatest priorities (not ranked) in the region as:

- Species of Concern and Listed Species
- Migratory Birds
- Bats
- Subtropical Dry Forest Conservation/Enhancement/Restoration
- Wetland and Mangrove Restoration
- Coral Reefs
- Invertebrates
- Invasive Exotic Species
- Law Enforcement
- Fire Management
- Contaminants

The Caribbean Islands NWR Complex protects several highly endangered ecosystems, including (1) subtropical dry forest, (2) coral reefs, and (3) seagrass beds and adjacent beaches used by nesting and foraging threatened and endangered sea turtles. The Complex also protects important habitats for migrating shorebirds, nesting seabirds, and an increasing number of sites with emergent wetlands and mangroves (USFWS 2002).

The Complex conserves wildlife and ecosystems found nowhere else in the United States. Many of the component species are endemic, such as the St. Croix ground lizard, which exists on St. Croix and nowhere else on Earth. Many migratory birds depend on habitat found within the Complex, including a large number of Fish and Wildlife Service Birds of Conservation Concern. Particularly notable are (1) species found nowhere else in the United States or elsewhere on Earth, (2) species spending part of the year in the neotropics (i.e., neotropical migratory birds), and (3) species that have unique breeding site requirements making them extremely vulnerable to decline, such as colonially nesting seabirds, waterfowl, marshbirds, and shorebirds (USFWS 2002).

In addition to the above-listed threats and problems that confront Virgin Islands wildlife, is the overarching threat of global climate change resulting from worldwide anthropogenic emissions of greenhouse gases. Global warming is not only heating the atmosphere, it is warming the world's oceans. Warmer waters, in turn, cause the ocean to expand, raising sea levels along coastlines and exposing coastal habitats and human development to flooding, especially during storms and hurricanes. In the future, hurricanes are likely to become more intense, with higher peak wind speeds and heavier precipitation (Intergovernmental Panel on Climate Change [IPCC] 2007).

Elevated sea levels will have disastrous consequences for wildlife dependent on beach and coastal habitat, such as nesting sea turtles. Because of topographic structure, many beach habitats will not "move to higher elevation" as sea level increases, they will disappear.

Furthermore, increasing seawater temperatures are harming the ecological integrity and health of marine ecosystems, causing massive coral bleaching and spreading disease in places such as Virgin Islands National Park and Buck Island Reef National Monument. Today, up to 90 percent of the corals in the Virgin Islands are dead or dying due to a host of factors, including widespread coral bleaching, in which stressed coral polyps expel from their tissues the colorful symbiotic algae they need to survive (National Wildlife Federation [NWF] 2007). In addition to the complex marine ecosystems provided by healthy coral reef systems, coral reefs also furnish physical protection to shoreline areas and entire islands from catastrophic waves generated by hurricanes and tsunamis.

Oceanographers have recently begun to express grave concern about the vast potential implications of another result of increasing atmospheric carbon dioxide levels: acidification of the surface layers of the ocean due to higher concentrations of carbonic acid, formed when the ocean absorbs carbon dioxide. While research into this phenomenon and its possible ramifications is still in its infancy, there is convincing evidence to suggest that such acidification will affect the process of calcification, whereby marine organisms like corals and mollusks construct shells and plates from calcium carbonate. Tropical and subtropical corals are anticipated to be among the worst affected, with ominous implications for the stability and longevity of the coral reefs they build and the diverse, productive, and colorful ecological communities that depend on them (Kleypas et al. 2006; Royal Society 2005).

PHYSICAL RESOURCES

CLIMATE

All three national wildlife refuges in the USVI experience a semi-arid, subtropical climate. Due to the maritime influence, there is relatively little variation in daily and seasonal temperatures. Average daily maximum temperatures are in the mid- to upper 80 degrees Fahrenheit (F), while average daily minimum temperatures range from the lower to upper seventies. Winds are predominantly trade winds blowing from the east.

Annual rainfall ranges from 35-45 inches annually (USFWS 1999a). While the Virgin Islands do not have a defined rainy season, there are month to month variations in precipitation. In descending order, the rainiest months in the Virgin Islands are November, October, September, August, and May (Anon. 2007a).

Each of the USVI refuges is exposed to hurricanes and tropical storms seasonally, with September and October being the peak of the annually recurring hurricane season.

Sandy Point NWR

Table 2 presents average maximum and minimum temperatures by month and average monthly precipitation (all of which falls as rainfall) from a Federal Aviation Administration (FAA) weather station at St. Croix's airport several miles east of Sandy Point NWR. The average annual maximum monthly temperature is about 87° F, and the average annual minimum monthly temperature is 75° F. Annual rainfall is approximately 40 inches.

Table 2. Monthly climate summary in the vicinity of Sandy Point NWR

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	84.2	84.3	85.0	85.9	87.0	88.3	89.0	89.4	89.1	88.5	86.7	85.0	86.9
Average Min. Temperature (F)	72.1	72.1	72.4	74.1	76.1	78.1	78.3	78.0	77.1	75.9	74.5	73.2	75.1
Average Total Precipitation (in.)	2.06	1.86	1.72	2.08	3.47	2.08	2.89	3.66	5.15	5.35	6.51	3.39	40.22

Source: Southeast Regional Climate Center, 2007a
Period of Record: 1/1/1972 to 12/31/2003

Green Cay NWR

Table 3 presents average maximum and minimum temperatures by month and average monthly precipitation (all of which falls as rainfall) from a weather station in Christiansted several miles west of Green Cay NWR. The average annual maximum monthly temperature is about 86° F, and the average annual minimum monthly temperature is 74° F. Annual rainfall is approximately 41 inches.

Table 3. Monthly climate summary in the vicinity of Green Cay NWR

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	83.0	83.1	83.7	84.7	86.2	87.0	86.9	87.3	87.7	87.6	85.7	83.7	85.5
Average Min. Temperature (F)	71.1	70.9	71.9	73.4	75.1	76.9	76.5	76.2	75.5	75.0	74.0	72.4	74.1
Average Total Precipitation (in.)	2.02	1.49	1.68	2.50	4.18	2.68	3.00	3.67	5.23	5.27	6.23	3.20	41.17

Source: Southeast Regional Climate Center, 2007b
Period of Record: 1/1/1972 to 11/30/2005

Buck Island NWR

Table 4 presents average maximum and minimum temperatures by month and average monthly precipitation (all of which falls as rainfall) from a weather station in Charlotte Amalie on St. Thomas, several miles north of Buck Island NWR. The average annual maximum monthly temperature is about 88° F, and the average annual minimum monthly temperature is 75° F. Annual rainfall is approximately 39 inches.

Table 4. Monthly climate summary in the vicinity of Buck Island NWR

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	85.2	85.2	85.9	86.8	87.7	89.3	90.1	90.4	89.8	89.0	87.3	85.8	87.7
Average Min. Temperature (F)	72.2	72.0	72.5	74.1	76.2	77.6	77.9	77.8	77.4	76.5	75.0	73.2	75.2
Average Total Precipitation (in.)	1.97	1.49	1.54	2.71	3.33	2.55	2.56	3.54	5.37	5.57	5.61	2.93	39.19

Source: Southeast Regional Climate Center, 2007c
Period of Record: 1/12/1972 to 12/31/2005

GEOLOGY AND TOPOGRAPHY

Although the Caribbean islands form an island arc or chain, they were not formed at the same time in the geologic past. Those of the Greater Antilles—the islands of Cuba, Jamaica, and Hispaniola (Haiti and the Dominican Republic)—are older than those of the Lesser Antilles, including the Virgin Islands. The Greater Antilles are made up of continental rock, while the Lesser Antilles consist of mostly young volcanic or coral islands. The Lesser Antilles more or less coincide with the outer edge of the Caribbean (tectonic) Plate, and many of the islands were formed by subduction, as one or more other plates slipped under the Caribbean Plate (Anon. 2007b).

Sandy Point NWR, St. Croix

The refuge is comprised of a peninsula that projects west and south from the southwestern portion of the island and includes adjacent interior coastal areas and salt ponds. In terms of geological structure, Sandy Point NWR is unique in St. Croix, which is geologically unique within the USVI.

The island of St. Croix consists of the tip of a submarine platform separated from Puerto Rico and the remaining Virgin Islands by the nearly 3-mile deep Virgin Islands Basin and Anegada Gap or trough. The upper or surface portion of the platform dates to the Late Cretaceous, and consists of predominantly sedimentary rocks derived from deep-marine volcanic origins (Panamerican Consultants 1997). As a result, St. Croix is the only island within the USVI that does not border the Atlantic Ocean; it is the only major island that is completely surrounded by the Caribbean Sea.

These predominantly sedimentary rocks are termed the Caledonia Formation, which contains mudstones, sandstones, and limestones, among other rocks. This formation occurs on both the eastern and western ends of St. Croix. The Judith Fancy Formation, dating to the very end of the Cretaceous Period, overlies the Caledonia Formation. The Judith Fancy Formation consists of a thick sequence of tuffaceous rock and is located in the western and central-eastern portion of the island. Overlying these two formations within the refuge are Quaternary alluvial and beach deposits, which form a major part of the geologic structure of the refuge (Panamerican Consultants 1997).

The eastern boundary of the refuge has the highest elevation within the refuge and contains exposed limestone formations and occasional exposed volcanic mudstone and sandstone. Westward of these exposed formations is the West End Salt Pond. Its southern two-thirds are within the refuge boundary. The western shoreline of the West End Salt Pond is only a few feet above sea level and contains mangrove habitat. Westward and southward from the salt pond, refuge habitat is almost exclusively low-elevation sandy soil supporting dry coastal thorn-scrub habitat, extending to the refuge beaches that border the Caribbean Sea.

This is what makes Sandy Point geologically unique within St. Croix. It contains the longest beach in the Virgin Islands because the beach is essentially an enormous sandy peninsula that wraps around the West End Salt Pond (and the western end of St. Croix). No other site like it exists on the island and its geologic formation is unique in the region. The peninsula originated from sand accumulation caused by oscillating north and south shore currents. Although the underlying geologic formation of sandstones and limestone is quite stable, beach areas are highly dynamic. Sand deposition and erosion occur continuously, and the width of the beach varies significantly throughout the year. Not only do these dynamic processes create extensive beach areas, but they create and maintain beach areas that are optimal as nesting sites for leatherback, green, and hawksbill sea turtles. No other sea turtle nesting sites having the same dynamic conditions exist on St. Croix, and they are very uncommon in the US Virgin Islands, the sandy beach at the western end of Buck Island Reef National Monument being a rare example. Maps dating back more than three centuries to 1667 show Sandy Point essentially the same as it is today – a flat area with a maximum elevation of less than ten feet (USFWS 1999a).

Green Cay NWR, St. Croix

Green Cay is a small, 14-acre, uninhabited island about 1,650 feet in length (northeast to southwest) and approximately 500 feet in width at its widest point. The island is about 1,200 feet north of Chenay Bay beach on the main island of St. Croix.

The southern third of the island is the highest point at 63 feet above sea level. Structurally, the island is composed primarily of igneous (volcanic) rock. The shoreline perimeter ranges from vertical to relatively steep, consisting of exposed volcanic mudstone, solidified magma, and exposed horizontal strata that has been uplifted and folded to almost vertical positions. Other portions of the shoreline are relatively narrow and range from steep to almost horizontal. At the surface these areas are composed of a mixture of loose sand and alluvial soil mixed with shells, pieces of coral, and “talus” (loose volcanic mudstone and igneous rock that has washed down to the shoreline).

Within the exposed strata are rocks consisting of layered hornblendite intrusives and roof pendants of steeply dipping quartose hornfels of the Cretaceous Caledonia Formation (Weiss and Gladfelter 1978). Some of these “quartzite” layers are almost vertical and can be seen from miles away.

The island’s slopes are covered locally with stony *terra rosa*, a reddish tropical laterite soil that has a high clay and iron content and relatively little organic material. Stones on the surface are angular chunks of closely fractured bedrock. Cliffs rim much of the island’s perimeter, but colluvial slopes

have been cut back by the surf locally, perhaps as a result of the Holocene sea level rise (Weiss and Gladfelter 1978). Severe wave-cutting of the island's perimeter, especially along the western shoreline, has continued into recent times during hurricane and strong storm episodes.

A narrow sandy beach is located at the extreme northern tip of the island. Large, exposed offshore rocks lie just north of this beach and are exposed to heavy wave action throughout the year. The island has a continuous coral reef along its eastern perimeter which protects a small beach on its southeastern shoreline. This beach is more properly a sandbar which appears and disappears throughout the year due to wave action and oscillating currents.

Buck Island NWR, St. Thomas

Buck Island has high, rocky cliffs, sheltered coves, and a very rocky shoreline. The geologic history of Buck Island is very complex. Like Green Cay, Buck Island and neighboring Capella Island are composed primarily of igneous (volcanic) rocks. The main rock is a form of diorite or granodiorite. This particular diorite more closely resembles a salt and pepper granite than diorite proper. All diorite exposures on the island are heavily weathered. The diorite weathers to a very fine granular gravel and eventually to soil (Anon. 1974).

A more siliceous form of diorite is found in a dike cutting across the granodiorite on the northeastern end of Buck Island. This rock contains considerable amounts of the mineral orthoclase feldspar, which is unusual in the USVI. It looks similar to conglomerate, characterized by large crystals of quartz, mica, and the alteration products of hornblende in a thick matrix of the mineral oligoclase. Instead of the whole rock weathering simultaneously the diorite's large crystals weather first (Anon., 1974).

Other dikes on Buck Island are composed of the igneous rock diabase, which is dark green, with dark silicates completely changed to the metamorphic minerals epidote and chlorite.

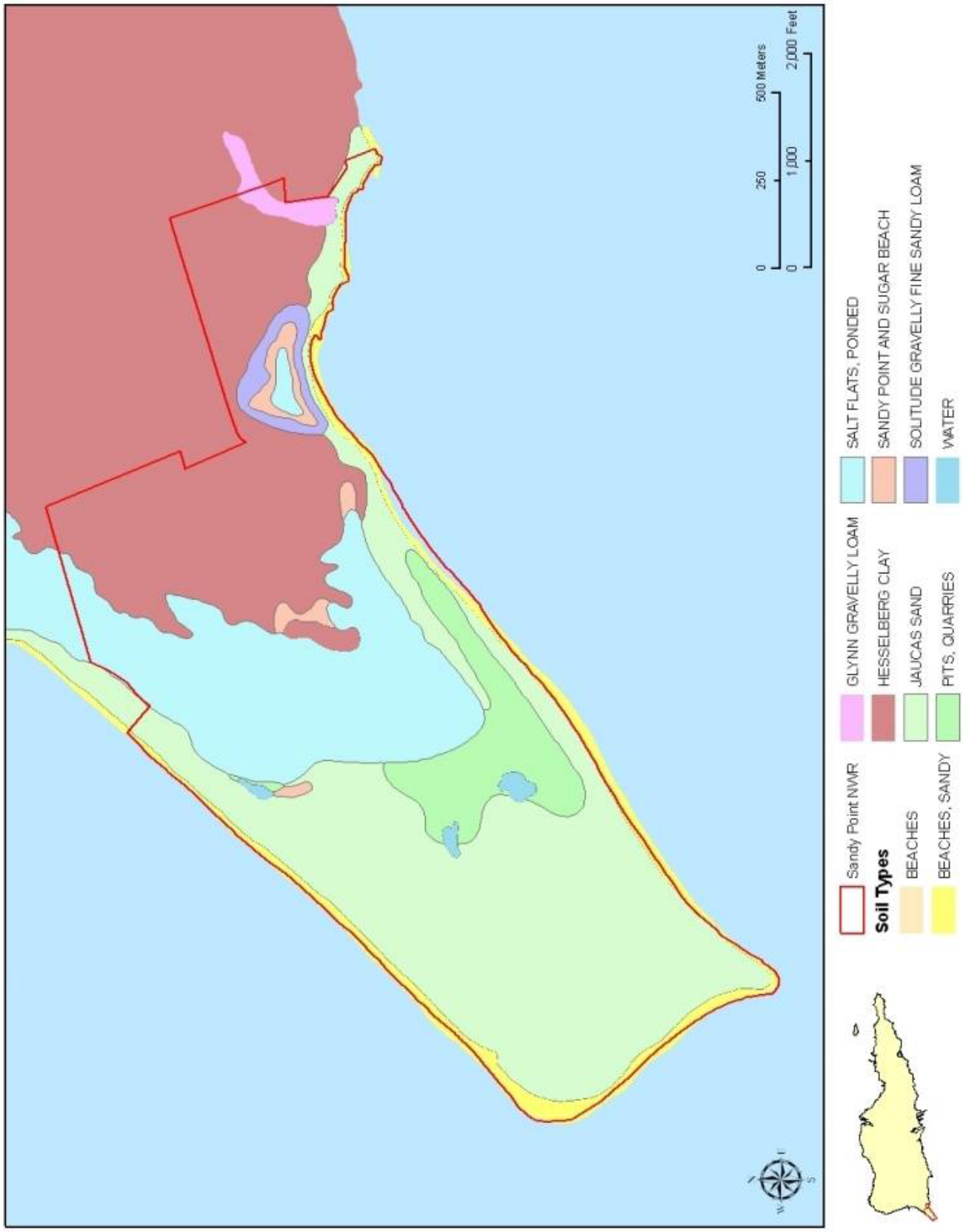
SOILS

Sandy Point NWR, St. Croix

The soils of the Sandy Point NWR are depicted in Figure 6. The most common soil type is Jaucas Sand, which forms most of the peninsula. The Natural Resources Conservation Service (NRCS) lists the following soil properties and qualities for Jaucas Sand (NRCS 1998):

- Drainage class: Excessively drained
- Permeability: Very rapid
- Available water capacity: Low
- Organic matter content: Low
- Natural fertility: Low
- Hazard of erosion: Slight
- Seasonal high water table: More than 6 feet deep
- Depth to bedrock: More than 60 inches
- Root zone: More than 60 inches
- Shrink-swell potential: Low
- Salinity: Moderately saline
- Flooding: Rare
- Stoniness: Non-stony

Figure 6. Soils of Sandy Point NWR



While the NRCS rates Jaucas Sand as “unsuited to most recreational uses” because of the severe limitations imposed by flooding, the sandy subsoil, and excess salt, and as “poorly suited to use as wildlife habitat,” it notes at the same time that this unit is in fact used mainly for recreational uses and as wildlife habitat (NRCS 1998). The refuge’s beach sand is calcareous (calcium carbonate-based sand). Because this sand is not siliceous (not a silica-based sand), its grains are flattened, not round, and do not compact tightly as silica-based sands usually do. As a result, the beach sand at the refuge remains loose and noncompacted, eroding and redepositing more readily than other sands.

Hesselberg Clay predominates on the northeastern part of the refuge. The Hesselberg series consists of shallow, well-drained soils on marine terraces, usually above a limestone base. These soils formed in alkaline, clayey sediments. Slopes range from 0 to 12 percent. The NRCS lists the following soil properties and qualities for Hesselberg Clay (NRCS 1998):

- Drainage class: Well drained
- Permeability: Slow
- Available water capacity: Low
- Organic matter content: Moderate to high
- Natural fertility: Moderate to high
- Hazard of erosion: Moderate
- Seasonal high water table: More than 6 feet deep
- Depth to bedrock: 10 to 20 inches
- Root zone: 10 to 20 inches
- Shrink-swell potential: High
- Salinity: Non-saline
- Flooding: None
- Stoniness: Non-stony

The NRCS rates this soil as “poorly suited for recreational uses” because of the depth to a cemented pan and the clayey subsoil. The NRCS also rates it as poorly suited for use as wildlife habitat because of a cemented pan, the low available water capacity, the depth to water, and the droughtiness of the soil (NRCS 1998). In fact, the soil substrate in the northern and eastern area of the refuge supports one of the last remaining portions of relatively undisturbed dry, coastal thorn-scrub habitat on St. Croix, including one of the largest stands of the federally listed endangered Vahl’s boxwood tree.

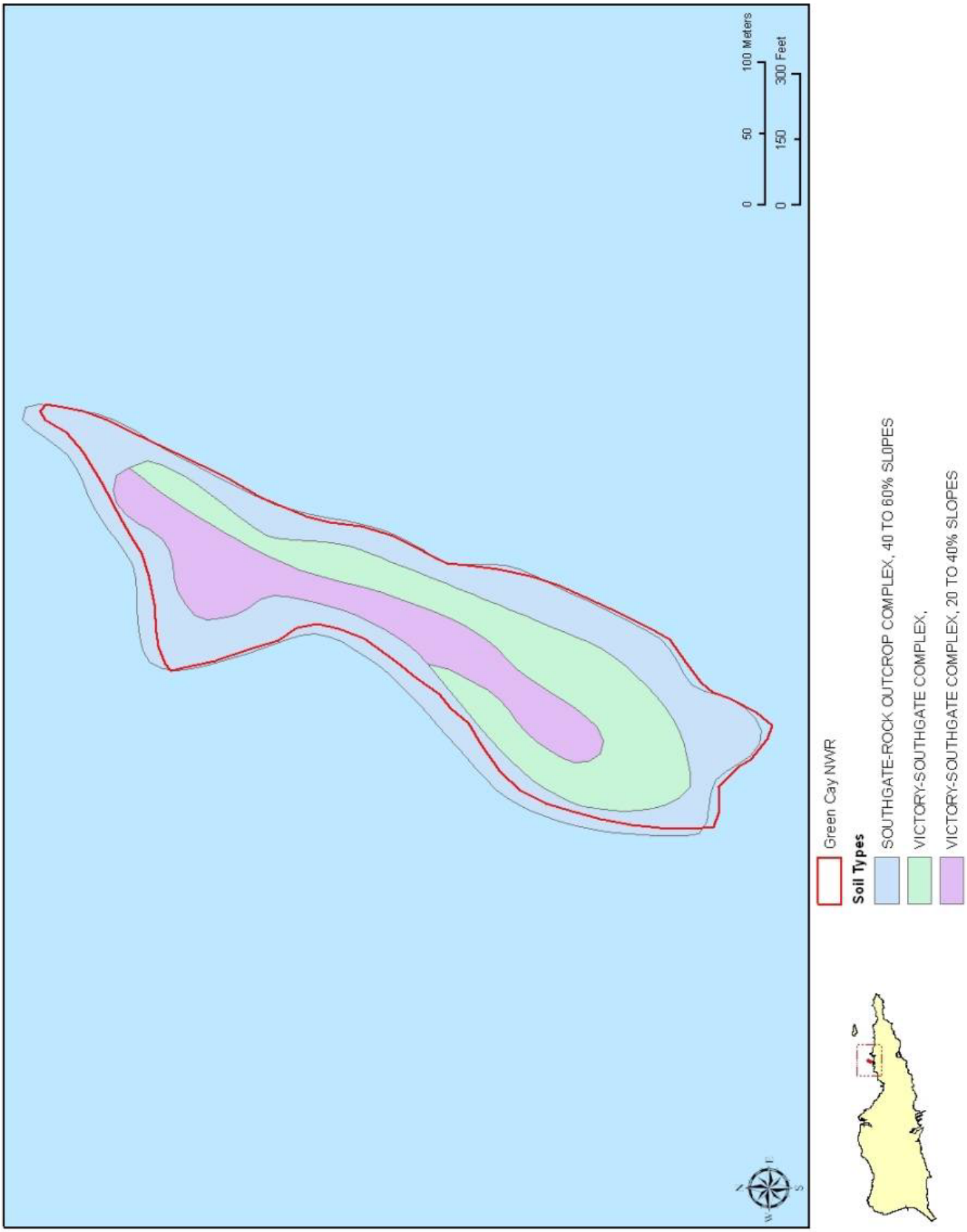
Green Cay NWR, St. Croix

The soils of the Green Cay NWR are depicted in Figure 7. Only three soil types have been identified on this small island: the Southgate-Rock Outcrop Complex, 40 to 60 percent Slopes; the Victory-Southgate Complex; and the Victory-Southgate Complex, 20 to 40 percent Slopes.

Southgate-Rock Outcrop Complex, 40 to 60 percent Slopes – The settings of this soil unit in the Virgin Islands landscapes are summits and side slopes of volcanic hills and mountains. The NRCS lists the following properties and qualities for this soil unit (NRCS 1998):

- Drainage class: Well drained
- Permeability: Moderate
- Available water capacity: Very low
- Organic matter content: Low to moderate

Figure 7. Soils of Green Cay NWR



- Natural fertility: Moderate
- Hazard of erosion: Severe
- Seasonal high water table: More than 6 feet deep
- Depth to bedrock: 10 to 20 inches
- Root zone: 10 to 20 inches
- Shrink-swell potential: Low
- Salinity: Non-saline
- Flooding: None
- Stoniness: Extremely stony

The NRCS rates this soil type as unsuited for recreation uses because of limitations imposed by slope and depth to bedrock and as poorly suited for use as wildlife habitat because of bedrock, droughtiness, and depth to water (NRCS 1998). However, of the sites where this soil unit occurs on the refuge, vegetation cover exists and provides essential habitat for St. Croix ground lizards as well as other species of birds and reptiles.

The two remaining units mapped on Green Cay—the Victory-Southgate Complex, and the Victory-Southgate Complex, 20 to 40 percent Slopes—are related to each other, representing a combination of the Victory Series and the Southgate Series. A "series" consists of soils within a soils family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. Like the Southgate-Rock Outcrop Complex just described, the Victory-Southgate Complex is also found on summits and side slopes of volcanic hills and mountains in the Virgin Islands. The NRCS lists the following properties and qualities for these two soil units (NRCS 1998):

- Drainage class: Well drained
- Permeability: Moderate
- Available water capacity: Low to very low
- Organic matter content: Low to high
- Natural fertility: Low to moderate
- Hazard of erosion: Severe
- Seasonal high water table: More than 6 feet deep
- Depth to bedrock: 10 to 40 inches
- Root zone: 10 to 40 inches
- Shrink-swell potential: Low
- Salinity: Non-saline
- Flooding: None
- Stoniness: Very stony

The NRCS rates this map unit as unsuited for recreational uses because of limitations imposed by the slope, depth to bedrock, and small stones on the surface. According to the NRCS, the Victory-Southgate Complex is also poorly suited to use as wildlife habitat because of management concerns related to the depth to bedrock, the shallow rooting depth, depth to water, and droughtiness of the soil (NRCS 1998). However, this soil unit supported an almost continuous forest canopy across most of the island prior to the arrival of Europeans. Unfortunately, this dry-forest canopy developed over many centuries, if not millennia, and was very susceptible to disturbance by human activities. The characteristics of this soil make habitat restoration problematic because the tree species involved can take centuries to mature and maintain themselves.

Buck Island NWR, St. Thomas

The soils of the Buck Island NWR are depicted in Figure 8. The island's soils are dominated by three units of the Southgate-Rock Outcrop Complex: 12 to 20 percent slopes, 20 to 40 percent slopes, and 40 to 60 percent slopes. These units are differentiated only by the severity of slope. The soil properties, limitations and uses are described in the section above under Green Cay NWR.

Another series occurs on the beaches on the north and east of the island: Redhook Extremely Stony Sand, 0 to 5 percent Slopes. The landform position of this unit is on coastal beaches that are composed of calcareous sand. The NRCS lists the following properties and qualities for this soil unit (NRCS 1998):

- Drainage class: Excessively drained
- Permeability: Very rapid
- Available water capacity: Low
- Organic matter content: Low
- Natural fertility: Low
- Hazard of erosion: Slight
- Seasonal high water table: More than 6 feet deep
- Depth to bedrock: More than 60 inches
- Root zone: More than 60 inches
- Shrink-swell potential: Low
- Salinity: Moderately saline
- Flooding: Rare
- Stoniness: Rubbly

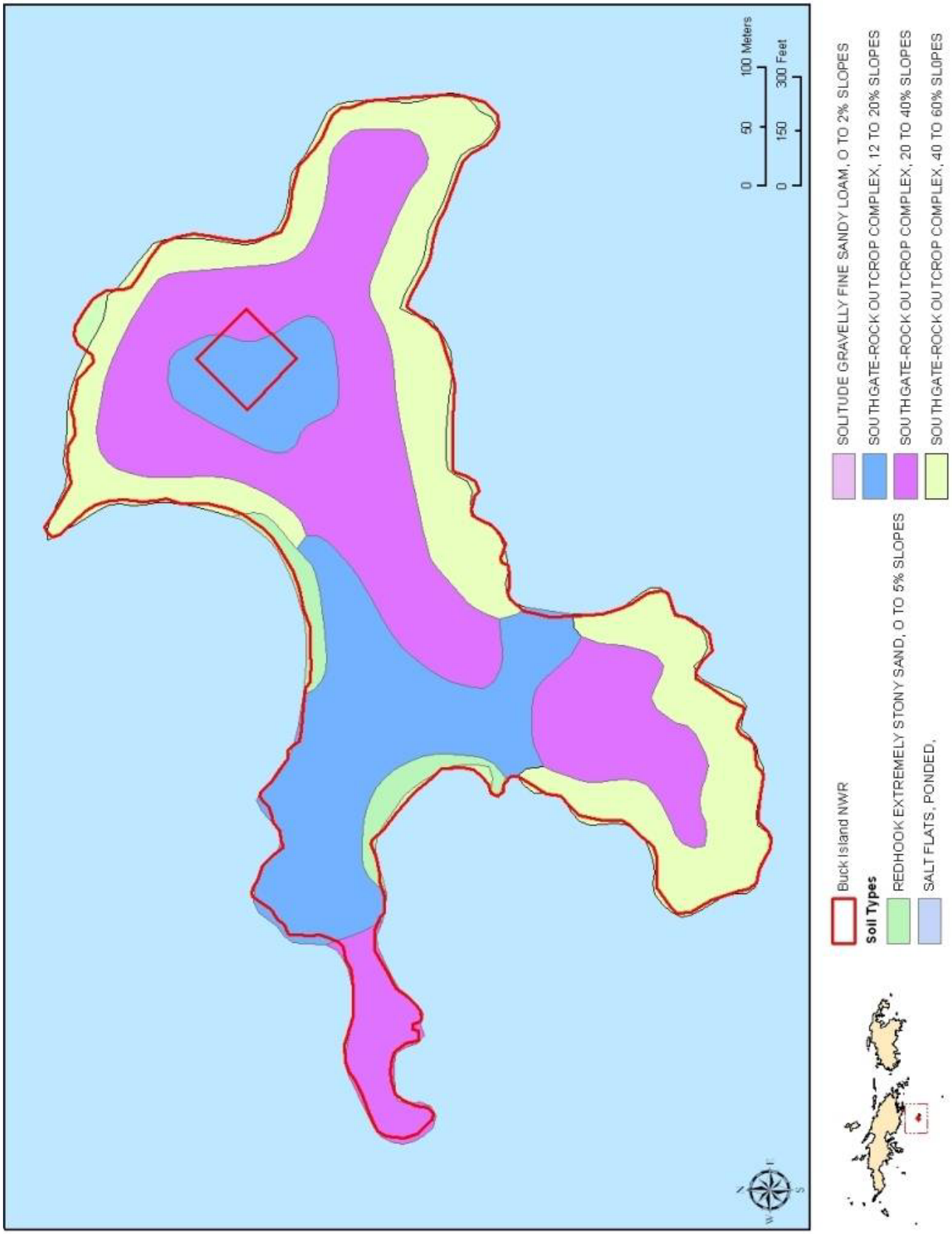
The NRCS notes that while this map unit is in fact used mainly for recreational purposes and as wildlife habitat, it is "unsuited" for the former and "poorly suited" for the latter due to a number of limitations and management concerns. However, these ratings themselves are somewhat flawed by narrow definitions as to what constitutes valuable wildlife habitat and recreational potential. Additionally, the very nature of these soil units is what ultimately determines vegetation cover and habitat characteristics. Both native plant species and native animal species have developed and are adapted to the limitations and opportunities imposed by the habitat conditions that result from these soil unit characteristics.

HYDROLOGY, WATER QUALITY AND QUANTITY

Due to their small sizes—and in the case of Sandy Point NWR, its minimal relief—there are no permanent stream courses on any of the USVI refuges. Indeed, the only surface water flow would occur during and immediately after storm events. The very low to low water capacity of the soils described in the previous section, coupled with high evapotranspiration rates (averaging 63 inches per year in the case of Green Cay), result in a water deficit throughout much of the year. Due to the drying effect of winds, available moisture varies sharply between the windward and leeward sides of the refuges, especially Green Cay and Buck Island.

All three refuges contain extensive beachfront areas influenced by the Caribbean's modest tides, wave action, and high salinity. Plant and animal life in this zone are adapted to harsh and variable physical conditions.

Figure 8. Soils of Buck Island NWR



Three-quarters of the West End Salt Pond is located in the Sandy Point Refuge. It is the largest salt pond in the Virgin Islands and is a shallow, hyper-saline, brackish lagoon ringed by mangroves without a surface outlet to the sea. The Salt Pond comprises roughly one-quarter of the refuge's area. Four other smaller salt ponds are located within the refuge's boundaries.

AIR QUALITY

The air quality in the USVI is regulated by the Division of Environmental Protection (DEP), a unit of the Department of Planning and Natural Resources (DEP 2006). The DEP provides regulatory oversight and has authority to implement and enforce air pollution and air quality requirements in the USVI. Under the auspices of its Air Pollution Control Program (APC), the DEP is responsible for both air quality and compliance monitoring, as well as for issuing permits. Air quality monitoring consists of collecting weekly particulate matter samples from five monitoring stations in the territory. On St. Croix, the local oil refinery, Hovensa—the largest in the Western Hemisphere and located approximately eight miles east of the Sandy Point Refuge—conducts sulfur dioxide monitoring at its petrochemical facility. Compliance monitoring consists of annual or more frequent inspections of regulated facilities to determine compliance. Citizens' complaints also assist the DEP in identifying sources that are out of compliance with local and or federal laws. The DEP processes applications and issues permits to construct, install and operate air pollution emission sources (DEP 2006).

Under the Federal Clean Air Act, as amended in 1970, 1977, and 1990, the United States Environmental Protection Agency (EPA) established the National Ambient Air Quality Standards (NAAQS) to protect human health with an adequate margin of safety by setting maximum ambient air concentrations for six "criteria" pollutants (de Nevers 2000). The six criteria pollutants are carbon monoxide (CO), ozone (O_3), nitrogen oxides (NOx), sulfur dioxide (SO_2), lead (Pb) and particulate matter (PM). PM is regulated both as PM_{10} (particulate matter less than or equal to 10 microns in diameter) and $PM_{2.5}$ (particulate matter less than or equal to 2.5 microns in diameter, about 1/30th the width of a human hair).

All areas of the USVI meet the EPA's new, more stringent, health-based fine particle standard. Fine particles (PM 2.5) have been shown to cause premature mortality, aggravate asthma and other unhealthy respiratory conditions and contribute to cardiovascular problems such as heart attack and arrhythmia (EPA 2004).

The National Park Service has continuously monitored ozone at Virgin Islands National Park on the island of St. John since 1998. The data indicate no exceedances of the 1-hour human health-based primary NAAQS, or any calculated exceedances of the new 8-hour primary NAAQS (National Park Service [NPS] 2005).

Dust from the Sahara Desert frequently contributes to visibility impairment at Virgin Islands National Park and the USVI in general. During these Saharan dust episodes, visibility impairment can be significant. While the issue has not been studied to date, some scientists have also expressed concern that there may also be nutrient or disease impacts associated with dust deposition in the marine environment (NPS 2005). Additionally, volcanic eruptions from Monserrat Island transport volcanic ash and sulfur dioxide to the Virgin Islands, also causing health and environmental hazards.

As part of the nationwide Toxic Release Inventory (TRI) under the auspices of the EPA, more than 600 chemicals and chemical categories of toxic releases in the Virgin Islands from a number of industries are currently tracked. The EPA reports that from 2000 to 2001, total releases of toxic substances increased from approximately 670,000 pounds to over 1,000,000 pounds. The increase was due to higher amounts of carbonyl sulfide, carbon disulfide and nitrate compounds emissions

reported by Hovensa, based on more extensive sampling at its facility. Hovensa promised the EPA that it would revise past TRI reports and use specialty catalysts to reduce their future emissions (EPA 2003). While a number of Hovensa's neighbors rate the oil refinery's environmental record highly, others claim its emissions have caused ailments ranging from skin rashes to burning eyes to nausea (Relly 1999). The Hovensa oil refinery is located roughly equidistant between Sandy Point NWR and Green Cay NWR on St. Croix, about 10 miles east of the former and 10 miles southwest of the latter.

BIOLOGICAL RESOURCES

HABITAT

The 2005 *Comprehensive Conservation Strategy for the U.S. Virgin Islands*, prepared by the DPNR's Division of Fish and Wildlife, identifies and describes several notable habitat types and subtypes that occur on the USVI and within the three Virgin Islands national wildlife refuges.

Beaches and Rocky Shorelines – This edge habitat is where marine and terrestrial ecosystems meet and overlap. The 235-mile USVI coastline (including 50 Cays) consists of both beaches and rocky shorelines; it comprises a large percentage of the total island area. Sandy beaches comprise 50 miles or over 20 percent of the total shoreline (Dammann and Nellis 1992).

There are three types of beaches in the USVI: sand, gravel, and coralline. Sandy beaches are a mixture of several materials, including coral particles, shell and urchin fragments, and algal plates. Gravel beaches are made of minerals or rocks that erode from cliffs and are carried to the shore during torrential rainfalls. Coralline rubble beaches are formed by fragments of coral skeleton broken by storm action and deposited by currents, tide, and waves.

Beaches furnish habitat for numerous invertebrates, which in turn serve as food for vertebrates, especially shorebirds. They also provide a substrate for nesting sea turtles. Shoreline plant species must be drought, heat, and salt-tolerant.

Wetlands – Wetlands are areas sufficiently inundated or saturated by water to support a prevalence of "hydrophytic" vegetation, that is, plants adapted for life in saturated soils. Wetlands are vital habitats for wildlife and fisheries, providing food, shelter from predators, protective nurseries, and filters of sediments and pollutants. Wetlands occur throughout the major islands and Cays of the USVI, and have been grouped into five categories: salt ponds, salt flats, mangrove wetlands, mixed swamp, and freshwater ponds. Two of the categories—salt ponds and mangroves—occur at Sandy Point NWR. The two island refuges—Green Cay and Buck Island—are too small, well-drained, and hilly to contain substantial wetlands.

Salt Ponds. Salt ponds are the dominant type of wetland found in the USVI. These are small bodies of saltwater that form into intertidal basins. Originally open to the sea as bays or inlets, they become isolated from the sea over time as storm-deposited materials form a berm. The resulting ponds may maintain an influx of salt water either through tidal seepage or periodic breaching of the berm by the sea during storm surges. Water salinity, oxygen content, and temperature are highly variable and dependent on rainfall and evaporation (Dammann and Nellis 1992). Salt ponds support invertebrates that are important prey for shorebirds and other waterbirds. These ponds also act as catchment basins for runoff, debris, and pollutants, thus protecting coral and seagrass beds in the marine environment.

Mangrove Wetlands. These are periodically flooded forests that grow in sheltered, tidal areas throughout the tropics. Mangroves are trees that have converged in their adaptations for colonizing quiet, shallow coastal habitats with a broad range of salinities and relatively anoxic (low oxygen) soils.

In the USVI, there are four species of trees in four distinct genera and three taxonomic families. Mangrove forest is dominated by the red mangrove (*Rhizophora mangle*), and to a lesser extent by black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia recemosa*) and buttonwood (*Conocarpus erectus*), forming a closed canopy. Mangrove woodland is similar but with a more open canopy and dominated by mangrove species other than the red mangrove. Mangrove wetlands are nursery grounds for reef fishes and invertebrates, and mangrove roots trap sediment washed from upland areas. Trapped soil eventually causes the shoreline to grow seaward over time, as terrestrial vegetation fills in the land created behind the mangrove stand.

Shrublands and Grasslands – Shrublands and grasslands are widespread in the USVI, especially on St. Croix. They occur in dry lowland areas and some moist upland areas, and are maintained by grazing, cutting, or fire. Shrublands and grasslands provide an important resource for wildlife, although they have lower wildlife species diversity than forest because of the lower diversity of plant species and simpler vegetative structure.

Shrublands. Shrublands occur in dry locations at low elevations on all islands, including Cays such as Green Cay and Buck Island. Because vegetative growth is limited by thin, infertile soils, strong winds, and minimal moisture, shrubland vegetation is relatively short, typically ranging from 2-15 feet in height. Nevertheless, shrubland vegetation is often dense and sometimes nearly impenetrable to humans. Bushy, multiple-stemmed shrubs that are often thorny and have interlocking branches typically dominate the vegetation of this habitat. Cacti and other succulents may be interspersed among the shrubs. The subtypes of USVI shrublands include gallery shrubland, thicket/scrub, mixed dry shrubland, coastal hedge, and sclerophyllous (thick, hard, leathery foliage) evergreen shrubland.

Grasslands. Grasslands occur in areas with very low rainfall or subjected to frequent disturbance by agriculture, grazing, fire, or mowing. In the Virgin Islands, most grasslands are anthropogenic, that is, a result of human activity, and represent an early stage of succession. Grassland-dominated communities with less than 10 percent cover from shrubs and trees are referred to as pasture, which is maintained by grazing or fire. When such communities are covered 10-25 percent by shrubs and trees, they are referred to as pasture mixed scrub; this usually results from succession when grazing is discontinued and fire excluded. Mixed dry grassland is 25-50 percent covered by shrubs and trees, and usually results from selective grazing by livestock that shun spiny or poisonous plants. Coastal grassland occurs naturally where extreme conditions from wind, salt spray, and low moisture combine to preclude the survival and growth of woody plants, thus enabling the growth of grasses adapted to such harsh environments.

Forests – In the USVI as elsewhere, forests are an important habitat not just for wildlife but for human consumption and recreation. The diversity of plant species and the complex structure of forests furnish a wealth of ecological niches for forest-dependent animal species to find food, seek shelter, avoid predation, and reproduce. The dominant native forest ecosystems of the USVI include subtropical dry forests and, to a smaller extent, subtropical moist forests. Forested habitats are highly variable. Although several sub-types of forest habitat are recognizable, they grade readily into one another and are generally difficult to delineate without being arbitrary.

Dry Forest. Dry forest occurs at lower elevations, typically below 1,000 feet, where annual rainfall ranges from 33-40 inches. The height of climax vegetation may reach 50-70 feet, but is shorter on steep slopes, in areas subjected to strong winds, and where exposed to heavy salt spray. Usually only two canopy layers are formed. The foliage tends to be deciduous in more humid areas and sclerophyllous in drier areas.

Moist Forest. Moist forest refers to seasonal evergreen forests with predominantly broad-leafed trees forming a canopy ranging in height from 30-100 feet. Seventy percent or more species in a moist forest are evergreen and there is typically some loss of foliage during the 2-4 month dry season. Rainfall generally exceeds 50 inches per year.

Woodlands. The woodlands that occur throughout the USVI are relatively open, characterized by separated crowns and a reduced canopy cover of about 25-60 percent. The canopy height varies from about 25-70 feet, depending upon human modifications, the effects of hurricanes, and soil moisture. Most woodlands in the USVI are "anthropogenic in origin" and often contain naturalized, non-native plants.

Except for a relatively small amount of dry forest and woodland at Sandy Point NWR, forested habitat is not well represented in any of the USVI national wildlife refuges.

Cays – More than 50 small, mostly uninhabited islands, collectively referred to as "Cays," are sprinkled throughout the USVI and comprise about three percent of the territory's total area. Because of their relative inaccessibility and the scarcity of predators on many of them, the Cays provide sanctuary for a variety of wildlife species and are especially important for colonial nesting seabirds. The varied vegetation formations on Cays include subtropical dry forest, shrublands, and grasslands. When present, salt ponds and their associated mangroves provide habitat for a variety of invertebrates, shorebirds, and indigenous waterbirds. Sparsely vegetated geological formations (such as cliffs, rock outcrops, and beaches) provide habitat for nesting seabirds and other wildlife.

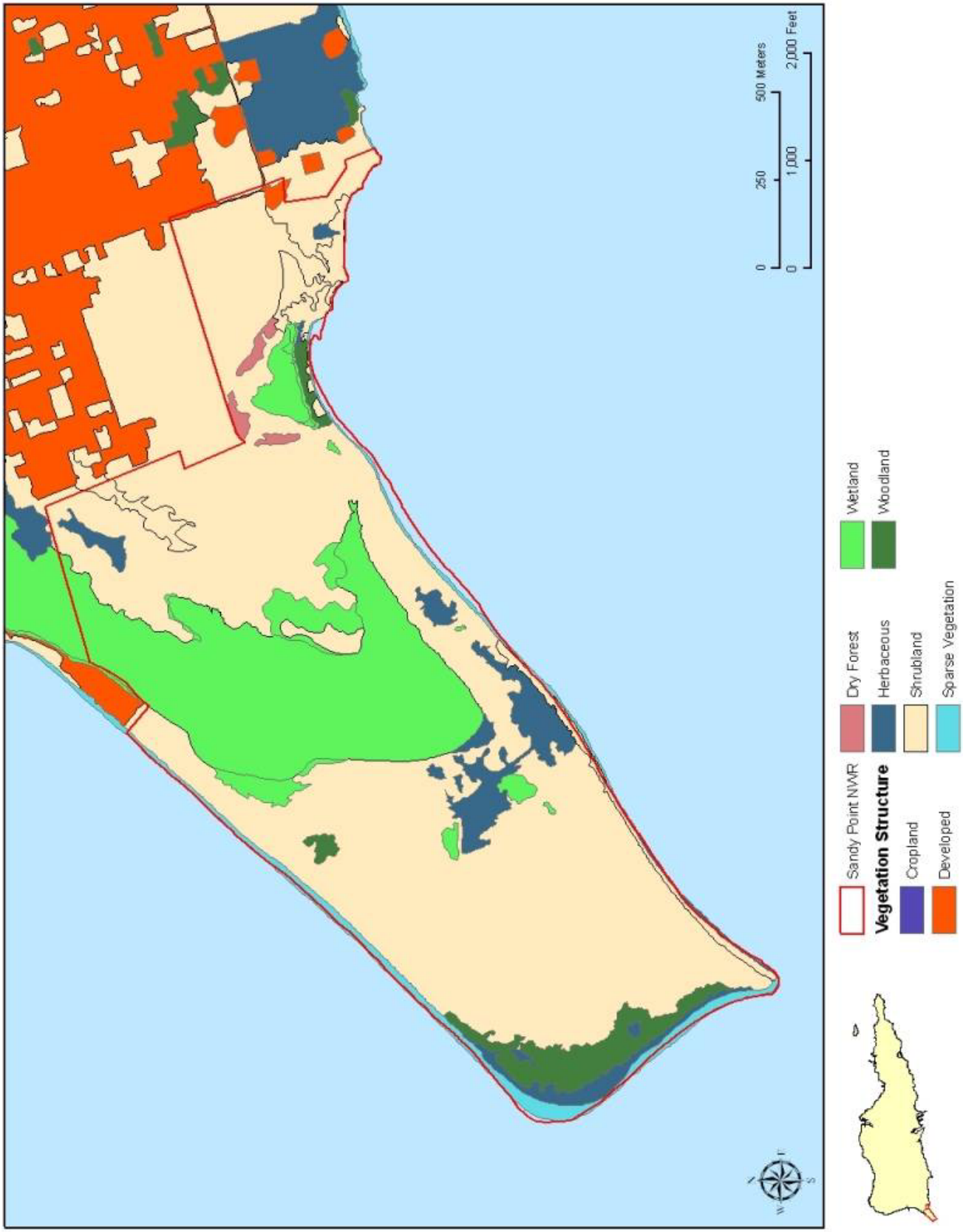
In comparison with the major islands in the USVI, the terrestrial fauna of the Cays is generally depauperate (poor in species diversity). Amphibians and many landbirds are usually absent because of the absence of subtropical forest habitat, reduced habitat complexity, and the small size of Cays. However, seabird colonies may thrive on Cays because of their very isolation and small size. Non-native species, in particular rats, are an ever-present, long-term menace to the flora and fauna of Cays. Rats both eat native vegetation and prey upon wildlife, including the eggs and nestlings of sea turtles and seabirds, and seabirds have abandoned some of these islands. Green Cay NWR and Buck Island NWR are both Cays.

Sandy Point NWR, St. Croix

Figure 9 shows the different habitats or vegetative communities present at Sandy Point National Wildlife Refuge. Most of the refuge—about two-thirds—is covered with dense shrubland, described generally in the previous section. Approximately one-quarter of the refuge consists of the West End Salt Pond, the light green area designated as wetland in Figure 9. This brackish, shallow, low-oxygen salt pond is heavily used by water-dependent birds (such as seabirds, shorebirds, wading birds and waterfowl) and is rimmed by mangroves.

The remaining 10-15 percent of the refuge is divided among the dry forest, herbaceous, sparse vegetation, and woodland categories and includes four other small salt ponds. Approximately 225 species of plants in 64 distinct taxonomic families have been identified at Sandy Point NWR (Anon. no date).

Figure 9. Principal habitats of Sandy Point NWR



Green Cay NWR, St. Croix

The first formal inventory of the flora of Green Cay was conducted nearly a quarter of a century ago (Woodbury and Vivaldi 1982). At this time, the flora consisted of over 60 species, most being native. There were approximately 12 tree, 20 shrub, 9 vine, and 18 herbaceous species. Species diversity is low at about 4.5 species per acre. Recent visits have revealed an additional five species (only one native) bringing the total species count to 65 (Lombard, pers com).

Natural forest is poorly developed except for a closed mesic forest on the southwestern part of the Cay. Other less densely forested areas are found throughout the southern half of the Cay. The dominant tree species are *Cordia ricksecker*i, *Tabebuia heterophylla*, and *Hippomane mancinella*. Most of the Cay is covered by shrubs, mainly *Eupatorium sinuatum*, *Oplonia spinosa*, *Lantana involucrata*, and *Clerodendrum aculeatum*. The northern half of the Cay primarily has a shrub-grassland association. It is characterized by impenetrable, almost mono-specific shrub stands up to two meters tall, together with wind-swept grasslands. Herbaceous plants are scattered throughout the Cay. There are three main exotic species that appear to be increasing in abundance, *Tecoma stans*, *Andropogen pertusus, and Urchloa maximum.*

Four plant communities were identified and two of these were subdivided into plant associations. Soil types and wind exposure appeared to the most significant factors determining vegetation types. The four plant communities are:

Beach Vegetation. This was restricted to the Jaucas sand on the southern end of the island. With the exception of a few buttonwood (*Conocarpus erectus*), beach vegetation was composed of shrubs, vines, and herbs less than 3 feet high.

Mesic Cordia Forest. This had the most developed trees on the island, and was restricted to the southwestern part, where a deeper, reddish soil (Victory Southgate Complex) had accumulated and the high point to the east protected the forest from the easterly trade winds. Available moisture appeared to be greater than for the rest of the island. The humid forest soil contrasted sharply with the dry and shallow soils found elsewhere. *Cordia ricksecker*i was the dominant species, reaching heights of about 25 feet and a diameter at breast height (dbh) of three feet. The second most common species in this forest was the vine *Cissus sicyoides,* found hanging from most of the trees. *Rivina humilis* was the most common shrub. The western part of this small forest and the cliff area, where a brown pelican roosting and nesting area is located, was somewhat drier than the rest of the forest and had two cacti species.

Dry Woodland. This community occupied the rest of the southern half of Green Cay. This was a more open habitat with large, dense patches of the grass *Andropogen pertusus*. A second invasive grass species, guinea grass (*Urchloa maximum*) has arrived in more recent years (Lombard, pers com) and is found in patches around the northern part of the southern hill. Here trees attained a maximum height of little more than 10-12 feet. On the basis of tree cover and species composition, two associations were delineated within this community, an open Cordia woodland and a closed Hippomane-Tabebuia woodland. The former was found mostly in the shallow, rocky soils of the Southgate-Rock land complex on the more exposed areas of Green Cay. The dominant trees were *Cordia alba* and *Cordia ricksecker*i. The exotic species *Tecoma stans* formed almost pure stands on the eastern, windward slopes and is rapidly expanding its range in all directions. The latter (Hippomane-Tabebuia woodland) had much more tree cover, shade, some litter accumulation, and close spacing of trees. For the most part, this association was found on deeper soils to the north and northeast of the southern hill.

Shrub-Grassland Association. This plant community occupied the northern half of the island. It was characterized by impenetrable, almost mono-specific shrub stands up to 6-7 feet tall, along with wind-swept grasslands. A small woodland was also present. This community was subdivided into five distinct associations, three of which were shrub associations, one woodland, and one grassland. The five associations were (1) an almost pure stand of *Lantana involucrata*, (2) an almost pure stand of *Oplonia spinosa*, (3) a narrow band of *Eupatorium sinuatum*, (4) a small Tabeubia-Hippomane-Cereus woodland, and (5) a large grassland associations with small shrubs and sedges occupying much of the northern part of the island. Today, *Tecoma stans* has begun to expand into this northern range of the Cay.

Buck Island NWR, St. Thomas

Starting in 2001, intermittent site visits and wildlife surveys have been conducted at Buck Island. Buck Island consists of a mixture of shrubland and grassland, with small interspersed patches of poorly developed subtropical dry forest or woodland. A total of 100 species of vegetation have been documented, of these only 40 have been positively identified. Approximately 65 percent of the island consists of shrubland habitat, 30 percent grassland, and the remaining 5 percent dry or woodland forest. The territorial-endangered wooly nipple cactus (*Mammalaria nivosa*) occurred in 5 clumps of 10-20 individuals and 6 other lone individuals were also observed in 2001. On more recent visits no individuals were observed.

The only formal survey of flora and habitats on the Buck Island NWR took place more than 30 years ago, several years after the refuge's establishment in 1969 (Anon. 1974). It was conducted by a team of students from the Hackley School in Tarrytown, New York, under the direction of four university biologists and marine biologists.

The main kinds of plants identified on the leeward side of Buck Island were mimosa, sea grape, wild thyme, frangipani, goat's foot, thorny shrubs and bushes, lianas, cacti, and foxtail grass. Plant cover was similar throughout the island – dense masses of thorny shrubs, choked with vines, interrupted by stretches of tall golden foxtail grasses. Near the shore, sea grape and goats foot grew abundantly. Moving inland, surveyors encountered wild thyme, lianas, frangipani, and herbs. Prickly pear and barrel cacti were numerous. Vegetation was thickest on the northern side, where shrubs entangled with vines were nearly impenetrable. Many plants had spines or thorns.

Due to the influence of wind and salt spray from waves, the flora of the windward side of Buck Island differed significantly from the flora of the leeward side. Tall bushes, shrubs and grasses were replaced by short grasses, bushes, herbs and barrel cacti. The dominant windward plants on and near the shoreline were barrel cactus, sea grape, goats foot, and the legume *Canavalia lineata*. Away from the shore, grasses were dominant, especially *Sporobolus virginicus* (marsh grass or crab grass).

WILDLIFE

Staffing constraints at the three refuges have precluded the conducting of wildlife inventories or the preparing of checklists for the five major classes of vertebrates—birds, mammals, amphibians, reptiles and fish. Management has necessarily emphasized threatened and endangered species at each refuge. Thus, the discussion of wildlife overall must be in general terms, and is drawn primarily from the DFW's *Comprehensive Wildlife Conservation Strategy for the U.S. Virgin Islands* (DFW 2005).

Terrestrial Invertebrates

In terms of biodiversity, there are far more species of invertebrates (animals without backbones) than any other fauna in the Virgin Islands. They include a wide variety of tropical snails, slugs, crabs,

spiders, scorpions, centipedes, millipedes, and insects, as well as freshwater fauna such as snails, crabs, crayfish, and a number of insect taxa. To date, the invertebrate fauna of the USVI are still poorly inventoried, in spite of efforts begun as far back as the 1920s and 1930s. The fact that not a single terrestrial invertebrate species in the USVI is currently listed as endangered or threatened by the federal and territorial governments is less a reflection of their actual status than a lack of knowledge regarding that status.

A wide diversity of terrestrial crabs live in the USVI, and many of these occur on the three refuges, especially Sandy Point. Ghost crabs (*Ocypode quadrata*) inhabit sandy beaches and can be found on all three refuges. Salt ponds, mangroves, and lagoons are home to blue crabs (*Callinectes sapidus*), which are strictly aquatic, as well as the semi-aquatic mangrove crabs (*Aratus pisonii*) and fiddler crabs (*Uca* spp.) are all found on Sandy Point as well as the great land crab (*Cardisoma guanhumi*) which is found in low-lying estuarine areas within 5 km of the coast. Soldier (hermit) crabs (*Coenobita clypeatus*) are common on all three refuges, are terrestrial except during the breeding phase, and are found in coastal scrub, mangrove forests, riparian zones and upland forests. Crabs are an important link in ecological food chains, and some species are directly exploited by humans. Ghost and fiddler crabs, for example, are valuable food resources for some species of shorebirds. Soldier crabs, meanwhile, are frequently collected for pets and for fishing bait, while blue crabs and great land crabs are harvested for food in the USVI (DFW 2005; Lombard pers comm.).

The Virgin Islands are home to a number of indigenous species of spiders, the largest and most visible of which is the tarantula (*Cyrtopholis bartholomei*). Other prominent spiders include the golden weaver spider (*Nephilia clavipes*), silver argiope (*Argiope argentata*), spiny-bodied spider (*Gasteracantha tetracantha*), and orchard spider (*Leucauge regnyi*). Little is known of their conservation status (DFW 2005).

Amphibians

Five native species of amphibians—frogs, treefrogs, and toads—inhabit the USVI, four of which are found on St. Thomas, three on St. Croix, and five on St. John (one of which is believed to be extirpated). Three non-native amphibians have also been introduced to and become naturalized on the three main islands. The status and distributions of the native species are not well documented, although one species (*Eleutherodactylus lentus*) is endemic and is listed as endangered on the International Union for the Conservation of Nature's Red List of Threatened Species (IUCN et al. 2004).

The presence and distribution of amphibians on the three refuges are uncertain, though a recent herpetological survey revealed the presence of *Eleutherodactylus lentus* at Sandy Point. Threats to amphibian populations in the USVI include habitat loss, modification, degradation, and fragmentation as well as predation and competition from introduced species (DFW 2005).

Reptiles

While the terrestrial reptiles of the Cays in the USVI are almost entirely undocumented, they have been inventoried on the main islands, and include one amphisbaenid, 11 lizards, four snakes, and two chelonians. Three lizards are endemic to St. Croix. One lizard and one snake are federally endangered, while two other species are proposed as locally threatened. Baseline information is lacking on the abundance, distribution, and basic ecological requirements of reptiles to effectively conserve and manage them in the USVI. Much of the existing information on the USVI's terrestrial reptiles is several decades old, and is incomplete or dated (DFW 2005).

The species of greatest concern on the USVI are the tree boa (*Epicrates monensis granti*), St. Croix ground lizard (*Ameiva polops*), slipperyback skink, (*Mabuya sloanii*), and the amphisbaena (*Amphisbaenia fenestrata*). Other species of concern include the Puerto Rican racer (*Alsophis portoricensis*) and blind snake (*Typhlops richardi*). There are two introduced species of management concern in the USVI: the red-eared slider (*Trachemys scripta*) and in St. Croix the *Ameiva exsul* (Lombard pers. comm.).

The Virgin Islands amphisbaena is considered a legless lizard. Its abundance and distribution within the USVI are unknown because of the difficulty in locating it. Of the two species of ground lizard found in the USVI, the common ground lizard is native to St. Thomas and St. John, and recently introduced to St. Croix. The St. Croix ground lizard, having been extirpated from the island for which it is named, is now restricted to three Cays off St. Croix, as well as BIRNM, to which a population was translocated in 2008 in a cooperative effort between the Service, NPS, DPNR-DFW, and Texas A&M. The St. Croix ground lizard is discussed more extensively under the Green Cay NWR section.

Four species of anoles are found in the USVI, of which only one, the abundant St. Croix anole (*Anolis acutus*), occurs on St. Croix. The St. Croix anole forages on the ground and perches on tree trunks from just above the ground to 10 feet high. It is distributed across a wide range of habitat types and structures on St. Croix (DFW, 2005), and is abundant at Sandy Point NWR (Lombard pers comm). The crested anole (*Anolis cristatellus*) is distributed across a wide range of habitats on St. Thomas and is abundant on Buck Island (Lombard pers comm).

The green iguana (*Iguana iguana*) is native to Central and South America, but its present distribution extends across the Caribbean, although it is absent from most uninhabited Cays in the USVI. Zoologists believe that this species was introduced to the islands by pre-Colombian Indians, although it may also have floated here; iguanas are good swimmers. The populations at Cabo Rojo and Laguna Cartagena NWRs on Puerto Rico are most likely from escaped or released pets. The green iguana inhabits a wide variety of xeric and mesic habitats. It is a large, charismatic lizard and a popular tourist icon. It is fairly common in the USVI, particularly around restaurants and tourist beaches where it basks in trees, poses for photographs, and readily accepts handouts. Many consider it to be a pest species (DFW 2005).

Two species of dwarf geckos occur in the USVI. The common dwarf gecko (*Sphaerodactylus macrolepis*) occurs on the major islands, while the St. Croix dwarf gecko (*S. beattyi*) is found only in certain areas of St. Croix and nearby Cays. Two other gecko species in the USVI are introduced—the Mediterranean house gecko (*Hemidactylus mabouia*) and the fat-tailed gecko (*Thecadactylus rapicauda*), which is only present on St. Croix. Their impact on native reptile and amphibian populations is unknown (DFW, 2005). The common dwarf gecko and the Mediterranean house gecko are both found on Sandy Point and Green Cay (Lombard pers comm.).

The slipperyback skink (*Mabuya sloanii*) is listed as territorially endangered due to a lack of recent records. The apparent absence of this species from the major islands is likely due to the presence of the introduced Indian mongoose. The skink is found in low to moderate numbers on Buck Island and a single individual was reported on Green Cay in September 2000 (Lombard 2001).

The federally endangered Virgin Islands tree boa (*Epicrates monensis granti*) is a semi-arboreal snake with a long history of extirpation and decline. In the USVI it is precariously confined to extreme eastern St. Thomas, though a small population has recently been introduced to an undisclosed Cay in the USVI as part of recovery efforts. The subspecies of Puerto Rican Racer (*Alsophis portoricensis nicholsi)* found on Buck Island is believed to be endemic (i.e., found only on Buck Island). During most site visits to Buck Island, at least one individual has been observed (Lombard pers comm.).

The terrestrial red-footed tortoise (*Geochelone carbonaria*) is widespread in tropical South America, and was probably introduced to the West Indies by pre-Columbian Indians long ago and others much more recently. It has since become naturalized in the USVI, where it inhabits forests and grasslands and consumes a diet of fruits, leaves, and flowers. The tortoise has never been documented on any of the three refuges.

The exotic red-eared slider is a highly invasive freshwater turtle native to the south-central United States. It was probably introduced to the USVI via the pet trade. This turtle is highly adaptable, and can withstand considerable temperature fluctuations as well as tolerate brackish water. In the USVI it is restricted to aquatic habitats, primarily freshwater ponds, including the ornamental ponds associated with resorts. The red-eared slider will eat almost anything, including fish, frogs, insects, snails, crustaceans, vegetation, and human kitchen refuse. The slider has never been observed on any of the three refuges.

The probable causes of the decline of terrestrial reptiles in the USVI include predation by the introduced Indian mongoose (*Herpestes javanicus*), feral house cats (*Felis domesticus*), and rats (*Rattus* spp.), as well as habitat loss, degradation and fragmentation from human development. The absence of certain species from the larger islands has been attributed to predation, primarily by the mongoose (Platenberg 2005), which has been implicated in the decline and extirpation of reptiles elsewhere in the West Indies (Powell and Henderson 2005). Habitat loss is having a significant impact on remaining herpetofauna populations. Development pressures in the USVI for tourism, housing, and commercial interests are a critical issue for most wildlife populations including terrestrial reptiles (DFW 2005).

Four species of sea turtles forage and nest within the USVI, all of which are federally protected. Sandy Point Refuge hosts one of the most important nesting sites in the United States for the federally endangered leatherback turtle (*Dermochelys coriacea*). In addition, the federally endangered hawksbill (*Eretmochelys imbricata*) and the federally threatened green turtle (*Chelonia mydas*) forage near and/or nest on all three refuges in the Virgin Islands. The federally threatened loggerhead turtle (*Caretta caretta*) has also been observed, but only around St. Croix (DFW 2005).

Birds

More than half of the landbirds breeding in North America migrate southward to winter in the Caribbean and Central or South America. Collectively termed Nearctic migrants (or “neotropical migrants” in North America), these species take advantage of seasonal feeding opportunities throughout the year. However, they are exposed to adverse weather, predation, and navigational hazards during migration. They are also susceptible to habitat reduction, fragmentation, and degradation in their breeding and wintering ranges, and also along their connecting migratory routes, including the Eastern Caribbean (McNair et al. 2002).

Many Nearctic migratory landbirds, especially warblers, winter regularly within the USVI, where the best habitat is mature intact forest on St. John. At least 59 species of migratory Nearctic landbirds have been recorded in the USVI, including five raptors, one cuckoo, two nightjars, one swift, one kingfisher, one woodpecker, one flycatcher, three vireos, six swallows, two thrushes, 30 warblers, one tanager, three grosbeaks and buntings, and two blackbirds. Of these 59 species, almost half are vagrants. Of the remaining 30 species, 14 are proposed to be territorially listed as species of special concern or peripheral, including nine warblers (DFW 2005).

Another group of landbirds found in the USVI are termed intratropical migratory landbirds; these species breed in the USVI and elsewhere in the Caribbean and migrate southward for the winter. In general, their wintering ranges in South America are poorly known.

There are only 17 year-round, or resident, landbirds in the USVI, including one hawk, one falcon, two cuckoos, one owl, three hummingbirds, three flycatchers, two mimids (mockingbird and thrasher), one warbler, one bananaquit, and two seed-eating finches. There is documentation of at least four resident landbird extinctions in the USVI from human influence (DFW 2005).

Ten species of pigeons and doves are recorded in the USVI, of which seven have established populations. The white-crowned pigeon (*Patagioenas leucocephala*), which formerly nested in large numbers on Green Cay, is listed by DFW as one of the species of greatest concern in the USVI. The white-crowned pigeon population nesting on Green Cay was subjected to uncontrolled hunting pressure for a number of years in the last century and eventually dwindled (Seaman, 1956). Aside from the former threats of overhunting and illegal poaching, the major current threats to pigeons and doves in the USVI are development and hurricanes, both of which can destroy habitat (DFW, 2005). White crowned pigeons, scaley-naped pigeons, zenaida doves, common ground doves, and white winged doves are frequently observed on Sandy Point NWR. White-crowned pigeons, zenaida doves, and common ground doves currently nest in low numbers on Green Cay. Zenaida and common ground doves have also been documented nesting in very low numbers on Buck Island (Lombard pers comm.).

The declining populations of some landbirds highlight the importance of preserving or enhancing their remaining habitats especially mature mesic, xeric, or mangrove forest. The primary cause of population declines in migratory landbirds is the loss, fragmentation, and degradation of habitat for development in both the breeding and wintering ranges. The loss of mature mangrove forest on St. Croix, including the irreplaceable human-caused destruction of Krause Lagoon in the early 1960s by Hess Oil, Martin Marietta Alumina (Davis 2007) and its natural elimination at Sugar Bay (part of the Salt River Bay system) by Hurricane Hugo in 1989, has seriously reduced the species composition and abundance of Nearctic migrants on St. Croix (DFW 2005).

Other threats to landbirds include predation, especially of eggs and young, by exotic predators including the domestic cat, mongoose and rats, collisions with vehicles and man-made structures, unprovoked destruction of nests by humans, and pesticide poisoning. Tall, lit structures cause considerable mortality during migration, especially on cloudy nights when birds often fly into them or their supporting structures such as guy wires (DFW 2005).

Seabirds are one of the most conspicuous forms of wildlife in the Caribbean. Of the 39 species of seabirds recorded in the USVI, 15 species breed here. One seabird is listed as threatened or endangered by the Service: the roseate tern (*Sterna dougallii*). The brown pelican (*Pelecanus occidentalis*) was removed (delisted) from the Federal List of Endangered and Threatened Wildlife in November 2009. Three other species are currently listed as territorially protected: the Audubon's shearwater (*Puffinus lherminieri*), white-tailed tropicbird (*Phaethon lepturus*) and least tern (*Sterna antillarum antillarum*). Brown boobies, brown pelicans, and magnificent frigatebirds occur year-round in the USVI. In contrast, most petrels, shearwaters, storm-petrels, tropicbirds, jaegers, gulls, and terns are present only during the migratory or breeding seasons. Most seabirds nest on Cays and all are piscivorous (fish-eating) except for storm-petrels, which forage predominantly on zooplankton (DFW 2005). During 2003 and 2004, brown pelicans nested on the southwestern edge of Green Cay. A total of 54 nests were documented in 2003 and 64 in 2004. Brown pelicans and magnificent frigatebirds roost year round in the trees, cliffs, and beaches on Green Cay (Lombard pers. comm.).

Most seabirds are long-lived and are characterized by delayed maturity and low reproductive rates, so the time scales of population processes are quite long, necessitating long-term monitoring to assess the status of the various species and to guide effective research and management actions (Nisbet 1989). Except for certain tern species, most seabirds nest at the same colony year after year, and rarely form new colonies (DFW 2005).

Resident seabird populations on USVI Cays are at risk from a variety of factors in spite of their relatively inaccessible nest sites. Introduced predators, especially rats (*Rattus* spp.), have caused abandonment of colonies. Introduced goats (*Capra hircus*) trample nests and devour vegetation. Excessive human disturbance may result in exposure and thus mortality of eggs and small chicks or colony abandonment by adults, and illegal egg collecting still occurs. Other threats include declining fish stocks (i.e., seabird prey) because of overfishing, pollution, entanglement in fishing line, predation by laughing gulls and peregrine falcons, and storms and hurricanes, especially during the breeding season. The Society for the Conservation and Study of Caribbean Birds states that many of the region's seabirds are in serious decline (DFW 2005; Schreiber and Lee 2000).

Twenty-tree species of waterfowl (family Anatidae—ducks, geese, and swans) have been documented within the USVI, but only three species are known to breed here. Nonbreeding waterfowl comprise two groups: nearctic migrants (15 species), which breed in North America and winter during the nonbreeding season in the USVI, and rare visitors that breed elsewhere in the Caribbean or South and Middle America (intratropical migrants—four species). White cheek pintail nests have been documented on multiple occasions on Green Cay (Lombard pers comm.).

Marshbirds are a heterogeneous assemblage of families: grebes, wading birds, and rails, gallinules, and coots (Rallidae). Two species of grebes occur in the USVI, and fifteen species of wading birds have been recorded, including four vagrants. Six species of rallids, of which four are breeding residents, have been documented within the USVI, excluding the flightless De Booy's rail (*Nesotrochis debooyi*) that became extinct before the arrival of Europeans (Wetmore 1918). Four of these rallids are breeding residents.

Shorebirds are long-billed, long-necked, and long-legged birds that typically feed on invertebrates along or near the shoreline or in short grasslands. Thirty-seven species, the largest single taxonomic group in the USVI, have been recorded from these islands and 24 of these species are of potential and practical management concern (Appendix IX). Five shorebirds currently breed within the USVI (DFW 2005).

The main threats to waterfowl, marshbirds, and shorebirds in the USVI are the loss or degradation of wetland habitats (especially coastal salt ponds and lagoons), beach development, and human recreational use of beaches. An additional threat is predation by introduced mongooses (DFW 2005).

Mammals

Only a few native species of terrestrial mammals inhabit the USVI due to their geographic isolation. At least two indigenous species are known to be extinct, based on excavation of fossil remains unearthed in American Indian kitchen middens: the rodent *Isolobon portoricensis*, and the insectivore *Nesophontes edithae*. Among terrestrial mammals, bats are the most successful at colonizing small, isolated islands because of their strong dispersal abilities, small body sizes, and low trophic levels. Six species of bats have been recorded in the USVI. Eleven species of non-native mammals have become naturalized, that is, established feral or free-ranging populations, including the domestic cat (*Felis domesticus*), domestic dog (*Canis familiaris*), small Indian mongoose (*Herpestes javanicus*), donkey (*Equus asinus*), horse (*Equus caballus*), pig or hog (*Sus scrofa*), white-tailed deer

(*Odocoileus virginianus*), goat (*Capra hircus*), roof or black rat (*Rattus rattus*), Norway rat (*Rattus norvegicus*), and house mouse (*Mus musculus*) (DFW 2005).

The mammalian species of greatest concern in the USVI are four of the six indigenous species of bats: the red fig-eating bat (*Stenoderma rufu*), greater bulldog or fishing bat (*Noctilio leporinus*), Antillean fruit-eating bat (*Brachyphylla cavernarum*), and Brazilian free-tailed bat (*Tadarida brasiliensis*). Bats occupy most terrestrial environments in the USVI except the smaller offshore Cays. The principal causes of bat population declines are the loss, fragmentation, and degradation of habitat. Large bat roosts are vulnerable to disturbance or destruction by humans. Fruit bats are potential pests to fruit growers because they may eat their crop and swimming pool owners because they may foul water (DFW 2005).

Wildlife of Sandy Point NWR, St. Croix

Wildlife surveys have focused primarily on nesting populations of federally endangered and threatened marine turtles on Sandy Point NWR, including:

- Leatherback Sea Turtle (*Dermochelys coriacea*) – federally endangered
- Atlantic Green Sea Turtle (*Chelonia mydas*) – federally threatened
- Hawksbill Sea Turtle (*Eretmochelys imbricata*) – federally endangered

Each of these is described briefly. The leatherback turtle is described more thoroughly since the refuge was established because of this endangered species. It has been the main focus of wildlife conservation efforts and funding at Sandy Point NWR over the years.

An undetermined number of the USVI invertebrates, amphibians, reptiles, birds and mammals described above may be present on this refuge.

Other threatened or endangered species occurring or potentially occurring at Sandy Point NWR include the following (USFWS 2002):

<u>Birds</u>
Brown Pelican (*Pelicanus occidentalis occidentalis*) – federally endangered (now delisted)
Caribbean Roseate Tern (*Sterna dougallii*) – federally endangered/threatened
Peregrine Falcon (*Falco peregrinus tundrius*) – territorially endangered
Least Tern (*Sterna antellarum*) – territorially endangered

<u>Plants</u>
Vahl's boxwood (*Buxus vahlii*) – federally endangered
Sandy Point or island peacock orchid (*Psychilis macconnelliae*) – territorially listed

Brown Pelican

The Caribbean subspecies or race of the brown pelican is distributed throughout the West Indies. In November 2009, with preparation of this CCP well-advanced, the entire listed species – six subspecies of brown pelican, including the Caribbean subspecies – was removed by the Service from the federal list of endangered and threatened wildlife due to recovery. The brown pelican remains protected by the provisions of the Migratory Bird Treaty Act (USFWS 2009).

Although the Caribbean subspecies resembles the eastern subspecies, the Caribbean brown pelican has a darker nonbreeding plumage above the surface. Both subspecies can weigh up to eight pounds and larger individuals have wing spreads over seven feet (USFWS, no date-b). In the USVI, breeding colonies occur at several Cays off the main islands, including Green Cay and Buck Island Reef National Monument off northern St. Croix. Pelicans normally nest in trees and shrubs but after hurricanes may nest on fallen vegetation or on the ground (DFW 2005).

The entire population of the subspecies *Pelecanus occidentalis occidentalis*, which includes the brown pelicans of eastern Mexico and the Caribbean, has been reported to have declined by 20 percent from 6,200 pairs (USFWS, 2007). The entire West Indies population has been estimated to be "about" 1,500 breeding pairs (Collazo et al. 2000, cited in Shields 2002; and USFWS 2007). The current breeding population of brown pelicans in the USVI and British Virgin Islands (BVI) is estimated at about 500-850 nesting pairs. In combination with recent counts from Puerto Rico (120-200 pairs), the current total is greater than the estimated number of 350 breeding pairs considered sufficient to maintain a sustainable population on the Puerto Rican Bank. Non-breeding pelicans are widely distributed (DFW 2005).

In St. Croix, many birds are concentrated along the southwest coast, at and in the vicinity of Sandy Point NWR, where more food is apparently available, and disturbance less. Bird surveys often documented over 100 pelicans roosting on the edge of the West End Salt Pond as well as roosting and feeding around the sandy shoreline of Sandy Point beach (Lombard pers. comm.). Large numbers of post-breeding birds apparently disperse from the USVI to Puerto Rico (Collazo et al. 1998). Small numbers occasionally roost at freshwater wetlands. The factors affecting the non-breeding abundance and distribution of Brown Pelicans in the USVI are still uncertain (DFW 2005).

Caribbean Roseate Tern

The roseate tern is a medium-sized seabird whose populations are listed by the Service as endangered in the northeastern United States and threatened in the Caribbean (USFWS 1993; USFWS 1987a). The largest breeding colonies of the Caribbean population occur on the Puerto Rican Bank, in Puerto Rico and the Virgin Islands; certain Cays tend to be favored. None of the 17 breeding sites recorded in the USVI since 1987 has been used every year. This unpredictability hinders attempts to manage and protect breeding colonies (DFW 2005).

Unlike the roseate terns of the northeastern U.S., which tend to nest under vegetation or other shelter, Caribbean populations nest in more open sites, such as narrow rock ledges, on steep slopes, or among coral rubble of rocky, offshore islands (USFWS 1993). Eggs are usually laid directly on the ground, rock, or vegetation with little or no nest material added. Eggs and young chicks are vulnerable to predation. Breeding populations in the USVI during 1997-2001 fluctuated between 773 and 2,258 pairs. For a long time, post-breeding movements of Caribbean roseate terns were poorly known, but DPNR's banding program has now documented the post-breeding movement of terns as far away as Brazil, where they intermix with northeastern roseate terns (Pierce 2009).

Roseate tern colonies in the USVI are especially susceptible to human disturbance because they are often precariously situated on readily accessible islands located near heavily used tourist areas. Other major threats include predation on eggs or chicks by laughing gulls, rats, and fire ants. Outside of the USVI, wintering terns along the northeastern coast of South America are often killed for human consumption (DFW 2005).

Peregrine Falcon

The peregrine falcon was formerly listed as federally endangered, although its populations have been gradually recovering from the deleterious effects of DDT, a pesticide banned in the United States for more than three decades, on its reproductive biology (USFWS 2006a). Consequently, its proposed down-listed territorial status is “special concern” even though predation by peregrines at important seabird colonies in the northern USVI during winter may be an important cause of mortality (DFW 2005).

Least Tern

While the Caribbean race of the least tern is not federally listed, this species is territorially listed as endangered. Little is known about the least tern (*Sterna antillarum antillarum*) in the Caribbean, including the USVI. From 2003 to 2006, a total of 56 colonies (4,640 nests) built on salt ponds, sandy beaches, offshore Cays, and an industrial park were monitored. The least tern population nesting on St. Croix is the largest known in the Caribbean. The annual number of nests ranged from 919 to 1,341. Daily nest survival rates averaged 0.92 ± 0.04. Rainfall significantly and negatively influenced daily survival rates. Estimated breeding productivity was 0.08 (i.e., female fledglings/female). Five colonies at Sandy Point Refuge were protected from predation (exclosure) and flooding (elevated platform) to determine the gains in nest survival. These colonies yielded a daily nest survival of 0.957 ± 0.02, or a gain of ~100 percent in nest survival (0.24 to 0.50) (Lombard 2007).

Leatherback Turtle

The federally endangered leatherback is the largest living marine or sea turtle on earth. Mature males and females can reach six and a half feet in length and weigh almost a ton (2000 lbs). It is the only sea turtle that lacks a hard, bony carapace (shell). Instead, the leatherback's 1.5-inch thick carapace consists of leathery, slightly flexible, oil-saturated connective tissue overlaying loosely interlocking dermal (backside) bones; five prominent longitudinal ridges run the length of the carapace and converge in a blunt point near the tail. The front flippers lack claws and scales and are proportionally longer than in other species; the back flippers are paddle-shaped. This species is so distinctive that taxonomists place it in a separate family from other marine turtles, Dermochelyidae. All other sea turtles are in the family Cheloniidae. The leatherback’s unique morphology equips it for long migrations from nest sites to distant foraging grounds (National Oceanic and Atmospheric Administration [NOAA] Fisheries, no date; National Marine Fisheries Service [NMFS] and USFWS 1992).

Much about leatherback behavior and movements remains unknown. As adults, they spend almost their entire lives in the deep waters of the open ocean. They are capable of diving to at least 1,500 meters (nearly 5,000 feet or almost one mile) in depth (West Indies Marine Animal Research and Conservation Service [WIMARCS] 2006a). Aside from the nesting season, they are rarely encountered in coastal waters. Almost nothing is known of leatherback distribution from post-hatching through sub-adulthood (DFW, 2003c).

Little is known about the diet of most marine turtles and leatherbacks are no exception. Most evidence indicates that both adults and juveniles feed almost exclusively on gelatinous organisms, especially jellyfish. In captivity, hatchlings will feed voraciously on jellyfish, eating up to twice their own body weight per day. Nonetheless, jellyfish are a poor nutritional source because their tissue consists mostly of water. It is unclear just how leatherbacks can reach their tremendous bulk on such a minimally nutritious diet alone (DFW 2003c).

Female leatherbacks lay clutches of about 100 eggs on sandy, tropical beaches. Females nest several times during the nesting season, typically at 10-day intervals. Leatherback hatchlings emerge from the nest after 60-65 days and promptly head for the edge of the sea. Leatherback turtles nest around the world, with the largest remaining nesting areas located on the coasts of northern South America and western Africa. The U.S. Caribbean, primarily Puerto Rico and the USVI, and southeast Florida support minor nesting colonies, but represent the most significant nesting activity within the jurisdiction of the United States. Adult leatherbacks can tolerate a wide range of water temperatures, and in the western Atlantic Ocean have been sighted from tropical Caribbean waters to as far north as the Gulf of Maine (NOAA Fisheries no date).

Leatherback turtles are threatened both on nesting beaches and in the marine environment. The greatest long-term causes of their population decline and the ongoing primary threats to leatherbacks worldwide are deliberate harvest and incidental capture in fishing gear. Deliberate harvesting of eggs and adults occurs on nesting beaches, while juveniles and adults are harvested on feeding grounds. Incidental (accidental) capture by fishing gear occurs primarily in gillnets, but also in trawls, traps and pots, longlines, and dredges. Altogether, these threats are serious continuing sources of mortality that thwart the leatherback's recovery (NOAA Fisheries no date). Multi-pronged, international conservation efforts are being undertaken to save this endangered species.

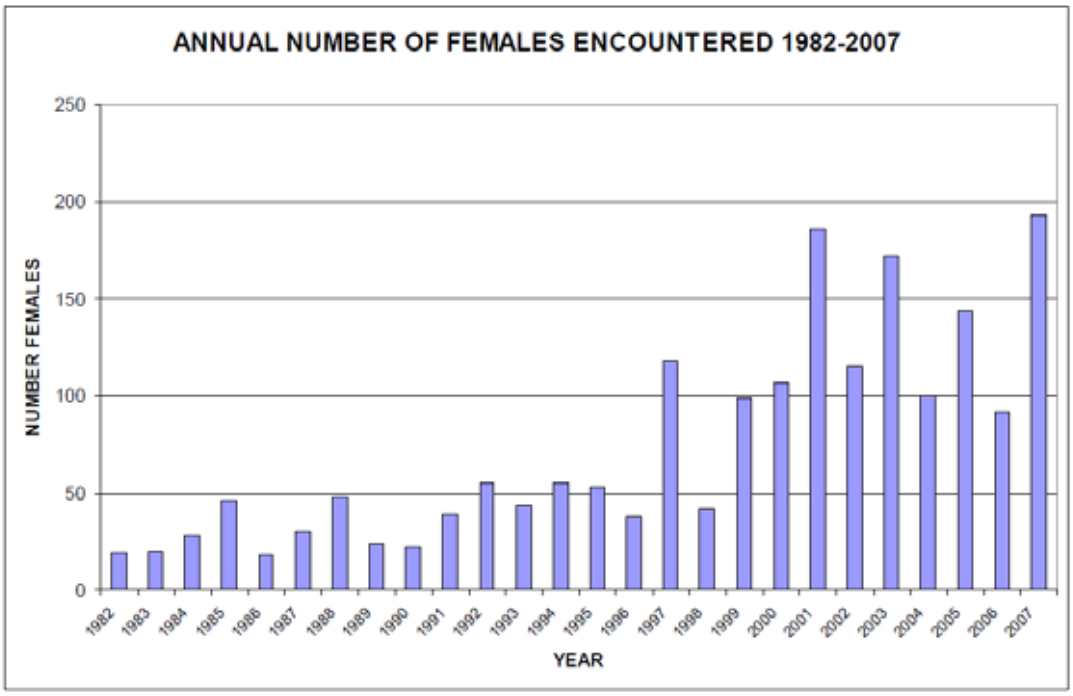
The beaches at Sandy Point NWR support the largest leatherback nesting site in the entire United States and the northern Caribbean (WIMARCS 2006a; WIMARCS 2006b). Females usually select large sandy beaches with easy access to deep waters for nesting, and Sandy Point is ideal habitat. Figure 10 shows leatherback turtle nest distribution at Sandy Point NWR. Nesting season is typically from March through August, and nesting almost always takes place at night. Nesting females haul themselves up across the beach using their front flippers, leaving behind a distinctive, large track in the sand, often 6-7 feet wide. They first sweep away loose dry sand to form a large shallow depression (a process called body pitting). Then they use their rear flippers to scoop out a hole, alternating between left and right flippers and flinging the sand forward over their heads. When the nest is deep enough (usually 2-3 feet), they proceed to lay approximately 80 eggs. They will try to disguise their nests by spreading sand after the eggs have been laid. Adult female leatherbacks migrate to nesting sites every 2-3 years. During a single season at Sandy Point, females nests every 9-10 days, typically laying 5-7 clutches in total (DFW 2003c), although as many as 11 have been recorded for one female in a season (WIMARCS 2006b).

The leatherback turtles nesting at Sandy Point NWR are not only the largest nesting population of the species in the entire U.S., but the largest continuously studied population of nesting leatherbacks in the world. Flipper tagging began in 1977; since 1981, saturation tagging and regular night patrols during the nesting season have yielded a large data set on female nesting at Sandy Point (Garner et al. 2006). During the three decades the leatherback turtle project has been conducted at Sandy Point NWR, the Service and its two main partners – the DFW and the West Indies Marine Animal Research and Conservation Service (WIMARCS), aided by more than a thousand Earthwatch volunteers logging over 100,000 hours and walking nearly as many miles – have answered a number of questions about the biology and reproductive physiology of this little-known endangered marine reptile, one of the world's oldest living vertebrates species (WIMARCS 2006b). During this time, the protection afforded by the refuge also facilitated a sizable increase in the number of nesting leatherbacks, from less than 20 in 1982 to more than 100 for most years in the present decade (Figure 11).

In the 2007 nesting season, 193 turtles laid a total of 989 nests with an average of about 78 yolked eggs per clutch. Of these nests, 303 (31 percent) were relocated to protect them from inundation or erosion. The number of nests per female ranged from 0 to 10. One hundred and thirty-three (133) or

Figure 10. Distribution of leatherback turtle nests at Sandy Point NWR, 2006

Figure 11. Annual number of leatherback females at Sandy Point NWR, 1982-2007



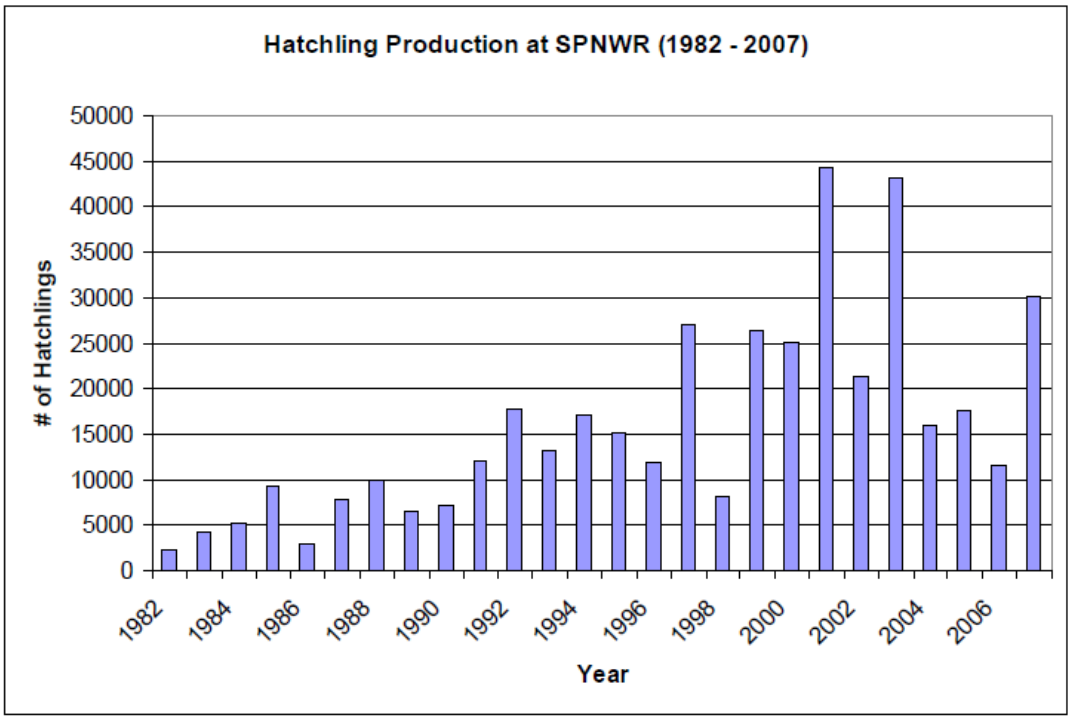
Source: Garner and Garner 2007

about two-thirds of the turtles were remigrants, that is, they had nested at Sandy Point before, with remigration intervals of 2 to 10 years. Of the 336 nests analyzed, mean overall hatch success was approximately 45 percent. Like most previous years, the emergence success of in situ nests (i.e., those left in place) was significantly higher than that of relocated nests. Approximately 5.3 percent of the nests were lost to erosion and 2.8 percent experienced some form of predation. Between 1981 and 2006, a total of 888 leatherbacks were tagged; tagging efforts continue. Nightly patrols and a concerted relocation effort have reduced the major historical threats of poaching and erosion at Sandy Point (Garner and Garner 2007). Figure 12 shows the trend for leatherback hatchling production at Sandy Point.

At the same time that the numbers of nesting female leatherbacks and overall hatchling production have increased, the nest hatch success rate has decreased, as evidenced by Figure 13. This downward trend is cause for concern and future research and management efforts will address this decline. Potential factors causing decreased hatch success include:

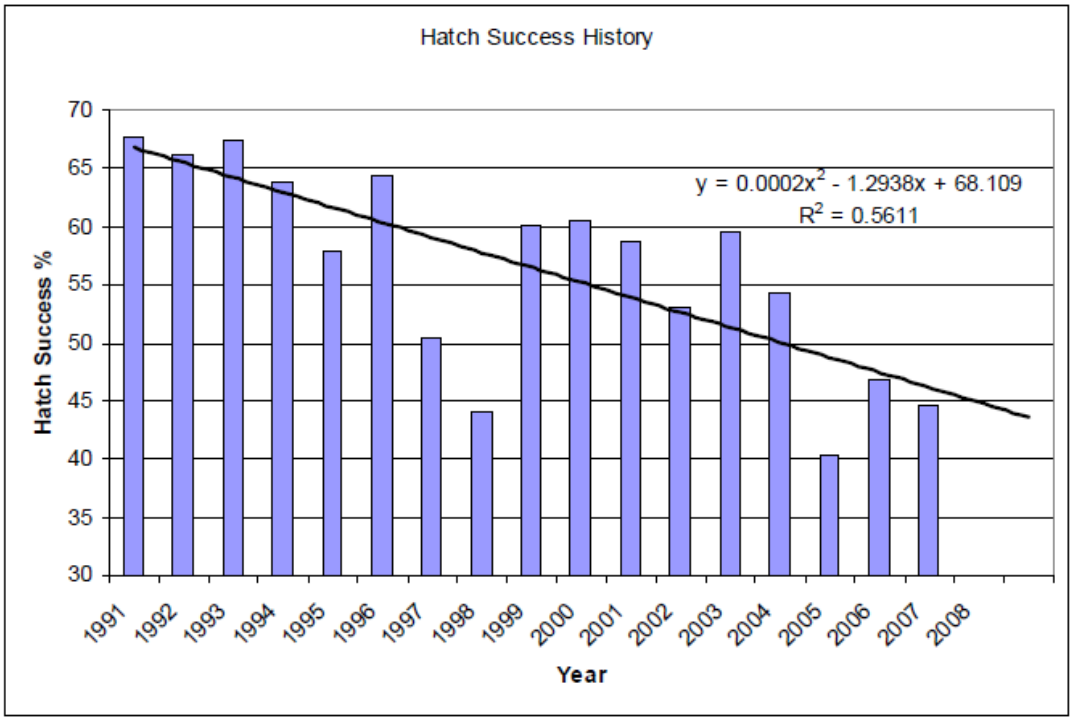
- abnormal beach erosion patterns;
- increased number of nests and nest density;
- increased beach vegetation;
- increased rainfall; and
- nest relocation procedure.

Figure 12. Hatchling production of leatherback turtles at Sandy Point NWR



Source: Garner and Garner 2007

Figure 13. Leatherback hatchling nest success at Sandy Point NWR, 1982-2007



Source: Garner and Garner 2007

Green Turtle

The green sea turtle is medium to large-size, reaching lengths of about three feet (1 m), and weighing up to 400 pounds. Their coloration varies, ranging from green to gray to brown, and their carapaces are often marked by darker spots or streaks. Their name "green" comes from the greenish color of its subdermal tissue, not from their external coloration.

Green sea turtles are circumglobal in the tropics and subtropics. Green sea turtles have a life history similar to most other sea turtles: adults and juveniles occur in different habitats, with hatchlings and juveniles occurring offshore and adults found in coastal waters. The green turtle diet consists mainly of seagrasses and algae, although some gelatinous organisms are also ingested (DFW 2005; DFW 2003a).

Like leatherbacks, green sea turtles almost always nest at night; they may nest year-round, although the peak nesting season is August-October. Females emerge and crawl up the beach to dig their nests, usually near vegetation on the edge of the open beach, laying 3.5-4 clutches per year.

The green sea turtle is listed by the Service as threatened throughout the Caribbean. Unfortunately, poaching is still a problem due to insufficient enforcement, and in the Virgin Islands this species is the most frequently poached of all the sea turtles. Like other marine turtles, the green turtle is vulnerable to injury from boats and propellers. Sea turtles can also ingest or become tangled in fishing line, nets or other marine debris (DFW 2005; DFW 2003a). The recovery plan for the Atlantic green turtle lists a number of specific measures related to protecting nesting and marine habitats with the ultimate objective of delisting the species once recovery has been achieved (USFWS 1991).

Funding constraints do not allow for night time monitoring during green and hawksbill nesting seasons. The leatherback, green, and hawksbill sea turtle nesting seasons overlap in July and August. During this time the WIMARCS monitors green turtle nesting activities at Sandy Point. Monitoring activities include night time or day time patrols, tagging, collection of typical nesting data, and nest excavations. From August to January, the Service conducts regular day time patrols and nest excavations. During 2003 the Service entered into a Cooperative Agreement with The Nature Conservancy to conduct full scale night time monitoring for greens and hawksbills at Sandy Point and on the East End Beaches of St. Croix. A total of 19 green turtles were observed nesting and 47 nests were confirmed at Sandy Point. Mean clutch size was 114.1 eggs and mean hatch success was 84.0 percent (14.2 SD).

Table 5 shows the nesting activity data for green and hawksbill sea turtles at Sandy Point NWR, from February 17 to October 31, 2005, the most recent period for which nesting data have been compiled and reported.

Hawksbill Turtle

The federally endangered hawksbill turtle is relatively small for a sea turtle, rarely reaching three feet (1 m) in length. They usually weigh below 80 kg (176 lbs), occasionally reaching 250 pounds. They are widely distributed across the world's tropical and sub-tropical waters. Hawksbills use several different habitat types during their life cycle. Hatchlings and young turtles are pelagic, living in the open ocean far from land. Caribbean hawksbill hatchlings are believed to remain within a central, rotating oceanic current known as the Caribbean gyre. There, they take shelter in weed lines formed by the convergence of currents. Juveniles (8-10 inch carapace length) reenter coastal waters where coral reefs provide foraging habitat. They generally reside on shallow reefs, but as they mature the adults move to deeper habitats and may forage to depths greater than 300 feet. Ledges and caves found in and around the coral reefs furnish resting sanctuaries and nighttime sleeping shelters (DFW 2003b).

Table 5. Nesting activity data for green and hawksbill turtles at Sandy Point NWR, 2005

Feature or activity	Greens	Hawksbills
In Situ nests[1]	3	6
Relocated nests[2]	1	1
Probable lays[3]	88	76
Dry runs[4]	97	50
Track only[5]	35	30
Total nests	58	53
Nests excavated	2	1
Nests washed out	1	0
Nests analyzed	1	1
Average hatch success	90.3%	43.3%
Yolked excavated	124	150
Total hatchlings to emerge	6,384	3,392

[1] nest that was laid In Situ or in the nest that the turtle dug. In Situ nests must have been witnessed by an observer and the observer must have actually witnessed eggs being deposited by the turtle.

[2] In Situ nest that a qualified technician (with a VIDPNR permit) has relocated (or has "caught" the eggs from the turtle) to another location. This is typically done when the In Situ nest is in imminent danger from erosion, predation, etc.

[3] A disturbance in the sand that a qualified observer feels is most likely a sea turtle nest, but did not actually witness the egg deposition.

[4] When a female turtle emerges from the water, attempts to dig a nest, but is unsuccessful in depositing eggs.

[5] When a turtle emerges from the water, never attempts to dig a nest, and then returns to the sea.

During their pelagic phase, the diet of most sea turtles is not well documented. Hawksbill hatchlings and younger juveniles probably feed opportunistically in the weed lines along which they live. When juveniles return to coastal habitats, they begin to consume a variety of marine invertebrates, including sponges. A diet of sponges is difficult: they are filled with silicious spicules (literally spines made of glass) and sometimes even toxins. Hawksbills are the only sea turtles, and one of only a few vertebrates, which feed on sponges. Although they occasionally prey on other organisms, their dietary specialization on sponges renders them especially vulnerable to degradation of coral reefs (DFW 2003b).

In the USVI, hawksbill turtles may nest throughout the year, although the peak nesting season is from July to October. Nesting usually occurs at night, but may take place during daytime as well. Because of their relatively smaller size and agility, female hawksbills can maneuver among rocks and other obstacles to crawl high up onto beaches. In contrast with other sea turtles, they dig nests under sea grape or other vegetation beyond the edge of the beach. Some hawksbills have even been documented making extensive excursions upland from the beach into beach forest habitat to nest. Females lay between up to 3-5 clutches per year, returning to nest every 2-3 years (DWF 2005; DWF 2003b).

As with green turtles, WIMARCS monitors hawksbill turtle nesting activities in July and August at Sandy Point. Monitoring activities include night time or day time patrols, tagging, collection of typical nesting data, and nest excavations. From August to January, the Service conducts frequent day time patrols to record nesting activities and nest excavations to determine hatch success. During 2003 the Service entered into a Cooperative Agreement with The Nature Conservancy to conduct full scale night time monitoring at Sandy Point and on the East End Beaches of St. Croix. A total of 26 hawksbill turtles were observed nesting and 23 nests were confirmed at Sandy Point. Mean clutch size was 131.2 eggs and mean hatch success was 80.6 percent (11.3 SD). Table 5 shows data from February 17 to October 31, 2005, the most recent period for which nesting data have been compiled and reported.

The hawksbill turtle is listed as endangered throughout its range and a recovery plan was prepared in 1993. Decades of intensive harvesting of hawksbills for their “tortoiseshell” have led to severe population declines. Despite protective legislation, international trade in tortoiseshell and the subsistence use of meat and eggs continue unabated in many countries. These dual threats menace the survival of the hawksbill (USFWS and NMFS 1993). As of 2009 in the Eastern Caribbean, due to intensive conservation and management on the few remaining hawksbill nesting beaches, some signs of recovery are being recorded (e.g., Buck Island Reef National Monument, Mona Island, Antigua, Barbados).

Vahl’s Boxwood

Vahl’s boxwood is an evergreen shrub or small tree up to 15 feet (4.6 m) tall with stems up to three inches (7.6 cm) thick. The twigs have two characteristic grooves beneath each pair of leaves. The entire plant is hairless. The oblong leaves are simple, opposite, dark shiny green, up to 1.5 inches (3.8 cm) long and 3/4 inch (1.9 cm) wide. This species does not reproduce vegetatively; flowering is from December to early April. The flower cluster is small, about 3/10 inch (0.6 cm) long, with the solitary female flower at the tip and several male flowers borne just below it. The fruit is a horned capsule (USFWS 1985).

The species has the ability to adapt to different environmental conditions. Such adaptations include shrubby growth in dry areas where it grows as part of the understory versus an arborescent (tree-like) growth form in high precipitation areas. The specimens of the Sandy Point Refuge population are shrubby because of the drier climate of this area. They are part of the dry forest understory (Carrero Rivera 2001).

At the time of its initial listing as an endangered species in 1985, Vahl’s boxwood was believed to be found at only two sites in semi-evergreen seasonal forests on limestone within the karst region on the northern side of Puerto Rico. When the recovery plan for Vahl’s boxwood was completed in 1987, only 85 plants were known to survive in these two populations, one of which was on private land, the other on land owned by the Commonwealth of Puerto Rico. Since historical records of the species included only the two Puerto Rican populations, the reasons for its extreme rarity are obscure, but are probably attributable to the widespread deforestation and development that accompanied human population growth throughout the lowland areas of the island (USFWS 1987b).

When Vahl's boxwood's was listed as an endangered species, botanists believed the specimens on St. Croix not to be *Buxus vahlii* proper but rather a closely related species, and that *B.vahlii* was, therefore, endemic to Puerto Rico. However, further research has convinced taxonomists that the specimens at Sandy Pont NWR are indeed *B. vahlii* after all.

At present there are six known populations of Vahl's boxwood, four in Puerto Rico and two in St. Croix (Frederiksted and Christiansted). The Frederiksted population was on private land, but this land was acquired as part of a 43-acre purchase by Sandy Point NWR to protect this remnant population, which appears to be the largest of the six remaining populations of Vahl's boxwood (Carrero Rivera, 2001). The population covers approximately 0.22 acre and consists of over 100 individuals (Lombard pers comm).

Sandy Point or Island Peacock Orchid (*Psychilis macconnelliae*)

The Sandy Point Orchid (*Psychilis macconnelliae*) is one of three rare native Virgin Island orchids that can still be found on St. Croix. The population has seriously declined due to land development, private collectors and natural disasters such as hurricanes and brush fires. The Sandy Point orchid is listed as an endangered plant on the VIDPNR endangered species list. This rare, imperiled orchid is found on the refuge (New York Botanical Garden, 2005; Partners for Fish and Wildlife, no date) and BIRNM (NPS). The Service has partnered with the University of the Virgin Islands to conduct research on micro-propagation and acclimatization of the Sandy Point Orchid. The specific objectives of the project are to:

- improve the micro-propagation system for the *Psychilis macconnelliae* utilizing seed capsules to ensure genetic diversity;
- develop an acclimatization system for the *Psychilis macconnelliae* in order to produce a large number of seedlings for distribution; and
- develop publications and brochures for the general public on using tissue culture technology for conservation and propagation of endangered orchids for other Caribbean islands.

Green Cay NWR, St. Croix

The small size of Green Cay (14 acres) constrains its biodiversity. Five reptiles have been documented on the Cay. The St. Croix anole and the dwarf gecko are very common throughout the Cay. The St. Croix ground lizard is considered critically endangered by the federal government and the largest natural population is found on Green Cay. Hawksbill sea turtles have occasionally used the sandy spit on the southeastern shoreline for nesting. In September of 2000, James Rebholz (USFWS contractor) observed a single slipperyback skink on the southern end of the Cay (Lombard pers comm.).

Zenaida doves and common ground doves currently nest in low numbers, maximum of 12 and five nests respectively. In addition to pigeons and doves, yellow warblers and Antillean-crested hummingbirds have been recently documented nesting on Green Cay. The green-throated Carib and Antillean crested hummingbird are frequently observed on Green Cay and are both restricted-range species within the Eastern Caribbean. Other land birds that have been recorded on Green Cay include the yellow warbler, gray kingbird, pearly eyed thrasher, green-throated Carib, Antillean-crested hummingbird, bananaquit, black-whiskered vireo, Caribbean elenia, red-legged thrush, American redstart, and the ovenbird (Wiley 2001; Lombard pers comm.).

It is common to observe ospreys and belted kingfishers perched or feeding on dead branches on the cliffs on Green Cay. Red-tailed hawks and peregrine falcons are occasionally observed perched or flying over the Cay and American kestrels are often observed hunting on Green Cay.

Great egrets, great blue herons, yellow-crowned night herons, and little blue herons are frequently seen in small number on Green Cay. Almost every year one to two pairs of little blue herons nest in the Cordia forest on the southwestern part of the Cay. In early 2006 it was first documented that cattle egrets were roosting in the southwestern Cordia forest. Each night over 100 individuals arrive just at dusk and depart by first light the following morning.

Shorebirds that have been recorded on Green Cay include Wilson's plover, oyster catcher, ruddy turnstone, spotted sandpiper, least sandpiper, semipalmated sandpiper, sanderlings, and the black-bellied plover. Sea birds include least terns and laughing gulls. In 2006 a total of seven least tern nests were recorded on the south beach, every year one to two Wilson's plover nests are recorded on the shorelines, and every year a single oyster catcher nest is documented.

Several non-native species of plants and animals occur or potentially occur on the island. The black rat (*Rattus rattus*) feeds extensively on the terminal shoots of trees and shrubs to obtain moisture throughout the dry season on this island. There are no streams, ponds or other source of permanent freshwater on Green Cay. Virtually any new tree or shrub growth is quickly consumed. Given time, the Cay's remnant forest would succumb to this herbivory, which could be disastrous for the endangered St. Croix ground lizard (USFWS 1999b). The black rat was believed to have been eradicated in 2000 through an active rat control program (USFWS, 2002). However, either the rats were never entirely eliminated, or they reappeared, because by 2006 another eradication program needed to be undertaken. Rats were trapped using rat traps baited with peanut butter at a number of elevated stations on the island. A number of rats were removed in this manner until it appeared that the island's population had been eradicated. However, by the summer of 2007, follow-up trapping revealed that this invasive species was still present, though in much lower numbers (Lombard 2007).

Invasive plants on Green Cay include the tan-tan (*Leucaena leucocephala*) and Guinea grass (*Urchloa maximum*) (USFWS 2002). Tan-tan, also known as Leucaena, lead tree, or white popinac, is a member of the Mimosoid leguminosae subfamily native to Mexico that was widely promoted in the 1970s and 1980s as a "miracle tree" for its many agroforestry uses (firewood, fiber, food, and livestock feed) but that also has a reputation for being highly invasive (NRCS 2007).

Threatened or endangered species occurring or potentially occurring at Green Cay NWR include the following (USFWS 2002):

<u>Birds</u>
Brown Pelican (*Pelicanus occidentalis occidentalis*) – federally endangered (now delisted)
Peregrine Falcon (*Falco peregrinus tundrius*) – territorially endangered
White-cheeked pintail (*Anas bahamensis*) – territorially endangered
White-crowned pigeon (*Patagioenas leucocephala*) – territorially endangered
Least tern (*Sterna antillarum antillarum*) – locally endangered

<u>Reptiles</u>
St. Croix Ground Lizard (*Ameiva polops*) – federally endangered
Hawksbill Sea Turtle – (*Eretemechelys imbricata*) – federally endangered
Slipperyback Skink (*Mabuya sloanii*) – locally threatened

Brown Pelican

The brown pelican was listed as an endangered species in 1970 and the Caribbean population remained listed until November 2009, when all subspecies of this bird were removed from the Federal List of Endangered and Threatened Wildlife due to generalized, long-term recovery of the various subspecies and populations. During 2003 and 2004 brown pelicans nested on the western side of Green Cay. A total of 54 nests were documented in 2003 and 64 in 2004. Brown pelicans and magnificent frigatebirds feed off shore and roost year round in the trees, cliffs, and beaches of Green Cay.

Please see the description of the brown pelican in the Sandy Point NWR section above for further information.

Peregrine Falcon

Peregrine falcons are occasionally observed perched or flying over the Green Cay. Please see the description of the peregrine falcon in the Sandy Point NWR section above for further information.

White-Cheeked Pintail

The white-cheeked pintail is the most common breeding species of waterfowl in the USVI. It breeds on Cays, especially those with salt ponds, and at or near a variety of wetlands on major islands. Its numbers appear to be increasing (McNair et al. 2005), and a recent population shift toward resorts has occurred in the northern USVI where the pintails are fed by tourists, thus posing potential health risks in swimming pools and restaurants. Individuals tagged and banded in Puerto Rico and Culebra have been seen in St. Thomas, and one banded on Guana Island was recovered in the USVI, suggesting that genetic exchange may be frequent among the Caribbean Islands populations (DFW 2005). Nests have been observed occasionally on Green Cay (Lombard pers comm.)

White-Crowned Pigeon

The white-crowned pigeon nests and roosts in mangroves and littoral forest on larger islands and Cays. It forages mostly in littoral forest and frequently in upland forests. Many individuals leave the USVI during winter. Although it used to be hunted, the white-crowned pigeon has been protected in the USVI for over 40 years and should remain protected because of its pronounced long-term population decline and general low numbers in the Caribbean, where large numbers are still shot. Limited poaching still occurs on St. Croix, especially of squabs from nests at one of the two main breeding colonies at Ruth Island. The white-crowned pigeon is locally uncommon to common in St. Croix, but rare in St. John and on St. Thomas where it breeds at Mangrove Lagoon and Benner Bay (DFW 2005).

White-crowned pigeons are listed as Near Threatened on the IUCN Red List and as endangered in the U.S. Virgin Islands (US Virgin Islands Endangered and Indigenous Species Act of 1990). In the early 1900s wildlife biologist George Seaman documented thousands of white-crowned pigeons and Zenaida doves nesting on Green Cay. He also reported on the “indiscriminate slaughter” of these birds by hunters every year from May to July. Each year he recorded fewer and fewer birds until hunters no longer found it worth their time to hunt on Green Cay. This disturbance and mortality year after year probably helps account for why these pigeons and doves largely abandoned Green Cay (Seaman 1956). In recent years no more than five breeding pairs of white-crowned pigeon have been observed (Lombard pers comm.).

Least Tern

In 2006 a total of 7 least tern nests were recorded on the southeastern sand spit. No nests survived likely due to kayak visitation. Please see the description of the least tern in the Sandy Point NWR section above for further information.

St. Croix Ground Lizard

The St. Croix ground lizard (*Ameiva polops*) has a light brown, mid-dorsal stripe, bordered by wide dark brown or black stripes below which are narrow parallel stripes of brown, black and white. The top of the head is uniformly brown, while the chin, threat, chest, sides of the snout and undersides of the forelegs are deep pinkish-red. The tail has alternating blue and black rings. Taxonomically and genetically, *A. polops* is apparently most closely related to *A. taeniura* on Hispaniola (i.e., the Dominican Republic and Haiti), while its closest geographic relative in the same genus is *A. exsul* on Puerto Rico (USFWS 1984).

The endemic St. Croix ground lizard was once widespread and abundant in coastal areas of St. Croix. The lizard was extirpated from the main island as a result of predation by the introduced small Indian mongoose and habitat loss via encroaching coastal development. It was thought to have become extinct early in the 20th century but was rediscovered in the 1930s at the East end, some empty lots in Christiansted harbor, Green Cay and Protestant Cay. While it was never found on Buck Island, St. Croix, there is evidence that it should have occurred there prior to the introduction of the mongoose in 1912 to that island. Prior to 1967, population estimates were 35 individuals on Protestant Cay and 100 on Green Cay. In 1967, the existence of a small population was reported in Frederiksted, in addition to about 200 individuals at Protestant Cay and about 300 individuals at Green Cay. After 1968, no St. Croix ground lizards were detected at any location on the island of St. Croix proper (USFWS 1984).

Unpublished mark and release surveys conducted by DFW and the Service in 1980-81 estimated that the Green Cay population ranged widely between 360 and 4,300 individuals (USFWS 1994). In the early 1990s the population was estimated at 420-620 animals. Surveys conducted in 2002, yielded a conservative population estimate of 183 individual lizards with a 95 percent confidence interval of 108-258 individuals. Survey methods consisted of six surveys along 32 randomly selected fixed-width plots (25 by 4 meters). The number of lizards was positively associated with a greater number of shrub stems. Lizards were also more abundant in forest areas in the southern half of the Cay (81 percent of the weighted total), but scarcer than expected on beaches, especially treeless areas (McNair and Lombard, 2004). A repeat of this study was conducted in 2007 and yielded a population estimate of 576 individuals, almost 400 individuals more than in 2002 (Mackay 2007).

Table 6. St. Croix ground lizard surveys at Green Cay NWR, 2007

	Divisions*		Plots*		Population estimates*
Identity	**Area (%)**	**Area (m^2)**	**Number (n)**	**Area (m^2)**	**Mean (±95% CI)**
South	53	30,210	1-6, 21-32 (18)	1800	475 (253-696)
North	43	24,510	11-19 (9)	900	87 (30-143)
Beach	4	2,280	7-10, 20 (5)	500	14 (1-26)
Total (weighted)	**100**	**57,000**	**1-32 (32)**	**3200**	**576 (462-690)**

* *The identity and area of divisions, the number and area of plots, and the mean population estimates of St. Croix ground lizards in plots within each division and for the entire Cay (total weighted by different survey efforts in divisions and areas of divisions) at Green Cay National Wildlife Refuge, St. Croix, USVI (August 21-23, 27-29 2007).*

A total of 20 circular habitat plots over the 16 sampling periods were surveyed during the winter (December 2003, January 2004) and the summer (June and July 2004). The total weighted mean population estimate during the winter was 1,169 lizards (Table 7). When the survey was repeated in the summer the weighted mean population estimate rose to 2,177 lizards (Table 2). In both surveys, the majority of the lizards were counted in the South but the Beach plots had the fewest lizards in the first survey while the North had the fewest in the summer.

The St. Croix ground lizard actively prowls, roots and digs for prey. A 1936 study dissected a number of specimens and found that they had eaten the amphipods found abundantly on the beach. Two other studies reported that hermit crabs, grammarian amphipods flushed from sea grasses, and small white moths taken from under forest litter, were all prey items. Foraging and food manipulation is their major activity and thermoregulation (warming or cooling body temperature by basking or cooling) the next most important (USFWS 1984). *Ameiva polops* spends the greatest part of its time budget on basking when looking at a single behavior. Foraging, which is made up of eight minor activities, was the group of behaviors that made up the largest part of their budget (71 percent). Thermoregulation was the major behavior which followed foraging. These data are taken from the analysis of 60 complete records where focal animals were observed for ten minute periods (Mackay 2007).

Table 7. St. Croix ground lizard surveys at Green Cay NWR, 2003-2004

	Divisions*		**Plots***		**Population estimates***	
Identity	**Area (%)**	**Area (m^2)**	**Number (n)**	**Area (m^2)**	**Mean (±95% CI)**	
South	53	30,210	9	254	Winter	Summer
North	43	24,510	6	170		
Beach	4	2,280	5	141		
Total (weighted)	**100**	**57,000**	**20**	**565**	**1169 (887-1451)**	**2177 (1976-2379)**

* *The identity and area of divisions, the number and area of plots, and the mean population estimates of St. Croix Ground Lizards in circular habitat plots within each division and for the entire Cay (total weighted by different survey efforts in divisions and areas of divisions) at Green Cay National Wildlife Refuge, St. Croix, United States Virgin Islands. (December 2003, January 2004 - Winter and June and July 2004 - Summer)*

Juveniles were found in open beach areas at a higher rate than adults. Juveniles also spend more time foraging with their vision obscured by leaf litter when they would slowly undulate their blue tails until they emerged from the leaf litter.

Individual lizards are active during a narrow range of temperature, 29.6 – 41.2 ° C.

The St. Croix ground lizard is able to tolerate a good deal of natural and unnatural disturbance in beach and dry forest, which is not altogether surprising, since hurricanes periodically affect these habitats. Its key habitat components include bare ground (including sandy, exposed areas), high densities of leaf and tidal litter, woody debris, scrub, and forest with intermediate to high woody stem densities that permit dappling of sun and shade (canopied and exposed areas), and burrows including crab burrows (DFW 2005).

Conservation plans for the St. Croix ground lizard include the removal of exotic vegetation and restoration of the quality and quantity of habitat on Protestant Cay, Green Cay, and Buck Island Reef National Monument (managed by the National Park Service [NPS]). In May 2008 the first step to establishing a fourth population was accomplished. A total of 57 individuals from Green Cay were translocated to Buck Island Reef National Monument. Captured lizards were individually marked by toe-clipping and with colored glass beads sutured onto the dorsum of the base of the tail. Toe-clips and tail tips were preserved for genetic samples. Lizards were placed into eight enclosures in beach forest on the northwest end of BIRNM for a two-month observation period. Release from the enclosures occurred in July 2008. By the following year, the translocated population at BIRNM was exhibiting signs of successful reintroduction, including adult growth and weight increases and young of 1st year becoming reproductive (Z. Starr, pers. comm.). The translocation project was a collaborative effort between the USFWS, NPS, DPNR-DFW, and Texas A&M University (TAMU), College Station. An earlier effort to translocate the St. Croix ground lizard to BIRNM failed because of the failed attempt to eradicate mongoose from the island. The NPS has successfully eradicated mongoose and rats and is controlling conducting eradication efforts for many invasive exotic plant species (USFWS 1984).

Buck Island NWR, St. Thomas

Buck Island NWR is located about two miles south of St. Thomas, USVI. The 45-acre Buck Island and adjacent 23-acre Capella Island, managed by DFW, are connected by a series of rocks that are exposed during calm conditions and low tides. Buck and Capella islands, along with several smaller islets, are sometimes referred to as the Capella group. As described above, Buck Island vegetation consists of scrub brush, grasslands, and a small forest dominated by orange manjack (*Cordia rickseckeri*). It is believed that the xeric woodlands were once more extensive (USFWS 2002).

As noted earlier, before its acquisition as a national wildlife refuge, Buck Island was used as a Navy and Coast Guard Lighthouse station. Hawksbill turtles and green sea turtles may have nested on a few small beaches of the Capella group. Both islands are believed to have once provided more suitable habitat for nesting seabirds and land birds, neotropical migratory birds, and the Virgin Islands tree boa (*Epicrates monensis*), prior to the island's use as a lighthouse station and the arrival of the rats. Roughly a dozen bird species have been seen on or near the island. Nesting species currently include the laughing gull (300-500 pairs), zenaida dove and likely the pearly eyed thrasher. Small numbers of red-billed tropicbirds (*Phaethon aethereus*) nest in crevices in the low cliffs of the islands. The tropicbirds and laughing gull chicks are occasionally preyed upon by peregrine falcons and red tail hawks (USFWS 2002). Endemic species present on this refuge include the green-throated Carib (*Eulampis holosericeus*), a bird endemic to the Antilles, and the Puerto Rican racer (*Alsophis portoricensis nicholsi*), a snake.

In 2005, the Service in cooperation with the USDA - Wildlife Services and DPNR-DFW implemented a program to eradicate introduced Norway rats and black rats from Buck Island NWR and Capella Island. In addition to the USDA, the Service also partnered with the Virgin Islands Department of Natural Resources, Division of Fish and Wildlife to conduct similar work on neighboring Capella Island. Rats are known to have a variety of detrimental effects on delicate ecosystems of offshore Cays. Rats greatly suppress natural vegetative growth by eating fresh shoots, fruits, and seeds. Rats are also known to predate chicks of ground nesting and tree nesting birds as well as native reptiles.

Eradication efforts began by constructing an island-wide grid system of 121 elevated bait stations on Buck Island and 51 stations on Capella Island. Access trails were cut between stations and marked when necessary. Bait stations were placed along each grid line approximately 30 meters apart to ensure sufficient coverage. Bait stations on Buck and Capella Island were mounted on rebar

approximately 25 cm off the ground and fitted with bird and hermit crab excluder devices. The rodenticide bait used during the project was a J.T. Eaton Bait Block (EPA Reg. No. 56-42), which is a large, wax bait block containing 0.005 percent diphacinone.

Traps were baited until bait ceased to be taken from traps (almost 2 weeks). Eradication was successful and follow-up snap trapping has taken place for almost 3 years and no evidence has been observed of a reinvasion. Periodic monitoring will continue to determine the success of the eradication and whether reinvasion has occurred. The successful eradication of rats from Buck Island will stimulate the recovery of native vegetation as well as eliminate predation, thus enhancing wildlife habitat. The absence of predation will also further encourage the return of nesting seabirds that have abandoned the island. Furthermore, normal erosion rates would be restored as rats cease to tunnel in softer soils and graze on native vegetation.

Threatened or endangered species occurring or potentially occurring at Buck Island NWR include the following (USFWS 2002):

<u>Birds</u>
Brown Pelican (*Pelicanus occidentalis occidentalis*) – federally endangered (now delisted)
Caribbean Roseate Tern (*Sterna dougallii*) – federally endangered/threatened
Peregrine Falcon (*Falco peregrinus tundrius*) – territorially endangered

<u>Reptiles</u>
Slippery back skink (*Mabuya mabouya*) – territorially endangered
Puerto Rican Racer (*Alsophis porticensis*) - territorially threatened

<u>Plants</u>
Wooly nipple cactus (*Mammillaria nivosa*) – territorially endangered

Brown Pelican

Please see the description of the brown pelican in the Sandy Point NWR section above. The Caribbean subspecies of the brown pelican (*P. o. occidentalis*) was delisted, along with all other subspecies of the brown pelican, in November 2009. It remains protected by the Migratory Bird Treaty Act.

Caribbean Roseate Tern

Please see the description of the Caribbean roseate tern in the Sandy Point NWR section above.

Peregrine Falcon

Please see the description of the peregrine falcon in the Sandy Point NWR section above.

Slippery Back Skink

The slippery back skink is listed as territorially endangered because of a lack of recent records, although it does occur on some such as Buck Island. The apparent absence of this species from the major islands is probably attributable to the introduced Indian mongoose. This skink feeds on insects in low, dense vegetation on the beaches and lower slopes of Cays, sheltering in grass and brush litter, under rocks and other surface debris, in rocky fissures, and on the branches of low shrubs. The distributional range of this species includes the Turks and Caicos Islands, Jamaica, Hispaniola, Puerto Rico, USVI and BVI. There may be more than one genetically distinct form in the Virgin

Islands (DFW, 2005). The skink is found in low to moderate numbers on Buck Island and a single individual was reported on Green Cay in September 2000 (Lombard, 2001).

Puerto Rican Racer

The Puerto Rican Racer (*Alsophis porticensis nicholsi)* is believed to be a subspecies found only on Buck Island. During most site visits to Buck Island, at least one individual is observed.

Wooly Nipple Cactus

The wooly nipple cactus may be solitary or in clusters. Its stems are short and cylindrical, dark green to bronze, and 3-4 inches in diameter. It has a yellow flower, 0.6-0.8 inches long, and a club-shaped, red fruit and brown seeds. Its geographic distribution is the Caribbean, where it tends to bronze in strong sunlight, which encourages flowering and heavy wool and spine production (Mammillarias.net, 2004). The VI endangered wooly nipple cactus (*Mammalaria nivosa*) occurred in five clumps of 10-20 individuals and six other lone individuals were also observed in 2001. On more recent visits no individuals were observed.

CULTURAL RESOURCES

Cultural resources include historic properties as defined in the National Historic Preservation Act (NHPA), cultural items as defined in the Native American Graves Protection and Repatriation Act (NAGPRA), archaeological resources as defined in the Archeological Resources Protection Act (ARPA), sacred sites as defined in Executive Order 13007, *Protection and Accommodation of Access to "Indian Sacred Sites"* to which access is provided under the American Indian Religious Freedom Act (AIRFA), and collections. As defined by the NHPA, a historic property or historic resource is any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP), including any artifacts, records, and remains that are related to and located in such properties. The term also includes properties of traditional religious and cultural importance (traditional cultural properties), which are eligible for inclusion in the NRHP as a result of their association with the cultural practices or beliefs of an American Indian tribe. Archaeological resources include any material of human life or activities that is at least 100 years old, and that is of archaeological interest.

The three USVI national wildlife refuges follow these legal mandates to protect the public's interest in preserving the cultural legacy that may potentially occur on the refuges. Each of the refuges possesses cultural/historic resources of some value. Whenever construction work is undertaken that involves substantial excavation with heavy earth-moving equipment, such as tractors, graders, and bulldozers used in the development of moist-soil units, the refuges contract with a qualified archaeologist or cultural resources expert to conduct an archaeological survey of the site. The results of these surveys are submitted to the Service's Regional Historic Preservation Officer, as well as the State Historic Preservation Office (SHPO), which, in the USVI, is a division within the Department of Planning and Natural Resources (DPNR), the same department in which the Division of Fish and Wildlife is located. The SHPO has offices in St. Thomas and St. Croix that review the surveys and determines whether cultural resources will be impacted, that is, whether any properties listed in or eligible for listing in the National Register will be affected. If cultural resources are actually encountered during construction activities, the refuge is to notify the SHPO immediately.

Major functions of the USVI SHPO include administering the NRHP, surveying and inventorying of historic places and sites (on land and in coastal waters), reviewing and ensuring compliance with federal and territorial preservation laws, historic preservation planning, securing technical assistance, educating the public education and identifying cultural resources (SHPO 2005).

The SHPO is also responsible for reviewing rehabilitation work that is eligible for federal and local tax incentives or federal grants, and for enforcing Acts 6234 and 2258 of the Antiquities and Cultural Properties Act of the Virgin Islands, for the protection of the archaeological and historic properties and cultural assets of the Virgin Islands (SHPO 2005).

SANDY POINT NWR, ST. CROIX

Sandy Point NWR is home to the prehistoric Aklis site. This former settlement is located on the southeast corner of the refuge, on land that was acquired by the refuge to protect it and a nearby stand of endangered Vahl's boxwood. As requested by the National Park Service, Panamerican Consultants, Inc., conducted an archaeological investigation of the site in 1994. This investigation was undertaken partly to assess the damage wrought by Hurricane Hugo to the exposed and eroding western shoreline boundary of the site. The study also aimed to establish the limits of the Aklis site, to reconstruct site-specific cultural material, settlement, subsistence and demographic patterns, and to integrate these patterns with those from other Virgin Islands and Puerto Rican sites. In addition the investigation report furnished recommendations on management, conservation and future research (Panamerican Consultants 1997).

The field portion of the 1994 Aklis investigation consisted of excavating 30 shovel tests, five 2-by-2 meter units, one 1-by-1 meter unit, and the profiling of approximately 50 meters of the exposed and eroding western shoreline boundary. Faunal and botanical samples and a very small amount of human skeletal material were collected and analyzed by specialists in the field.

The investigation found that the entire Aklis site ranges from 6 to 14 acres in size and was a settlement or village. There is a high-artifact density or midden area measuring about 20 x 50 meters or 800-1,000 square meters and an unspecified low-artifact density area comprising the remaining acreage. Possible functions of the low-artifact portion of the site include a public area, residential section or the edge of the site. Two features were identified, one a concentration of limestone chunks, ceramics and faunal material and the other an association of partial and nearly complete ceramic vessels. Primary occupation at the site was continuous, containing a mix of Cuevas/Longford and Monserrate/Magens Bay I ceramic styles dated to a calibrated age range of A.D. 600-900. The subsistence strategy of the village combined cultivated foods, terrestrial resources (animals, fruits, fuelwood) and marine faunal resources. Manioc (also known as cassava or yuca) is likely to have been cultivated in plots within or near the Aklis settlement. The prehistoric environment on St. Croix contained forests which would have furnished fruits, seeds, and wood for fuel and building supplies. The faunal subsistence strategy emphasized marine (mollusks and fishes) over terrestrial resources. Marine food sources were harvested primarily from the coastal zone (shallow waters, rocky coasts, estuarine coastal) and secondarily from coral reefs and deeper waters. This subsistence strategy was opportunistic, in that it favored the closest, most available habitats. The limited demographic or skeletal data indicate a population similar to those of other larger prehistoric Virgin Islands or Puerto Rican populations. The Aklis population's solutions to universal challenges such as housing, water storage, social organization/hierarchy, and entertainment must await future investigators, techniques, and technologies, or remain undiscovered (Panamerican Consultants 1997).

The Aklis report made four recommendations:

1. Investigate the entire Aklis site. This would include determining the actual boundaries of the site based on surface and subsurface testing, and identification of more activity areas, middens, settlement and household areas, possible cemetery sites, etc.

2. If additional serious beach erosion continues along the shoreline of the Aklis site, additional investigations and sampling in this area should be considered. Although an adequate artifact sample has been collected from this portion of the Aklis site, the presence of human burial remains eroding from several locations along the shoreline has not been adequately recovered or evaluated. The testing strategy could include intensive shovel testing and placement of formal excavation units in any areas of high artifact concentration.

3. The site should be monitored on a regular basis by refuge personnel to evaluate vandalism and to assess any significant damage to the site which may have occurred from natural causes. Although in a publicly owned area, access to this portion of the refuge should be limited to minimize any potential damage. No subsurface activities or disturbance (e.g., grading, removing vegetation by excavation, pits, campfires, etc.) should be allowed in this area.

4. If expansion of the refuge is ever considered, the remainder of the Aklis site located on adjacent private property should be acquired. This part of the site was not investigated and was in danger of destruction from proposed future development. (The Service did indeed purchase this property and add it to the refuge after the 1997 Aklis report was published.)

GREEN CAY NWR, ST. CROIX

Many hundreds of punctured and highly weathered, bleached conch shells occur on the southeast margin of Green Cay. If the extent and thickness of the exposed shell-bearing stratum is reconstructed to past sea level, it can be estimated that the midden holds at least 33,000 discarded shells. They lie on the beach behind a small fringing reef tract, on the nearby bottom, and within a steep soil bank at the foot of the colluvial slope of the island. Each of the shells has been punctured near the apex to extract the mollusk inside the shell for food. The crude shape and large size of this hole indicates that the conches must have been prepared with stone tools rather than newer tools like screwdrivers. Although some of the conches are small, most are large with thick, heavy shells, suggesting that they were harvested from a stable population of mature individuals (Weiss and Gladfelter 1978).

Researchers used radiocarbon dating on one conch sample to derive an estimate of the age of the Green Cay midden. The corrected date on the conch is 930 years $\pm$ 140 years B.P. (Before Present). That is, the probable age of the sample was between 790 to 1,070 years ago. This would make the archaeological age 1020 A.D., almost 500 years or half a millennium, before Columbus. Such a date would place the conch fishers at the boundary of Neo-Indian Periods III and IV. The vanished fishers may have been members of an early phase of the Magens Bay-Salt River culture, in all likelihood part of the Elenoid Series (Weiss and Gladfelter 1978).

BUCK ISLAND NWR, ST. THOMAS

While the most important known cultural resources at both Sandy Point and Green Cay NWRs are prehistoric or pre-contact, indigenous, and archaeological in origin—and date back many hundreds of years—Buck Island NWR's only known cultural resource is an historic structure not quite a century old ... a lighthouse that dates to the end of the Danish colonial period.

The Buck Island lighthouse is located at about the highest point on Buck Island. The lighthouse has been inactive and abandoned for a number of years, replaced by a steel skeletal tower still operated by the U.S. Coast Guard. In late 2003 the Coast Guard was in the process of nominating the site for the National Register. In addition, the Coast Guard declared the light station to be excess property, and in 2004 the General Services Administration completed the process of transferring it to the U.S. Fish and Wildlife Service, which owns the rest of the island (Rowlett 2007).

The Buck Island Light Station was erected in 1913. This 25-foot-high, truncated square steel tower represents Danish Colonial style. It is the older of two towers situated on a 0.92-acre site located atop a plateau on the crest of the northeast corner of the Island. The lighthouse was owned by Denmark at the time of the transfer of the Danish West Indies to the United States in 1917. The lighthouse and improvements were conveyed to the United States from the Harbor Board of St. Thomas on July 29, 1919. The lighthouse was in use until the mid-1990s when a modern steel tower was built near the property. The original Buck Island Light Station was then deactivated. The new steel light station stands approximately 50 feet northwest of the older light (Rowlett 2007).

SOCIOECONOMIC ENVIRONMENT

The Sandy Point and Green Cay NWRs are on and near St. Croix, the largest island of the USVI, and the Buck Island NWR is close to St. Thomas and St. John, the other two main islands of the USVI. This section considers the socioeconomic setting or environment of all three refuges together.

Table 8 contains key demographic and socioeconomic data for the U.S. Virgin Islands from the U.S. Census Bureau and the 2000 Census. Columns in the table compare data on important parameters for the United States as a whole, the entire USVI, and St. Croix in particular. The population of the USVI in 2000 was 108,612, of which about ¾ were black or African American, 13 percent white, and 11 percent other races (including those who selected more than one race on the Census form). The percentages of whites and blacks in the USA as a whole and the Virgin Islands in particular are almost exactly reversed. Hispanics or Latinos, who may be of any race (i.e., they do not comprise a race, but rather an ethnic group) are approximately 14 percent of both the American and Virgin Island populations, although they represent a somewhat higher proportion, about one-fifth (21 percent), of St. Croix's population (U.S. Census Bureau 2007 and 2003).

Three times as many residents of the USVI are foreign born compared to the U.S. in general: 33 vs. 11 percent. At 2.64 persons per household, the average household size in the USVI is slightly higher than the United States overall. However, both the median household income and the per capita money income of the USVI are substantially below (little more than half) the American medians. This translates into a much higher percentage of the population living in poverty: 33 percent for the USVI vs. only 13 percent for the United States as a whole. The percentage of persons below the poverty level is even higher on St. Croix—39 percent—than the USVI in general (U.S. Census Bureau 2007 and 2003).

Consistent with the lower overall socioeconomic level of wellbeing, the educational attainment of Virgin Islanders is much lower than Americans in general. Only about one in four of Virgin Islanders aged 25 or more have a high school diploma, as opposed to more than three in four Americans (80 percent). This discrepancy is similar for college graduates: one in ten (10 percent) Virgin Islanders aged 25 or above hold a bachelor's degree or more, versus one in four (24 percent) of Americans overall (U.S. Census Bureau 2007 and 2003).

Table 8. Key demographic and socioeconomic data for the USVI

Attribute	USA	USVI	St. Croix
Population, 2000	281,421,906	108,612	53,234
Black persons (sole race)	13%	76%	73%
White persons (sole race)	80%	13%	12%
Other races, percent[1]	7%	11%	15%
Hispanic or Latino[2]	14%	14%	21%
Average household size	2.59	2.64	2.71
Foreign born	11%	33%	30%
Median household income[3]	$44,334	$24,704	$21,401
Per capita money income[4]	$21,587	$13,139	$11,868
Persons below poverty level	13%	33%	39%
High school graduates[5]	80%	26%	26%
Bachelor's degree or higher[5]	24%	10%	9%

Sources: U.S. Census Bureau, 2007 and 2003
[1] Persons reporting two or more races or race other than black or white.
[2] Ethnicity; may be of any race. 2005 data for USA; 2000 data for USVI and St. Croix.
[3] 2004 data for USA; 2000 data for USVI and St. Croix.
[4] 1999 data for USA; 2000 data for USVI and St. Croix.
[5] Percentage of persons age 25+, 2000

The number of children in the USVI declined between 1990 and 2000, but children comprise a very high percentage of the Virgin Islands population. In 2000, 32 percent of the population in the Virgin Islands was under the age of 18. While this is a decrease since 1990 (from 35 percent), the percentage of the population under the age of 18 is still much higher than the national average of 26 percent (Population Reference Bureau 2002).

The large number of children in the USVI is indicative of a growing population: the number of Virgin Islanders grew seven percent – from 101,809 to 108,612 – between 1990 and 2000, somewhat less than the percentage of U.S. population growth. Population growth in the USVI was offset by emigration to the mainland United States.

The large percentage of children has important social implications for Virgin Islands society. The "child dependency ratio" (the number of people under age 18 for every 100 people ages 18 to 64) is relatively high in the USVI (53), compared with the national average (42). This relatively large number of children in the USVI population means that providing education and social services for this vulnerable age group tends to consume a larger share of society's scarce budgetary, financial, educational, and labor resources. The large number of children, especially younger children, also increases the demand for child care (Population Reference Bureau 2002).

In Chapter I of this CCP, human population growth was identified as a significant source of increasing stress on the natural environment—including wildlife and wildlife habitat, both terrestrial and marine – in the USVI. By 2000, the USVI population had grown to where the USVI had almost twice the human population density of the United States as a whole (including low-density Alaska) – 135 persons per square mile (USVI) to 78 per square mile (entire USA).

Table 9 quantifies this population growth from 1901 to 2000.

Table 9. Population growth in the USVI, 1901-2000

Year	St. Croix	St. Thomas	St. John	Total USVI
1901	18,600	11,000	900	**30,500**
1911	15,500	10,700	900	**27,100**
1917	14,900	10,200	1,000	**26,100**
1930	11,400	9,800	800	**22,000**
1940	12,900	11,300	700	**24,900**
1950	12,100	13,800	700	**26,700**
1960	15,000	16,200	900	**32,100**
1970	31,900	29,600	1,700	**63,200**
1980	49,000	44,200	2,400	**95,600**
1990	50,100	48,200	3,500	**101,800**
2000	53,200	51,200	4,200	**108,600**

NOTE: All data are rounded to the nearest hundred. Source: Lahmeyer 2002

Two striking and contradictory demographic trends are evident in Table 9. In the first half of the 20th century, the population of each of the major islands in the USVI, as well as the overall population, actually declined. In sharp contrast, during the second half of the 20th century the USVI population grew explosively, approximately quadrupling in size. This was due to a combination of both high fertility and high immigration rates. As an illustration of the former, in 2000, 12 percent of USVI women ages 35-44 reported giving birth to five or more children during their lifetimes, compared to just three percent of U.S. women (Population Reference Bureau 2002). At the same time, as noted in Table 8, fully one-third (33 percent) of the USVI population in 2000 was foreign born. Furthermore, migration from Puerto Rico and other parts of the mainland United States added to the islands' population growth in the latter half of the 20th century.

Population growth has slowed in the present decade and the USVI has actually experienced "negative growth" in recent years. The July 2007 population estimate of the USVI is 108,448, down slightly from the 2000 population of 108,612. Although it has declined in recent decades, the birth rate is still about double the death rate, so this recent population decline is due to emigration to the United States (Central Intelligence Agency [CIA] 2007).

The three interrelated factors of (1) human population growth and high population density pressures on a severely limited land and resource base; (2) high poverty rates; and (3) generally low educational levels, all present a particular challenge to wildlife conservation in general, and endangered species and national wildlife refuge protection in particular, in the USVI.

Table 10 displays economic data for the USVI related to occupation, industry and class of worker. In terms of the employed civilization population 16 years and older, management and professional, service, and sales/office occupations provide similar levels of employment. With regard to industry, the largest industry on the island is "arts, entertainment, recreation, accommodation and food services," related to the importance of tourism to the islands' economy. Private wage and salary workers represent nearly two-thirds of the workforce.

Table 10. Occupation, industry and class of worker statistics for the USVI, 2000

Subject	Number	Percent
Occupation		
Management, professional and related	11,401	24.5
Service	10,325	22.2
Sales and office	13,055	28.0
Farming, fishing, and forestry	274	0.6
Construction, extraction, and maintenance	6,162	13.2
Production, transportation, and material moving	5,348	11.5
Industry		
Agriculture, forestry, fishing/hunting, mining	324	0.7
Construction	4,900	10.5
Manufacturing	2,754	5.9
Wholesale trade	912	2.0
Retail trade	6,476	13.9
Transportation and warehousing, and utilities	3,321	7.1
Information	931	2.0
Finance, insurance, real estate, rental and leasing	2,330	5.0
Professional, scientific, management, administrative, and waste		

Subject	Number	Percent
management services	3,058	6.6
Educational, health and social services	6,742	14.5
Arts, entertainment, recreation, accommodation, and food services	7,351	15.8
Other services (except public administration)	2,535	5.4
Public administration	4,931	10.6
Class of Worker		
Private wage and salary workers	29,917	64.2
Government workers	11,394	24.5
Self-employed in own not incorporated business	5,001	10.7
Unpaid family workers	253	0.5

NOTE: Numbers of workers reflect employed civilian population 16 years and older.

REFUGE ADMINISTRATION AND MANAGEMENT

SANDY POINT NWR, ST. CROIX

Land Protection and Conservation

Leatherback Turtle Project

Since the establishment of the refuge the main thrust of conservation efforts at Sandy Point NWR has been the leatherback turtle recovery project. As noted earlier, flipper tagging began back in 1977, and since 1981, saturation tagging and regular night patrols during the nesting season have been carried out every year (Garner et al. 2006). During the three decades the leatherback turtle project has been conducted, the Service and its principal partner the DFW, assisted by several researchers and hundreds of Earthwatch volunteers, have answered numerous questions about the biology, behavior, and conservation management of the leatherback. During this time, the protection provided by refuge staff and volunteers has supported recovery for the Sandy Point population. The number of nesting females has grown from under 20 in 1982 to more than 100 in most recent years. The 2007 nesting season set a record: 193 nesting females and almost 1000 nests. In addition, hatchling production has increased many-fold since the start of the leatherback project.

To aid in leatherback recovery, refuge management annually closes the beach to the public during the peak nesting season, typically from May through August. The specific times vary from year to year depending on the number and timing of nesting turtles. This closure avoids a number of potential problems that the presence of people can cause turtles, nests, and hatchlings. These and other management measures implemented by the Service and its partners have reduced the number and degree of impacts such as poaching, vehicles, horses, and predation on nests and hatchlings. In

2004, WIMARCS continued utilizing a relocation protocol designed to mimic the random nesting patterns of females. This helped alleviate fish predation problems due to unnaturally high densities of nests in the relocation area of the beach. A major problem continues to be light disorientation of the hatchlings, due to lights at the Frederiksted ball field, causing increased predation by extending hatchling time on the beach, and loss of energy needed for offshore migrations, (Villanueva-Mayor 2002).

Hourly beach patrols begin at Sandy Point around the 1st of April. Patrols start at 8 p.m. and continue until either 5 a.m. or the last female finishes nesting. The 2008 and 2009 seasons were the first in over a decade that researchers were not assisted by teams of Earthwatch volunteers throughout the season. Patrols are conducted hourly to ensure all nesting turtles are observed, tagged, and recorded (Garner et al. 2006).

Researchers complete a nesting data sheet every time a turtle is encountered on the beach. This sheet contains data on nesting, identification, morphology, location, nest parameters, and behavior. Date of emergence and excavation are recorded once hatchlings emerge. In addition, researchers excavate all nests after the initial emergence; nest contents are categorized to determine nest success and all un-hatched eggs are opened to ascertain stage of development (Garner et al. 2006).

More specifically, leatherback data are collected on the following:

A. Morphology – Curved carapace length and width are recorded once a turtle successfully nests (i.e., lays eggs). Individuals are measured every time they are encountered.

B. Nesting – Whenever possible, turtle nesting behavior and technique are observed and any anomalies recorded. Abnormalities in digging, condition of rear flippers, nest cavity structure, presence of roots, and condition of the sand in the nest are noted.

C. Relocated Nests – Any nests that appear to be in imminent danger of erosion or frequent and/or repeated tidal inundation are relocated. In addition, those nests with standing water in the nest cavity are also relocated. Eggs from these “doomed” nests are collected during deposition and placed in a plastic bag before they touch the sand in the nest cavity. The eggs are then transported to a safer, stable area of the beach, where the clutches are relocated into cavities excavated by qualified staff. The locations of all relocated nests are recorded, along with the number of yolked and yolkless eggs deposited. Average depth, width and overburden (depth of sand over the eggs as measured from the top of the egg mass to the sand surface) are also documented for each nest.

D. Marginal Nests – Nests that are determined to have a reasonable chance of survival, in spite of their location relatively close to the high water mark, or inside the erosion zone, are left in situ (in place) and recorded as “marginal.” Nests are left in situ to minimize the potential of skewing the hatchling sex ratios. Moving nests, such as marginal nests, which likely incubate at cooler temperatures due to wave washover, could inhibit the production of male hatchlings.

E. Nest Location – The location of each nest is determined by measuring the distance from the center of the nest cavity to each of the two nearest marker stakes. The distance of each nest to the vegetation line and to the high water mark is also recorded.

F. Tagging – Tags are attached to the inguinal skin flap between the rear flipper and the tail of every untagged turtle. All tagging procedures are designed to cause minimal disturbance to the turtles.

G. Emergence and Excavation – Nests are monitored nightly beginning three days before the expected emergence date. After emergence, the location, date, time and number of hatchlings seen are recorded. Live hatchlings are guarded from potential predators until they enter the surf. Disoriented hatchlings, those wandering the beach, going away from or parallel to the water, or hatchlings trapped in vegetation, are assisted to the water's edge. If a nest does not emerge within three days of the expected emergence date, it is excavated to ensure that no hatchlings are trapped inside and to reduce the high full-term pipped mortality often seen in relocated nests. After emergence, nests are excavated and nest contents evaluated for hatching success. All un-hatched eggs are opened to determine stage of development. Any abnormalities are described. The condition of the nest cavity is noted to help determine possible causes for poor hatch success. These include extremely wet or dry sand, as well as the presence of mold, roots, and other vegetation.

H. Blood and Tissue Samples – Blood and/or tissue samples are taken from adult turtles for genetic analysis. Blood samples are taken from veins in the rear flipper using a 21-gauge needle; these samples are only taken while the turtle is depositing eggs and in the nesting trance. Skin samples (6mm diameter) are taken using a sterile biopsy punch or a razor blade. All sampling is conducted during or shortly after the turtle lays her eggs, to ensure the least disturbance to the nesting process (Garner et al. 2006).

When encountered during leatherback surveys and patrols, green and hawksbill sea turtle activities are also documented (Garner et al. 2006). Greens and hawksbills are tagged during the leatherback nesting season. In addition, regular daytime track surveys for these two species are conducted, which provide reliable estimates of the numbers of females coming ashore to nest the night before.

Other Wildlife and Habitat Conservation Efforts

In addition to management, conservation and protection of nesting marine turtles, Sandy Point NWR staff undertakes a number of other wildlife and habitat-oriented actions, including the following:

- Protecting roosting sites of brown pelicans on the refuge by minimizing the potential for disturbance by visitors and human activity.

- Monitoring, managing, protecting and enhancing least tern nesting sites on the refuge.

- Conserving, enhancing, and restoring habitats for landbirds, shorebirds, and waterbirds on the refuge.

- Cooperation with partnering agencies, universities, and nongovernmental organizations (NGOs) in wildlife-related research, surveys, inventories, and censuses. For example, the refuge cooperated with DFW in a survey of Columbids (pigeons and doves) on the refuge, as part of a wider effort on St. Croix. This research indicated that significant numbers of white-crowned pigeons, scaly-naped pigeons, zenaida doves, and ground doves all use the refuge for feeding and nesting.

- Selective trapping and control of non-native mammals such as the Indian mongoose and feral dogs and cats to protect indigenous fauna. The most damaging of these predators for native fauna is the mongoose, which was introduced throughout the West Indies during the 19th century and is responsible for the decline or outright extirpation of many birds and reptiles on islands on which it was released. In the 1990s, Sandy Point had one of the highest concentrations of mongoose on St. Croix, probably due to an abundance of terrestrial crabs,

turtle hatchlings, and low scrub nesting habitat for birds. Mongoose have been observed excavating and depredating hawksbill and leatherback turtle nests to a depth of nearly four feet (USFWS 1999a). Dogs have attacked and killed three nesting hawksbill turtles on and adjacent to Sandy Point in 2007 as well as destroyed entire colonies of nesting least terns.

During the peak of leatherback nesting season (June and July), Tomahawk-type live traps are routinely set along the vegetation line of the beach to remove mongoose. Experience has indicated that the removal of 12-15 individuals from the beach can significantly reduce turtle nest predation (USFWS 1999a).

- Protecting the stand of the endangered Vahl's boxwood on the refuge. Determining germination protocols to propagate seedlings and establish new populations.

- Protecting and restoring existing dry forest habitats on the refuge. The new refuge headquarters/office now has a nursery in which staff is propagating native plants and trees for transplanting onto appropriate refuge habitats. Over the years staff has planted native plants and trees as part of an overall effort to restore native flora biodiversity.

  Although much of the vegetative cover on the refuge is characteristic littoral woodland, salt stress and habitat degradation from past sand mining operations have exacerbated low plant diversity. Cocoplum (*Chrysobalanus icaco*), once common on the island, continues to decline throughout the refuge due to harvesting of its edible fruit by residents. The refuge has cooperated with the St. Croix Environmental Association and the UVI Extension Service in gathering ripe fruit to conduct germination experiments and propagate new stock from seed. Some of these seedlings were planted on the refuge while others were distributed to area residents (USFWS 1999a).

- Conducting regular control of invasive vegetation.

- Managing cultural resources, particularly the Aklis archaeological site, consistent with Section 106 of the National Historic Preservation Act. The Aklis site is located on the shoreline of the extreme southeastern boundary of the refuge. For a number of years, it has been subjected to severe erosion from seasonal storms and hurricanes. Artifacts and human skeletal remains have been exposed in a number of areas, resulting in unauthorized removal by artifact hunters. Aklis is now recognized as one of the three most important archaeological sites on St. Croix (USFWS 1999a).

- Analysis indicates the presence of extirpated vertebrates, including one mammal and one reptile that were probably food items for occupants of the site back to 400 AD. Skeletal remains of the extinct hutia (*Isolobodon portoricensis*), a large rodent resembling the agouti, were found during excavation. The remains of the ground iguana (*Cyclura pinguis*), extirpated from Puerto Rico and the USVI but still surviving on two islands in the British Virgin Islands, were also found. These findings are significant because in the future the refuge may wish to reintroduce the ground iguana (USFWS 1999a).

At the present time, budgetary and staffing constraints result in the following activities not being prioritized:

- No active management for or surveys of reptiles (other than sea turtles) and amphibians on the refuge. In 2008 the first herptofauna surveys were conducted.
- No active management for or surveys of bats on the refuge.
- No active management for or surveys of invertebrates on the refuge.
- No active management of rare plants other than Vahl's boxwood.
- No active management of wetlands such as the West End Salt Pond, mangroves, or mudflats.
- No active monitoring of sea level rise.

Visitor Services

At this time, the Sandy Point NWR operates without a Visitor Services Plan. Nonetheless, the refuge staff serves the public on a daily basis. Every year, thousands of visitors flock to Sandy Point NWR to enjoy the wide, sandy beach and warm, clear waters in a lovely, natural setting. In addition, thousands of more visitors arrive to participate in the educational experience of guided sea turtle nesting and hatching observation. Hundreds of volunteers help with the turtle recovery program.

Every nesting season, hundreds of local students and adults visit Sandy Point to witness both leatherback nesting and hatchling emergence. The program, started in 1997 by the Service, plays an important role in the conservation of the leatherback sea turtle.

The Sandy Point Sea Turtle Education Program makes the community an integral part of the protection of sea turtles and their habitats. In doing so, it fosters a conservation ethic which extends to all aspects of the natural community. An educated and concerned public is our greatest ally when it comes to the preservation of sites such as Sandy Point. The visitor program shows visitors a world they may never have seen before. This is especially true of our local, young people since St. Croix has no zoos or natural history museums. For many of these children, this is their first opportunity to interact with a wild animal in its natural state.

Since 1997, thousands of schoolchildren and local adults have visited Sandy Point to see leatherback sea turtles nesting. Beginning on 1 March, the refuge starts accepting reservations from school, youth, and community groups for trips in April through August. Weekend nights are limited to school and youth groups and reservations are only accepted for groups of 15 to 30 people at a time.

During the peak of the leatherback turtle nesting season (May through August), the refuge is closed to the public. From September through mid-May access to the refuge and its beaches is permitted on Saturday and Sunday from 10 a.m. to 4 p.m. Visitation at these times ranges from 25 to 150 people per day. Visitor parking areas may receive as many as 60 to 70 vehicles per day. Vehicles and horses are prohibited from beaches. Power boats are also prohibited from landing on refuge beaches or placing anchors or mooring lines in the sand of the beach. No fires, tents, or camping are allowed. Vehicle parking sites are accessed from the single refuge road and sometimes heavy traffic and limited parking space can be problematic. A Federal Highway Administration road project is currently underway to address visitor parking and road condition issues. Actual construction is planned to begin in 2009.

Problems associated with visitation include littering, unauthorized camping, use of horses, and trespass onto closed turtle nesting areas. The lack of parking space results in damage to vegetation alongside the road during periods of high visitation. In addition, up to 5 – 6 individuals per day may visit the refuge seasonally to fish along the beach. While their impact is minimal, they rarely comply with refuge regulations regarding visiting hours (USFWS 1999a).

While it has decreased significantly, horseback riding on the beach has been a particular concern over the years. During the nesting season, hatchling turtles remain just below the surface of the sand, awaiting nightfall to emerge. The impact of a horse's hoof on the sand above a nest can crush those hatchlings closest to the surface, as well as prevent others beneath from emerging. In other words, a single hoof-fall can destroy an entire nest of emerging hatchlings (USFWS 1999a). The same situation applies to pedestrian foot traffic on the beach during the nesting season.

On several occasions over the years, staff have tried to open portions of the beach that were known to have relatively few turtle nests, but these trial openings have not proved successful. It was too difficult to control behavior and movement once the public was allowed access to limited areas of the beach. The need to limit visitor beach access in order to protect endangered marine turtles is perhaps the main management issue the refuge faces.

Of the six public uses cited in the National Wildlife Refuge System Improvement Act of 1997 (e.g., hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation), only hunting is prohibited at Sandy Point NWR. The refuge's small size, the proximity of residential areas, dense vegetation, the presence of endangered species, and the general absence or paucity of most game species, all make hunting inappropriate and incompatible at Sandy Point.

The refuge's visitor-related activities include the following:

- The Turtle Watch education program provides an opportunity for controlled observation of nesting turtles and hatchling emergences as well as periodic environmental education on and off-refuge. The Turtle Watch program is reserved for school classes, youth groups, and community organizations. Because of the potential for disturbing nesting turtles at night, especially as they emerge from the surf and head up the beach (when they are particularly sensitive), relatively few visitors can be brought out to the refuge during any given night. Strict adherence to these procedures minimizes any disturbance to nesting turtles (USFWS 1999a).

  Before the 1990s, almost all participants in the Turtle Watch were non-islanders or tourists, and mostly adults. Local residents felt reluctant to participate because of the prevailing perception that the program was aimed at "white tourists" and not residents. Since the goal of this program is to gain the support of the island community for turtle conservation efforts, the refuge decided to shift the program's focus to youth groups and community groups. Results over the past decade or more have been quite encouraging. The Turtle Watch program is now enthusiastically endorsed by the local community and participation is high. It was found that several young participants were from families in which a parent or other relative has actually poached sea turtle nests or killed and eaten adult turtles. After participating in the program, these young participants told their own relatives about the importance of not killing turtles and taking eggs from nests (USFWS 1999a).

Community interest in the refuge is quite high, reflected in the overwhelming popularity of the Turtle Watch program and an interest in turtle conservation at Sandy Point. However, the very popularity of the program is creating problems. Staff is concerned that if too many people visit the beach at night it will disturb turtles and disrupt research. At present, and for the past decade or more, demand for the program exceeds capacity, and the coordinator has to regularly turn away people wishing to participate (USFWS 1999a).

- A new, strategically-located refuge headquarters/office that will serve as a visitor contact station. Until 2007, Sandy Point NWR had no office or visitor contact station actually on the refuge. For years, the refuge office was located in the Federal Building in Christiansted, about half an hour's drive from the refuge. The new office is located at the entrance to the refuge adjacent to the refuge access road.

- Periodic news releases, news media interviews, website content, school visits, and frequent informal face-to-face contact with refuge visitors during regular weekend patrols.

- Refuge staff and volunteers provide outreach, giving off-refuge educational presentations to students and the public. The Service has partnered with the St. Croix Environmental Association and the Animal Welfare Center for youth and adult field trips to Sandy Point and to school classrooms. The refuge has also regularly participated in Earth Day activities at the St. George Botanical Garden (Lombard, pers. comm.).

Personnel, Operations, and Maintenance

Sandy Point NWR has a full-time, permanent staff of two: refuge manager and biologist. While the majority of their time and efforts are devoted to Sandy Point NWR, because they are stationed here and it has the largest programs, they are also responsible for Green Cay NWR and Buck Island NWR. In addition to this permanent, full-time staff, Sandy Point NWR occasionally supports part-time, temporary, and STEP employees and interns who serve in a variety of roles, related both to resource conservation and visitor services.

Both the refuge manager and biologist conduct law enforcement as collateral duties. Law enforcement at Sandy Point NWR emphasizes protection of sea turtles and ensuring the safety of refuge visitors, researchers, and volunteers. Historically, turtles and their nests were heavily exploited by island residents. There has been a cultural tradition in the community that encouraged the taking of turtle eggs and turtle meat, although this tradition is diminishing. Unfortunately, poaching continues throughout St. Croix, although infrequently on the refuge itself. Because the refuge is perceived as relatively remote by local standards and is located near a densely populated area (Frederiksted), it has been the site of a variety of criminal activities. There is a history of serious crime, including homicide, armed assault, kidnapping, rape, and vehicle break-in. As a result, law enforcement at the refuge entails more than routine enforcement of wildlife and refuge regulations (USFWS 1999a).

In their law enforcement capacity, the refuge staff has provided technical assistance to both local police and a number of federal agencies, including the Drug Enforcement Administration, Immigration and Customs Enforcement (formerly the Immigration and Naturalization Service), the Federal Bureau of Investigation, U.S. Coast Guard, and NOAA regarding drug trafficking, illegal immigration, stolen vehicles, and orientation to the refuge and coastal areas. The refuge manager has also provided training for police cadet classes of the Virgin Islands Police Department (USFWS 1999a).

Sandy Point NWR has a Youth Conservation Corps (YCC) program. In the YCC program, local teenagers, supervised by refuge staff, assist on a variety of manual tasks and projects around the refuge and at the new headquarters. In addition to providing needed physical labor for the refuge, the aim of the YCC program nationally is to provide environmental and outdoor education and experience to youths.

A number of volunteer programs operate simultaneously at Sandy Point NWR during the year. By far, the greatest number of volunteer hours has been provided by Earthwatch volunteers to the Leatherback Turtle Recovery Project. In its more than quarter century of operation, more than 1,000 Earthwatch volunteers have contributed to the recovery project, often donating more than 4,000 hours per year. During one 16-year period, nearly 1,000 volunteers logged over 80,000 hours of work, including approximately 58,000 miles walked on the beach scouting for nesting turtles and hatchlings. The data they helped to compile are unrivaled globally in marine turtle conservation research. For Earthwatch Expeditions, the Sandy Point NWR Leatherback Turtle Recovery Project has proved one of their most popular over the years (USFWS 1999a).

Permanent residents of St. Croix are another major source of volunteers. In one representative year, a total of 72 local volunteers contributed almost 1,700 hours assisting with sea turtle research, educational programs, beach cleanup, brush clearing, and other work. In that same year, the volunteer coordinator invested over 300 hours presenting programs. Preparing presentation materials, taking reservations for the Turtle Watch program, fielding inquiries, and working as a liaison with the school system consumed at least 100 additional hours. Volunteers have also assisted with mist netting and bird banding, invasive species control, tree planting, native tree propagation, fencing least tern nesting sites and many other tasks over the years.

The refuge enjoys productive partnerships with the National Park Service, Virgin Islands Department of Planning and Natural Resources, especially its Division of Fish and Wildlife; academic researchers; WIMARCS; the St. Croix Environmental Association (SEA); The Nature Conservancy; local citizens and businesses; the University of the Virgin Islands and other universities in Puerto Rico and the mainland; and other governmental and non-governmental organizations.

With regard to facilities, infrastructure, and equipment, as mentioned above, the refuge has a new headquarters at the only refuge road entrance, a greenhouse/nursery, an unpaved road that requires periodic maintenance, two metal container storage facilities, two vehicles (a jeep and a pickup truck), one all-terrain vehicle (ATV), one farm tractor, one Zodiac inflatable boat, and one Navy johnboat.

GREEN CAY NWR, ST. CROIX

Land Protection and Conservation

Land protection and conservation efforts on this refuge have emphasized restoring habitat for the critically endangered St. Croix ground lizard. In August 2004, the refuge biologist selected planting sites for native vegetation. The sites were selected to extend existing optimal ground lizard habitat and create corridors among patchy habitats along the eastern slope and eastern shoreline of Green Cay. Service personnel and volunteers cleared invasive vegetation, dug holes and planted 100 native trees including sea grape (*Cocoloba uvifera*), pink cedar (*Tabebuia heterophylla*), orange manjack (*Cordia rickseckeria*), buttonwood (*Conocarpus erectus*) and *Lignum vitae*. Crews also constructed a water catchment above and adjacent to planting sites (USFWS 2006b). Future restoration will include more invasive vegetation removal and native tree planting.

A prolonged and heavy rainy season furnished ample amounts of water to the newly planted trees. In July 2005, all sea grape trees experienced a boring insect infestation. Trees were pruned back and all infested branches removed from Green Cay; the sea grapes all recovered. After 1.5 years (early 2006), the survival rate of the 100 trees planted during August 2004 was 93 percent (USFWS 2006b).

In 1999-2000, the Service initiated a rat eradication project on Green Cay. The decision was made to use live trapping techniques to avoid any negative impacts to the St. Croix ground lizard that may result from the more common method of eradication, poison. By October 2000, rats were determined to be successfully eradicated from Green Cay. Subsequent to the 2000 eradication, consistent follow-up trapping was conducted on Green Cay to confirm the continued absence of rats. After five years of Green Cay being rat-free, trapping efforts in January 2006 confirmed the existence of rats once again in what is believed to have been a reintroduction. As described above, another rat eradication project using snap traps was conducted in late 2006 and early 2007, which appears to have succeeded in reducing but not eliminating non-native rats from the island.

Refuge management continues to collect and germinate seeds from Green Cay. The 2007 construction of a greenhouse/nursery at Sandy Point NWR will assist Green Cay's replanting and reforestation efforts. While no tree seedlings were planted in 2007, there will be more planting in the near future. Rat control and eradication efforts will also continue as needed (USFWS 2006b).

Other resource management efforts at Green Cay NWR include the following:

- Periodic inventories of the critically endangered St. Croix ground lizard;
- Monitoring, protecting, and minimizing disturbance to rookery and nesting sites of the recently delisted Caribbean race of the brown pelican (still protected by the Migratory Bird Treaty Act);
- Monitoring, protecting, and minimizing disturbance to rookery and nesting sites of the white-crowned pigeon and other columbid species;
- Controlling invasive plants and animals; and
- Managing cultural resources, particularly the prehistoric shell midden discussed above, consistent with Section 106 of the National Historic Preservation Act.

Visitor Services

Green Cay NWR is closed to the public. Public visitation is prohibited because of the threat it could pose to the highly endangered, vulnerable St. Croix ground lizard. Thus no visitor services are provided. However, staff does maintain a website for the refuge as well as provide off-refuge educational and outreach services. In addition, staff works to educate nearby resorts and hotels concerning the prohibition on landing at Green Cay and the reasons for this ban on visits to the refuge. The refuge also maintains useful contacts with local outdoor equipment concessionaires, who provide valuable information on what they observe occurring on the island. In terms of education and outreach, staff also conducts occasional off-refuge presentations about Green Cay, the St. Croix ground lizard, control of invasive species like the rat, and habitat restoration efforts.

The staff also maintains several official Service signs around the perimeter of the island that read: "National Wildlife Refuge: Unauthorized Entry Prohibited" and "Area Beyond This Sign Closed: All Public Entry Prohibited." On the southeast corner of the island, where there is a small sandy beach,

the nearest sign is behind and above the sandy beach on firmer, more stable ground, where storm tides will not undermine it or sweep it away. The phrasing on these signs may mislead people who occasionally land on the beach to believe that they are not trespassing as long as they stay on the strand of sandy beach, which is not the case.

At times nearby kayakers land on or become stranded at the small beach along the southeast corner of the island. Because no refuge staff is present on site and because some of these situations are a result of fatigue and miscalculation on the part of the kayakers, staff does not issue tickets for these violations. When these instances of trespassing are observed, however, the staff has issued warnings. Offshore Cays are important sites for nesting shorebirds and seabirds. Least terns, oyster catchers, and Wilson plovers have all been documented nesting on the shoreline of Green Cay and likely have been impacted by illegal visitation. The waters around Green Cay are popular for snorkeling, which is permitted because neither the waters nor the offshore coral reefs are within the refuge proper.

Personnel, Operations, and Maintenance

Green Cay NWR has no dedicated staff on site. Rather, this refuge is managed as a satellite refuge of Sandy Point NWR. Sandy Point NWR personnel, specifically the refuge manager and biologist, are also responsible for managing Green Cay. They are occasionally assisted by other Caribbean Islands' staff, NPS, as well as partners and volunteers. Green Cay NWR has no facilities or infrastructure on site, other than the aforementioned national wildlife refuge signs and no trespassing signs. NPS law enforcement rangers and resource management staff provide observations regarding activities at Green Cay during their boat patrols to BIRNM.

A number of individuals and groups assisted with the 2004 reforestation project described above, including SEA, The Nature Conservancy (TNC), the St. George's Botanical Garden, and NPS staff and YCC students. SEA shared a greenhouse, provided greenhouse operation instructions, helped plant trees, and instructed and conducted pruning of infested sea grapes. TNC staff dug auger holes, invested and constructed the water catchment and watering system, and helped plant trees. Staff-led volunteer groups also regularly clean the shoreline of trash that regularly floats ashore.

As described above, in 2008, refuge and Ecological Services staff, NPS, DPNR-DFW, and TAMU researchers collaborated in the capture and translocation of St. Croix ground lizards from Green Cay NWR to BIRNM, establishing four populations of this highly endangered reptile in the world. The Service will continue to collaborate with NPS and DPNR on population surveys at BIRNM.

BUCK ISLAND NWR, ST. THOMAS

Land Protection and Conservation

It is logistically difficult and time-consuming for the St. Croix-based staff of the three refuges to even reach Buck Island NWR, which is 40 miles north of St. Croix and several miles south of Charlotte Amalie and the island of St. Thomas. The relative remoteness and difficulty of access have resulted in Buck Island NWR receiving less active management than both Sandy Point and Green Cay NWRs. In a typical year, the refuge manager and biologist may visit Buck Island NWR only several times.

Nevertheless, some active management has occurred in recent years. In October 2005, the Service, in cooperation with USDA Wildlife Services, implemented a program to eradicate introduced Norway rats (*Rattus norvegicus*) from Buck Island NWR. The DFW also participated in this effort, in particular, a parallel rat eradication program on neighboring Capella Island. The detrimental impact

of rats on the delicate ecosystems of offshore Cays is well documented. They greatly suppress natural vegetative growth by eating fresh shoots, fruits, and seeds. They are also known to prey on eggs and chicks of ground-nesting and tree-nesting birds as well as native reptiles. Thus, rat eradication would stimulate recovery of native vegetation and wildlife habitat, in addition to encouraging the return of nesting seabirds once this source of predation and mortality is eliminated. Additionally, there would be a reduction of excessive rates of erosion from rats tunneling in softer soils and grazing on native vegetation (USFWS 2005a).

During a 5-day period in October 2005, a team of five people prepared both Buck and Capella islands for the eradication project. This preparation consisted of constructing an island-wide grid of 121 elevated bait stations on Buck Island NWR and 51 stations on Capella Island. Access trails were cut through the ground vegetation between stations and marked when necessary. Bait stations were placed at 30-meter intervals along these grid lines. A number of modifications to the bait stations was tested on prior rat eradication projects on other offshore Caribbean Cays to determine which modifications would best provide ready access to rats while minimizing access to non-target species. The bait stations on Buck Island NWR and Capella Island were mounted on rebar approximately 25 cm (10 inches) above the ground and fitted with bird and hermit crab excluder devices. While hermit crabs were present, they did not significantly interfere with baiting. If a particular bait station was being excessively raided by crabs, the position of the station was adjusted in order to remedy the situation (USFWS 2005a, NPS 1999).

The rodenticide was the same approved and used in the successful rat eradication projects on BIRNM (1999) and the offshore Cays of Saba, Dutchcap, and Congo. The crew began baiting on October 7, 2005, and continued until the incidence of bait taken by rats ceased on October 19th. Bait was distributed to all bait stations and checked daily for a period of 12 days. Three bait blocks were placed in each bait box initially and replenished when needed until rats were no longer removing the bait. By day 5, evidence of rat consumption was observed in the form of green droppings. On day 6, the team started observing dead rats. Both the black rat and Norway rat were observed at this time. Judging by the uptake of bait, the pre-program population of rats on Buck Island NWR was classified as light to moderate (USFWS 2005a).

There were concerns that not all rats might have been removed and about the potential for reinfestation. Many snorkeling and dive charter boats visit Buck Island and offshore waters daily, and these could provide a ready conduit for reinfestation. Buck Island's vegetation appeared very green and healthy during the 2005 eradication program, suggesting the possibility that the rats continued to consume highly available vegetation rather than the bait blocks, and that therefore, some may have survived. However, snap trapping census in 2006, 2007, and 2008 has confirmed a successful eradication program thus far.

Over time, monitoring will be conducted to continually verify the absence of rats. In addition to periodic snap trapping, signs of rats gnawing on plants, droppings, and active burrows will be used as evidence of rat presence or absence. The refuge will also design and implement a long-term monitoring protocol for the indefinite future. It will give the Service time to respond to any new introduction of rats before the population becomes abundant and widespread and substantial habitat damage becomes evident (USFWS 2005a).

Management and protection of cultural resources on the refuge, particularly the historic lighthouse, is consistent with Section 106 of the National Historic Preservation Act. The refuge is examining treatment and preservation options for this lighthouse.

Due to the absence of dedicated full-time staff on the refuge and the relative difficulty (both logistics and timing) of accessing the refuge by the St. Croix-based staff, the following management activities will not be undertaken at this time.

- Active management of Antillean skink, Puerto Rican racer, or other herptiles;
- Active management of the magnificent frigatebird and red-billed tropicbird;
- Active control program for invasive plant species; and
- Active habitat restoration other than controlling invasive animal species.

Visitor Services

While Buck Island NWR is not closed to the public like Green Cay NWR, it has no visitor services program and no facilities or infrastructure to accommodate visitation to the island. The island does have one or more informal trails leading to the lighthouses, but these are not officially maintained.

As noted earlier, tens of thousands of visitors on guided and chartered snorkeling and scuba diving tours, based out of Charlotte Amalie, St. Thomas, visit the coral reefs surrounding Buck Island NWR every year. As the tour boats anchor just offshore in one of the Cay's two small bays, it is uncertain just how many visitors actually land on the Cay and enter the refuge either at its beaches or at its upland areas. Likewise, the Service has no information on the extent to which disturbance of ground and shrub-nesting birds on Buck Island NWR may be a problem.

The staff maintains a website and limited signage for the refuge and provides occasional off-refuge educational and outreach services, including periodic presentations in Charlotte Amalie.

Personnel, Operations, and Maintenance

No staff is stationed at Buck Island NWR. Like Green Cay NWR, this unit is managed as a satellite refuge of Sandy Point NWR on St. Croix. Sandy Point NWR personnel, specifically the refuge manager and biologist, are also responsible for managing Buck Island NWR. They are occasionally assisted by other Caribbean Islands' staff as well as partners and volunteers. Buck Island NWR has no facilities or infrastructure on site.

The Service's major partner in managing the Buck Island NWR is the DFW. The federal and territorial agencies cooperate on joint wildlife and habitat management efforts for Buck Island NWR and adjacent Capella Island, which belongs to the territorial government.

III. Plan Development

OVERVIEW OF THE PLANNING PROCESS

The Service began the planning process with a biological review and a visitor services review, which were conducted in 2002 and 2003, respectively. The biological review covered all nine refuges in the Caribbean Islands NWR Complex, including the three covered by this comprehensive conservation plan. The visitor services review, on the other hand, covered Sandy Point NWR, because it is the only one of the three Virgin Islands refuges with significant public use and with management of that use.

In the biological review, a diverse team of Service and island territory personnel undertook a comprehensive examination of the nine refuges' habitat and wildlife management programs, including those at the Sandy Point, Green Cay, and Buck Island NWRs. The team then considered how each refuge might fit into accomplishing a number of relevant system-wide and landscape conservation needs. The biological review team included staff from the refuges and Service fish and wildlife biologists from the Divisions of Ecological Services and Migratory Birds. The biological review team's goals and objectives, set forth in its final report entitled, *Caribbean Islands National Wildlife Refuge Complex Biological Review*, were instrumental in the comprehensive planning process.

The visitor services review was conducted by a team of several public use and outreach specialists from the Service. The visitor services review team toured the Sandy Point NWR, identified and discussed the current status of the refuge's public use programs, and debated the pros and cons of various recommendations for enhancing and improving these programs.

The development of this CCP began in late 2006, with a site visit and kickoff meeting between the refuge manager and a private contractor. In early 2007, another meeting was held that included the refuge staff, Caribbean Islands NWR Complex staff, refuge supervisor, and the private contractor. This group discussed the composition of the core planning team, which would draft the vision, goals, objectives, and management alternatives for each of the three refuges. Representatives from the Virgin Islands Department of Planning and Natural Resources, Division of Fish and Wildlife, and two non-governmental organizations – the West Indies Marine Animal Research and Conservation Service (WIMARCS) and the St. Croix Environmental Association (SEA) – were invited to join the core planning team. A notice of intent to prepare a CCP for the Sandy Point, Green Cay, and Buck Island NWRs was published in the *Federal Register* on March 12, 2007.

The core planning team held two public scoping meetings, one in Charlotte Amalie, St. Thomas, on June 5, 2007, and the other in Christiansted, St. Croix, on June 7, 2007. Both of these public scoping meetings were advertised beforehand and both were well attended. Three local newspapers reported on the results of the meetings, further informing the public of the proceedings and the comprehensive conservation planning process for the refuges.

The Draft CCP/EA was released to the public in September 2009. In late February 2010, public meetings to receive comments on the Draft CCP/EA were held on St. Thomas and St. Croix. Comments from the public were received through March 2010. See Appendix IV for these comments and the Service's responses.

SUMMARY OF ISSUES, CONCERNS, AND OPPORTUNITIES

The core planning team identified a number of issues, concerns, and opportunities related to fish and wildlife protection, habitat restoration, recreation, and management of threatened and endangered species on the three refuges. Additionally, the planning team considered federal and territorial mandates, as well as applicable local ordinances, regulations, and plans. The team reviewed the recommendations of the biological review and visitor services review teams, and the comments that were obtained at the two public scoping meetings. Comment forms and personal contacts were also used to solicit additional public comments. Appendix IV, Public Involvement, summarizes the public comments that were received. An open planning team workshop was conducted to craft the visions, goals, and objectives for the three refuges.

All public and advisory team comments were considered; however, some issues that are important to the public are beyond the scope of the Service's authority and cannot be addressed within this planning process. The team did consider all issues that were raised throughout the planning process, and has developed a plan that attempts to balance the competing opinions regarding important issues. The team identified those issues that, in its best professional judgment, are the most significant to the three refuges. The significant issues are summarized below, in no particular order.

SANDY POINT NWR, ST. CROIX

Fish and Wildlife Population Management

- Continuation of enhancement of nest sites to increase nesting success for colonially nesting least terns.
- Continuation of monitoring, habitat improvements, and general promotion of brown pelican recovery on refuge lands.
- Continuation of protection of wetland habitats to support healthy populations of resident and migratory shorebirds, seabirds, waterbirds, and waterfowl.
- Continuation and improvement of surveys tracking use of wetlands by birds.
- Lack of general herpetofaunal surveys.
- Lack of knowledge of the species of bats present on the refuge and their habitat requirements.
- Lack of comprehensive, sustained inventorying and monitoring for targeted flora and fauna.
- Continuation of protection for the leatherback sea turtle—both nesting females and hatchlings—as well as nesting habitat and nests, from a variety of threats, thus contributing to the recovery of this endangered species.
- Continuation of contributions to the recovery of green and hawksbill turtles by protecting nesting females, nests, and hatchlings; initiation of night time monitoring program.
- Continuation and expansion of the protection and study of endangered and threatened species, like the leatherback sea turtle, that use and depend on the refuge habitats.

- Continuation of the study of least tern nesting activity by staff would increase the likelihood of successful protection. More funding, staff, and volunteers may well be needed for this effort.

- The Service has not established how many turtles at Sandy Point NWR are enough.

- Public desire to relocate sea turtle nests to allow the beach to be opened to more public use without harming the turtles.

Habitat Management

- Conservation and restoration of habitat for migratory and resident bird species associated with dry subtropical forest, such as the white-crowned pigeon.

- Conservation and restoration of habitat for migratory and resident bird species associated with mangroves, such as the white-crowned pigeon and yellow “golden” warbler.

- Promotion of nesting habitat for shorebirds, such as the snowy plover, Wilson’s plover, and the American oystercatcher.

- Restoring the structure, function, and diversity of dry forest habitat.

- Maintaining and restoring mangrove areas.

- Pressure by some local interests to build a marina in the non-refuge portion of the West End Salt Pond which would have adverse impacts on the lagoon and likely on refuge beaches and thus the nesting sea turtles.

- Lack of a more aggressive program to propagate the native plants from Sandy Point, such as coco plum, wild cinnamon, princewood, water mampoo, and other plants that are uncommon elsewhere on the island.

- Habitats should not be managed any differently than today.

- Control of invasive plants to improve sea turtle and bird habitat and plant diversity.

Resource Protection

- Monitoring and controlling or eradicating populations of non-native invasive species on the refuge.

- Protection and recovery of threatened and endangered plants that occur at the Sandy Point NWR, in particular *Buxus vahlii* (Vahl’s boxwood).

- Developing an Oil Spill and Hazardous Substances Contingency Plan for the refuge.

- Continuing to manage and protect cultural resources, particularly the Aklis archaeological site.

- Effort should be made to expand the areas at the refuge that exclude exotic predatory animals and human disturbance.

- If refuge staff were increased to protect public safety, the days and hours of beach access could increase during those months when turtle activity is not an issue.

- Expanding hours during which the refuge is open to the public may also increase property crime, assault, and theft as well as illegal activities such as dumping of garbage, appliances, vehicles, and unwanted animals (e.g., dogs, cats, horses).

- An attitude of people versus wildlife seems to be growing on St. Croix, which is exacerbated by the island's depressed economy.

- Protection of the threatened and endangered sea turtles and birds that use the refuge for foraging, nesting, and roosting.

- Insufficient funding for adequate staff to provide protection from illegal activities (e.g., drug trafficking, illegal immigration).

Visitor Services

- Developing a Visitor Services Plan.

- Determine whether to formally permit fishing on the refuge.

- Opportunities for expanding wildlife observation and photography in ways that do not compromise or disturb sensitive wildlife.

- How best to provide beach access to an eager public without harming turtle recovery efforts.

- How to provide for public safety on the refuge, particularly beaches, given limited staffing resources for patrol and enforcement.

- Increase staff – add outreach/education coordinator to improve local community support for wildlife conservation on the refuge.

- Some St. Croix citizens do not understand the most basic facts about leatherback sea turtles and most people on the island are unaware of the habitat needs of breeding least terns.

- Community outreach and education programs should be expanded to increase understanding of the importance of protecting wildlife and their habitats, leatherback recovery, the role of Sandy Point NWR and the National Wildlife Refuge System.

- The public feels locked out of Sandy Point, which is one of St. Croix's loveliest beaches.

- Access to the beach at Sandy Point should be increased, but only to the extent that it would have little or no impact on the wildlife and habitats.

- Pressure to increase public use of the beach

- The most important issue facing the refuge is public relationship: the public has no idea of what Sandy Point NWR is all about. If the public knows more about the refuge, there will be more support. Access to the refuge will all be worked out once the public becomes more aware of the value of the resource. Issues can be addressed by town meetings, and television and radio talk shows.

- Management of habitats and wildlife should not be done differently; however, access to the beach can be increased with additional Service staff.

- Creation of interpretive trails in certain sections of Sandy Point that teach about the relationship between plants, animals, and humans might be appropriate, after careful studies of the area.

- Limiting public access to Sandy Point beaches to just the winter months prohibits islanders and neighbors from enjoying the beach when the weather, water, and temperatures are better and from enjoying the sight of wildlife such as dolphins.

- The refuge wrongly gives priority to turtles over people, and has taken the best beach on St. Croix away from the public and given it to turtles. It appears that public access to other beaches on St. Croix is also being threatened. This is an assault on island heritage and culture.

Refuge Administration

- Cooperative efforts between the Service and the VIDPNR, Division of Fish and Wildlife.

- Collaboration with other partnering non-governmental organizations, in particular WIMARCS, SEA, and TNC.

- Potential for partnering with non-governmental organizations and local government agencies to increase the level of educational activities that could take place at Sandy Point, especially during the months with less sea turtle activity.

- More informational signage, positive use of the press, and partnerships with local agencies and organizations could improve public perception of the refuge.

- Raising local money to pay for more staff so that access could be increased and extending the hours that the refuge is open during the fall and winter months are good ideas.

- Fifteen years is a long time between management efforts; it would be helpful to update the public on the success (or failure) of management actions during the interim.

GREEN CAY NATIONAL WILDLIFE REFUGE, ST. CROIX

Fish and Wildlife Population Management

- Promoting continuing recovery of the brown pelican by protecting and enhancing nesting and roosting sites on the island.
- Promotion of nesting habitat for shorebirds and seabirds such as the snowy plover, Wilson's plover, least tern, and American oystercatcher.
- Promoting nesting birds by rat control, baseline surveys, and searches.
- Conducting status surveys for reptile and amphibian species of special concern.
- Determining the species of bats present on the refuge and their habitat requirements.
- The need to eliminate rats from the island to help with reforestation, pelicans, and the St. Croix ground lizard.
- Monitor and inventory for brown pelicans, the St. Croix ground lizard, and reforestation (i.e., measuring success of reforestation efforts).
- Endangered species, final refuge of non-endangered species extirpated by human activities elsewhere; loss of other insular refuges to development.
- Continuation of monitoring and research of *Ameiva polops* (St. Croix ground lizard).
- Preserving marine fish is the most important issue facing the refuge, and the best way to address this is a no fishing area from Green Cay to Buck Island. We must have a fish recovery area.

Habitat Management

- Continuing reforestation efforts on Green Cay by planting seedlings and by rat control or eradication.
- Propagation of trees for reforestation in refuge nursery; provide assistance to community propagation projects.
- Because one must have a boat to reach it and because Green Cay has no sandy beaches, current management is probably sufficient to protect this critical habitat.
- Protection and enhancement of habitat for the threatened and/or endangered species for which the refuge was established.
- Refuge should stress active habitat management, including restoration of native community and removal of non-native species.

Resource Protection

- Developing an Oil Spill and Hazardous Substances Contingency Plan for the refuge.

Visitor Services

- Whether or not to allow any visitation at all over the coming 15 years.
- How to reduce the number of occasional boaters, kayakers, and jet skiers who come ashore on an island that is closed to the public to protect the ground lizard and nesting pelicans.
- How to improve signage to make it clear to prospective visitors that the entire island, including seasonal beaches at the southern edge, is closed to the public.
- The refuge provides critical habitat for the endangered St. Croix ground lizard, and should remain off-limits to the public if this species is to survive at the refuge.
- The ground lizard population is still very low and it would be inappropriate to increase public use of Green Cay because of the potential for damage of habitat and introduction of invasive animals and/or plants.

Refuge Administration

- Need more staff to enable more active management (e.g., removal of non-native species).
- Green Cay needs more boats patrolling the area which should be a “no fishing” zone.

BUCK ISLAND NWR, ST. THOMAS

Fish and Wildlife Population Management

- Conducting baseline surveys and searches for seabirds.
- Conducting status surveys for reptile and amphibian species of special concern.
- Determining the species of bats present on the refuge and their habitat requirements.
- Control or eradication of populations of non-native invasive species.
- Conducting status surveys on plant species of special concern.
- Inventorying and monitoring of nesting laughing gulls, tropicbirds, terns, sea turtles, boa, and rats.
- No active management of the Antillean skink or Puerto Rican racer, which are documented on Buck Island NWR and currently listed or proposed for listing by VIDPNR.
- No active management of the magnificent frigatebird or the red-billed tropicbird, which are both species of concern in the Virgin Islands.

- Endangered species, final refuge of non-endangered species extirpated by human activities elsewhere; loss of other insular refuges to development.

- Monitor and research *Alsophis portoricensis* (Puerto Rican racer) and *Mabuya sloanii* (Antillean skink).

- Preserving marine fish is the most important issue facing the refuge, and the best way to address this is a no fishing area from Green Cay to Buck Island. We must have a fish recovery area.

Habitat Management

- Promotion of nesting habitat for shorebirds such as the snowy plover, Wilson's plover, and the American oystercatcher.

- Promotion of foraging habitat for transient and wintering species of shorebirds.

- Restoring the structure, function, and diversity of dry forest habitat.

- Evaluation of past forest cover and propagation of appropriate species of trees.

- Inventorying and monitoring of reforestation efforts.

Resource Protection

- Promotion of predator control, primarily of rats, to increase use of now abandoned areas by seabirds.

- Developing an Oil Spill and Hazardous Substances Contingency Plan for the refuge.

- Human encroachment and pollution are the most important issue facing Buck Island.

- Human encroachment and pollution should be addressed by educating the public and beefing up enforcement and patrolling the refuge.

Visitor Services

- Evaluation of refuge use and projects for potential impacts to off-refuge marine habitats (i.e., coral reefs) in the immediate vicinity of Buck Island.

- During peak months, the waters surrounding Buck Island host many hundreds of visitors daily, but these visitors are unaware that they are even close to a national wildlife refuge.

- Opportunities exist for partnering with tour operators who have a vested interest in the quality of habitat and opportunities for wildlife observation on Buck Island.

- The potential for providing public use opportunities to visitors actually landing on and exploring Buck Island (e.g., marked trail(s), the historic lighthouse, and interpretive and way-finding signage).

- Buck Island could offer more educational opportunities. Options include informational leaflet/pamphlet on seabirds and reptiles to disseminate through tour operators; training of tour operators, kiosks/signage on island, visitor's center at lighthouse. Trail should be maintained to keep visitors channeled.

- Establish and maintain educational aspect at Buck Island NWR over the next 15 years.

- Current use of the Buck Island NWR is appropriate.

Refuge Administration

- The lack of a Service management and enforcement presence on the refuge, which is managed by staff at Sandy Point NWR on St. Croix some distance away.

- The absence of a Fish and Wildlife Service presence on Buck Island and on St. Croix contributes to ignorance of the national wildlife refuge and its significance.

- Due to the proximity of Capella Island and Buck Island (which may touch each other at low tide), there are opportunities for collaborative management between the Service and the VIDPNR, Division of Fish and Wildlife.

- Need more staff to enable more active management (e.g., removal of non-native species).

- Buck Island needs more boats patrolling the area, which should be a "no fishing" zone.

WILDERNESS REVIEW

Refuge planning policy requires a wilderness review as part of the comprehensive conservation planning process. The lands within the Sandy Point, Green Cay, and Buck Island NWRs were reviewed for their suitability in meeting the criteria for national wilderness designation, as defined by the Wilderness Act of 1964.

None of the lands within the three refuges were found to meet the criteria for wilderness, in particular the criterion related to size (e.g., 5,000 contiguous roadless acres). The three refuges are too small. The criteria for wilderness and the results of the wilderness review are provided in Appendix VIII.

IV. Management Direction

INTRODUCTION

The Service manages fish and wildlife habitats considering the needs of all resources in decision-making. But first and foremost, fish and wildlife conservation assumes priority in refuge management. A requirement of the Improvement Act is for the Service to maintain the ecological health, diversity, and integrity of refuges. Public uses are allowed if they are appropriate and compatible with wildlife and habitat conservation. The Service has identified six priority wildlife-dependent public uses. These uses are hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

Described below is the proposed comprehensive conservation plan for managing Sandy Point NWR, Green Cay NWR, and Buck Island NWR for the next 15 years. The proposed management directions contain the goals, objectives, and strategies that will be used to achieve the refuges' visions.

For Sandy Point NWR, four alternatives for managing the refuge were considered: Alternative A, Current Management (No Action); Alternative B, Expanded Visitor Opportunities; Alternative C, Exclusive Biological Program Emphasis; and Alternative D, Enhanced Biological and Visitor Service Programs (Preferred Alternative).

For both Green Cay NWR and Buck Island NWR, two alternatives for managing the refuges were considered: Alternative A, Current Management (No Action) and Alternative B, Enhanced Biological and Visitor Service Programs (Preferred Alternative).

Implementing the preferred alternatives for all three refuges will result in enhanced biological and visitor service programs. More specifically, for Sandy Point NWR, endangered marine turtles, particularly the leatherback, will benefit from the preferred approach, as will a number of other wildlife species. Dry upland forest, mangrove, and salt pond habitats will be maintained or restored, to the benefit of the wildlife species they support. At the same time, visitor services and public uses will be expanded somewhat.

For both the Green Cay and Buck Island NWRs, expanded biological programs are emphasized, but certain visitor services will be enhanced as well. At Green Cay NWR, the primary wildlife beneficiaries will be the critically endangered St. Croix ground lizard, the brown pelican, and the white-crowned pigeon, while at Buck Island NWR, the Antillean skink, Puerto Rican racer, magnificent frigatebird, and red-billed tropicbird will benefit most from enhanced management efforts. At both of these refuges, control of habitat-damaging invasive rats and habitat restoration are the main approaches at improving their value to wildlife.

REFUGE VISIONS

SANDY POINT NWR, ST. CROIX

A leatherback turtle monitoring program was initiated in 1981 by the Government of the Virgin Islands, Department of Conservation and Cultural Affairs. In cooperation with the Service, Sandy Point NWR was established in 1984 on 340 acres purchased from the West Indies Investment Company for the protection of nesting leatherback sea turtles. An additional 43 acres have been

acquired since that time to protect the Aklis archaeological site and the endangered Vahl's boxwood tree. The refuge's establishing purposes are: "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species …or (B) plants."

Sandy Point NWR provides important nesting habitat for three species of federally threatened and endangered sea turtles: the leatherback, hawksbill, and green sea turtles. A leatherback turtle recovery program has been developed with partnering agencies, non-governmental organizations, and volunteers, to continue efforts on behalf of these species, including control of poaching, nest management, and monitoring of nesting levels, success, and population trends. In 1997, as a result of a dramatic increase in leatherback sea turtle nesting, the Service took over the education component of the leatherback turtle recovery program, and established the Turtle Watch Education Program. This program has provided the public with conservation and education opportunities to learn about and interact with nesting leatherback turtles; every nesting season, hundreds of children and adults visit the refuge to observe both leatherback nesting and hatchling emergence. The refuge also conducts day time monitoring activities of green and hawksbill sea turtle nesting. The refuge also conducts habitat management of dry coastal scrub forest, using techniques such as reforestation and control of non-native, invasive plants. Regular surveys are conducted to monitor waterbird, nesting seabird, and neotropical migratory bird populations.

The vision for Sandy Point NWR is as follows:

Sandy Point National Wildlife Refuge will continue to conserve and recover nesting sea turtles and their critical habitat, enhance upland forests and wetlands, protect cultural resources, and provide for increased compatible wildlife-dependent recreation that will not compromise wildlife and habitat.

GREEN CAY NWR, ST. CROIX

The 14-acre island of Green Cay was purchased in 1977 to protect the critically endangered St. Croix ground lizard. Green Cay NWR is 2.5 miles east of the town of Christiansted, St. Croix, U.S. Virgin Islands, and consists of the entire 14-acre island. The establishing purpose of the refuge was "… to conserve fish or wildlife which are listed as endangered species or threatened species.…" The refuge's objective is to maintain and restore the natural island ecosystem, protecting the endangered St. Croix ground lizard and colonial nesting birds. In order to protect this highly endangered species, public access to the island is prohibited.

The vision for Green Cay NWR is as follows:

Optimal habitat for the St. Croix ground lizard will be expanded throughout the Green Cay National Wildlife Refuge through reforestation efforts and removal of non-native, invasive species of plants and animals. Habitat improvement will increase the population's stability and viability and allow for the potential to translocate individuals to other suitable habitats and islands, thus contributing to the survival of this species.

BUCK ISLAND NWR, ST. THOMAS

The Service obtained about 36 acres from the U.S. Navy in 1969 and the remaining 10 acres from the U.S. Coast Guard in 1981. The purpose for which Buck Island NWR was established was for its "… particular value in carrying out the national migratory bird management program." The refuge's objectives are to manage and protect natural plant and wildlife communities. The Service is beginning to improve habitats on the island by controlling non-native, invasive species. The refuge is home to two rare reptiles endemic to the Puerto Rican bank – the Antillean skink

and the Puerto Rican racer – as well as the territorially listed magnificent frigatebird and red-billed tropicbird. Outstanding coral reefs lie just offshore, and are visited annually by tens of thousands of boaters, snorkelers, and scuba divers. The refuge also contains an important cultural resource, a historic Danish lighthouse that was erected in 1916.

The vision for Buck Island National Wildlife Refuge is as follows:

The Fish and Wildlife Service will continue to improve Buck Island National Wildlife Refuge habitat through restoration efforts and continued control of non-native, invasive species. The refuge will also monitor and inventory the Antillean skink, Puerto Rican racer, magnificent frigatebird, and red-billed tropicbird. All wildlife and habitat work will be conducted in close cooperation with the USVI DPNR, especially considering the close proximity of Capella Island, which is managed by DPNR. The refuge will also evaluate the condition and safety of the historic lighthouse and decide on the feasibility of preservation or restoration.

GOALS, OBJECTIVES, AND STRATEGIES

The goals, objectives, and strategies for the three refuges presented below are the Service's responses to the issues, concerns, and needs expressed by the planning team, the refuge staff and partners, and the public and are presented in a hierarchical format. Chapter V, Plan Implementation, identifies the projects associated with the various strategies.

These goals, objectives, and strategies reflect the Service's commitment to achieve the mandates of the Improvement Act; the mission of the Refuge System; and the purposes and visions of Sandy Point, Green Cay, and Buck Island NWRs. The Service intends to accomplish these goals, objectives, and strategies within the next 15 years.

SANDY POINT NWR, ST. CROIX

FISH AND WILDLIFE POPULATION MANAGEMENT

Sandy Point Goal 1: Conserve, enhance, restore, and protect native wildlife populations at Sandy Point NWR.

Sandy Point NWR's native wildlife populations include species from all five types of vertebrates, but the most significant on this refuge are several species of federally and territorially listed marine turtles and birds. The refuge was established specifically to protect important nesting habitat for endangered leatherback turtles, as well as listed green and hawksbill turtles. This protected nesting habitat has allowed these species to make dramatic local recovery. Prior to refuge establishment, poaching, predation of eggs and hatchlings primarily by non-native, invasive species (e.g., mongoose, dogs, and cats) and beach erosion had all taken a serious toll on the numbers of nesting female turtles and hatchling production at Sandy Point. The recently delisted brown pelican and the least tern use the West End Salt Pond and its surrounding habitats for foraging, nesting, and roosting. Non-native, mammalian predators such as mongoose, rats, dogs, and cats remain a serious problem for the ground-nesting least terns.

Sandy Point Objective 1-1: <u>Leatherback Sea Turtle Recovery</u> – Maintain seasonal beach closure, saturation tagging, and nest management.

Discussion: Sandy Point NWR boasts not only the best studied nesting population of leatherbacks in the world, but the largest nesting population in the United States. The refuge and its cooperating partners (e.g., DFW, WIMARCS, and Earthwatch) now have nearly three decades

of experience in carrying out the leatherback sea turtle recovery program at Sandy Point. Since the early 1980s, there has been a dramatic upward trend in the number of nesting females and hatchlings produced (Figures 11 and 12), although in the present decade both these measures of success may have started leveling off. The progress of the recovery program is attributable to three main elements: the seasonal beach closure, saturation tagging, and nest management. The first entails closing the beach to all public visitation (other than the Turtle Watch Program) during the peak leatherback hatchling emergence season. The second element involves saturation tagging, the tagging of each and every female that visits Sandy Point. The third involves relocating nests deemed vulnerable to beach erosion to stable beach areas.

Strategies:

- Conduct research to determine how to improve nest relocation protocol to improve relocated hatch success.
- Relocate any nests that appear to be in imminent danger of erosion or frequent and/or repeated tidal inundation, as well as those nests with standing water in the nest cavity. Collect eggs from these nests and place in a heavy plastic bag and relocate them to a stable beach area.
- Record the locations of all relocated nests, along with the number of yolked and yolkless eggs deposited. Document average depth, width, and overburden (depth of sand over the top of the egg mass).
- Using tagging pliers, attach Inconel tags to the inguinal skin flap between the rear flipper and the tail of every untagged turtle.
- Tag nesting adult females with electromagnetically encoded microchip, or Passive Integrated Transponder (PIT) tags directly into the left or right shoulder muscle. Use PIT tags only if turtles have commenced laying eggs, are motionless, and have entered the nesting “trance.”
- Continue to document the incidence of injuries among nesting female leatherback turtles.
- Monitor beach erosion and dynamics to observe and document effects on nesting patterns.
- Monitor and control beach vegetation as necessary. Roots can harm nests, eggs and hatchlings, while vines growing over the sand can entangle and disorient hatchlings.
- Cooperate with outside scientists and with researchers in the wider Caribbean, Puerto Rico, and the British Virgin Islands to get a more accurate picture of the regional nesting population.
- Utilize remote sensing technology, satellite tagging, and further projects tailored to the effects and implications of an expanding population.
- Undertake more detailed beach contour and erosion tracking and monitoring, possibly utilizing GIS and GPS. Cyclical patterns may be identified and monitoring results may potentially be correlated to suitable nesting habitat.
- Conduct a geological study to document the sand movement in and around Sandy Point. Results from such a study may allow us to predict erosion and accretion patterns, which ultimately drive better management decisions.
- Identify suitable nest relocation habitat and consider increasing it by vegetation management or removal. Adverse effects should be studied before any such removal is undertaken. Use adaptive management and small-scale pilot projects to study effects of vegetation control.
- Explore the development of a more controlled relocation area that may reduce environmental factors adversely affecting relocated nests.

Sandy Point Objective 1-2: Protecting Adult Leatherback Turtles and Nesting Areas – Continue night-time closures to protect turtles and nests and monitor nesting turtles.

Discussion: Night-time closure of the beach at Sandy Point is necessary to prevent disturbance of female leatherbacks arriving at the beach to nest. Like all sea turtles, female leatherbacks are extremely sensitive to artificial lights, sights, and sounds as they exit the surf and move up the beach to nest at night. When disturbed, they will often turn around and abandon that nesting attempt. The night-time closure is also indispensable as a tool to control poaching, which is now much less of a problem on the refuge than it used to be, but which still occurs at other beaches on St. Croix. Moreover, the closure serves to protect volunteers, students, and researchers. Monitoring nesting turtles both assures that the process might continue smoothly and uninterrupted and it has also allowed for the collection of a large data base now spanning nearly three decades. These data are invaluable in expanding our knowledge of this endangered species and in leading to informed resource decision-making.

Strategies:

- Using volunteers, conduct nightly beach patrols during prime leatherback nesting season, approximately from late March into early September. Patrols should start at 8 p.m. and continue to 5 a.m. or until the last female finished nesting.
- During peak leatherback nesting season, May and June primarily, continue to have researchers and volunteers patrol the nesting beach at 45-minute intervals. Since leatherbacks require at least 1.5 hours to complete the nesting process, patrolling the beach at 45-minute intervals ensures that all nesting turtles are observed, tagged, and recorded.
- If nest predation by non-native invasive animals is noted in parts of the beach, conduct targeted control operations of these animals in these areas using a combination of control methods, depending on particular circumstances.
- Maintain Turtle Watch program, but continue to closely control and monitor behavior of participants to minimize disturbance of nesting turtles.
- Every time a turtle is encountered on the beach, complete a nesting data sheet. Data recorded include date and time, identification, morphology (carapace length and width), location, nest parameters, and behavior.
- Collect blood and/or tissue samples from adult turtles, hatchings, and eggs for genetic analysis.

Sandy Point Objective 1-3: Leatherback Turtle Hatchling Production – Continue nest management efforts and maintain flexible seasonal closure on entire beach during prime turtle nesting season to optimize hatchling production on the beach.

Discussion: Nest management consists of the relocation of nests laid in beach erosion zones. Nest relocations prevent the loss of hundreds of nests to beach erosion thus increasing hatchling productivity. The seasonal closure of Sandy Point beaches, which runs annually from approximately May to late August or early September, is crucial to protecting vulnerable nests, eggs, and hatchlings from both inadvertent and deliberate disturbance, damage, and mortality. High concentrations of beach goers and turtle nests are not a mix that is conducive to optimal hatchling survival. Because the peak nesting season varies somewhat from year to year, it is desirable to maintain flexibility in announcing the start and finish of the refuge and beach closure.

Strategies:

- Work with the local community to shield or change lights at Frederiksted Ball Park to reduce or stop hatchling disorientation.
- Continue seasonal beach closures to protect and enhance leatherback sea turtle nesting success.
- Beginning three days before the expected hatchling emergence date, monitor nests nightly.
- Place a wooden stick, with a piece of tape denoting the location and identification number of the nest, about 10 inches behind the emergence area to mark the spot for future excavation.
- Guard live hatchlings from potential predators until they enter the water. Assist disoriented hatchlings, those wandering the beach, moving away from or parallel to the water, or hatchlings trapped in vegetation, to the water's edge.
- If a nest does not show hatchling emergence within three days of the expected emergence date, excavate the nest to ensure that no hatchlings are trapped inside and to reduce the high full-term pipped mortality often seen in relocated nests.
- Record hatchling data on date of emergence and excavation once hatchlings emerge and nests are excavated. Upon excavation, categorize all nest contents to determine nest success.
- When excavating nests, open all unhatched eggs to determine their stage of development.
- Note the condition of the nest cavity to help determine possible causes for poor hatch success. These could include extremely wet or dry sand, as well as the presence of mold, roots, and other vegetation.
- Perform day patrols to search for entangled and struggling hatchlings.
- Study possible causes of and remedies to downward trend in leatherback hatch success at Sandy Point. The effects of precipitation, water table, nest density, sand properties, bacterial loading, and maternal impacts on hatch success bear further investigation.

Sandy Point Objective 1-4: Hawksbill and Green Turtle Recovery – Implement saturation tagging and nest management.

Discussion: At present, efforts on behalf of nesting endangered hawksbill and threatened green turtles at Sandy Point NWR are limited to regular daytime beach patrols to record tracks. While researchers and beach patrols are actively focused on the leatherback turtle, they nevertheless do tag any hawksbill and green turtles that nest during the leatherback nesting season. They also conduct regular daytime track surveys from August to December. By implementing saturation tagging and nest management, which are at present only practiced for the leatherback turtles at Sandy Point, the refuge would be expanding and intensifying its population recovery efforts on behalf all three species of locally occurring marine turtles.

Poaching is a much greater threat for green and hawksbill turtles than for leatherbacks. While egg poaching is negligible when Sandy Point is patrolled nightly during the leatherback nesting season, once the patrols stop, the poaching increases dramatically. Adult green and hawksbill turtles are also poached in the USVI for their meat and shells. Traditionally, both eggs and adults have been taken after the leatherback season ends at Sandy Point and year-round throughout the rest of St. Croix.

Strategies:

- As appropriate, apply strategies listed for leatherback turtles under Objectives 1-1, 1-2, and 1-3 to hawksbill and green turtles.
- Until such time as saturation tagging and nest management can be implemented specifically for hawksbill and green sea turtles, continue documenting their nesting activities via daytime patrols. This includes opportunistic tagging and identification and enumeration of in situ nests, relocated nests, probable lays, dry runs, and track only events.
- In record keeping for hawksbill and green turtles, consider changing nomenclature and categories for hawksbill and green turtles to standard terms for sea turtle activities, that is, lay/observed, lay/suspected, emerge/no lay (BIRNM Sea Turtle Protocol, 2002).
- Continue to collect morphological data on hawksbill and green turtles, including carapace length and width.
- Hawksbill nests are more vulnerable to predation because they are typically located in vegetation at the beach edge and are much shallower than leatherback nests. This can be counteracted by increasing control of non-native predators such as dogs, cats, and mongoose.

Sandy Point Objective 1-5: Brown Pelican Recovery – Continue to protect roosting sites on the refuge by minimizing potential for disturbance by visitors and human activity.

Discussion: The Caribbean subspecies or race of the brown pelican was listed as endangered by the Service until December 2009 and still receives protection conferred by the Migratory Bird Treaty Act. The entire West Indies population of the subspecies has been estimated at 1,500 breeding pairs, of which 500-850 breed in the USVI and British Virgin Islands. Most of the St. Croix foraging population is concentrated along the southwest coast, at and in the vicinity of Sandy Point NWR, where more food is apparently available. Large numbers of post-breeding birds apparently disperse from the USVI to Puerto Rico.

Strategies:

- Continue to discourage visitor access to the West End Salt Pond to minimize the human presence and the potential for regular disturbance of roosting pelicans.
- Work with DPNR, the St. Croix territorial government, and the city of Frederiksted to ensure that management of the northern portion of the salt pond outside of refuge boundaries is consistent with the management inside the refuge.
- Post signs near or in the direction of where brown pelicans roost. The information posted may help discourage the public from disturbing roosting sites.
- Make signs large and readable. They should explain why the roosting sites are important to the survival of the brown pelican. Once the signs have some kind of explanation rather than just depicting “Brown Pelican Protected Area,” the public will be more likely to yield to the warning.
- Place a kiosk or information bulletin board outside the refuge boundaries to improve the public’s knowledge of the area.
- Work with the Park and Recreational Department which manages the pool west of the refuge.
- Conduct meetings or workshops for Park and Recreational Department staff members to educate them about the refuge.

Sandy Point Objective 1-6: Least Terns – Continue to monitor, manage, protect, and enhance least tern nesting sites on the refuge. Increase least tern nesting on the refuge but without year-round refuge closure.

Discussion: The Caribbean race of the least tern is listed as endangered in the USVI. In contrast to other terns in the USVI, the majority of least terns nest on St. Croix, where the breeding population is currently 300-325 pairs. On St. Croix, these terns have been recorded nesting at 26 sites in various habitat types, including beaches, salt flats, a dredge spoil pile, a gravel parking lot and the containment areas around storage tanks and roads at the Hovensa oil refinery. Available data suggest that the population has suffered a serious decline in St. Croix; studies are underway to assess the status of the species. Predation by dogs, cats, and mongoose and human disturbance are responsible for most nest failures.

Because the preferred nesting habitat for the least tern and its peak nesting season both correspond with heavy use of beaches by the public, this species is often forced into less preferred habitats such as the West End Salt Pond where mammalian predators such as mongoose, rats, dogs, and cats are very serious problems. Consideration should be given for continuing or eliminating all public use of refuge beaches such as at Sandy Point. With public use closed on the refuge during peak sea turtle nesting, there is still a need to better control possibly excessive disturbance associated with sea turtle research. The future existence of least terns at Sandy Point NWR may hinge upon elimination of disturbance at primary nesting sites to maintain and improve nesting success.

Strategies:

- Determine effects of sea turtle monitoring/research on least terns attempting to establish nest sites on beaches.
- If sea turtle monitoring/research efforts are having a deleterious effect on least tern nest site establishment and reproductive success, then undertake efforts to adjust sea turtle work to reduce conflicts.
- Cooperate with sea turtle researchers to educate staff and volunteers involved in leatherback turtle beach patrols and tagging about the need to avoid least tern nest sites and reduce inadvertent disturbance and mortality.
- Since least tern eggs are camouflaged and their nests inconspicuous, explore methods of marking the nests in such a manner that will alert humans to their presence without disturbing the birds or attracting predators.
- Temporarily close off zones of high nest density by using fencing or other barriers to discourage access by nesting turtles, predators, and humans.
- Consult with other national wildlife refuges and state sanctuaries to learn what methods they have used successfully to attract least tern nesting and protect eggs and chicks, such as wooden decoys at Hobe Sound NWR.
- Since least terns require nest sites largely devoid of vegetation, consider managing one or more areas of the beach to provide these conditions. The site(s) would be in an area of relatively lower turtle nesting density.
- Continue monitoring occurrence of least terns on the refuge by conducting annual nesting surveys/censuses that count numbers of nesting pairs and other demographic data.
- If after all efforts have been exhausted to increase and stabilize least tern nesting efforts on beaches, then focus on improving nesting at Salt Pond by protecting nest sites from predators and generally conducting predator control especially on rats and mongoose.
- Continue to provide or expand nesting platforms and small islands.

- Increase survey attention on locating least terns attempting to establish nesting, and count the number of pairs to establish baseline (whether beach or Salt Pond). Track response based on changes to research use on beaches, if such changes are considered necessary.

Sandy Point Objective 1-7: Landbirds, Shorebirds, and Waterbirds – Upgrade quality and increase native biodiversity of upland forests and wetlands to benefit landbirds, shorebirds, and waterbirds.

Discussion: The variety of habitats available at Sandy Point NWR, including surf, shallow marine waters, sandy beach, beach vegetation, shrubland, dry forest, woodland, mangrove, salt pond, and mud flats, attracts many bird species with diverse habitat and food needs. Although acreages of the different habitats present on the refuge tend to be small and fragmented, they still possess important value for many resident, migratory, breeding, and wintering birds. Landbirds include upland species such as forest and woodland birds; shorebirds include sandpipers and relatives that depend upon mudflats and unvegetated wetlands; waterbirds include numerous species associated with water, such as waterfowl (ducks, geese, swans), wading birds (herons and egrets), and marsh birds.

Strategies:

- Establish point counts or transects surveys to establish baseline population status for forest-associated species.
- Plant native fruit-producing trees to provide food for birds and bats.
- Locate white-crowned pigeon nesting areas, and if there is a threat of excessive human-based disturbance, then work to alleviate this conflict.
- Pigeon hunting should not be allowed near the refuge where white-crowned pigeons are known or suspected to occur.
- Continue to prohibit hunting on the refuge.
- Conduct standardized surveys for the yellow “golden” warbler in mangroves. The status of this “sentinel species” will serve as an indicator of any changes in mangrove habitat over time.
- Continue biannual mist-netting surveys to track both resident and migratory bird populations.
- Continue and expand survey efforts for shorebirds on the Salt Pond to document both overall use of shorebird habitat and assess habitat condition.
- Continue to establish baseline studies at Salt Pond for present waterbird use and track trends over time.

Sandy Point Objective 1-8: Amphibians and Reptiles – Within 5 years of the date of this CCP, begin to conduct status surveys for amphibians and reptiles and species of special concern.

Discussion: Three species of amphibians are native to St. Croix. Their status and distribution are not well documented. In addition, three non-native amphibians have also been introduced to and become naturalized in the USVI. Threats to native amphibian populations in the USVI include habitat loss, modification, degradation, and fragmentation as well as climate change, predation and competition from introduced species. To date, no baseline inventory of amphibians has ever been conducted at Sandy Point, so the presence or absence on the refuge of the three native species known to occur on St. Croix has not yet been ascertained.

Terrestrial reptiles have been inventoried on the three main islands in the USVI, and include one amphisbaenid, eleven lizards, four snakes, and two chelonians; however, much of the existing information on USVI terrestrial reptiles is now outdated. Moreover, baseline information is lacking

on the abundance, distribution, and basic ecological requirements of USVI reptiles for their effective conservation and management. There is one introduced species of management concern in the USVI, the red-eared slider.

The common ground lizard is native to St. Thomas and St. John, and was recently introduced to St. Croix. The abundant St. Croix anole forages on the ground and perches on tree trunks from just above the ground to 10 feet high; it probably occurs at Sandy Point NWR. The widespread green iguana also likely occurs on the refuge. Two native species of dwarf geckos occur on St. Croix: the common dwarf gecko and the St. Croix dwarf gecko, both of which could occur on Sandy Point NWR. Two other gecko species in the USVI are introduced and could possibly occur on the refuge. As with amphibians, to date, no baseline inventory of reptiles has been conducted at Sandy Point NWR.

Strategies:

- If necessary, partner with other agencies, organizations, or universities to carry out herpetofaunal surveys.
- Conduct regular herpetofaunal surveys to establish long-term trends.
- If species of concern are discovered, it may be advisable to conduct more frequent surveys or take management actions on their behalf.

Sandy Point Objective 1-9: Bats – Within 5 years of the date of this CCP, conduct surveys to determine the presence or absence of bats. Undertake habitat enhancement and installation of artificial nest structures.

Discussion: Bats occupy most of the terrestrial environments in the USVI except the smaller offshore Cays. They are the only native terrestrial mammals, and several species are listed as threatened or endangered in the territory. As noted earlier, the main causes of their decline are the loss, fragmentation, and degradation of habitat, as well as the loss of roost areas (trees and structures) in particular. Large bat roosts are vulnerable to disturbance or destruction by people, some of whom will kill any bat they can from prejudice and ignorance. The piscivorous (fish-eating) greater bulldog bat, frugivorous (fruit-eating) Jamaican fruit-eating bat, frugivorous and nectarivorous (nectar-eating) Antillean fruit-eating bat, and insectivorous (insect-eating) velvety free-tailed bat all occur on St. Croix and could potentially be found on the refuge. Bats have never been inventoried at Sandy Point NWR.

A survey on bats was conducted on St. Thomas and St. John and a few off-island Cays. The final draft of the project was sent out early in 2009. It was conducted by the Island Resources Foundation located on St. Thomas, under a Wildlife Restoration Grant W-22-3 from the Service to DPNR.

Strategies:

- Conduct mist netting or sound frequency surveys to determine the presence or absence of bats. Where and when bats are found, use mist netting to capture and identify the species.
- Survey known areas on refuge lands where nesting/roosting habitat may exist.
- Work with universities/researchers to survey and define feeding, nesting, and roosting sites.
- Work with universities/researchers to elucidate the life histories of the species of bats found to be using refuge lands.
- Provide improved bat habitat through native tree restoration.
- Make contact with DPNR to determine the best way to conduct a bat survey on the refuge.

Sandy Point Objective 1-10: Invertebrates – Within 5 years of the date of this CCP, begin to conduct status surveys for invertebrates.

Discussion: As stated in Chapter II, there are many more species of invertebrates than any other fauna in the Virgin Islands. Invertebrates occur widely in marine, freshwater, and terrestrial environments. They include tropical snails, slugs, other molluscs, crabs, spiders, scorpions, beetles, centipedes, millipedes, insects, and crayfish. Invertebrates are still poorly inventoried in the USVI, despite efforts started back in the 1920s. The USVI hosts a wide diversity of crabs, and also have a number of indigenous spider species, whose conservation status is unknown. Invertebrates have never been systematically studied or inventoried on the refuge.

Strategies:

- Partner with other agencies or organizations to work with entomologists or invertebrate biologists specializing in Caribbean insects and other arthropods (both terrestrial invertebrates such as insects and arachnids and/or marine invertebrates) from either the university, non-governmental, or contracting sectors to carry out one or more surveys.
- Conduct invertebrate surveys once every decade if possible to establish long-term trends.
- If species of concern are discovered, it may be advisable to conduct more frequent surveys or take management actions on their behalf.

Sandy Point Objective 1-11: Non-Native Invasive Animal Species – Implement refuge-wide control of non-native animals as needed to protect indigenous fauna.

Discussion: As stated in Chapter II, the refuge is plagued with several non-native invasive species, including the Indian mongoose, and feral dogs and cats, that prey on sea turtles (eggs and hatchlings) and other sensitive species of native fauna. Presently, the refuge conducts opportunistic, selective trapping and control of these invasive animals. The level of effort is not great enough to eliminate the problem entirely, although the situation has improved tremendously since before control efforts began. As noted earlier, the mongoose is capable of digging out nests and did this frequently before trapping reduced its numbers.

Strategies:

- Within 5 years of the date of this CCP, prepare and begin to implement a Non-Native Invasive Animal Control Plan, which will specify objectives, actions, and strategies to reduce populations of exotic and invasive species to levels that do not compromise native flora and fauna.
- Use a combination of control methods, depending on particular circumstances.

HABITAT MANAGEMENT

Sandy Point Goal 2: Conserve, enhance, restore, and protect native habitat and vegetation at Sandy Point NWR.

The diverse habitats and vegetation at Sandy Point NWR are not pristine and unchanging, but have been heavily altered over time by human activities (e.g., sand mining, clearing, agriculture, and grazing) and natural forces (e.g., hurricanes and storms, fires, beach erosion, and rainfall), all acting independently. There are ample opportunities for habitat conservation, enhancement,

restoration, and protection on the refuge, in spite of its small size—at 383 acres, less than one square mile. The terms ”conservation,” ”enhancement,” ”restoration,” and ”protection” are not interchangeable, but do overlap somewhat.

Sandy Point Objective 2-1: Dry Forest – Accelerate efforts to restore structure, function, and diversity of dry forest habitat.

Discussion: In the USVI, dry forest is typically found below 1,000 feet elevation. Annual rainfall ranges from 33-40 inches in this zone; at Sandy Point NWR it is about 40 inches (Table 2 in Chapter II), or at the upper end of this range. The height of climax vegetation in dry forests may reach 50-70 feet, but is shorter on steep slopes with thin soils, in areas subjected to strong winds, and where exposed to heavy salt spray. Usually only two canopy layers are formed. The foliage tends to be deciduous in more humid areas and sclerophyllous (thick, hard, leathery foliage that resists transpiration) in drier areas.

Figure 9 depicts only small fragments of dry forest remaining on the refuge, with the majority of the acreage in shrubland. However, this shrubland is likely a “sere” (successional phase), and given a chance through natural succession, much of this shrubland would likely succeed eventually to dry forest, so there is a large potential for restoration of dry forest habitat at Sandy Point. The refuge has been replanting native trees for some years, and with a nursery/greenhouse now erected and operating behind the refuge office, will be able to accelerate these restoration efforts.

Strategies:

- Collect seeds from a variety of sources, especially native trees on the refuge itself, to germinate in the refuge’s nursery behind the new office. Plant and tend seedlings to propagate these species.
- Initiate a comprehensive invasive exotic vegetation removal plan throughout the entire refuge.

Sandy Point Objective 2-2: Wetlands – Begin to monitor status and trends on West End Salt Pond as they affect mangroves, wetlands, and wildlife habitat.

Discussion: About one-quarter to one-third of the refuge consists of wetlands. These wetlands are virtually all associated with the West End Salt Pond, and include open water, salt and mud flats, and mangroves. The West End Salt Pond currently has no surface connection to the ocean, a condition that has persisted for many decades. Thus, it has no direct tidal influence. Various waterbirds use or depend on this salt pond, including seabirds (such as the brown pelican and least tern), shorebirds, and wading birds. The West End Salt Pond is an example of a hypersaline lagoon, a habitat which contains abundant algae and invertebrates, which support a large biomass of fish and crustaceans. These in turn support large numbers of shorebirds and wading birds.

Strategies:

- Restore mangrove wherever appropriate in the next 15 years.
- Establish point counts or transects surveys to establish baseline population status for mangrove-associated species; focus on yellow “golden” warbler in order to track responses to any mangrove restoration or other habitat changes occurring over the next 15 years.
- Develop baseline sampling and monitoring of some water quality parameters, particularly top and bottom dissolved oxygen levels and salinity monitoring in West End Salt Pond.
- Conduct an invertebrate survey in the West End Salt Pond.

Sandy Point Objective 2-3: Vahl's Boxwood – Protect and conduct recovery activities, such as nursery germination and planting, for *Buxus vahlii*.

Discussion: The federally endangered Vahl's boxwood is an evergreen shrub or small tree up to 15 feet high with stems up to 3 inches thick. Its twigs have two characteristic grooves beneath each pair of leaves. The entire plant is hairless. The oblong leaves are simple, opposite, dark shiny green, up to 1.5 inches long and 3/4 inch wide. The species has the ability to adapt to different environmental conditions. The specimens of the Sandy Point NWR population are shrubby because of the drier climate of this area and are part of the dry forest understory. The Sandy Point NWR population of Vahl's boxwood is the largest of only six known populations remaining in the world – four in Puerto Rico and two on St. Croix. The tract where they occur was part of a 43-acre parcel purchased by the refuge specifically to protect this endangered plant and the culturally significant Aklis site.

Strategies:

- Conduct a more comprehensive survey and map the known population to determine number of individual trees, location, range, and monitor the status. Use GPS and GIS to precisely map locations.
- Coordinate with St. George Botanical Garden and University of Puerto Rico's Botanical Garden on ongoing propagation/introduction efforts.

Sandy Point Objective 2-4: Other Endangered Plants – Investigate the potential for establishing a *Catesbaea melanocarpa* population on the refuge.

Discussion: The federally endangered *Catesbaea melanocarpa* has no common name. It is a small spiny shrub of the family Rubiaceae. This plant is extremely rare and is documented only on Puerto Rico, St. Croix, Barbuda, Antigua, and Guadeloupe. In the U.S. Caribbean, this species is currently known from only one individual in Cabo Rojo, Puerto Rico, and approximately 100 individuals at one location in St. Croix. All known individuals in Puerto Rico and St. Croix are found on privately owned lands (USFWS 2005b).

Catesbaea melanocarpa occurs in the subtropical dry forest life zone, the driest life zone in Puerto Rico and the USVI. This life zone receives a mean annual rainfall of 24-40 inches. Its vegetation typically forms a nearly continuous single-layered canopy, with little ground cover, and it is deciduous on most soils. The leaves of dry forest species are succulent or coriaceous (leathery), and species with spines and thorns are common. In Puerto Rico, *Catesbaea melanocarpa* is found in dry forest habitat, but in St. Croix, it is found in dry thicket scrub vegetation. *Catesbaea melanocarpa* is threatened by the limited number of individuals and distribution, habitat destruction or modification for residential and tourist development, fire, and catastrophic natural events such as hurricanes. Because this species is extremely rare, the risk of extinction is high (USFWS 2005b).

Strategies:

- Survey the refuge for *Catesbaea melanocarpa* specimens and map all individuals discovered. Use GPS and GIS to precisely map locations.
- Determine number of individual *C. melanocarpa* shrubs, their locations and extent, and monitor status.
- Partner with St. George Botanical Garden and UPR Botanical Garden in any regional conservation/propagation/introduction efforts.

- Collaborate with NPS to study and determine whether it would be appropriate to introduce *C. melanocarpa* to BIRNM.

RESOURCE PROTECTION

Sandy Point Goal 3: Identify, conserve, and protect natural and cultural resources through partnerships, land protection programs, and law enforcement.

As described throughout this CCP, the refuge partners closely with a number of agencies, non-governmental organizations, and individuals in all aspects of refuge management including resource protection. These efforts will be reinforced and expanded in the present plan.

Sandy Point Objective 3-1: Sea Level Rise – Cooperate with the U.S. Geological Survey (USGS) and other agencies to develop and implement protocols for monitoring sea level rise and its impacts on habitats.

Discussion: Global warming is not just heating the earth's atmosphere and melting the world's glaciers, it is warming the world's oceans even now. Warmer waters, in turn, cause the ocean to expand (thermal expansion), raising sea levels along coastlines and exposing coastal habitats and human development to flooding, especially during storms and hurricanes. In the future, hurricanes are likely to become more intense, with higher peak wind speeds and heavier precipitation.

Sea level rise has profound implications for important wildlife habitats at Sandy Point NWR, particularly the sandy beaches which constitute critical nesting habitat for three listed species of sea turtles and on the salt pond and its encircling mangroves. With rising average water levels, greater storm surges, and possibly more intense storms, the potential for beach erosion is expected to be higher. While the refuge's beaches are believed to be geologically stable, and to have been present for thousands of years, their characteristics (e.g., depositional patterns, width, slope, composition, depth to saturation, and seasonal features) and location decades from now, and thus their suitability for nesting sea turtles, cannot be taken for granted. Furthermore, the integrity of the Aklis archaeological site would be even more threatened than at present. Thus, this objective calls for the Service to cooperate with the U.S. Geological Survey (USGS) and other agencies, such as the National Aeronautics and Space Administration (NASA) and National Oceanic and Atmospheric Administration (NOAA), to begin monitoring sea level rise on the refuge and consider its potential impacts on crucial habitats and cultural resources.

Strategies:

- Within 5 years of the date of this CCP, contact USGS, NOAA, and other coastal refuges to begin developing a monitoring protocol for sea level rise and its effects on habitats and wildlife, particularly nesting sea turtles.
- Using GPS and GIS, begin to develop baseline data for entry into a long-term database that will track changes in sea level on a decadal time scale.
- Begin to collect and archive measurements on Sandy Point beaches, including beach width during different seasons, composition, slope, etc.
- Continue intensive nesting sea turtle monitoring to observe changes over time in response to rising average sea level.
- Observe and record responses of beach, beach strand, and terrestrial habitats to rising sea level.

Sandy Point Objective 3-2: Non-Native Invasive Plants – Within 5 years of the date of this CCP, develop and begin to implement a step-down management plan on invasive plant control.

Discussion: Non-native, invasive plants are a problem not just for Sandy Point NWR, but throughout the Caribbean refuges, and indeed, throughout the entire Refuge System. Invasive plants, most of them non-native, both displace native flora and tend to have less value for native wildlife. At present, non-native invasive vegetation on the refuge is controlled periodically, but not systematically. Under this objective, the refuge would inventory its invasive plants and concurrently, prepare a plan for their control, and where possible, eradication. Control measures that could potentially be used include mechanical, chemical, and/or biological, depending on the plant in question.

Strategies:

- Using a qualified botanist, conduct an inventory of all invasive plant species found on the refuge. In addition to naming the unwanted plants, this inventory should also specify their location and suggest effective control strategies.
- Prepare a Non-Native Invasive Species Control Plan in collaboration with NPS Exotic Plant Management Program at the South Florida/Caribbean office.
- Use a combination of herbicides, mechanical removal, and/or biological controls to reduce the incidence of and damage caused by invasive plant pests.

Sandy Point Objective 3-3: Cultural Resources – Continue to manage cultural resources, particularly the Aklis archaeological site, consistent with Section 106 of the National Historic Preservation Act. Within 15 years of the date of this CCP, develop and begin to implement a Cultural Resources Management Plan (CRMP).

Discussion: The Aklis site, situated in the southeastern corner of the refuge along the beach, is an important archaeological property entrusted to the refuge's management and protection. This prehistoric settlement left behind many artifacts and even human remains that have added considerably to our knowledge of the folkways of aboriginal populations in the Caribbean. It is regarded as one of the two most important cultural resource sites on St. Croix. The proposed CRMP is a step-down plan that would provide overall guidance on the refuge's approach to managing cultural resources.

Strategies:

- Within 10 years of the date of this CCP and contingent upon funding, conduct a Phase I archaeological survey of the non-inundated areas of the refuge by qualified personnel, as a necessary first step in cultural resources management.
- Conduct a Phase II investigation if archaeological resources, in addition to the Aklis property, are identified during the Phase I survey. In this, the eligibility of identified resources for listing on the National Register of Historic Places is evaluated prior to any disturbance.
- Conduct a Phase III data recovery if resources identified in Phases I and II are determined to be eligible. This will recover data and mitigate adverse effects of any undertaking.
- Follow procedures outlined in CRMP for consultation with the Service's Regional Historic Preservation Officer (RHPO) and Virgin Islands SHPO.
- Follow procedures detailed in CRMP for inadvertent discoveries of human remains.
- Ensure archaeological and cultural values are described, identified, and taken into consideration prior to implementing undertakings.
- Develop a step-down plan for surveying lands to identify archaeological resources and for developing a preservation program.

Sandy Point Objective 3-4: Law Enforcement – Refuge manager and at least one other staff person will continue to provide law enforcement as a collateral duty.

Discussion: For a variety of reasons, the law enforcement function at Sandy Point NWR has been a very important part of staff duties, and of protecting resources, staff, facilities, and the public. Over the years, law enforcement officers on the refuge have had to address turtle and turtle egg poaching, other kinds of poaching, violent crime, property crimes, theft, drug dealing, illegal immigration, littering, and unlawful dumping. Staff has cooperated on law enforcement matters with a number of other federal and territorial agencies, including the Federal Bureau of Investigation, U.S. Marshals, Drug Enforcement Administration, Immigration and Customs Enforcement, Department of Homeland Security, U.S. Coast Guard, DPNR Environmental Enforcement, and the USVI Police Department.

Strategies:

- Continue to cooperate closely and maintain a tight working relationship with other federal and territorial law enforcement agencies for law enforcement issues on and off the refuge.
- Continue to provide a visible law enforcement presence on the beach when the refuge is open to the public.
- Conduct beach patrols in conjunction with turtle researchers during leatherback nesting season.
- Maintain equipment such as vehicles, cell phones, walkie-talkies, and firearms and facilities such as gates and fences in good working condition.
- Practice "community policing" by maintaining good relations with residents of Frederiksted in particular and St. Croix in general.

VISITOR SERVICES

Sandy Point Goal 4: Provide opportunities for public involvement and wildlife-dependent recreation and education, to enhance public appreciation and awareness of refuge wildlife, habitats, and cultural history, as well as enhance public understanding of the mission of the Refuge System.

Sandy Point NWR is the only one of the three USVI refuges that supports substantial public use. The refuge's wide, clean sandy beaches, gentle surf, and beautiful waters attract many beach-goers and bathers. In addition, opportunities for wildlife viewing abound at Sandy Point, from watching dolphins offshore, to observing flocks of terns, pelicans, and nesting turtles on the beach itself. Of the six priority wildlife-dependent public uses deemed generally compatible with national wildlife refuges by the National Wildlife Refuge System Improvement Act of 1997 (e.g., hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation), only hunting is not permitted at Sandy Point NWR.

Sandy Point Objective 4-1: Visitor Services Plan – Within 5 years of the date of this CCP, adopt and begin to implement a Visitor Services Plan.

Discussion: A Visitor Services Plan has never been developed for Sandy Point NWR. This "step-down management plan" will provide guidance for all refuge management's efforts and programs on behalf of public visitation. This plan will improve the ability of staff to provide the visiting public with compatible opportunities to enjoy and appreciate fish, wildlife, plants, and other resources. As a result, the visiting public will develop an understanding and will build an appreciation of each individual's role in the environment, and particularly wildlife conservation, today and into the future.

Strategies:

- The plan should reflect current legislation, director's orders, initiatives, policy, and the mission of Sandy Point NWR, the Refuge System, and the Service.
- The plan should also address the current and future visitor services and recreation needs of the refuge visitors as well as the law enforcement capacity needed to accommodate these demands.
- The plan should consider ideas such as the following:
    - Placing a kiosk at the entry gate. The kiosk should have panels that tell about the Service, the Refuge System, Sandy Point NWR, sea turtles, and the habitat/geology. It should also explain why the refuge is open on such a limited basis.
    - When available, assigning one of the law enforcement staff at Vieques NWR to work part-time at Sandy Point NWR.
    - Developing a small visitor information area at the new headquarters.
    - Expanding the parking area at the beach and developing it into a one-way loop.
    - Continuing to limit public access to the Saturday/Sunday open times, because protecting the wildlife resources is the refuge's top priority.

Sandy Point Objective 4-2: Shoreline Fishing – Expand fishing opportunities on refuge.

Discussion: Currently, surf fishing from the shore is permitted during open hours, from 10 a.m. – 4 p.m. on weekends, when the refuge is open to the visiting public. The refuge is not open to fishing during the seasonal closure to protect nesting sea turtles. There are no freshwater fishing opportunities on the refuge due to the absence of streams, ponds, and lakes. Refuge staff will consider opening the refuge to shoreline fishing at other times, such as between 9 a.m. and 5 p.m. outside of the seasonal closure for turtle nesting.

Strategies:

- Work informally with fishers to ensure that they are abiding by refuge rules and conservation principles.
- Ensure that fishers pick up after themselves and do not leave behind line, hooks, and other tackle that are a hazard to wildlife and other beach users as well as an eyesore.
- Establish a permit system for people wishing to fish on the refuge.
- If refuge beaches are opened to surf fishing during the week, conduct periodic patrols to establish a refuge and law enforcement presence.

Sandy Point Objective 4-3: Wildlife Observation and Photography – Within 15 years of the date of this CCP, develop an accessible trail and observation deck with expansive views of the West End Salt Pond.

Discussion: Existing opportunities for wildlife observation and photography include controlled observation of nesting turtles and hatchlings as well as limited, largely informal opportunities for bird watching. In addition, all refuge visitors have casual opportunities for observing wildlife ranging from marine mammals to termites. Building a trail and observation deck overlooking the salt pond would literally open up new vistas for wildlife observation and photography on the refuge. While a potential site or sites for the observation deck have not yet been designated, several possible locations exist, along the southern, southeastern, and eastern sides of the salt pond. It would be important not to erect this facility right on the edge of the salt pond, so as to minimize its visibility, and therefore potential disturbance, to birds roosting, resting, and loafing on the salt pond and in mangroves around the perimeter. Depending on the specific location, the trail leading to the observation deck could

range from just a few yards to several hundred yards long. After it is developed, the trail could also be modified to serve as a nature trail rather than only as access to the observation deck by adding posts, stations, kiosks or signs.

Strategies:

- In scouting for the best possible location for a trail and observation deck, consider a range of factors such as prospective views of the salt pond and its wildlife from alternative locations, height of observation deck, obtrusiveness of location (i.e., potential disturbance of birds), feasibility of construction, capital and maintenance costs, length of trail, attractiveness of terrain and vegetation through which trail would cross, and so forth.
- Consult with the Service's Southeast Regional Office and other refuges in the region that have constructed similar facilities to learn from their experience.
- Place a sign advising approaching motorists of the trailhead and observation deck approximately 150 feet from the trailhead alongside the road.
- Widen the road or develop a small parking area to accommodate up to five parked vehicles without blocking road access.
- Construct trail in a manner that maximizes scenic and educational potential. Without adding too much to distance, consider placing curve(s) in trail rather than making it a straight line.
- Consider placing a fixed viewing scope on the observation deck. The deck should be no higher than the level of tree branches.

Sandy Point Objective 4-4: Environmental Education and Interpretation – Expand environmental education and interpretive opportunities. In addition, develop environmental education and interpretive opportunities around the new refuge headquarters.

Discussion: The refuge's existing environmental education and interpretation efforts include the very active turtle watch education program, as well as periodic environmental education on and off the refuge. A number of partners, both individuals and groups (agencies and non-governmental organizations), actively collaborate with the Service in providing environmental education and interpretive services. The new refuge headquarters, opened in 2007 near the southeast corner of the refuge, provides a base for expanding on-refuge environmental education and interpretation. Exhibits and materials will be available inside, and in the immediate vicinity, the refuge may develop a short nature trail or other exhibits. The proposed observation deck and trail leading to it also represent an excellent opportunity to provide additional environmental education and interpretation, including at the parking area, along the trail, and at the deck itself.

Strategies:

- Hire a person to function as education/outreach specialist and volunteer coordinator.
- Develop a volunteer-led education program and/or use interns to develop the education program.
- With the help of volunteers, expand the education curriculum.
- From February to May have an "Adopt-a-Clutch" program with elementary or junior high students.
- Consider other education programs such as the Shorebird Sister School Program and the ABA Junior Birder program.
- Place an interpretive panel or kiosk at the trailhead to the observation deck informing visitors about the tropical dry forest and the wildlife it supports.

- Consider converting the trail to the observation deck into a nature trail by developing posts or stations identifying and describing trees and other plants for visitors.
- Place an interpretive panel at observation deck emphasizing the ecology and wildlife of the West End Salt Pond.
- Create walking trails within the appropriate areas of the refuge to educate the public about the connection between the marine and terrestrial environment.
- Identify key plant species along the trail route.
- Strategically post a large map on the refuge showing direction of the trail route.
- Create an advertising campaign by working with local businesses to print and produce items and souvenirs such as T-shirts, cups, etc., for sale, which feature the sea turtle with the Sandy Point logo.
- Sell these items and souvenirs at local stores on all three major U.S. Virgin islands.
- Use radio and TV talk shows as another medium for promoting public awareness regarding the refuge.

Sandy Point Objective 4-5: Visitor Center – Establish interpretive trail near visitor contact station and expand information and educational opportunities within and beside the center.

Discussion: The new refuge office and headquarters beside the vehicular entrance to the refuge near the southeastern corner was occupied by staff in 2007 after several years of remodeling and exterior work, including the installation of a sidewalk, signage, and chain link security fence around the grounds. Over the next few years, staff will continue preparing this facility to serve both administrative and visitor contact functions. Over a somewhat longer timeframe, the refuge and its partners will design and build a short interpretive trail (up to ¼-mile in length) within the woodland and shrubland on refuge property adjacent to the refuge office and headquarters, either north or south of the refuge access road. In addition, staff will expand visitor-oriented information, exhibits, and facilities inside and outside the office building.

Strategies:

- Develop a short interpretive loop from the new headquarters out to the Salt Flat that also provides a view of the beach.
- Develop an overlook at the Salt Flats.
- Prepare a portion of the new office to serve as a visitor contact station with refuge brochures and other information on display, including maps, Service literature, and posters.
- Develop exhibits and kiosks inside and outside the headquarters that explain the role of the refuge and Refuge System in wildlife conservation locally, in the Caribbean, and nationally.
- Emphasize educational messages at the visitor contact station on the ecology and reproduction of sea turtles, their conservation status and recovery efforts, the importance of Sandy Point to the leatherback, hawksbill, and green sea turtles, neotropical migratory birds that pass through the refuge, and the threats to terrestrial and marine wildlife in the USVI (e.g., habitat destruction and degradation from human population growth and development, invasive species such as the mongoose and rat, and climate change).

Sandy Point Objective 4-6: Beach Access – In addition to weekend openings (10 a.m. to 4 p.m.), provide pedestrian access to beach during entire week from 9 a.m. to 5 p.m. outside of seasonal closure for turtle nesting.

Discussion: During the turtle nesting season, typically from March or April to the end of August or beginning of September, the refuge and beach are closed to the public. The one exception to this closure is for the Turtle Watch program, which allows hundreds of visitors annually onto the beach in controlled groups to observe nesting and hatchling leatherback turtles at close range. During the approximately seven months of the year outside of this seasonal closure, the refuge is open to the public only on weekends from 10 a.m. to 4 p.m. The gate remains closed and locked during the week, and public access prohibited, due to staffing limitations.

Because of the refuge and beach's relative seclusion, in spite of its proximity to populous Frederiksted, it has at times been a magnet for criminal activity, including violent crime. Thus, due to these public safety concerns, it is important for the Service to maintain a law enforcement presence on the beach during open periods. With a staff of just two, it has been infeasible to provide this presence and still accomplish other critical refuge functions during the work week. The objective of opening the beach during the week depends on obtaining adequate staffing so as not to shortchange critical refuge administrative, research, and management functions while simultaneously providing for adequate law enforcement presence so as to safeguard beachgoers and other refuge visitors.

Strategies:

- Obtain additional staffing (one full-time equivalent with collateral law enforcement responsibility) to allow for a minimum of one beach patrol per day during weekdays. Vary the time of the patrol from day-to-day.
- Interact as informally as possible with beachgoers and other visitors, and during these interactions provide information on wildlife and refuge programs, particularly nesting sea turtles. Encourage visitors to participate in a Turtle Watch program to broaden their appreciation of the beach and its value to endangered wildlife.
- Maintain beach signs and evaluate whether or not new signs or different messages are needed.
- Encourage beachgoers to pick up after themselves and not leave trash behind on the beach.

REFUGE ADMINISTRATION

Sandy Point Goal 5: Provide adequate staff, equipment, facilities, and funding to accomplish refuge goals and objectives while encouraging cooperative efforts with other agencies, non-governmental organizations, universities, volunteers, and other partners.

Until 2007, Sandy Point NWR was actually headquartered in a basement office of the Federal Building in Christiansted, St. Croix. This office space was located one-half hour's drive from the refuge itself on the opposite side of the island. Furthermore, the secure federal facility, to which entry required passing through a metal detector and past armed guards, did not convey a feeling of openness and accessibility to the general public. Until 2007, in essence, the refuge had no visitor contact station. Nevertheless, staff maintained a robust level of contact with the public through regular beach patrols.

The new refuge headquarters, located on the refuge itself and at the main refuge entrance, is a significant step forward in the administration of Sandy Point NWR. It substantially increases staff presence on the refuge, which is beneficial both for the public and for refuge management as well as resource protection.

The refuge has partnered for decades with several key institutions and during the next 15 years will deepen and broaden these partnerships.

Sandy Point Objective 5-1: Outreach and Public Involvement – Increase education and outreach efforts. Collaborate with Virgin Islands Network of Environmental Educators.

Discussion: The refuge has conducted environmental education and outreach for years. These efforts have taken place both on and off the refuge, and have included presentations in K-12 classrooms around St. Croix and participation in fairs, among other things. In spite of these endeavors, some comments received during the CCP scoping process indicated that the refuge is not well enough known or supported by much of the local population. According to this view, this lack of knowledge and support – of having a stake in the refuge or being a "stakeholder" – can turn some of the public against the refuge because of its restrictions on beach access. Thus, the refuge needs to step up or modify its efforts to make them more effective in educating the public about the refuge's contributions to St. Croix residents and thus earning greater public support and understanding. Overall, in its nearly 30 years of existence, Sandy Point NWR has made great strides in eliciting growing public acceptance and support through the sea turtle program. Nevertheless, these outreach and public involvement efforts need to increase because of greater population and economic stresses on island residents and resources.

Strategies:

- Develop a Sandy Point NWR interpretive/informational exhibit to be located at the NPS Visitor Center.
- Develop an interpretive kiosk to be located in Ft. Fredrick.
- Develop a sea turtle brochure and a "Birds of St. Croix" brochure.
- Develop a community festival such as "Welcome the Turtles Home" festival.
- Provide regularly scheduled guided tours.
- Continue to work with local media to provide information about the purpose and importance of Sandy Point NWR.
- Cooperate with the Virgin Islands Network of Environmental Educators to develop age-appropriate materials and presentations for integration into classroom science curricula.

Sandy Point Objective 5-2: Youth Conservation Corps – Expand the YCC program to include more participants.

Discussion: The existing YCC program on the refuge takes place on a relatively small scale, approximately five YCC participants, for two months during the summer. Over the 15-year planning horizon, the objective would be to roughly double or triple those numbers. The YCC program provides a benefit to both the refuge and the community. For the refuge, it is an available source of manual labor to accomplish physical projects on the ground. In the summer of 2007, the YCC helped on a number of projects at the refuge, including building the greenhouse/nursery and constructing a sidewalk to the new office building. The YCC program also includes a certain amount of environmental education for its teenage participants. By providing a source of gainful employment for the local community, the program also helps the refuge gain community support. From the community's perspective, the YCC provides needed summer jobs for its youth. These jobs are not only a source of income, but help teach valuable work skills that will help these individuals in life.

Strategies:

- Maintain a position on the refuge staff to serve as coordinator of the YCC. This position will be charged with promoting the program among local schools and youth, supervising YCC students, and developing the combination of work projects and education that characterize YCC ideals.
- Give presentations to local schools about summer jobs with the YCC.
- Cultivate relationships with local teachers and guidance counselors to disseminate interest in the YCC program.

- If certain YCC students perform exceptionally well, consider using them the following year in an advisory or supervisory capacity.

Sandy Point Objective 5-3: Partnerships and Volunteers – Expand on existing partnerships and encourage development of a Friends of Sandy Point NWR organization (Friends Group).

Discussion: Sandy Point NWR has extensive existing partnerships with the VIDPNR Division of Fish and Wildlife, NPS, many turtle and other wildlife researchers associated with a variety of institutions, WIMARCS, SEA, local citizens and businesses, the University of the Virgin Islands and other universities, and other governmental and non-governmental organizations. The refuge's objective in the coming 15 years would be to grow these partnerships, both deepening existing partnerships and adding new ones. In addition, the refuge will encourage the development of a "Friends of Sandy Point National Wildlife Refuge" organization. Friends groups exist at many national wildlife refuges around the country, and these nonprofit non-governmental organizations collaborate with the refuges in many ways, such as by providing volunteers, conducting environmental education, representing the refuge in the local community, advocating for the refuge in the political and civic arena, preparing grant requests, and receiving funds for specific capital or operating projects.

Strategies:

- Consider using a seasoned volunteer or hiring a local teacher temporarily during the summer to serve as the leader for the YCC program.
- Maintain volunteer/intern housing upstairs at the new headquarters.
- Develop a "Friends of Sandy Point National Wildlife Refuge" organization based on sea turtle nesting. This would not be a traditional community-based support group but rather a national or international friends group.
- By speaking one-on-one or in small groups, encourage volunteers participating in the leatherback turtle program to assist in forming a Friends of Sandy Point Refuge.

Sandy Point Objective 5-4: Staffing – Add 1.0 FTE assistant refuge manager, 1.0 FTE law enforcement ranger, 1.0 FTE maintenance worker, and 1.0 FTE administrative assistant.

Discussion: The refuge's permanent staff at present consists of 2.0 full-time equivalent positions (FTEs): refuge manager and biologist. In addition, Sandy Point NWR has a fluctuating number of temporary staff. Refuge personnel are also responsible for managing Green Cay and Buck Island NWRs. As a result of this limited staffing for a sub-complex of three refuges, Sandy Point personnel are sharply constrained in what they are able to accomplish. Adding an assistant refuge manager, law enforcement ranger, maintenance worker, and administrative assistant will boost the refuge's capabilities in a number of respects. Research, wildlife and habitat management, and visitor services on the refuge will all benefit from the proposed staffing additions.

Strategies:

- Assistant refuge manager will directly assist refuge manager in day-to-day operations.
- Law enforcement ranger will improve visitor safety and resource protection.
- Maintenance worker or mechanic is needed for repair and upkeep of equipment, facilities, headquarters/office, and infrastructure, as well as capital improvement and certain wildlife and habitat projects.
- Administrative or office assistant will be based at the new refuge office and serve as a dispatcher, receptionist, clerk, office manager, and computer network operator.

Sandy Point Objective 5-5: Facilities and Equipment – Within 15 years of the date of this CCP, add a visitor center distinct from the refuge headquarters and maintenance facility.

Discussion: At present, refuge facilities and equipment consist of a new headquarters, greenhouse/nursery, main access road, storage facilities, three vehicles, one zodiac, and one Navy johnboat. The new headquarters also serves as the only visitor contact station on the refuge. During the coming 15 years, the refuge will augment visitor services and opportunities at this contact station, by adding exhibits, information, signage, and an interpretive trail at and near the headquarters. However, adding a new visitor center nearby will substantially enhance the visitor experience.

Strategies:

- Work closely with the Service's Southeast Regional Office and architectural firms in the siting, architectural design, landscaping, and construction of a visitor center in the vicinity of the new refuge office.
- Design the exterior and interior of the visitor center to highlight the unique aspects of the U.S. Virgin Islands and particularly Sandy Point NWR. Major theme should be nesting sea turtles.
- Attempt to make the visitor center as "green" as feasible by incorporating elements of renewable energy (e.g., active and passive solar, wind), energy efficiency and conservation, and water conservation. These would symbolize the refuge's response to the challenges global climate change and sea level rise pose to the Sandy Point NWR and its habitat and wildlife.
- Collaborate with partners such as local artists, businesses, and Chambers of Commerce to develop and run a unique facility that can serve as the focus of visitor services on the refuge.
- Consider using volunteers and/or future Friends Group members to help staff the front desk of the visitor center, as is done at certain other refuges.
- Collaborate with the Service's Southeast Regional Office and interpretive specialists on the preparation of interpretive exhibits, material, and themes for the visitor center.

GREEN CAY NATIONAL WILDLIFE REFUGE, ST. CROIX

FISH AND WILDLIFE POPULATION MANAGEMENT

Green Cay Goal 1: Conserve, enhance, restore, and protect the St. Croix ground lizard and other native wildlife populations at Green Cay NWR.

The St. Croix ground lizard is the most sensitive species, but not the only sensitive or listed species, found on the refuge. Green Cay NWR was established three decades ago specifically to protect this critically endangered species, and most of the world's remaining population is found on Green Cay. The Cay also supports a small population of nesting brown pelicans (recently delisted) and white-

crowned pigeons (territorially endangered). Two other species that occur there in low numbers are the territorially endangered peregrine falcon and white-cheeked pintail.

Green Cay Objective 1-1: St. Croix Ground Lizard Recovery – Continue existing programs of reforestation, non-native invasive pest and plant control and population monitoring. Maintain closure of island to public access. In addition, develop habitat restoration plan within 3 years of the date of this CCP.

Discussion: The federally endangered St. Croix ground lizard is a small species of the genus *Ameiva*. Prior to human settlement and widespread ecosystem disruption, the St. Croix ground lizard was probably restricted to St. Croix and the islands and Cays offshore. There is strong circumstantial evidence that correlates the decline of the St. Croix ground lizard with the proliferation of the Indian mongoose on the Virgin Islands, beginning more than a century ago in 1884. The St. Croix ground lizard was thought to have become extinct early in the 20th century but was rediscovered in the 1930s at East End, some empty lots in Christiansted harbor, on Green Cay, and on Protestant Cay. After 1968, however, no St. Croix ground lizards were detected on the island of St. Croix proper.

The most recent surveys on Green Cay, in 2002, yielded a conservative population estimate of 183 individual lizards with a 95 percent confidence interval of 108-258 individuals. The major continuing threat to the Green Cay population is from habitat damage caused by the introduced rat. Thus, interlocking keys of population recovery are believed to be elimination of rats from Green Cay, and concurrently, reforestation. To that end, the Service has been pursuing both rat eradication and reforestation in recent years.

Strategies:

- Continue regular monitoring of rat presence on an annual or biannual basis.
- Continue rat eradication efforts until success is obtained.
- Continue population trend monitoring (i.e., regular censuses of St. Croix ground lizard population) at a minimum of once every five years. Coordinate censuses with DFW and NPS on other populations (e.g., Protestant Cay, BIRNM) of *Ameiva polops* to determine population status/time.
- Monitor survival and growth of tree seedlings planted in 2004 as part of reforestation effort.
- Remove competing vegetation around planted seedlings to improve their chances of survival.
- Using partners, volunteers, and/or YCC crews from Sandy Point NWR, continuing planting new seedlings of native trees to reforest island.
- Work with the NPS to monitor success of the St. Croix ground lizards translocated from Green Cay to Buck Island Reef National Monument.

- Continue to maintain closure of Green Cay to visitors. This will avoid and reduce risk of trampling lizards underfoot, disturbance to nesting birds, habitat damage, and inadvertent transport of seeds of invasive plants.

Green Cay Objective 1-2: Brown Pelican Recovery – Monitor, protect, and minimize disturbance to rookery and nesting sites. Accelerate reforestation efforts to increase optimal nest sites.

Discussion: The recently delisted Caribbean subspecies or race of the brown pelican is distributed throughout the West Indies. The current breeding population of brown pelicans in the USVI and British Virgin Islands (BVI) is estimated at about 500-850 nesting pairs. Pelicans normally nest in trees and shrubs but after hurricanes may nest on fallen vegetation or on the ground. A nesting colony of brown pelicans has bred on Green Cay intermittently in recent years.

Strategies:

- Maintain the closure of Green Cay to the public, thereby minimizing disturbance to roosting and nesting pelicans.
- Conduct annual censuses of nesting pairs, nestlings, and fledglings as a gauge of population trends.
- Consider participation in a territory-wide banding effort to track movements and distribution and population trends of brown pelicans in the Caribbean, including Puerto Rico and U.S. and British Virgin Islands.
- In cooperation with partners, periodically obtain tissue or blood samples from eggs or chicks to monitor concentrations of environmental toxins/contaminants and investigate whether levels are potentially problematic.
- Accelerate reforestation and protect existing trees through continuing rat eradication efforts to improve quality and quantity of nest sites in trees.

Green Cay Objective 1-3: White-crowned Pigeon – Monitor, protect, and minimize disturbance to rookery and nesting sites. Accelerate reforestation efforts to increase optimal nest sites.

Discussion: The white-crowned pigeon nests and roosts in mangroves and littoral forest on larger islands and Cays. It forages mostly in littoral forest and frequently in upland forests. Many individuals leave the USVI during winter. Although it used to be hunted, the white-crowned pigeon has been protected in the USVI for over 40 years. At one time, Green Cay supported large breeding colonies of white-crowned pigeons and zenaida doves, but they were subject to wanton slaughter. This disturbance and mortality year probably contributed to the abandonment of Green Cay by large numbers of pigeons and doves; remnant numbers persist today.

Strategies:

- In cooperation with partners and volunteers, conduct annual census of nesting white-crowned pigeons on Green Cay during peak nesting season.
- In collaboration with NPS and DFW, consider extending census to BIRNM.
- Minimize disturbance to rookery and nesting sites by maintaining visitation closure for Green Cay NWR.
- Continue with efforts at reforestation both by eliminating rats from the Cay and planting and tending seedlings of native trees.

HABITAT MANAGEMENT

Green Cay Goal 2: Conserve, enhance, restore, and protect native habitat and vegetation at Green Cay NWR.

Green Cay Objective 2-1: Habitat Recovery – As resources permit continue to reforest island using native tree species. Develop habitat restoration plan within 3 years of the date of this CCP and accelerate rate of reforestation to complete 100 percent of area intended for reforestation by end of planning period.

Discussion: The only inventory of vegetation on Green Cay was conducted in 1982. At that time, and still today, the natural forest on Green Cay was poorly developed except for a small mesic forest woodland on the southwestern part of the island. Other less densely forested, more xeric (drier) areas were scattered throughout the southern half of Green Cay. The dominant tree species were Geiger or manjack, the poisonous manchineel, and pink trumpet or white cedar. Most of the island was covered by four species of shrub. Herbaceous plants were scattered throughout the island. A shrub-grassland community occupied the northern half of the island, characterized by impenetrable, almost monospecific shrub stands up to 6-7 feet tall, along with wind-swept grasslands.

In 2004, the refuge biologist selected planting sites for native vegetation. The sites were selected to extend existing optimal ground lizard habitat and create corridors among patchy habitats along the eastern slope and eastern shoreline of Green Cay. Service personnel and volunteers dug more than 100 holes and cleared on a one-meter radius around each hole of encroaching vegetation. In August 2004 crews planted and water 101 trees on Green Cay, consisting of 30 sea grape, 33 pink cedar, 25 orange manjack (*Cordia ricksecker*i), eight buttonwood, and four *Lignum vitae.* After 1.5 years (early 2006), the survival rate of the 100 trees planted during August 2004 was 93 percent.

Strategies:

- Prepare habitat restoration plan within 3 years of the date of this CCP, using forestry, botany, and ecological expertise from Caribbean NWR Complex, Southeast Regional Office, and Caribbean sources as appropriate.
- The plan will include a list of species to be planted, map of planting locations, and schedule of planting efforts. It will also detail efforts to maximize survival rate of young seedlings, such as watering during the dry season, weeding competing vegetation, and controlling rats.
- If possible, utilize seeds and seedlings from local genetic sources to maintain the genetic diversity and uniqueness of genetic stock.

RESOURCE PROTECTION

Green Cay Goal 3: Conserve and protect the refuge's natural and cultural resources.

The main threat to Green Cay NWR's habitat and wildlife is not poaching, habitat destruction, development or pollution, but invasive non-native species, both plants and animals, primarily the latter, and primarily one type of animal, the introduced black rat.

Green Cay Objective 3-1: Non-Native Invasive Species – Increase control of non-native invasive plants and non-native invasive animals using appropriate means; evaluate effectiveness of different methods of control.

Discussion: In the only inventory ever conducted of Green Cay flora, in 1982, all but two of the 60 species of plants identified—one grass and one tree—were native to the island. The non-native grass, called hurricane grass (*Andropogen pertusus*), was widespread on the Cay and the most abundant species of grass; it formed dense mats. The tree was ginger thomas (*Tecoma stans*), also known as yellow elder or "sauco amarillo" in Spanish. Yellow elder was found mostly on windward slopes.

Among the non-native fauna at Green Cay, the black rat is the biggest threat to native flora and fauna. It feeds extensively on the terminal shoots of trees and shrubs to obtain moisture throughout the dry season. Virtually any new tree or shrub growth is quickly consumed. Given time, the Cay's remnant forest would succumb to this herbivory, which could be disastrous for the endangered St. Croix ground lizard. The black rat was believed to have been eradicated in 2000 through an active rat control program. However, either the rats were never entirely eliminated, or they reappeared, because by 2006 another eradication program was undertaken. Rats were trapped using rat traps baited with peanut butter at a number of elevated stations on the island. A number of rats were removed in this manner until it appeared that the island's population had been eradicated. However, by the summer of 2007, follow-up trapping revealed that this invasive pest was still present, though in much lower numbers.

Strategies:

- Experiment with control of non-native, invasive plants through a combination of methods and strategies, including reforestation, weeding and manual removal using hand tools, selective use of herbicides.
- Cooperate with partners, volunteers, NPS, YCC, and others as available to conduct periodic, all-day or multi-day weed control actions on Green Cay.
- Continue monitoring for presence/absence of rats on an annual or biannual basis.
- If rats are discovered through monitoring, immediately begin trapping and eradication effort to reduce or eliminate them before the problem can get out of hand.
- Have situation reviewed by USDA/WS wildlife biologist to develop control strategy.

Green Cay Objective 3-2: Cultural Resources – Continue to manage cultural resources consistent with Section 106 of the National Historic Preservation Act. Also, within 15 years of the date of this CCP, develop and begin to implement a Cultural Resources Management Plan (CRMP).

Discussion: Green Cay NWR has a prehistoric shell midden consisting of many hundreds of punctured and highly weathered, bleached conch shells on the southeast margin of the island. Each of the shells has been punctured near the apex to extract the mollusk inside the shell for food. The crude shape and large size of this hole indicates that the conches must have been prepared with stone tools rather than newer tools like screwdrivers. Researchers used radiocarbon dating on one conch sample to derive an estimate of the age of the midden: 930 years ±140 years B.P. (Before Present). That is, the probable age of the sample was between 790 to 1,070 years ago. This would make the archaeological age 1020 A.D., almost 500 years or half a millennium, before Columbus.

No other historic properties, structures, or artifacts are known on Green Cay, but this does not mean that other undiscovered cultural resources are lacking.

Strategies:

- Continue closure of island to visitors so as to protect known and unknown cultural resources.

- Encourage North American and Caribbean archaeologists and researchers to continue studies and data collection at Green Cay midden site.
- Work with NPS Southeastern Archaeological Center to conduct partnership site assessment.
- Work with RHPO and academics or consulting archeologists to prepare a CRMP for the refuge.

VISITOR SERVICES

Green Cay Goal 4: Increase public awareness and appreciation of this refuge and its crucial role in saving a critically endangered species.

Because of the extreme sensitivity and vulnerability of the critically endangered St. Croix ground lizard population present on this small island, Green Cay is not open to the public. Nonetheless, there are a number of opportunities for public outreach and education that can both allow the public to appreciate the island from offshore and afar, as well as to educate the public as to the refuge's purpose. No staff is stationed at Green Cay NWR, which is an additional factor both in lack of a visitor services program and limited enforcement capability. Reaching Green Cay in a timely manner for law enforcement purposes would be logistically difficult.

Green Cay Objective 4-1: Outreach and Education – Continue to maintain website, information distribution, limited signage on the island, and periodic presentations off-refuge. Install larger signs, expand outreach to hotels, and consider alternatives to visitation (e.g., boat and kayak tours around the island).

Discussion: Because Green Cay NWR is closed to the public, no visitor services are provided on the refuge itself. However, the staff does maintain a website for the refuge as well as provide off-refuge educational and outreach services. In addition, the staff works to educate nearby resorts and hotels concerning the prohibition on landing at Green Cay, and the reasons for this ban on visits to the refuge. The refuge also maintains useful contacts with local outdoor equipment concessionaires, who provide valuable information on what they observe occurring on the island. In terms of education and outreach, the staff also conducts occasional off-refuge presentations about Green Cay, the St. Croix ground lizard, the control of invasive species like the black rat, and the refuge's habitat restoration efforts.

The staff also maintains several official Service signs around the perimeter of the island. At times nearby kayakers or boaters land on or become stranded at the small beach along the southeast corner of the island. Because no refuge staff is present on site and because some of these situations are a result of fatigue and miscalculation on the part of the kayakers, the staff has issued warnings rather than tickets for these violations.

Strategies:

- Maintain and improve the website for Green Cay NWR, with periodic and regular updates on the status of the St. Croix ground lizard, rat control program, reforestation, and nesting of brown pelicans, white-crowned pigeons, and any other birds or fauna (e.g., sea turtles) of note.
- Provide information, such as fliers, posters, and brochures, on the refuge and its public closure to nearby hotels and the marina. Emphasize the importance to rare and endangered wildlife of keeping the refuge free of disturbance and trampling by visitors.
- Make periodic presentations on refuge to nearby communities, schools, hotels, ecotourism concessionaires, etc. Prepare one or more PowerPoint presentation(s) that is (are) appropriate to these venues.
- Consider working with hotels, concessionaires, partners, and volunteers, to provide guided kayak or boating around the island. The nearby Green Cay Marina is a natural place for tours to originate. Three nearby hotels provide kayaks for rent and often kayaks end up on Green Cay.
- Partner with Green Cay Marina and hotels in the area by providing them with fact sheets and brochures of the refuge.

- Obtain larger or more numerous signs to be placed securely around the Cay identifying it as a national wildlife refuge and stressing that trespassing is prohibited because of highly sensitive wildlife resources. These signs should be large and readable.
- Re-establish informal or formal agreement with NPS BIRNM for law enforcement ranger oversight and collaboration for boat patrol around refuge.
- Place informational stands, booths, or kiosks inside and outside of business establishments as a means of encouraging the conservation and protection of the refuge.
- Place coastal signs in appropriate areas along the northeast beaches of the island, such as Chenay Bay and Shoy Beach, as another way of educating the public about the refuge.
- Place signs along Route 82 (East End Road) starting from the Buccaneer entrance to the Chenay Bay Hotel area.
- Provide all dive shops/marinas with information about the Green Cay NWR. This can be in the form of fact sheets, brochures, or large signs posted within the establishment.
- Post large signs about the Green Cay NWR at the airport and sea plane area.

BUCK ISLAND NATIONAL WILDLIFE REFUGE, ST. THOMAS

FISH AND WILDLIFE POPULATION MANAGEMENT

Buck Island Goal 1: Conserve, enhance, restore, and protect native wildlife populations at Buck Island NWR.

Due to the island's relatively small size and the principles of island biogeography (which assert among other things that species diversity is positively correlated with the area of available habitat), it is not surprising that Buck Island is "depauperate," that is, relatively poor in the diversity of its fauna. However, this impoverishment is also due to the island's history and the highly disturbed condition of its habitat. Nonetheless, the island supports several sensitive wildlife species, including the Antillean skink, Puerto Rican racer, magnificent frigatebird and red-billed tropicbird. The CCP aims to conserve, enhance, restore and protect these species at Buck Island NWR.

Both Buck Island and adjacent Capella Island are thought to have provided habitat for nesting seabirds and land birds, neotropical migrants, and the Virgin Islands tree boa prior to the arrival of rats. About a dozen bird species have been seen on or near the island. Nesting species currently include the laughing gull, zenaida dove and likely the pearly eyed thrasher. Small numbers of red-billed tropicbirds nest in crevices in the low cliffs of the islands; they are occasionally preyed upon by peregrine falcons.

Buck Island Objective 1-1: <u>Amphibians and Reptiles</u> – Within 5 years of the date of this CCP, draft and begin to implement an Inventorying and Monitoring Plan for the Antillean skink and the Puerto Rican racer.

Discussion: The Puerto Rican racer is a reptile (a snake). At about 3 feet in length, it is the second largest Puerto Rican snake; known to be aggressive, its venomous bite is mildly poisonous. It is a diurnal (active during the daytime) and terrestrial snake, although it can be found in trees. An active hunter, the racer immobilizes its captive prey with a toxic salivary secretion and chews the prey several times to allow its enlarged back teeth to become effective. In Puerto Rico, its diet consists mainly of small lizards (anoles) and frogs. Nothing is known of the specific life history or food habits and diet of the sub-species (*Alsophis portoricensis nicholsi*) that occurs on Buck Island (USDA Forest Service 2007).

The slippery back skink is listed as territorially endangered because of a lack of recent records, although it does occur on some such as Buck Island. The apparent absence of this species from the major islands is probably attributable to the introduced Indian mongoose. This skink feeds on insects in low, dense vegetation on the beaches and lower slopes of Cays, sheltering in grass and brush litter, under rocks and other surface debris, in rocky fissures, and on the branches of low shrubs. The distributional range of this species includes the Turks and Caicos Islands, Jamaica, Hispaniola, Puerto Rico, USVI and BVI. There may be more than one genetically distinct form in the Virgin Islands (DFW 2005).

Strategies:

- In cooperation with partners such as the DPNR DFW Herpetologist, USDA Forest Service (El Yunque National Forest in Puerto Rico), university herpetologists and volunteers, initiate inventories of the Antillean skink and Puerto Rican racer on Buck and Capella Islands.

- Determine current and possible population sizes (carrying capacities under ideal habitat conditions) of these reptiles. Investigate potential limiting factors such as predation or competition by rats or inadequate vegetative cover.
- Integrate habitat needs of these species into habitat planning and restoration efforts for the two islands.
- In collaboration with partners, develop the Inventory and Monitoring Plan to help attain long-term stable populations of each species on both Buck and Capella islands.

Buck Island Objective 1-2: Birds – Within 5 years of the date of this CCP, draft and begin to implement an Inventorying and Monitoring Plan for the magnificent frigatebird and the red-billed tropicbird.

Discussion: The magnificent frigatebird (*Fregata magnificens*) feeds mostly on fish but also steals meals from other birds. It is widespread in the tropical Atlantic Ocean but territorially listed in the U.S. Virgin Islands; although a seabird, the magnificent frigatebird never lands on water. It is able to soar for hours at a time. This large bird averages about 35-40 inches long and a wingspan of about 85 inches. They have the largest wingspread in proportion to weight of any bird. Males are famous for their black bodies and brilliant scarlet throat sacs, which they inflate like a balloon during courtship. Frigatebirds are colony nesters. The female frigatebird lays one egg in a nest she has built of sticks provided by the male, usually in a clump of mangrove, sometimes in a tree, shrub or on the ground. Magnificent frigatebirds are known to roost but not nest on Buck Island, but no inventories of roosting colonies have ever been conducted.

The red-billed tropicbird is a pelagic bird that only comes ashore to breed. Adults are similar in appearance and have a red bill and long, white tail streamers. Red-billed tropicbirds breed on tropical islands, laying a single egg directly on the ground or a cliff ledge. Small numbers of red-billed tropicbirds are known to nest in crevices on Buck Island's low cliffs. When not breeding, tropicbirds wander widely across the seas.

Strategies:

- In cooperation with partners such as the DPNR, university ornithologists and volunteers, initiate inventories of roosting colonies of magnificent frigatebird and nesting colonies of red-billed tropicbird on Buck and Capella Islands.

- Determine current and possible population sizes (under ideal habitat conditions) of these birds. Investigate potential limiting factors such as nest predation by rats or inadequate vegetative cover.
- Integrate habitat needs of these species into habitat planning and restoration efforts for the two islands.
- In collaboration with partners, develop the Inventorying and Monitoring Plan to help attain long-term stable populations of each species on both Buck and Capella Islands.

Buck Island Objective 1-3: Non-Native Invasive Animal Species – Continue to monitor for rat reinvasions.

Discussion: Rats are the main non-native invasive animal species of concern on Buck Island; their grazing and nest predation adversely affect habitat and nesting seabirds. A 2005 eradication effort using rodenticide successfully eliminated Norway and black rats from both Buck and Capella islands. Due to the frequent presence of boats in the immediate vicinity, however, recolonization by rats remains a continuing possibility. Thus, long-term monitoring and trapping is essential to Buck Island's recovery.

Strategies:

- Continue monitoring for the presence or absence of rats on an annual or biannual basis.
- If rats are discovered through monitoring, immediately begin a trapping/baiting and eradication effort to reduce or eliminate them before the problem can get out of hand.
- Use temporary employees, students, YCC, or volunteers from St. Croix or St. Thomas in rat control efforts.
- Contact USDA/WS wildlife biologist, St. Croix.

HABITAT MANAGEMENT

Buck Island Goal 2: Conserve, enhance, restore, and protect native habitat and vegetation at Buck Island NWR.

At present, Buck Island's habitat is a highly disturbed mixture of shrubland and grassland, with interspersed patches of poorly developed subtropical dry forest or woodland. Due to the influence of wind and salt spray from waves, the flora of the windward side of Buck Island differs substantially from the flora of the leeward side. Tall bushes, shrubs and grasses characterize the leeward side while short grasses, bushes, herbs and barrel cacti dominate the windward side. Overall, the island's flora consists of dense masses of thorny shrubs, choked with vines, and interrupted by stretches of tall golden foxtail grasses. The vegetation is thickest on the northern side, where shrubs entangled with vines were nearly impenetrable.

Buck Island Objective 2-1: Habitat Recovery – Develop and begin to implement a habitat restoration plan within 5 years of the date of this CCP.

Discussion: As noted, the vegetation communities on Buck Island are heavily disturbed at present and have been so for many years. A habitat restoration plan will inventory what species and communities are present now, as well as describe, based on field work and regional botanical and ecological knowledge, the probable character of the plant communities and species that were likely to have occurred on the island prior to disturbance. In addition, the plan will set forth habitat recovery goals, objectives, strategies, and timelines.

Strategies:

- Prepare habitat restoration plan within 5 years of the date of this CCP, using forestry, botany, and ecological expertise from the Service's Regional Office and Caribbean sources as appropriate.
- The plan will include a list of species to be planted, map of planting locations, and schedule of planting efforts. It will also detail efforts to maximize survival rate of young seedlings, such as watering during the dry season, weeding competing vegetation, and controlling rats.
- If possible, utilize seeds and seedlings from local genetic sources to maintain the genetic diversity and uniqueness of genetic stock.

Buck Island Objective 2-2: Non-Native Invasive Plant Species – Increase control of non-native invasive plants using appropriate means; evaluate effectiveness of different methods of control.

Discussion: Habitat disturbance typically conjures up images of denuded earth stripped of its vegetation by machinery or fire. However, on Buck Island, virtually all of the habitat disturbance mentioned under Objective 2-1 refers to areas that have been overtaken by opportunistic, invasive, and non-native species rather than areas that have been denuded. Thus, controlling invasive species means reducing their dominance or presence in certain habitats on the island. The step-down habitat recovery plan in Objective 2-1 will also address the control of invasive plant to some extent. In general, methods of controlling invasive plants can be described as mechanical, chemical and biological. The method or methods chosen on Buck Island will depend on a variety of factors, including what works best on the species in question and control costs.

Strategies:

- Experiment with control of non-native, invasive plants through a combination of methods and strategies, including reforestation, fire, weeding and manual removal using hand tools, selective use of herbicides.
- Cooperate with partners, volunteers, NPS Exotic Plant Management Team at Virgin Islands National Park (St. John, USVI), YCC, and others as available to conduct periodic, all-day or multi-day weed control actions on Buck Island.
- Continue monitoring for presence/absence of rats on an annual or biannual basis.
- If rats are discovered through monitoring, immediately begin trapping and eradication effort to reduce or eliminate them before the problem can get out of hand.
- Use temporary employees, students, YCC, or volunteers from St. Croix or St. Thomas in rat control efforts.

RESOURCE PROTECTION

Buck Island Goal 3: Conserve and protect the refuge's natural and cultural resources.

The Buck Island NWR's only known cultural resource is a historic lighthouse, which has been inactive and abandoned for a number of years. Erected in 1913, this 25-foot high, truncated square steel tower represents the Danish Colonial style. The lighthouse was owned by Denmark at the time of the transfer of the Danish West Indies to the United States in 1919. The lighthouse was in use until the mid-1990s when a modern steel tower was built near the property. The original Buck Island Light Station was then deactivated.

Buck Island Objective 3-1: Cultural Resources – Continue to manage cultural resources, particularly the historic lighthouse, consistent with Section 106 of the National Historic Preservation Act. Also, within 5 years of the date of this CCP, evaluate the condition and safety of the historic lighthouse and decide on the feasibility of preservation or restoration. Within 15 years of the date of this CCP, develop and begin to implement a Cultural Resources Management Plan (CRMP).

Discussion: In late 2003, the U.S. Coast Guard was in the process of nominating the historic lighthouse site for the National Register of Historic Places. In addition, the Coast Guard declared the light station to be excess property, and the General Services Administration (GSA) has been in the process of transferring it to the Service. The island refuge may possess other undiscovered historic resources, the presence of which could be revealed by a systematic cultural resources survey. A CRMP would call for this and other measures to safeguard and identify the refuge's cultural and historic legacy.

Strategies:

- Cooperate with the RHPO and historic architectural experts in assessing the condition and safety of the historic lighthouse and in reaching a decision as to its fate (e.g., demolition and removal after sufficient documentation, preservation, restoration).
- Within 15 years of the date of this CCP, and contingent upon funding, conduct a Phase I archaeological survey of the refuge, by qualified personnel, as a necessary first step in comprehensive cultural resources management.
- Conduct a Phase II investigation if archeological resources, in addition to the historic lighthouse, are identified during the Phase I survey. In this, the eligibility of identified resources for listing on the NRHP is evaluated prior to any disturbance.
- Conduct a Phase III data recovery if resources identified in Phases I and II are determined to be eligible. This will recover data and mitigate adverse effects of any undertaking.
- Follow procedures outlined in CRMP for consultation with the Service's RHPO and Virgin Islands SHPO
- Follow procedures detailed in CRMP for inadvertent discoveries of human remains.
- Ensure archeological and cultural values are described, identified, and taken into consideration prior to implementing undertakings.
- Develop a step-down plan for surveying lands to identify archeological resources and for developing a preservation program.

VISITOR SERVICES

Buck Island Goal 4: Increase public awareness and appreciation of this refuge and its crucial role in saving threatened and endangered species.

Every year tens of thousands of visitors, most arriving in Charlotte Amalie by cruise ship, are brought from St. Thomas by commercial dive and ecotourism operators to snorkel and scuba dive among the coral reefs ringing Buck Island NWR. How many of these actually set foot on the island refuge, or step beyond its beaches, is unknown. The absence of Service staff on site and the difficulty and time of accessing the refuge for Service staff based at Sandy Point NWR inhibit not only visitor services on the refuge, but even knowledge as to how extensively Buck Island is visited and used at present.

Buck Island Objective 4-1: Outreach and Education – Continue to maintain website, information distribution, limited signage on the island, and periodic presentations off-refuge.

Discussion: Without staff present locally in St. Thomas or assigned to the refuge, the Service can offer very little to the public in the way of direct outreach and education. During scoping for the CCP, at least one eco-tour company suggested that the Service cooperate with interested commercial parties to provide information about Buck Island NWR and its noteworthy wildlife to tourists who snorkel and diving in the surrounding waters. By maintaining the Buck Island NWR website, distributing information about the refuge, maintaining limited signage on the island, and making periodic presentations at venues in Charlotte Amalie.

Strategies:

- Install refuge sign identifying the island as a national wildlife refuge.
- Post boundary signs around the island visible from just offshore.

- Post sign and install fence to protect lighthouse and visitors.
- Maintain and improve website for Buck Island NWR, with periodic and regular updates on the status of the four sensitive species (e.g., Puerto Rican racer, Antillean skink, magnificent frigatebird, and red-billed tropicbird), rat control program, reforestation, and any other birds or fauna (e.g., sea turtles) of note.
- Work with USVI Department of Tourism to provide information to concession operators. Improve awareness.
- Provide information such as fliers, posters, and brochures on the refuge and its public to hotels, marinas and ecotourism businesses in Charlotte Amalie and St. Thomas generally. Emphasize the connection of the refuge's health to the health of the surrounding coral reefs that attract so many divers and snorkelers.
- Make periodic presentations on refuge to communities, schools, hotels, ecotourism concessionaires, cruise ships, etc. in Charlotte Amalie. Prepare one or more PowerPoint presentation(s) that is (are) appropriate to these venues.
- Consider working with hotels, cruise ships concessionaires, partners, and volunteers, to provide guided occasional guided tours of the island. Tours could focus on the island's native habitat, invasive vegetation and animals, restoration efforts, sensitive indigenous wildlife species, and the historic lighthouse.
- Erect a kiosk on the island describing the history and purpose of the refuge.
- Post signs at the refuge depicting the destruction caused by rats and the effect it has on the terrestrial environment and bird life.
- Post signs at the refuge listing and describing certain species of birds, especially endangered and threatened species.
- Post a sign at the St. Thomas airport depicting the history of the refuge and the protection of wildlife.
- Post a sign to let visitors know what the rules are and that these rules are intended to protect the refuge's seabird colony.
- Consider a seasonable closure of the refuge from May – August to protect nesting seabirds.
- Near the historic lighthouse, post signage depicting its history.
- Partner with local eco-tour companies, especially those offering kayaking, hiking and snorkeling opportunities at destinations like Mangrove Lagoon and other sites on and near St. Thomas.

Buck Island Objective 4-2: Partnerships and Volunteers – Continue to cooperate with VIDPNR on joint wildlife and habitat management efforts for Buck Island and adjacent Capella Island. Expand cooperative education and interpretive efforts with city of Charlotte Amalie and ecotourism companies which bring visitors to offshore waters to explore coral reefs. Explore development of Friends Group to provide more active management presence on island.

Discussion: The Service has cooperated with the VIDPNR in the management of these two islands, in particular on the rat eradication program. This partnership will continue. Given the various ecotourism, boating and diving businesses that bring large numbers of divers, snorkelers, and tourists to waters in the immediate vicinity of the refuge, there is a large unrealized potential for partnering with these operations to disseminate information about the refuge that will benefit both the visiting public and the refuge.

Strategies:

- Cooperate with the DPNR and other potential partners on rat control, reforestation, and inventories, surveys, and censuses of the island's flora, fauna, and particular species of concern.
- Attempt to tap into potential for volunteers and partners among the ecotourism, boat charter, diving and snorkeling businesses, as well as island residents and visitors. Efforts can take the form of distributing printed information on the refuge, participating in cleanup, reforestation and rat control programs, and guiding walking tours of visitors to the island.

V. Plan Implementation

INTRODUCTION

Refuge lands are managed as defined under the National Wildlife Refuge System Improvement Act of 1997. Congress has distinguished a clear legislative mission of wildlife conservation for all national wildlife refuges. National wildlife refuges, unlike other public lands, are dedicated to the conservation of the Nation's fish and wildlife resources and wildlife-dependent recreational uses. Priority projects emphasize the protection and enhancement of fish and wildlife species first and foremost, but considerable emphasis is placed on balancing the needs and demands for wildlife-dependent recreation and environmental education.

To accomplish the purposes, visions, goals, and objectives contained in this plan for Sandy Point, Green Cay, and Buck Island NWRs, this chapter identifies the projects, funding and personnel needs, volunteers, partnership opportunities, step-down management plans, a monitoring and adaptive management plan, and plan review and revision.

CURRENT AND PROPOSED PROJECTS

Listed below are current and proposed project summaries and their associated costs for fish and wildlife population management, habitat management, resource protection, visitor services, and refuge administration over the next 15 years. This proposed project list reflects the priority needs identified by the public, planning team, and refuge staff based upon available information. These projects were generated for the purpose of achieving each refuge's objectives and strategies. The primary linkages of these projects to those planning elements are identified in each summary.

FISH AND WILDLIFE POPULATION MANAGEMENT – SANDY POINT NWR

Current Sandy Point NWR Project #1: Leatherback Sea Turtle Recovery Project

The current Leatherback Sea Turtle Research Project conducts monitoring, research, and tagging for adult leatherback turtles, and conducts management activities and research data collection for leatherback turtle nests on Sandy Point NWR.

The current project addresses Sandy Point NWR Goal 1 and Objectives 1-1 through 1-3.

The project is conducted through a cooperative effort involving refuge staff, NGO staff and volunteers, VIDPNR staff, and other volunteers. The project is funded through a Service grant agreement with West Indies Marine Animal Research and Conservation Service (WIMARCS) at approximately $53,300 per year.

Current Sandy Point NWR Project #2: Hawksbill and Green Sea Turtle Recovery Project

The current Leatherback Sea Turtle Research Project includes the same monitoring, research, and tagging for adult hawksbill and green turtles that are encountered within the leatherback project's refuge patrol area and during the project's calendar year operation time-frame (April through August). However, green and hawksbill turtles nest during months outside of this time frame (September through March), and on refuge beach areas that are outside of the patrol area of the leatherback project. The majority of nesting activities for hawksbill and green turtles occur outside of the

leatherback project time frame. The current Hawksbill and Green Sea Turtle Recovery Project activities are conducted by refuge staff and volunteers, involving daytime track patrols only. Funding is covered through refuge staff salaries.

The current project addresses Sandy Point NWR Objective 1-4.

Proposed Sandy Point NWR New Project #3: Combined Leatherback, Hawksbill, and Green Sea Turtle Recovery Project

A new proposed project to address Sandy Point NWR Goal 1-3 is to expand the current Leatherback Sea Turtle Research Project to include hawksbill and green sea turtles by conducting research and recovery work throughout the calendar year (January through December) on all refuge beach areas.

Expanding the current leatherback project into a comprehensive refuge sea turtle recovery project will require an additional $50,000 per year.

The new proposed project will address Sandy Point NWR Objectives 1-1, 1-2, 1-3, and 1-4 by establishing a comprehensive Refuge Marine Turtle Research Project funded at approximately $103,300 per year.

Current Sandy Point NWR Project #4: Sandy Point NWR Brown Pelican Recovery Project

Present recovery efforts on Sandy Point NWR involve monitoring and survey of pelicans, and restricting human access to pelican roost areas on the West End Salt Pond. Funding is covered by refuge staff salaries.

The current project addresses Sandy Point NWR Objective 1-5.

Proposed Sandy Point NWR New Project #5: Acquisition of West End Salt Pond shoreline areas presently off-refuge

This new proposed project will continue refuge brown pelican recovery efforts and combine these efforts with other refuge goals involving wetland habitat management and wildlife population management. The proposed project is acquisition of West End Salt Pond shoreline properties that are off-refuge. Although approximately 2/3 of the West End Salt Pond is within the current refuge boundary, the entire shoreline that is not within the refuge is not developed, has no structures, etc., and contain extensive shoreline mangrove habitat. Including this shoreline within the refuge boundary would add critically important wildlife habitat and consolidate refuge wildlife and habitat management efforts by eliminating threats from development.

This proposal addresses Sandy Point NWR Objective 1-5 and 1-7, as well as Goal 2 (Habitat Management), Objective 2-2, and Green Cay NWR Goal 1, Objective 1-2 because it enhances roosting and feeding opportunities for brown pelicans that breed and nest on Green Cay NWR. Purchase costs are estimated at approximately $850,000 to $900,000.

Current Sandy Point NWR Project #6: Least Tern Monitoring Project

Present monitoring efforts involve surveys of arriving migratory least terns, identifying and marking nest locations, and a variety of habitat enhancement and site protection activities to maximize hatch success and chick survival. Funding is covered by refuge staff salaries.

The current project addresses Sandy Point NWR Objective 1-6.

Proposed Sandy Point NWR New Project #7: Least Tern Nest Site Enhancement

A new proposed project will continue present monitoring efforts, with expanded nest site protection and enhancement. Nesting sites will be cleared annually of invasive vegetation, graded, and fencing installed or maintained if already fenced. Shoreline beach nest sites will be cleared annually of vegetation and may be fenced if necessary. Nest platforms will be repaired annually and new platforms constructed.

The proposed project addresses Sandy Point NWR Objective 1-6 and 3-2. Funding to cover initial site rehabilitation, construction, heavy equipment rental, and additional labor costs is estimated at $40,000. Annual maintenance, materials and labor is $4,000 per year.

Current Sandy Point NWR Project #8: Landbird, Shorebird, Waterbird Surveys and Monitoring

Present monitoring and survey efforts involve all three groups of birds. Funding is covered by refuge staff salaries.

The current project addresses Sandy Point NWR Objective 1-7.

The Proposed Sandy Point NWR New Project #5, "Acquisition of West End Salt Pond shoreline areas presently off-refuge," will address Objective 1-7 as well as other habitat and wildlife management objectives.

Proposed Sandy Point NWR New Project #9: Constructed Bat Roost/Nest Sites (Boxes)

The proposed project involves construction and placement of concrete bat roost and nest towers and wood bat nest boxes at various locations throughout the refuge. Bat roost and nest box sites will Increase and stabilize native bat populations, which are critical for insect control, plant pollination, and maintenance of healthy ecosystems.

Present bat survey and monitoring efforts are funded through refuge staff salaries. Initial cost for materials and construction is $8,500. Regular maintenance and replacement of wood structures is $2,000 per year.

The proposed project and current surveys by refuge staff address Sandy Point NWR Objective 1-9.

Proposed Sandy Point NWR New Project #10: Invasive Animal Species Control

Present refuge efforts to control invasive animal species involve selective trapping of mongoose, feral cats, and feral dogs. Control of feral dogs on the refuge is problematic because the residential community that surrounds the refuge land boundary is a constant source of stray and feral dogs. Trapping efforts within the refuge cannot keep up with the off-refuge supply of stray dogs.
This new project proposes a partnership agreement with the St. Croix Animal Welfare Center and the VI Department of Agriculture to establish regular stray dog control efforts in the residential communities adjacent to the refuge, and include shoreline beach areas that are adjacent to the refuge. This project will be funded by the refuge and involves Animal Welfare Center staff conducting the control work (live-trapping and stray dog pick-up) on areas off-refuge, and refuge staff conducting animal control within the refuge.

This project addresses Sandy Point NWR Objective 1-11. On-refuge animal control costs are covered by refuge staff salaries, but will require sharing with other refuge projects at least one additional refuge FTE biologist/bio-technician. Off-refuge control would be conducted two days per week throughout the year by Animal Welfare Center staff at a cost of $30,000 per year.

FISH AND WILDLIFE POPULATION MANAGEMENT – GREEN CAY NWR

Current Green Cay NWR Project #1: St. Croix Ground Lizard Recovery Project

Regular survey and monitoring of St. Croix Ground Lizards on the refuge is conducted by refuge staff, VIDPNR staff, and National Park Service (NPS) staff and contract biologists. Additionally, refuge staff assists NPS staff with survey and monitoring of St. Croix Ground Lizards transferred from Green Cay NWR and released on Buck Island Reef National Monument (BIRNM – NPS).

The current project addresses Green Cay NWR Objective 1-1. Funding is covered through refuge staff salaries.

Current Green Cay NWR Project #2: Brown Pelican Recovery and White-crowned Pigeon Monitoring

Regular survey and monitoring of both species, in addition to general bird surveys are conducted on the refuge by refuge staff, VIDPNR staff, and volunteers.

The current project addresses Green Cay NWR Objectives 1-2, 1-3, Sandy Point Objective 1-7, and is funded through refuge staff salaries.

FISH AND WILDLIFE POPULATION MANAGEMENT – BUCK ISLAND NWR

Current Buck Island NWR Project #1: Wildlife Survey and Monitoring Project

Survey and monitoring of refuge wildlife species has been conducted by refuge staff with assistance from VIDPNR staff. Survey and monitoring efforts include reptile, bird, and invasive mammal (rat) species. For future surveys, this project will combine amphibian, reptile, and invertebrate status surveys for all three refuges and function as a combined wildlife survey and monitoring project.

The project addresses Buck Island NWR Objectives 1-1, 1-2, 1-3, Sandy Point NWR Objectives 1-8, 1-9, 1-10, and Green Cay NWR Objectives 1-1, 1-2, 1-3, and is funded through refuge staff salaries and refuge operational support.

HABITAT MANAGEMENT – SANDY POINT NWR

Current Sandy Point NWR Project #11: Refuge Reforestation Project

Native tree seeds have been collected on the refuge and germinated and propagated at the refuge nursery by refuge staff and volunteers. Tree seedlings are destined for planting on both Sandy Point NWR and Green Cay NWR to augment trees already planted on both refuges.

This project addresses Sandy Point NWR Objective 2-1 and Green Cay Objective 2-1. Funding is covered through refuge staff salaries.

Proposed Sandy Point NWR New Project #12: Mangrove Restoration and Enhancement Project

A preliminary project is under way on the refuge to measure mangrove leaf decomposition, leaf production (biomass), and seedling survival. Results will be used to evaluate a long-term mangrove monitoring project that compares productivity dynamics of refuge mangrove habitat in St. Croix with that of Vieques NWR (Puerto Rico) mangrove habitat. Additional research will determine refuge areas and techniques best suited for increasing mangrove habitat on the refuge.

This project addresses Sandy Point NWR Objective 1-5, 1-7, and 2-2. Preliminary assessment and research portion of this project is estimated to be $12,000 per year for 3 years. The results of the 3-year assessment will provide the total estimated expense for long-term mangrove habitat enhancement.

Proposed Sandy Point NWR New Project #13: Wetlands, Sea-level Rise, and Water Resources Monitoring Project

This new project will involve long-term monitoring activities throughout the calendar year of the West End Salt Pond, associated wetland areas, “borrow-pit ponds” (ponds created by former sand mining operations), the “ephemeral” salt ponds (small refuge salt ponds that dry out annually), and beach shoreline areas of the refuge.

Adjacent off-refuge areas of the West End Salt Pond will also be involved. Parameters will cover water level, salinity, turbidity, other standard water quality measures, and monitoring of tidal fluctuations and sub-surface water levels on beach shoreline areas, shoreline erosion episodes, and sea-level monitoring referenced to refuge terrestrial benchmarks on the refuge. Also included will be transect/plot monitoring of associated vegetation.

All of these proposed project activities will be conducted on Green Cay NWR and Buck Island NWR as appropriate.

This project will directly address Sandy Point NWR Objectives 2-2 and 3-1. Indirectly, this project addresses Sandy Point NWR Objectives 1-1, 1-2, 1-3, 1-4, 1-5, 1-6, and 1-7.

This project will be conducted by refuge staff in partnership with existing water monitoring programs or projects already in place in St. Croix (federal, territorial, private, NGO, etc.). Additional refuge staff will be required to fully implement this project. The project could eventually be combined with Sandy Point NWR New Project #12: Mangrove Restoration and Enhancement since primary elements of that project are also incorporated in this project.

Initial equipment and materials for project start-up (weather stations for refuges, computer, software, IT costs, instrumentation, etc.) is estimated at $48,000. This project will require at least 1 additional refuge staff FTE (full-time equivalent) biologist/bio-technician, and share at least 1 other additional refuge staff FTE biologist/bio-technician.

Proposed Sandy Point NWR New Project #14: Endangered Plant Species Monitoring and Propagation Project

This project will conduct germination and propagation recovery activities for the endangered Vahl’s Boxwood trees that occur naturally on the refuge. The potential for establishment of the endangered *Catesbaea melanocarpa* on the refuge will also be examined.

This project addresses Sandy Point NWR Objective 2-3 and 2-4.

Project activities will be conducted by refuge staff in a partnership with St. George Botanical Gardens and the University of Puerto Rico Botanical Gardens. Funding is covered by refuge staff salaries.

HABITAT MANAGEMENT – GREEN CAY NWR

Current Green Cay NWR Project #3: Refuge Reforestation Project

Native tree seeds have been collected on the refuge and other St. Croix sites, germinated, and propagated at the Sandy Point NWR refuge nursery by refuge staff and volunteers. Tree seedlings are destined for planting on both Sandy Point NWR and Green Cay NWR to augment trees already planted on both refuges in order to enhance existing forested areas of both refuges.

This project addresses Sandy Point NWR Objective 2-1 and Green Cay Objective 2-1. Funding for the current project is covered through refuge staff salaries.

Proposed Green Cay NWR New Project #4: Expanded Refuge Reforestation and Invasive Plant Control Project

This proposed new project will substantially increase reforestation efforts on both Green Cay NWR and Sandy Point NWR by providing a work crew dedicated to greenhouse operations, tree propagation, planting site preparation and maintenance, and tree transplantation to both refuges, including post-planting care and maintenance. On Green Cay NWR this project will also conduct invasive plant control work.

The reforestation crew will consist of 3 persons, and will operate a total of 6 months per year for 3 years. Project goals are (1) transplantation and care of sufficient trees within a 3-year period to reforest 80 per cent of Green Cay NWR, (2) conduct invasive plant control work on Green Cay NWR, (3) transplantation and care of sufficient trees to reforest approximately 5 acres (selected sites) of Sandy Point NWR.

This project addresses Sandy Point NWR Objective 2-1 and Green Cay Objective 2-1. Funding for the project is $45,000 (crew salaries) per year for a 3-year period, and $40,000 for equipment and material for the total project period.

Proposed Green Cay NWR New Project #5: Rainwater Collection and Storage Structure

An experimental rainwater collection structure was constructed on the refuge and stored water was available and used for dry-season watering of native tree seedlings and young trees. The experimental structure was temporary and will be replaced with a 400-gal water storage container receiving collected water from a 600 sq. ft. on-ground rainwater collection apron.

This project addresses Green Cay NWR Objective 2-1. Funding for materials and construction is estimated at $16,000.

HABITAT MANAGEMENT – BUCK ISLAND NWR

Proposed Buck Island NWR New Project #2: Refuge Reforestation and Invasive Plant Control Project

This proposed new project will initiate reforestation efforts on Buck Island NWR by providing a work crew dedicated to site preparation and maintenance and tree transplantation to the refuge, including post-planting care and maintenance. Simultaneously, the project will address control of invasive plant species through a variety of methods.

The crew will consist of 3 persons, and will operate a total of 6 months per year for 3 years. Project goals are (1) transplantation and care of sufficient trees within a 3-year period to reforest all suitable areas of Buck Island NWR and (2) control of invasive plant species.

This project addresses Buck Island NWR Objectives 2-1 and 2-2. Additionally, this project will indirectly support similar refuge projects involving Sandy Point NWR Objective 2-1 and Green Cay Objective 2-1. Funding for the project is $45,000 (crew salaries) per year for a 3-year period, and $60,000 for equipment and material for the total project period.

RESOURCE PROTECTION – SANDY POINT NWR

The major elements of Sandy Point Objective 3-1, Sea Level Rise, are incorporated in the Proposed Sandy Point NWR New Project #13, Wetlands, Sea-level Rise, and Water Resources Monitoring Project, as part of habitat management efforts on the refuge. Other elements of this objective are addressed in the Proposed Sandy Point NWR New Project #3, Combined Leatherback, Hawksbill, and Green Sea Turtle Recovery Project as part of fish and wildlife population management efforts on the refuge.

Sandy Point Objective 3-2, Invasive Plants, is addressed by the new proposed project described below.

Proposed Sandy Point NWR New Project #15: Invasive Plant Control

Although this project will complement proposed reforestation and invasive plant projects (habitat management) on Green Cay NWR and Buck Island NWR, it is intended that this project will be funded separately because its focus will be invasive beach vegetation control and near-shore invasive plant control, particularly as it relates to sea turtle nesting success and least tern nesting success on Sandy Point NWR.

The project crew will consist of 3 persons, and will operate on a seasonal basis. The duration of the project will be determined by an Invasive Plant Management Plan which will be developed within five years of CCP approval. Based on a 6-month per year seasonal operation, funding for the project is $45,000 (crew salaries) per year. Project start-up costs (equipment and material) will be an initial $40,000 for the first year.

Sandy Point Objective 3-3, Cultural Resources, is addressed by continuing current management strategies as indicated in the CCP. No new proposed projects or funding requirements are considered at this time, other than staff work-load requirements which are addressed through refuge staffing requirements.

Sandy Point Objective 3-4, Law Enforcement, is addressed by continuing current management strategies as indicated in the CCP. No new proposed projects or funding requirements are considered at this time, other than staff work-load requirements which are addressed through refuge staffing requirements.

RESOURCE PROTECTION – GREEN CAY NWR

The major elements of Green Cay NWR Objective 3-1, Invasive Species, regarding invasive plant species are addressed in the Proposed Green Cay NWR New Project #4: Expanded Refuge Reforestation and Invasive Plant Control Project (Habitat Management). Invasive animal species are addressed by the following:

Current Green Cay NWR Project #6: Invasive Rat Control

Periodic trapping of non-native black rats has eliminated, or substantially reduced rats on the refuge. Maintenance trapping to remove newly-introduced rats, or contain the established population at low numbers continues. Because the refuge is a small Cay relatively close to the shoreline of St. Croix, re-introduction of rats is a continuing problem. Long-term maintenance trapping may be the best solution to control invasive rats on the refuge. Monitoring for the presence of rats, and emergency trapping is currently funded through refuge staff salaries.

Proposed Green Cay NWR New Project #7: Invasive Rat Control

This project consists of a two-person team that will conduct four days of rat-trapping on the refuge on a quarterly basis (every 3 months) as a long-term maintenance trapping effort on the refuge. Funding for this project (salaries and equipment) is approximately $4,000 per year.

Green Cay NWR Objective 3-2: Cultural Resources is addressed by continuing current management strategies as indicated in the CCP. No new proposed projects or funding requirements are considered at this time, other than staff work-load requirements which are addressed through refuge staffing requirements.

RESOURCE PROTECTION – BUCK ISLAND NWR

Buck Island NWR Objective 3-1, Cultural Resources, is addressed by continuing current management strategies as indicated in the CCP. However, at the time of this writing, the cost of evaluating the historic Danish lighthouse on the refuge is not certain. Evaluation of the current condition of the lighthouse will determine the feasibility of preservation or restoration, and the cost of doing so.

Proposed Buck Island NWR New Project #3: Status Evaluation of Lighthouse

The cost of evaluating the current condition of the historic lighthouse, and determining the cost-effectiveness of either preservation of the current condition or restoration to its original condition is not certain at this time. Refuge staff will continue to monitor the lighthouse, identify knowledgeable sources for condition assessment, and establish a realistic cost-estimate for a condition assessment.

Proposed Sandy Point NWR New Project #16: Salt Pond Observation Deck

This project addresses Sandy Point Objective 4-3, Wildlife Observation and Photography. It will site and construct a visitor observation deck on the southeastern or southern shoreline of the West End Salt Pond. The observation deck will provide enhanced opportunities for wildlife observation and photography. The trail leading to the observation deck will be developed as an interpretive nature trail with signage and interpretive stations. Funding for construction (materials and labor) of the observation deck and trail is estimated at $25,500.

Proposed Sandy Point NWR New Project #17: Refuge Visitor Center

This project addresses Sandy Point NWR Objective 4-4 (Environmental Education and Interpretation), Sandy Point NWR Objective 4-5 (Visitor Center), and Green Cay NWR Objective 4-1 (Outreach and Education), by establishing interpretive exhibits and displays in the existing refuge visitor center. New indoor exhibits and outdoor information kiosks adjacent to the visitor center will be designed, constructed, and installed. Funding for design, materials, and installation is estimated at $45,000.

Proposed Sandy Point NWR New Project #18: New Visitor Hours

Although this project is actually a refuge operational issue, it is listed as a proposed project for the purpose of identifying an additional staffing cost. This project addresses Sandy Point NWR Objective 4-2 (Shoreline Fishing), Sandy Point NWR Objective 4-6, (Beach Access) and Sandy Point NWR Objective 5-1 (Outreach and Public Involvement) by expanding refuge visitor hours. Currently, the refuge is open to the public (September through March) on Saturdays and Sundays only, and closed to the public Monday through Friday. During the leatherback sea turtle nesting season (April through August), the refuge is completely closed to the public. Funding additional staff will allow the refuge to be open to the public Sunday through Saturday (7-days per week) from September through March. During the leatherback sea turtle nesting season (April through August) the refuge will remain completely closed to the public, although the visitor center and educational programs will be available to refuge visitors.

The staff position needed to expand visitor hours and deliver educational programs during refuge seasonal closure is Education/Interpretive Specialist, funded at a GS 7– 9 salary range. This staff position will assist in operating the visitor center and conducting educational programs, including the following:

Current Sandy Point NWR Project #19: "Turtle Watch" Program

This program addresses Sandy Point NWR Objective 4-4, Environmental Education and Interpretation, and Sandy Point NWR Objective 5-1, Outreach and Public Involvement. It is the single most popular education program on the refuge and has a public demand that far exceeds the program's capacity for participation.

Through the "Turtle Watch" Program, refuge visitors participate in an escorted night visit to beach areas to observe adult female leatherback sea turtles excavate nests and deposit eggs. Later in the nesting season, program participants are able to observe hatchlings emerge from nests and make their way to the shoreline.

At present, the greatest limitation for the program is staff to conduct it. Addition of a full-time Education /Interpretive Specialist will enable the refuge to expand the number of scheduled visits per week, develop educational materials to include in the program, and expand school teacher training and preparation for scheduled class visits.

VISITOR SERVICES – GREEN CAY NWR

This goal, and Green Cay NWR Objective 4-1, Outreach and Education, are addressed by Proposed Sandy Point NWR New Project #17, Refuge Visitor Center. Although located at Sandy Point NWR in Frederiksted, information, exhibits, and educational materials covering Green Cay NWR will be available at the visitor center. The facility will also serve as the operational center for scheduling community presentations, meetings, and contact with communities, schools, hotels, etc., in the vicinity of Green Cay NWR as well as across the island of St. Croix.

VISITOR SERVICES – BUCK ISLAND NWR

This goal, and Buck Island NWR Objective 4-1, Outreach and Education, are addressed by Proposed Sandy Point NWR New Project #17, Refuge Visitor Center. Information, exhibits, and educational materials covering Buck Island NWR will be available at the visitor center. The facility will also serve as the operational center for scheduling community presentations, meetings, and contact with communities, schools, hotels, etc., in Charlotte Amalie and across the island of St. Thomas.

Proposed Buck Island NWR New Project #4: St. Thomas Information Exhibits

Education and interpretation efforts covering Buck Island NWR will be enhanced by providing information exhibits on St. Thomas. Although mobile, these exhibits are intended to be semi-permanent to permanent, and can be placed at VI-Department of Planning and Natural Resources offices on St. Thomas, at the St. Thomas airport and seaplane airport, and at the Federal Building, Charlotte Amalie, St. Thomas. A minimum of two, possibly three, identical exhibits consisting of displays, artifacts, photos, and maps will be assembled and delivered to appropriate sites on St. Thomas that have maximum access to the community and island visitors.

This project addresses Buck Island NWR Objective 4-2, Partnerships and Volunteers. Funding is estimated at $16,000.

REFUGE ADMINISTRATION – SANDY POINT NWR, GREEN CAY NWR, BUCK ISLAND NWR

All three national wildlife refuges in the U.S. Virgin Islands are managed through Sandy Point NWR, Frederiksted, St. Croix. Staffing needs for all three refuges will be met by full-time staff based at Sandy Point NWR, and by part-time staff, partners, and volunteers located in St. Croix and St. Thomas as appropriate.

New additional staffing needed to continue current refuge projects and programs, and implement new proposed projects are as follows:

- FTE Assistant Refuge Manager (assists in refuge operations)
- FTE Park Ranger (Education, Interpretation, Law Enforcement) (conducts education and outreach programs in addition to law enforcement)

- FTE Administrative Assistant (receptionist, clerk, office manager)
- FTE Maintenance Worker (repair, upkeep of equipment, wildlife and habitat management projects)

New additional facilities needed to continue current refuge projects and programs, and implement new proposed projects are as follows:

Proposed Sandy Point NWR New Project #20: Maintenance Storage Building

This proposed project addresses Sandy Point NWR Objective 5-5, Facilities and Equipment. It would provide a hurricane-proof building to store equipment, vehicles, greenhouse plants, etc., during hurricanes and severe weather events. Costs are estimated at $60,000 - 80,000 for purchase of a prefabricated building, delivery to St. Croix, and erection.

Proposed Sandy Point NWR New Project #21: New Refuge Visitor Center

The addition of a new refuge visitor center will substantially enhance the visitor experience. Wildlife and natural history education for the island community is an increasingly focused issue for the refuge because of a lack of any other facility on the island that is structured for natural history education. A new visitor center will essentially function as a natural history museum and learning center. In order to accomplish its mission of recovering the nesting population of endangered leatherback sea turtles, the refuge must be closed to the public approximately five months per year. The new visitor center will allow the refuge to continue expanded public education during the seasonal closure. It will also function as a key component in tourism recovery for St. Croix by providing a new destination focus for the Frederiksted area, as well as the entire island. This also mitigates the “loss” of refuge access to the community and tourist visitors during the refuge’s seasonal closure. Functioning as a natural history museum and learning center will also enable the new visitor center to provide a new, unique teaching resource for the island’s school system.

This project will address resource management (mitigation for seasonal closure of refuge), tourism recovery, education and outreach, and enhancement of the island’s public school system programs by significantly expanding the refuge’s role as an essential part of the island infrastructure and community.

The estimated cost for development and construction of a new refuge visitor center is approximately $2,500,000.

FUNDING AND PERSONNEL

Table 11 summarizes the proposed new projects discussed above. Existing projects are not included in the table. The staff listed in the full-time equivalents (FTEs) column refers to the number of staff needed to implement or carry out a given project.

Table 11. Summary of new projects

PROJECT NUMBER	NEW PROJECT TITLE	FIRST YEAR COST	RECURRING ANNUAL COST	STAFF (FTEs)
SP #3	Combined Sea Turtle Recovery	$103,300.00	$103,300.00	2
SP #5	Acquisition of off-refuge salt pond shoreline areas	$900,000.00	0	0
SP #9	Bat roost / nest boxes	$6,500.00	$2,000.00	1
SP #10	Invasive animal control	$30,000.00	$30,000.00	1
SP #12	Mangrove restoration and enhancement	$12,000.00	$12,000.00	2
SP #13	Wetlands, sea-level rise monitoring	$48,000.00	$12,000.00	2
SP #15	Invasive plant control	$85,000.00	$45,000.00	1
SP #16	Salt pond observation deck	$25,500.00	$3,000.00	1
SP #17	Refuge visitor center	$45,000.00	$5,000.00	1
SP #18	new refuge visitor hours	$60,000.00	$60,000.00	1
SP #19	“Turtle watch” program	$60,000.00	$60,000.00	1
SP #20	maintenance storage building	$80,000.00	$3,000.00	1
SP #21	New refuge visitor center / museum	$2,500,000.00	$30,000.00	3
GC #4	expanded reforestation, invasive plant control	$85,000.00	$45,000.00	1
GC #5	Rainwater collection, storage	$16,000.00	$3,000.00	1
GC #7	invasive rat control	$4,000.00	$4,000.00	1
BI #2	reforestation, invasive plant control	$125,000.00	$45,000.00	1
BI #3	status evaluation lighthouse	$60,000.00?	?	1
BI #4	St. Thomas information exhibits	$16,000.00	$3,000.00	1

PARTNERSHIP AND VOLUNTEER OPPORTUNITIES

A key element of this comprehensive conservation plan is to establish partnerships with local volunteers, landowners, private organizations, and federal and island territory natural resource agencies. In the immediate vicinity of the U.S. Virgin Islands refuges, opportunities exist to establish partnerships with the St. Croix Environmental Association, West Indies Marine Animal Research and Conservation Service, University of the Virgin Islands, public schools, hotels, and commercial boating and diving companies. At regional and territorial levels, partnerships may be established or enhanced with organizations such as the U.S. Virgin Islands' Department of Planning and Natural Resources and its Division of Fish and Wildlife.

STEP-DOWN MANAGEMENT PLANS

A comprehensive conservation plan is a strategic plan that guides the direction of a refuge, or in this case, all three U.S. Virgin Islands refuges. A step-down management plan provides specific guidance on activities, such as habitat, fire, and visitor services. These plans (listed in Table 12) are also developed in accordance with the National Environmental Policy Act, which requires the identification and evaluation of alternatives and public review and involvement prior to their implementation.

Table 12. Step-down management plans related to the goals and objectives of the comprehensive conservation plan

Step-down Plan	Refuge	Completion Date
Invasive Animal Control Plan	Sandy Point	2014
Invasive Plant Control Plan	Sandy Point	2014
Cultural Resources Management Plan	Sandy Point	2024
Visitor Services Plan	Sandy Point	2014
Habitat Restoration Plan	Green Cay	2012
Cultural Resources Management Plan	Green Cay	2024
Inventory and Monitoring Plan for Antillean skink and the Puerto Rican racer	Buck Island	2014
Habitat Restoration Plan	Buck Island	2014
Cultural Resources Management Plan	Buck Island	2024

MONITORING AND ADAPTIVE MANAGEMENT

Adaptive management is a flexible approach to long-term management of biotic resources that is directed over time by the results of ongoing monitoring activities and other information. More specifically, adaptive management is a process by which projects are implemented within a framework of scientifically driven experiments to test the predictions and assumptions outlined within a plan.

To apply adaptive management, specific survey, inventory, and monitoring protocols will be adopted for the three U.S. Virgin Islands refuges. The habitat management strategies will be systematically evaluated to determine management effects on wildlife populations. This information will be used to refine approaches and determine how effectively the objectives are being accomplished. Evaluations will include ecosystem team and other appropriate partner participation. If monitoring and evaluation indicate undesirable effects for target and non-target species and/or communities, then alterations to the management projects will be made. Subsequently, the comprehensive conservation plan will be revised. Specific monitoring and evaluation activities will be described in the step-down management plans.

PLAN REVIEW AND REVISION

This CCP will be reviewed annually as the refuges' annual work plans and budgets are developed. It will also be reviewed to determine the need for revision. A revision will occur if and when conditions change or significant information becomes available, such as a change in ecological conditions or a major expansion at any of the refuges. The final plan will be augmented by detailed step-down management plans to address the completion of specific strategies in support of the refuges' goals and objectives. Revisions to the comprehensive conservation plan and the step-down management plans will be subject to public review and NEPA compliance.

Appendix I. Glossary

Adaptive Management: Refers to a process in which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in a management plan. Analysis of results helps managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

Alluvial: Sediment transported and deposited in a delta or riverbed by flowing water.

Alternative: 1. A reasonable way to fix the identified problem or satisfy the stated need (40 CFR 1500.2). 2. Alternatives are different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the Refuge System mission, and resolving issues (Service Manual 602 FW 1.6B).

Anadromous: Migratory fishes that spend most of their lives in the sea and migrate to fresh water to breed.

Biological Diversity: The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (Service Manual 052 FW 1. 12B). The System's focus is on indigenous species, biotic communities, and ecological processes. Also referred to as biodiversity.

Carrying Capacity: The maximum population of a species able to be supported by a habitat or area.

Categorical Exclusion: A category of actions that does not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in procedures adopted by a federal agency pursuant to the National Environmental Policy Act (40 CFR 1508.4).

CFR: Code of Federal Regulations.

Compatible Use: A proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose(s) of the national wildlife refuge [50 CFR 25.12 (a)]. A compatibility determination supports the selection of compatible uses and identifies stipulations or limits necessary to ensure compatibility.

Comprehensive Conservation Plan:	A document that describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purposes of the refuge; helps fulfill the mission of the Refuge System; maintains and, where appropriate, restores the ecological integrity of each refuge and the Refuge System; helps achieve the goals of the National Wilderness Preservation System; and meets other mandates (Service Manual 602 FW 1.6 E).
Concern:	See “Issue”.
Cover Type:	The present vegetation of an area.
Cultural Resource Inventory:	A professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined geographic area. Inventories may involve various levels, including background literature search, comprehensive field examination to identify all exposed physical manifestations of cultural resources, or sample inventory to project site distribution and density over a larger area. Evaluation of identified cultural resources to determine eligibility for the National Register follows the criteria found in 36 CFR 60.4 (Service Manual 614 FW 1.7).
Cultural Resource Overview:	A comprehensive document prepared for a field office that discusses, among other things, its prehistory and cultural history, the nature and extent of known cultural resources, previous research, management objectives, resource management conflicts or issues, and a general statement on how program objectives should be met and conflicts resolved. An overview should reference or incorporate information from a field office’s background or literature search described in Section VIII of the Cultural Resource Management Handbook (Service Manual 614 FW 1.7).
Cultural Resources:	The remains of sites, structures, or objects used by people in the past.
Designated Wilderness Area:	An area designated by the U.S. Congress to be managed as part of the National Wilderness Preservation System (Draft Service Manual 610 FW 1.5).
Disturbance:	Significant alteration of habitat structure or composition. May be natural (e.g., fire) or human-caused events (e.g., aircraft overflight).
Ecosystem:	A dynamic and interrelating complex of plant and animal communities and their associated non-living environment.
Ecosystem Management:	Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and basic ecosystem processes are perpetuated indefinitely.

Endangered Species (Federal):	A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.
Endangered Species (State):	A plant or animal species in danger of becoming extinct or extirpated in the state within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.
Environmental Assessment (EA):	A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).
Environmental Impact Statement (EIS):	A detailed written statement required by section 102(2)(C) of the National Environmental Policy Act, analyzing the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources (40 CFR 1508.11).
Estuary:	The wide lower course of a river into which the tides flow. The area where the tide meets a river current.
Finding of No Significant Impact (FONSI):	A document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment, that briefly presents why a federal action will have no significant effect on the human environment and for which an environmental impact statement, therefore, will not be prepared (40 CFR 1508.13).
Goal:	Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (Service Manual 620 FW 1.6J).
Habitat:	Suite of existing environmental conditions required by an organism for survival and reproduction. The place where an organism typically lives.
Habitat Restoration:	Management emphasis designed to move ecosystems to desired conditions and processes, and/or to healthy ecosystems.
Habitat Type:	See “Vegetation Type”.
Improvement Act:	The National Wildlife Refuge System Improvement Act of 1997.
Informed Consent:	The grudging willingness of opponents to “go along” with a course of action that they actually oppose (Bleiker).

Issue:	Any unsettled matter that requires a management decision [e.g., an initiative, opportunity, resource management problem, threat to the resources of the unit, conflict in uses, public concern, or other presence of an undesirable resource condition (Service Manual 602 FW 1.6K)].
Management Alternative:	See “Alternative”.
Management Concern:	See “Issue”.
Management Opportunity:	See “Issue”.
Migration:	The seasonal movement from one area to another and back.
Mission Statement:	Succinct statement of the unit’s purpose and reason for being.
Monitoring:	The process of collecting information to track changes of selected parameters over time.
National Environmental Policy Act of 1969 (NEPA):	Requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision-making (40 CFR 1500).
National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57):	Under the Refuge Improvement Act, the Fish and Wildlife Service is required to develop 15-year comprehensive conservation plans for all national wildlife refuges outside Alaska. The Act also describes the six public uses given priority status within the Refuge System (i.e., hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation).
National Wildlife Refuge System Mission:	The mission is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.
National Wildlife Refuge System:	Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife, including species threatened with extinction; all lands, waters, and interests therein administered by the Secretary as wildlife refuges; areas for the protection and conservation of fish and wildlife that are threatened with extinction; wildlife ranges; game ranges; wildlife management areas; or waterfowl production areas.

National Wildlife Refuge:	A designated area of land, water, or an interest in land or water within the Refuge System.
Native Species:	Species that normally live and thrive in a particular ecosystem.
Noxious Weed:	A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive or difficult to manage; parasitic; a carrier or host of serious insect or disease; or non-native, new, or not common to the United States. According to the Federal Noxious Weed Act (P.L. 93-639), a noxious weed is one that causes disease or had adverse effects on man or his environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.
Objective:	A concise statement of what we want to achieve, how much we want to achieve, when and where we want to achieve it, and who is responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies. Making objectives attainable, time-specific, and measurable (Service Manual 602 FW 1.6N).
Plant Association:	A classification of plant communities based on the similarity in dominants of all layers of vascular species in a climax community.
Plant Community:	An assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site such as soils, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community.
Preferred Alternative:	This is the alternative determined (by the decision-maker) to best achieve the refuge purpose, vision, and goals; contributes to the Refuge System mission, addresses the significant issues; and is consistent with principles of sound fish and wildlife management.
Prescribed Fire:	The application of fire to wildland fuels to achieve identified land use objectives (Service Manual 621 FW 1.7). May occur from natural ignition or intentional ignition.
Priority Species:	Fish and wildlife species that require protective measures and/or management guidelines to ensure their perpetuation. Priority species include the following: (1) State-listed and candidate species; (2) species or groups of animals susceptible to significant population declines within a specific area or statewide by virtue of their inclination to aggregate (e.g., seabird colonies); and (3) species of recreation, commercial, and/or tribal importance.
Public Involvement Plan:	Broad long-term guidance for involving the public in the comprehensive conservation planning process.

Public Involvement:	A process that offers impacted and interested individuals and organizations an opportunity to become informed about, and to express their opinions on Service actions and policies. In the process, these views are studied thoroughly and thoughtful consideration of public views is given in shaping decisions for refuge management.
Public:	Individuals, organizations, and groups; officials of federal, state, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in service issues and those who do or do not realize that Service decisions may affect them.
Purposes of the Refuge:	"The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge sub-unit." For refuges that encompass congressionally designated wilderness, the purposes of the Wilderness Act are additional purposes of the refuge (Service Manual 602 FW 106 S).
Recommended Wilderness:	Areas studied and found suitable for wilderness designation by both the Director of the Fish and Wildlife Service and the Secretary of the Department of the Interior, and recommended for designation by the President to Congress. These areas await only legislative action by Congress in order to become part of the Wilderness System. Such areas are also referred to as "pending in Congress" (Draft Service Manual 610 FW 1.5).
Record of Decision (ROD):	A concise public record of decision prepared by the federal agency, pursuant to NEPA, that contains a statement of the decision, identification of all alternatives considered, identification of the environmentally preferable alternative, a statement as to whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted (and if not, why they were not), and a summary of monitoring and enforcement where applicable for any mitigation (40 CFR 1505.2).
Refuge Goal:	See "Goal".
Refuge Purposes:	See "Purposes of the Refuge".
Songbirds: (Also Passerines)	A category of birds that is medium to small, perching landbirds. Most are territorial singers and migratory.
Step-down Management Plan:	A plan that provides specific guidance on management subjects (e.g., habitat, public use, fire, and safety) or groups of related subjects. It describes strategies and implementation schedules for meeting CCP goals and objectives (Service Manual 602 FW 1.6 U).

Strategy:	A specific action, tool, technique, or combination of actions, tools, and techniques used to meet unit objectives (Service Manual 602 FW 1.6 U).
Study Area:	The area reviewed in detail for wildlife, habitat, and public use potential. For purposes of this CCP, the study area includes the lands within the currently approved refuge boundary and potential refuge expansion areas.
Threatened Species (Federal):	Species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.
Threatened Species (State):	A plant or animal species likely to become endangered in the state within the near future if factors contributing to population decline or habitat degradation or loss continue.
Tiering:	The coverage of general matters in broader environmental impact statements with subsequent narrower statements of environmental analysis, incorporating by reference, the general discussions and concentrating on specific issues (40 CFR 1508.28).
U.S. Fish and Wildlife Service Mission:	The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.
Unit Objective:	See “Objective”.
Vegetation Type, Habitat Type, Forest Cover Type:	A land classification system based upon the concept of distinct plant associations.
Vision Statement:	A concise statement of what the planning unit should be, or what we hope to do, based primarily upon the Refuge System mission and specific refuge purposes, and other mandates. We will tie the vision statement for the refuge to the mission of the Refuge System; the purpose(s) of the refuge; the maintenance or restoration of the ecological integrity of each refuge and the Refuge System; and other mandates (Service Manual 602 FW 1.6 Z).

Wilderness Study Areas: Lands and waters identified through inventory as meeting the definition of wilderness and undergoing evaluation for recommendation for inclusion in the Wilderness System. A study area must meet the following criteria:

- Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation; and
- Has at least 5,000 contiguous roadless acres or is sufficient in size as to make practicable its preservation and use in an unimpaired condition (Draft Service Manual 610 FW 1.5).

Wilderness: See "Designated Wilderness".

Wildfire: A free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands (Service Manual 621 FW 1.7).

Wildland Fire: Every wildland fire is either a wildfire or a prescribed fire (Service Manual 621 FW 1.3

ACRONYMS AND ABBREVIATIONS

ATV	All Terrain Vehicle
BINWR	Buck Island National Wildlife Refuge
BIRNM	Buck Island Reef National Monument (NPS-managed)
BCC	Birds of Conservation Concern
BRT	Biological Review Team
CCP	Comprehensive Conservation Plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
CWCS	Comprehensive Wildlife Conservation Strategy
DEA	Drug Enforcement Administration
DFW	Division of Fish and Wildlife (of the USVI Department of Planning and Natural Resources)
DHS	Department of Homeland Security
DOI	Department of the Interior
DPNR	Department of Planning and Natural Resources (U.S. Virgin Islands)
EA	Environmental Assessment
EE	environmental education
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FR	Federal Register
FTE	full-time equivalent
FWS	U.S. Fish and Wildlife Service (also Service or USFWS)
FY	Fiscal Year
GIS	Global Information System
GCNWR	Green Cay National Wildlife Refuge
IBA	Important Bird Area
ICE	Immigration and Customs Enforcement
NEPA	National Environmental Policy Act
NPS	National Park Service
NRHP	National Register of Historic Places
NWF	National Wildlife Federation
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
PFT	Permanent Full Time
RHPO	Regional Historic Preservation Officer
RM	Refuge Manual
RNA	Research Natural Area
ROD	Record of Decision
RONS	Refuge Operating Needs System
RRP	Refuge Roads Program
SHPO	State (Territorial) Historic Preservation Officer (of the U.S. Virgin Islands)
SPNWR	Sandy Point National Wildlife Refuge
USFWS	U.S. Fish and Wildlife Service (also FWS or Service)
TAMU	Texas A & M University, College Station, TX
TFT	Temporary Full Time
USC	United States Code

USVI	United States Virgin Islands
VIDPNR	U.S. Virgin Islands Department of Planning and Natural Resources
YCC	Youth Conservation Corps

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Appendix III. Relevant Legal Mandates and Executive Orders

STATUTE	DESCRIPTION
Administrative Procedures Act (1946)	Outlines administrative procedures to be followed by federal agencies with respect to identification of information to be made public; publication of material in the Federal Register; maintenance of records; attendance and notification requirements for specific meetings and hearings; issuance of licenses; and review of agency actions.
American Antiquities Act of 1906	Provides penalties for unauthorized collection, excavation, or destruction of historic or prehistoric ruins, monuments, or objects of antiquity on lands owned or controlled by the United States. The Act authorizes the President to designate as national monuments objects or areas of historic or scientific interest on lands owned or controlled by the Unites States.
American Indian Religious Freedom Act of 1978	Protects the inherent right of Native Americans to believe, express, and exercise their traditional religions, including access to important sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.
Americans With Disabilities Act of 1990	Intended to prevent discrimination of and make American society more accessible to people with disabilities. The Act requires reasonable accommodations to be made in employment, public services, public accommodations, and telecommunications for persons with disabilities.
Anadromous Fish Conservation Act of 1965, as amended	Authorizes the Secretaries of Interior and Commerce to enter into cooperative agreements with states and other nonfederal interests for conservation, development, and enhancement of anadromous fish and contribute up to 50 percent as the federal share of the cost of carrying out such agreements. Reclamation construction programs for water resource projects needed solely for such fish are also authorized.
Archaeological Resources Protection Act of 1979, as amended.	This Act strengthens and expands the protective provisions of the Antiquities Act of 1906 regarding archaeological resources. It also revised the permitting process for archaeological research.
Architectural Barriers Act of 1968	Requires that buildings and facilities designed, constructed, or altered with federal funds, or leased by a federal agency, must comply with standards for physical accessibility.
Bald and Golden Eagle Protection Act of 1940, as amended	Prohibits the possession, sale or transport of any bald or golden eagle, alive or dead, or part, nest, or egg except as permitted by the Secretary of the Interior for scientific or exhibition purposes, or for the religious purposes of Indians.

STATUTE	DESCRIPTION
Bankhead-Jones Farm Tenant Act of 1937	Directs the Secretary of Agriculture to develop a program of land conservation and utilization in order to correct maladjustments in land use and thus assist in such things as control of soil erosion, reforestation, conservation of natural resources and protection of fish and wildlife. Some early refuges and hatcheries were established under authority of this Act.
Cave Resources Protection Act of 1988	Established requirements for the management and protection of caves and their resources on federal lands, including allowing the land managing agencies to withhold the location of caves from the public, and requiring permits for any removal or collecting activities in caves on federal lands.
Clean Air Act of 1970	Regulates air emissions from area, stationary, and mobile sources. This Act and its amendments charge federal land managers with direct responsibility to protect the "air quality and related values" of land under their control. These values include fish, wildlife, and their habitats.
Clean Water Act of 1974, as amended	This Act and its amendments have as its objective the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters. Section 401 of the Act requires that federally permitted activities comply with the Clean Water Act standards, state water quality laws, and any other appropriate state laws. Section 404 charges the U.S. Army Corps of Engineers with regulating discharge of dredge or fill materials into waters of the United States, including wetlands.
Coastal Barrier Resources Act of 1982 (CBRA)	Identifies undeveloped coastal barriers along the Atlantic and Gulf Coasts and included them in the John H. Chafee Coastal Barrier Resources System (CBRS). The objectives of the act are to minimize loss of human life, reduce wasteful federal expenditures, and minimize the damage to natural resources by restricting most federal expenditures that encourage development within the CBRS.
Coastal Barrier Improvement Act of 1990	Reauthorized the Coastal Barrier Resources Act (CBRA), expanded the CBRS to include undeveloped coastal barriers along the Great Lakes and in the Caribbean, and established "Otherwise Protected Areas (OPAs)." The Service is responsible for maintaining official maps, consulting with federal agencies that propose spending federal funds within the CBRS and OPAs, and making recommendations to Congress about proposed boundary revisions.
Coastal Wetlands Planning, Protection, and Restoration (1990)	Authorizes the Director of the Fish and Wildlife Service to participate in the development of a Louisiana coastal wetlands restoration program, participate in the development and oversight of a coastal wetlands conservation program, and lead in the implementation and administration of a national coastal wetlands grant program.

STATUTE	DESCRIPTION
Coastal Zone Management Act of 1972, as amended	Established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans and requires that "any federal activity within or outside of the coastal zone that affects any land or water use or natural resource of the coastal zone" shall be "consistent to the maximum extent practicable with the enforceable policies" of a state's coastal zone management plan. The law includes an Enhancement Grants Program for protecting, restoring, or enhancing existing coastal wetlands or creating new coastal wetlands. It also established the National Estuarine Research Reserve System, guidelines for estuarine research, and financial assistance for land acquisition.
Emergency Wetlands Resources Act of 1986	This Act authorized the purchase of wetlands from Land and Water Conservation Fund moneys, removing a prior prohibition on such acquisitions. The Act requires the Secretary to establish a National Wetlands Priority Conservation Plan, required the states to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers to the Migratory Bird Conservation Fund amounts equal to import duties on arms and ammunition. It also established entrance fees at national wildlife refuges.
Endangered Species Act of 1973, as amended	Provides for the conservation of threatened and endangered species of fish, wildlife, and plants by federal action and by encouraging the establishment of state programs. It provides for the determination and listing of threatened and endangered species and the designation of critical habitats. Section 7 requires refuge managers to perform internal consultation before initiating projects that affect or may affect endangered species.
Environmental Education Act of 1990	This Act established the Office of Environmental Education within the U.S. Environmental Protection Agency to develop and administer a federal environmental education program in consultation with other federal natural resource management agencies, including the Fish and Wildlife Service.
Estuary Protection Act of 1968	Authorized the Secretary of the Interior, in cooperation with other federal agencies and the states, to study and inventory estuaries of the United States, including land and water of the Great Lakes, and to determine whether such areas should be acquired for protection. The Secretary is also required to encourage state and local governments to consider the importance of estuaries in their planning activities relative to federal natural resource grants. In approving any state grants for acquisition of estuaries, the Secretary was required to establish conditions to ensure the permanent protection of estuaries.

STATUTE	DESCRIPTION
Estuaries and Clean Waters Act of 2000	This law creates a federal interagency council that includes the Director of the Fish and Wildlife Service, the Secretary of the Army for Civil Works, the Secretary of Agriculture, the Administrator of the Environmental Protection Agency and the Administrator for the National Oceanic and Atmospheric Administration. The council is charged with developing a national estuary habitat restoration strategy and providing grants to entities to restore and protect estuary habitat to promote the strategy.
Food Security Act of 1985, as amended (Farm Bill)	The Act contains several provisions that contribute to wetland conservation. The Swampbuster provisions state that farmers who convert wetlands for the purpose of planting after enactment of the law are ineligible for most farmer program subsidies. It also established the Wetland Reserve Program to restore and protect wetlands through easements and restoration of the functions and values of wetlands on such easement areas.
Farmland Protection Policy Act of 1981, as amended	The purpose of this law is to minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. Federal programs include construction projects and the management of federal lands.
Federal Advisory Committee Act (1972), as amended	Governs the establishment of and procedures for committees that provide advice to the federal government. Advisory committees may be established only if they will serve a necessary, nonduplicative function. Committees must be strictly advisory unless otherwise specified and meetings must be open to the public.
Federal Coal Leasing Amendment Act of 1976	Provided that nothing in the Mining Act, the Mineral Leasing Act, or the Mineral Leasing Act for Acquired Lands authorized mining coal on refuges.
Federal-Aid Highways Act of 1968	Established requirements for approval of federal highways through national wildlife refuges and other designated areas to preserve the natural beauty of such areas. The Secretary of Transportation is directed to consult with the Secretary of the Interior and other federal agencies before approving any program or project requiring the use of land under their jurisdiction.
Federal Noxious Weed Act of 1990, as amended	The Secretary of Agriculture was given the authority to designate plants as noxious weeds and to cooperate with other federal, State and local agencies, farmers' associations, and private individuals in measures to control, eradicate, prevent, or retard the spread of such weeds. The Act requires each Federal land-managing agency, including the Fish and Wildlife Service, to designate an office or person to coordinate a program to control such plants on the agency's land and implement cooperative agreements with the states, including integrated management systems to control undesirable plants.

STATUTE	DESCRIPTION
Fish and Wildlife Act of 1956	Establishes a comprehensive national fish, shellfish, and wildlife resources policy with emphasis on the commercial fishing industry but also includes the inherent right of every citizen and resident to fish for pleasure, enjoyment, and betterment and to maintain and increase public opportunities for recreational use of fish and wildlife resources. Among other things, it authorizes the Secretary of the Interior to take such steps as may be required for the development, advancement, management, conservation, and protection of fish and wildlife resources including, but not limited to, research, development of existing facilities, and acquisition by purchase or exchange of land and water or interests therein.
Fish and Wildlife Conservation Act of 1980, as amended	Requires the Service to monitor nongame bird species, identify species of management concern, and implement conservation measures to preclude the need for listing under the Endangered Species Act.
Fish and Wildlife Coordination Act of 1958	Promotes equal consideration and coordination of wildlife conservation with other water resource development programs by requiring consultation with the Fish and Wildlife Service and the state fish and wildlife agencies where the “waters of a stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted…or otherwise controlled or modified” by any agency under federal permit or license.
Improvement Act of 1978	This act was passed to improve the administration of fish and wildlife programs and amends several earlier laws, including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out volunteer programs.
Fishery (Magnuson) Conservation and Management Act of 1976	Established Regional Fishery Management Councils comprised of federal and state officials, including the Fish and Wildlife Service. It provides for regulation of foreign fishing and vessel fishing permits.
Freedom of Information Act, 1966	Requires all federal agencies to make available to the public for inspection and copying administrative staff manuals and staff instructions; official, published and unpublished policy statements; final orders deciding case adjudication; and other documents. Special exemptions have been reserved for nine categories of privileged material. The Act requires the party seeking the information to pay reasonable search and duplication costs.
Geothermal Steam Act of 1970, as amended	Authorizes and governs the lease of geothermal steam and related resources on public lands. Section 15 c of the Act prohibits issuing geothermal leases on virtually all Service-administrative lands.

STATUTE	DESCRIPTION
Lacey Act of 1900, as amended	Originally designed to help states protect their native game animals and to safeguard U.S. crop production from harmful foreign species, this Act prohibits interstate and international transport and commerce of fish, wildlife or plants taken in violation of domestic or foreign laws. It regulates the introduction to America of foreign species.
Land and Water Conservation Fund Act of 1948	This Act provides funding through receipts from the sale of surplus federal land, appropriations from oil and gas receipts from the outer continental shelf, and other sources for land acquisition under several authorities. Appropriations from the fund may be used for matching grants to states for outdoor recreation projects and for land acquisition by various federal agencies, including the Fish and Wildlife Service.
Marine Mammal Protection Act of 1972, as amended	The 1972 Marine Mammal Protection Act established a federal responsibility to conserve marine mammals with management vested in the Department of the Interior for sea otter, walrus, polar bear, dugong, and manatee. The Department of Commerce is responsible for cetaceans and pinnipeds, other than the walrus. With certain specified exceptions, the Act establishes a moratorium on the taking and importation of marine mammals, as well as products taken from them.
Migratory Bird Conservation Act of 1929	Established a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds. The role of the commission was expanded by the North American Wetland Conservation Act to include approving wetlands acquisition, restoration, and enhancement proposals recommended by the North American Wetlands Conservation Council.
Migratory Bird Hunting and Conservation Stamp Act of 1934	Also commonly referred to as the “Duck Stamp Act,” requires waterfowl hunters 16 years of age or older to possess a valid federal hunting stamp. Receipts from the sale of the stamp are deposited into the Migratory Bird Conservation Fund for the acquisition of migratory bird refuges.
Migratory Bird Treaty Act of 1918, as amended	This Act implements various treaties and conventions between the United States and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Except as allowed by special regulations, this Act makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, barter, export or import any migratory bird, part, nest, egg, or product.
Mineral Leasing Act for Acquired Lands (1947), as amended	Authorizes and governs mineral leasing on acquired public lands.

STATUTE	DESCRIPTION
Minerals Leasing Act of 1920, as amended	Authorizes and governs leasing of public lands for development of deposits of coal, oil, gas, and other hydrocarbons; sulphur; phosphate; potassium; and sodium. Section 185 of this title contains provisions relating to granting rights-of-way over federal lands for pipelines.
Mining Act of 1872, as amended	Authorizes and governs prospecting and mining for the so-called "hardrock" minerals (i.e., gold and silver) on public lands.
National and Community Service Act of 1990	Authorizes several programs to engage citizens of the U.S. in full- and/or part-time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. Among other things, this law establishes the American Conservation and Youth Service Corps to engage young adults in approved human and natural resource projects, which will benefit the public or are carried out on federal or Indian lands.
National Environmental Policy Act of 1969	Requires analysis, public comment, and reporting for environmental impacts of federal actions. It stipulates the factors to be considered in environmental impact statements, and requires that federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unqualified environmental values are given appropriate consideration, along with economic and technical considerations.
National Historic Preservation Act of 1966, as amended	It establishes a National Register of Historic Places and a program of matching grants for preservation of significant historical features. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register.
National Trails System Act (1968), as amended	Established the National Trails System to protect the recreational, scenic, and historic values of some important trails. National recreation trails may be established by the Secretaries of Interior or Agriculture on land wholly or partly within their jurisdiction, with the consent of the involved state(s), and other land managing agencies, if any. National scenic and national historic trails may only be designated by Congress. Several national trails cross units of the National Wildlife Refuge System.
National Wildlife Refuge System Administration Act of 1966	Prior to 1966, there was no single federal law that governed the administration of the various national wildlife refuges that had been established. This Act defines the National Wildlife Refuge System and authorizes the Secretary of the Interior to permit any use of a refuge provided such use is compatible with the major purposes(s) for which the refuge was established.

STATUTE	DESCRIPTION
National Wildlife Refuge System Improvement Act of 1997	This Act amends the National Wildlife Refuge System Administration Act of 1966. This Act defines the mission of the National Wildlife Refuge System, establishes the legitimacy and appropriateness of six priority wildlife-dependent public uses, establishes a formal process for determining compatible uses of Refuge System lands, identifies the Secretary of the Interior as responsible for managing and protecting the Refuge System, and requires the development of a comprehensive conservation plan for all refuges outside of Alaska.
Native American Graves Protection and Repatriation Act of 1990	Requires federal agencies and museums to inventory, determine ownership of, and repatriate certain cultural items and human remains under their control or possession. The Act also addresses the repatriation of cultural items inadvertently discovered by construction activities on lands managed by the agency.
Neotropical Migratory Bird Conservation Act of 2000	Establishes a matching grant program to fund projects that promote the conservation of neotropical migratory birds in the united States, Latin America, and the Caribbean.
North American Wetlands Conservation Act of 1989	Provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands between Canada, the United States, and Mexico. The North American Wetlands Conservation Council was created to recommend projects to be funded under the Act to the Migratory Bird Conservation Commission. Available funds may be expended for up to 50 percent of the United States' share cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on federal lands).
Refuge Recreation Act of 1962, as amended	This Act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife-oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.
Partnerships for Wildlife Act of 1992	Establishes a Wildlife Conservation and Appreciation Fund to receive appropriated funds and donations from the National Fish and Wildlife Foundation and other private sources to assist the state fish and game agencies in carrying out their responsibilities for conservation of nongame species. The funding formula is no more that 1/3 federal funds, at least 1/3 foundation funds, and at least 1/3 state funds.
Refuge Revenue Sharing Act of 1935, as amended	Provided for payments to counties in lieu of taxes from areas administered by the Fish and Wildlife Service. Counties are required to pass payments along to other units of local government within the county, which suffer losses in tax revenues due to the establishment of Service areas.

STATUTE	DESCRIPTION
Rehabilitation Act of 1973	Requires nondiscrimination in the employment practices of federal agencies of the executive branch and contractors. It also requires all federally assisted programs, services, and activities to be available to people with disabilities.
Rivers and Harbors Appropriations Act of 1899, as amended	Requires the authorization by the U.S. Army Corps of Engineers prior to any work in, on, over, or under a navigable water of the United States. The Fish and Wildlife Coordination Act provides authority for the Service to review and comment on the effects on fish and wildlife activities proposed to be undertaken or permitted by the Corps of Engineers. Service concerns include contaminated sediments associated with dredge or fill projects in navigable waters.
Sikes Act (1960), as amended	Provides for the cooperation by the Departments of Interior and Defense with state agencies in planning, development, and maintenance of fish and wildlife resources and outdoor recreation facilities on military reservations throughout the United States. It requires the Secretary of each military department to use trained professionals to manage the wildlife and fishery resource under his jurisdiction, and requires that federal and state fish and wildlife agencies be given priority in management of fish and wildlife activities on military reservations.
Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948	This Act provides that upon determination by the Administrator of the General Services Administration, real property no longer needed by a federal agency can be transferred, without reimbursement, to the Secretary of the Interior if the land has particular value for migratory birds, or to a state agency for other wildlife conservation purposes.
Transportation Equity Act for the 21st Century (1998)	Established the Refuge Roads Program, requires transportation planning that includes public involvement, and provides funding for approved public use roads and trails and associated parking lots, comfort stations, and bicycle/pedestrian facilities.
Uniform Relocation and Assistance and Real Property Acquisition Policies Act (1970), as amended	Provides for uniform and equitable treatment of persons who sell their homes, businesses, or farms to the Service. The Act requires that any purchase offer be no less than the fair market value of the property.
Water Resources Planning Act of 1965	Established Water Resources Council to be composed of Cabinet representatives including the Secretary of the Interior. The Council reviews river basin plans with respect to agricultural, urban, energy, industrial, recreational and fish and wildlife needs. The act also established a grant program to assist States in participating in the development of related comprehensive water and land use plans.

STATUTE	DESCRIPTION
Wild and Scenic Rivers Act of 1968, as amended	This Act selects certain rivers of the nation possessing remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values; preserves them in a free-flowing condition; and protects their local environments.
Wilderness Act of 1964, as amended	This Act directs the Secretary of the Interior to review every roadless area of 5,000 acres or more and every roadless island regardless of size within the National Wildlife Refuge System and to recommend suitability of each such area. The Act permits certain activities within designated wilderness areas that do not alter natural processes. Wilderness values are preserved through a "minimum tool" management approach, which requires refuge managers to use the least intrusive methods, equipment, and facilities necessary for administering the areas.
Youth Conservation Corps Act of 1970	Established a permanent Youth Conservation Corps (YCC) program within the Departments of Interior and Agriculture. Within the Service, YCC participants perform many tasks on refuges, fish hatcheries, and research stations.

EXECUTIVE ORDERS	DESCRIPTIONS
EO 11593, Protection and Enhancement of the Cultural Environment (1971)	States that if the Service proposes any development activities that may affect the archaeological or historic sites, the Service will consult with Federal and State Historic Preservation Officers to comply with Section 106 of the National Historic Preservation Act of 1966, as amended.
EO 11644, Use of Off-road Vehicles on Public Land (1972)	Established policies and procedures to ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.
EO 11988, Floodplain Management (1977)	The purpose of this Executive Order is to prevent federal agencies from contributing to the "adverse impacts associated with occupancy and modification of floodplains" and the "direct or indirect support of floodplain development." In the course of fulfilling their respective authorities, federal agencies "shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains."
EO 11989 (1977), Amends Section 2 of EO 11644	Directs agencies to close areas negatively impacted by off-road vehicles.
EO 11990, Protection of Wetlands (1977)	Federal agencies are directed to provide leadership and take action to minimize the destruction, loss of degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
EO 12372, Intergovernmental Review of Federal Programs (1982)	Seeks to foster intergovernmental partnerships by requiring federal agencies to use the state process to determine and address concerns of state and local elected officials with proposed federal assistance and development programs.
EO 12898, Environmental Justice (1994)	Requires federal agencies to identify and address disproportionately high and adverse effects of its programs, policies, and activities on minority and low-income populations.

EXECUTIVE ORDERS	DESCRIPTIONS
EO 12906, Coordinating Geographical Data Acquisition and Access (1994), Amended by EO 13286 (2003). Amendment of EOs and other actions in connection with transfer of certain functions to Secretary of DHS.	Recommended that the executive branch develop, in cooperation with state, local, and tribal governments, and the private sector, a coordinated National Spatial Data Infrastructure to support public and private sector applications of geospatial data. Of particular importance to comprehensive conservation planning is the National Vegetation Classification System (NVCS), which is the adopted standard for vegetation mapping. Using NVCS facilitates the compilation of regional and national summaries, which in turn, can provide an ecosystem context for individual refuges.
EO 12962, Recreational Fisheries (1995)	Federal agencies are directed to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities in cooperation with states and tribes.
EO 13007, Native American Religious Practices (1996)	Provides for access to, and ceremonial use of, Indian sacred sites on federal lands used by Indian religious practitioners and direction to avoid adversely affecting the physical integrity of such sites.
EO 13061, Federal Support of Community Efforts Along American Heritage Rivers (1997)	Established the American Heritage Rivers initiative for the purpose of natural resource and environmental protection, economic revitalization, and historic and cultural preservation. The Act directs Federal agencies to preserve, protect, and restore rivers and their associated resources important to our history, culture, and natural heritage.
EO 13084, Consultation and Coordination With Indian Tribal Governments (2000)	Provides a mechanism for establishing regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications.
EO 13112, Invasive Species (1999)	Federal agencies are directed to prevent the introduction of invasive species, detect and respond rapidly to and control populations of such species in a cost effective and environmentally sound manner, accurately monitor invasive species, provide for restoration of native species and habitat conditions, conduct research to prevent introductions and to control invasive species, and promote public education on invasive species and the means to address them. This EO replaces and rescinds EO 11987, Exotic Organisms (1977).

EXECUTIVE ORDERS	DESCRIPTIONS
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. (2001)	Instructs federal agencies to conserve migratory birds by several means, including the incorporation of strategies and recommendations found in Partners in Flight Bird Conservation plans, the North American Waterfowl Plan, the North American Waterbird Conservation Plan, and the United States Shorebird Conservation Plan, into agency management plans and guidance documents.

Appendix IV. Public Involvement

The Core CCP Planning Team invited the general public to attend two public scoping meetings, one held in Charlotte Amalie, St. Thomas, on June 5, 2007, and the second one held in Christiansted, St. Croix, on June 7, 2007. About five citizens attended the first meeting on St. Thomas, while about 25 attendees participated in the St. Croix meeting. Lively discussions took place in both meetings. At the St. Thomas meeting, the emphasis was on environmental education and means of improving public awareness and appreciation of the refuges. At the second meeting on St. Croix, most of the discussion concerned public access.

SUMMARY OF PUBLIC SCOPING COMMENTS

SANDY POINT NWR, ST. CROIX

Fish and Wildlife Population Management

- Continuation of enhancement of nest sites to increase nesting success for colonially nesting least terns.
- Continuation of monitoring, habitat improvements, and general promotion of brown pelican recovery on refuge lands.
- Continuation of protection of wetland habitats to support healthy populations of resident and migratory shorebirds, seabirds, waterbirds, and waterfowl.
- Continuation and improvement of surveys tracking use of wetlands by birds.
- Initiation of general herpetofaunal surveys.
- Determination of the species of bats present on the refuge and their habitat requirements.
- Establishment of comprehensive, sustained inventory and monitoring for targeted flora and fauna.
- Continuation of protection of the leatherback turtle—both nesting females and hatchlings—as well as nesting habitat and nests, from a variety of threats, thus contributing to the recovery of this endangered species.
- Continuation of contributions to the recovery of green and hawksbill turtles by protecting nesting females, nests, and hatchlings; Initiation of night time monitoring program.
- Continuation and expansion of the protection and study of endangered and threatened species, like the leatherback sea turtle, that use and depend on the refuge habitats.
- Continuation of the study of least tern nesting activity by staff would increase the likelihood of successful protection. More funding, staff and volunteers may well be needed for this effort.
- The Service has not established how many turtles at Sandy Point are enough?

- The refuge could follow the lead of other areas and carefully dig up the eggs in turtle nests and move them to a safer location, allowing the beach to be opened to more public use without harming the turtles.

Habitat Management

- Conservation and restoration of habitat for migratory and resident bird species associated with dry subtropical forest, such as the white-crowned pigeon.

- Conservation and restoration of habitat for migratory and resident bird species associated with mangroves, such as the white-crowned pigeon and yellow “golden” warbler.

- Promotion of nesting habitat for shorebirds such as the snowy and Wilson’s plover, and the American oystercatcher.

- Restoring the structure, function and diversity of dry forest habitat.

- Maintaining and restoring mangrove areas.

- Pressure by some local interests to build a marina in the non-refuge portion of the West End Salt Pond, which would have adverse impacts on the lagoon and likely on refuge beaches thus nesting sea turtles.

- There should be a more aggressive program to propagate the native plants from Sandy Point, such as coco plum, wild cinnamon, princewood, water mampoo, and other plants that are uncommon elsewhere on the island.

- Habitats should not be managed any differently than today.

Resource Protection

- Monitoring and controlling or eradicating populations of alien invasive species on the refuge.

- Protection and recovery of threatened and endangered plants that occur at Sandy Point Refuge, in particular *Buxus vahlii* (Vahl’s boxwood).

- Developing an Oil Spill and Hazardous Substances Contingency Plan for the refuge.

- Continuing to manage and protect cultural resources, particularly the Aklis archeological site.

- Effort should be made to expand the areas at the refuge that exclude exotic predatory animals and human disturbance.

- If refuge staff were increased to protect public safety, the days and hours of beach access could increase during those months when turtle activity is not an issue.

- Expanding hours during which the refuge is open to the public may also increase property crime, assault, and theft as well as illegal activities such as dumping of garbage, appliances, vehicles and unwanted animals.

- An attitude of people versus wildlife seems to be growing on St. Croix, which is exacerbated by the island's depressed economy.

- Protection of the threatened and endangered sea turtles and birds that use the refuge for foraging, nesting, and roosting.

- Insufficient funding for adequate staff to provide protection from illegal activities (e.g., drug trafficking, illegal immigration).

Visitor Services

- Developing a Visitor Services Plan.

- Whether to formally permit fishing on the refuge.

- Opportunities for expanding wildlife observation and photography in ways that do not compromise or disturb sensitive wildlife.

- How best to provide beach access to an eager public without harming turtle recovery efforts

- How to provide for public safety on the refuge, particularly beaches, given limited staffing resources for patrol and enforcement.

- Outreach and educational efforts to improve local community support for wildlife conservation on the refuge.

- Some St. Croix citizens do not understand the most basic facts about leatherback sea turtles and most people on the island are unaware of the habitat needs of breeding least terns.

- Community outreach and education programs should be expanded to increase understanding of the importance of protecting wildlife and their habitats, leatherback recovery, the role of Sandy Point Refuge and the National Wildlife Refuge System.

- The public feels locked out of Sandy Point, which is one of St. Croix's loveliest beaches.

- Access to the beach at Sandy Point should be increased, but only to the extent that it would have little or no impact on the wildlife and habitats.

- Pressure to increase public use of the beach.

- The most important issue facing the refuge is public relationship: the public has no idea of what Sandy Point Refuge is all about. If the public knows more about the refuge, there will be more support. Access to the refuge will all be worked out once the public becomes more aware of the value of the resource. Issues can be addressed by town meetings, and television and radio talk shows.

- Management of habitats and wildlife should not be done differently; however, access to the beach can be increased with additional Service staff.

- Creation of interpretive trails in certain sections of Sandy Point that teach about the relationship between plants, animals, and humans might be appropriate, after careful studies of the area.

- Limiting public access to Sandy Point beaches to just the winter months prohibits islanders and neighbors from enjoying the beach when the weather, water and temperatures are better and from enjoying the sight of wildlife such as dolphins.

- The refuge wrongly gives priority to turtles over people, and has taken the best beach on St. Croix away from the public and given it to turtles. It appears that public access to other beaches on St. Croix is also being threatened. This is an assault on island heritage and culture.

Refuge Administration

- Cooperative efforts between the Service and the VIDPNR, Division of Fish and Wildlife.

- Collaboration with other partnering NGOs, in particular WIMARCS, SEA, and TNC.

- Potential for partnering with NGO's and local government agencies to increase the level of educational activities that could take place at Sandy Point, especially during the months with less sea turtle activity.

- More informational signage, positive use of the press, and partnerships with local agencies and organizations could improve public perception of the refuge.

- Raising local money to pay for more staff so that access could be increased and extending the hours that the refuge is open during the fall and winter months are good ideas.

- 15 years is a long time between management efforts; it would be helpful to update the public on the success (or failure) of management actions during the interim.

GREEN CAY NWR, ST. CROIX

Fish and Wildlife Population Management

- Promoting recovery of the brown pelican by protecting and enhancing nesting and roosting sites on the island.

- Promotion of nesting habitat for shorebirds and seabirds such as the snowy and Wilson's plover, the least tern and the American oystercatcher.

- Promoting nesting birds by rat control, baseline surveys and searches.

- Conducting status surveys for reptile and amphibian species of special concern.

- Determining the species of bats present on the refuge and their habitat requirements.

- The need to eliminate rats from the island to help with reforestation, pelicans, and the St. Croix ground lizard.

- Monitor and inventory for brown pelicans, the St. Croix ground lizard, and reforestation (i.e., measuring success of reforestation efforts).

- Endangered species, final refuge of non-endangered species extirpated by human activities elsewhere; loss of other insular refuges to development.

- Continuation of monitoring and research of *Ameiva polops* (St. Croix ground lizard).

- Preserving marine fish is the most important issue facing the refuge, and the best way to address this is a no fishing area from Green Cay to Buck Island. We must have a fish recovery area.

Habitat Management

- Continuing reforestation efforts on Green Cay by planting seedlings and by rat control or eradication.

- Propagation of trees for reforestation in refuge nursery; provide assistance to community propagation projects.

- Because one must have a boat to reach it and because Green Cay has no sandy beaches, current management is probably sufficient to protect this critical habitat.

- Protection and enhancement of habitat for the threatened and/or endangered species for which the refuge was formed.

- Refuge should stress active habitat management, including restoration of native community and removal of non-native species.

Resource Protection

- Developing an Oil Spill and Hazardous Substances Contingency Plan for the refuge.

Visitor Services

- Whether or not to allow any visitation at all over the coming 15 years.

- How to reduce the number of occasional boaters, kayakers, and jet skiers who come ashore on an island that is closed to the public to protect the ground lizard and nesting pelicans.

- How to improve signage to make it clear to prospective visitors that the entire island, including seasonal beaches at the southern edge, is closed to the public.

- The refuge provides critical habitat for the endangered St. Croix ground lizard, and should remain off limits to the public if this species is to survive at the refuge.

- The ground lizard population is still very low and it would be inappropriate to increase public use of Green Cay because of the potential for damage of habitat and introduction of invasive animals and/or plants.

Refuge Administration

- Need more staff to enable more active management, e.g., removal of non-native species.
- Green Cay needs more boats patrolling the area which should be a “no fishing” zone.

BUCK ISLAND NWR, ST. THOMAS

Fish and Wildlife Population Management

- Conducting baseline surveys and searches for seabirds.
- Conducting status surveys for reptile and amphibian species of special concern.
- Determining the species of bats present on the refuge and their habitat requirements.
- Control or eradication of populations of alien invasive species.
- Conducting status surveys on plant species of special concern.
- Inventory and monitoring of nesting laughing gulls, tropicbirds, terns, sea turtles, boa, and rats.
- No active management of the Antillean skink or Puerto Rican racer, which are documented on Buck Island and currently listed or proposed for listing by VIDPNR.
- No active management of the magnificent frigatebird or the red-billed tropicbird, which are both species of concern in the Virgin Islands.
- Endangered species, final refuge of non-endangered species extirpated by human activities elsewhere; loss of other insular refuges to development.
- Monitor and research *Alsophis portoricensis* (Puerto Rican racer) and *Mabuya sloanii* (Antillean skink).
- Preserving marine fish is the most important issue facing the refuge, and the best way to address this is a no fishing area from Green Cay to Buck Island. We must have a fish recovery area.

Habitat Management

- Promotion of nesting habitat for shorebirds such as the snowy and Wilson’s plover, and the American oystercatcher.
- Promotion of foraging habitat for transient and wintering species of shorebirds.
- Restoring the structure, function and diversity of dry forest habitat.
- Evaluation of past forest cover and propagation of appropriate species of trees.
- Inventory and monitoring of reforestation efforts.

Resource Protection

- Promotion of predator control, primarily of rats, to increase use of now abandoned areas by seabirds.
- Developing an Oil Spill and Hazardous Substances Contingency Plan for the refuge.
- Human encroachment and pollution are the most important issue facing Buck Island.
- Human encroachment and pollution should be addressed by educating the public and beefing up enforcement and patrolling the refuge.

Visitor Services

- Evaluation of refuge use and projects for potential impacts to off-refuge marine habitats (i.e., coral reefs) in the immediate vicinity of Buck Island.
- During peak months, the waters surrounding Buck Island host many hundreds of visitors daily, but these visitors are unaware that they are even close to a national wildlife refuge.
- Opportunities exist for partnering with tour operators, who have a vested interest in the quality of habitat and opportunities for wildlife observation on Buck Island.
- The potential for providing public use opportunities visitors actually landing on and exploring Buck Island, e.g. marked trail(s), the historic lighthouse, interpretive and wayfinding signage.
- Buck Island could offer more educational opportunities. Options include informational leaflet/pamphlet on seabirds and reptiles to disseminate through tour operators; training of tour operators, or kiosks/signage on island, or visitor's center at lighthouse. Trail should be maintained to keep visitors channeled.
- Establish and maintain educational aspect at Buck Island NWR over the next 15 years.
- Current use of Buck Island NWR is appropriate.

Refuge Administration

- The lack of a Service management and enforcement presence on the refuge, which is managed by staff at Sandy Point NWR on St. Croix some distance away.
- The absence of a Service presence on Buck Island and on St. Croix contributes to ignorance of the national wildlife refuge and its significance.
- Due to the proximity of Capella Island and Buck Island (which may touch each other at low tide), there are opportunities for collaborative management between the Service and the VIDPNR, Division of Fish and Wildlife.
- Need more staff to enable more active management (e.g., removal of non-native species).
- Buck Island needs more boats patrolling the area which should be a "no fishing" zone.

DRAFT PLAN COMMENTS AND SERVICE RESPONSES

Comments on the Draft CCP/EA were received from the following individuals and organizations:

SANDRA MACPHERSON, REGIONAL AND NATIONAL SEA TURTLE COORDINATOR, U.S. FISH AND WILDLIFE SERVICE

Ms. MacPherson made numerous editorial comments and suggested changes to wording and phrasing in the Draft CCP. These were incorporated wherever possible into the Final CCP.

ZANDY HILLIS-STAR, RESOURCE MANAGEMENT SPECIALIST, NATIONAL PARK SERVICE, BUCK ISLAND REEF NATIONAL MONUMENT, ST. CROIX

Ms. Hillis-Star made hundreds of editorial comments and suggested changes to wording and phrasing in the Draft CCP. These were incorporated wherever possible into the Final CCP.

OLASEE DAVIS, EXTENSION ASSISTANT PROFESSOR/EXTENSION SPECIAL NATURAL RESOURCES, UNIVERSITY OF THE VIRGIN ISLANDS

Sandy Point NWR Land Protection and Conservation

Mr. Davis made the following suggestions:

1. Create walking trails within the appropriate areas of the refuge to educate the public about the connection between the marine and terrestrial environment.
2. Identify key plant species along the trail route.
3. Strategically post a large map on the refuge showing direction of the trail route.

Service response: These suggestions have each been incorporated into the CCP as strategies under Sandy Point Objective 4-4 (Environmental Education and Interpretation).

Green Cay NWR Land Protection and Conservation

Mr. Davis made the following suggestions:

1. Partner with Green Cay Marina and hotels in the area by providing them with fact sheets and brochures of the refuge.
2. Placement of informational stands, booths, or kiosks inside and outside of the business establishment is a good enforcement of the conservation and protection of the refuge.
3. Placement of signs on the refuge that are visible to all visitors. These signs should be large and readable.
4. Coastal signs should be placed in appropriate areas along the northeast beaches of the island such as Chenay Bay and Shoy Beach. This is another way of educating the public about the refuge.
5. Place signs along Route 82 (East End Road) starting from the Buccaneer entrance to the Chenay Bay Hotel area.
6. All dive shops/marinas should have some information about the Green Cay refuge. This can be in the form of fact sheets, brochures, or large signs posted within the establishment.
7. Large signs of the Green Cay refuge should be posted at the airport and Sea plane area.

Service response: These suggestions have each been incorporated into the CCP as strategies (in modified form) under Green Cay Objective 4-1 (Outreach and Education).

Buck Island NWR Land Protection and Conservation

Mr. Davis made the following suggestions:

1. Post a kiosk on the island describing the history and purpose of the refuge.
2. Post signs depicting the destruction caused by rats and the effect it has on the terrestrial environment and bird life. Hopefully, this will discourage people from dumping trash on the island. I believe when visitors find out how destructive rats are to the refuge environment, they would probably become a protector of the Buck Island NWR.
3. Post signs of some species of birds, especially endangered and threatened species.
4. Partner with marinas and hotels on St. Thomas by providing them with information for visitors/locals.
5. Post a sign at the St. Thomas airport depicting the history of the refuge and the protection of wildlife.
6. Signage depicting its history should be posted near the historic lighthouse.
7. Partner with the Virgin Islands Eco-tours. It is a company that conducts kayak, hike, and snorkeling at the Mangrove Lagoon on St. Thomas. Their website and toll free phone number are viecotour.com and 1-877-845-2925.

Service response: These suggestions have each been incorporated into the CCP as strategies (in modified form) under Buck Island Objective 4-1 (Outreach and Education).

Sandy Point NWR Fish and Wildlife Population Management

Mr. Davis made the following suggestions to assist with brown pelican recovery (Objective 1-5):

1. Post signs near or in the direction of where the Brown Pelican roost. Hopefully, the information posted will discourage the public from disturbing roosting sites.
2. Signs must be large, readable, explaining or describing why the roosting sites are important to the survival of the endangered species of the Brown Pelican. I think once the signs have some kind of explanation rather than just depicting “Brown Pelican protected area” the public will yield to the warning.
3. A kiosk or information bulletin board placed outside the refuge boundaries might improve the public knowledge of the area. Work with the Park and Recreational Department who manages the pool west of the refuge. Also, conduct meetings or workshops with the Park and Recreational staff to educate them about the refuge.

Service response: These suggestions have each been incorporated into the CCP as strategies (in modified form) under Sandy Point Objective 1-5 (Brown Pelican Recovery).

Sandy Point Objective 1-9 Bats

Mr. Davis indicated that a survey on bats was conducted on St. Thomas and St. John and a few off-island Cays. The final draft of the project was sent out early in 2009. It was conducted by the Island Resources Foundation located on St. Thomas, and was funded by the Wildlife Restoration Grant W-22-3 from the Service to DPNR. The project was prepared by Kevel Lindsay, Jean-Pierre Bacle, and Gary Kwiecinski.

Mr. Davis suggested that contact be made with DPNR to determine the best way to conduct the survey of bats on the refuge. However, this depends on the objectives for the project.

Service response: This information has been incorporated into the discussion under Sandy Point Objective 1-9 (Bats) and the suggestion on contacting DPNR on the best way to survey bats on the refuge has been included among the strategies under this objective.

Public Relationship

Mr. Davis offered two additional suggestions on ways to increase public awareness about the Sandy Point NWR:

1. Create an advertisement campaign by working with local businesses to print T-shirts, cups, etc. for sale, featuring the sea turtle with the Sandy Point logo. The items can be sold at local stores on all three major U.S. Virgin Islands.
2. Radio/TV talk shows can be another medium for promoting public awareness regarding the refuge.

Service response: These suggestions have been included as strategies under Sandy Point Objective 4-4 (Environmental Education and Interpretation).

Miscellaneous

Mr. Davis indicated that his office is always available to assist the refuge. He commented that it is important that the public be made to understand that the refuge belongs to the people of these islands. Education is the key and working with the public is the best approach to managing the refuge.

Service response: Comment acknowledged. Refuge and Service staff appreciates Mr. Davis' suggestions to this CCP and his contributions to raising public awareness among St. Croix residents about the refuge.

SARAH JAFFURS

Comment: I am a 30-year resident of St. Croix. I believe that the handling of these natural reserves has been excellent over the years. It is evident to me that the leadership has been effective, and I hope the guidelines will remain the same or similar as they have been in the past. Everyone has a great deal of respect for the national reserves here and around the globe. I know ours here are in good hands. Thank you.

Service response: Comment acknowledged. Refuge and Service staff thanks Ms. Jaffurs for taking the time to express her sentiments. The "guidelines" or guidance (goals and objectives) in this CCP are similar to those which have guided the refuge from its establishment to the present.

PAUL FRIESEMA

Comment: Please send me a paper copy of the draft comprehensive conservation plan and environmental assessment (Draft CCP/EA) for Buck Island, Green Cay, and Sandy Point NWR, USVI. And please keep me on the mailing list for the final documents.

Service response: Comment acknowledged.

THOMAS MOORE

Comment: I would like to have a hard copy.

Service response: Comment acknowledged.

PAUL CHAKROFF, EXECUTIVE DIRECTOR, ST. CROIX ENVIRONMENTAL ASSOCIATION

Comment: SEA applauds the high level of opportunity for input afforded the community throughout the process of drafting the Plan and EA. The resulting document is reflective of concerns raised by the community and the need to balance wildlife protection with sustainable human uses.

Service response: Comment acknowledged.

Comment: SEA endorses proposed Alternative D: Enhanced Biological and Visitor Service Programs for Sandy Point NWR. This option provides new opportunities for the community to experience the refuge while insuring the protection of sea turtles and other wildlife. The increase in knowledge to be gained from increased surveys of reptiles, amphibians, mammals and invertebrates has potential to benefit wildlife and the community at large and will better inform refuge management. Expansion of environmental education and interpretive opportunities as well as increased fishing and beach access will serve a need expressed during public meetings. Provision of adequate law enforcement presence will be critical to prevent increase in criminal activity.

Service response: The Service concurs with this endorsement and selected Alternative D as its preferred management alternative for Sandy Point NWR. Objectives associated with Alternative D served as the basis for the CCP.

Comment: SEA is eager to continue and expand partnership opportunities with refuge staff, in particular participation in sea turtle education programs and ongoing and proposed wildlife monitoring activities. SEA's environmental education program would likely make use of the proposed visitor center and interpretive trails.

Service response: The Service also looks forward to continuing and deepening the productive partnership between SEA and the refuge.

Comment: SEA endorses proposed Alternative B for Green Cay NWR. SEA has particular interest in Green Cay NWR because of its proximity to SEA's Southgate Coastal Reserve property and the shared use of these properties by some birds, particularly the brown pelican, white-crowned pigeon and white-cheeked pintail.

Service response: The Service concurs with this endorsement and selected Alternative B as its preferred management alternative for Green Cay NWR. Objectives associated with Alternative B served as the basis for the CCP.

Comment: SEA is interested in continuing and expanding partnership opportunities at this refuge. We agree that closing the refuge to the public is necessary for protection of the endangered St. Croix ground lizard.

Service response: Comment acknowledged.
Comment: SEA is less familiar with the resources and current programs at Buck Island NWR. However, we support proposed Alternative B because of the increase of wildlife monitoring, invasive species control, and education and interpretation programs.

Service response: The Service concurs with this endorsement and selected Alternative B as its preferred management alternative for Buck Island NWR. Objectives associated with Alternative B served as the basis for the CCP.

JUDY PIERCE, VIRGIN ISLANDS DEPARTMENT OF PLANNING AND NATURAL RESOURCES

Comment: P. 24, pp 2: "The island currently provides nesting habitat for the magnificent frigatebird" is wrong – no MAFR nesting. Might add that a few Sooty Terns have nested here since rat eradication (JP personal observation).

Service response: Comment acknowledged. This correction has been made in the text of the CCP.

Comment: P. 25 pp 2: The 2 separate planning efforts in the DFW plan should be separated out into a fisheries plan and a wildlife plan and not necessarily the funding as the plan covers all fish and wildlife, even those not covered under current DFW funding.

Service response: Comment noted.

Comment: P. 39, last pp: "The PR Racer is believed to be a subspecies found only on Buck Island". How do we know this? Sub-species that occurs on Buck Island (*Alsophis portoricensis nicholsi*).

Service response: Comment noted. The misspelling has been corrected and the sentence has been re-worded.

Comment: P. 51, Birds pp: …other threatened or endangered sp occurring or potentially occurring at Sandy Pt. lists Roseate Tern. Has the ROST ever been sighted at Sandy Pt.??

Service response: Appendix VII, the Intra-Service Section 7 Biological Evaluation, states that "presence of this species [is] not yet documented at Sandy Point." In Chapter II of the CCP, the roseate tern was included as in a list of "threatened or endangered species occurring or *potentially occurring* at Sandy Point NWR" [emphasis added].

Comment: P. 52, Caribbean Roseate Tern: "Post-breeding movements of Caribbean Roseate Terns are poorly known." Actually, thanks to our banding program, post-breeding movement of terns has been documented from Brazil where they intermix with Northeastern Roseate Terns.

Service response: Thank you for calling this to the Service's attention. The text has been revised to reflect this additional information on the Caribbean Roseate Tern's post-breeding movement.

Comment: P. 94, Resource Protection of Buck Island: I would add that signage is needed to let visitors know what the rules are – need to protect the seabird colony – maybe consider seasonable closure from May – August.

Service response: These suggestions have been added as strategies to Buck Island Objective 4-1 on Outreach and Education.

Comment: P. 131: Visitor Services – Buck Island Goal 4: "…and its crucial role in saving a critically endangered species"? What ES are they talking about? Maybe got mixed up with Green Cay?

Service response: As indicated in Chapter II of the CCP, threatened or endangered species (federally and/or territorially listed) occurring or potentially occurring at Buck Island NWR include the brown pelican (recently delisted), Caribbean roseate tern, peregrine falcon, slippery back skink, Puerto Rican racer, and wooly nipple cactus. Buck Island Goal 4 has been modified to read: "…its crucial role in saving threatened and endangered species."

Comment: By my estimates, the Buck Island Laughing Gull colony is approx. the 5th largest in the VI.

Service response: Comment noted.

Appendix V. Appropriate Use Determinations

Sandy Point, Green Cay and Buck Island National Wildlife Refuges Appropriate Use Determinations

An appropriate use determination is the initial decision process a refuge manager follows when first considering whether or not to allow a proposed use on a refuge. The refuge manager must find that a use is appropriate before undertaking a compatibility review of the use. This process clarifies and expands on the compatibility determination process by describing when refuge managers should deny a proposed use without determining compatibility. If a proposed use is not appropriate, it will not be allowed and a compatibility determination will not be undertaken.

Except for the uses noted below, the refuge manager must decide if a new or existing use is an appropriate refuge use. If an existing use is not appropriate, the refuge manager will eliminate or modify the use as expeditiously as practicable. If a new use is not appropriate, the refuge manager will deny the use without determining compatibility. Uses that have been administratively determined to be appropriate are:

- Six wildlife-dependent recreational uses - As defined by the National Wildlife Refuge System Improvement Act of 1997, the six wildlife-dependent recreational uses (hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation) are determined to be appropriate. However, the refuge manager must still determine if these uses are compatible.

- Take of fish and wildlife under state regulations - States have regulations concerning take of wildlife that includes hunting, fishing, and trapping. The Service considers take of wildlife under such regulations appropriate. However, the refuge manager must determine if the activity is compatible before allowing it on a refuge.

Statutory Authorities for this policy:

National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. §668dd-668ee. This law provides the authority for establishing policies and regulations governing refuge uses, including the authority to prohibit certain harmful activities. The Act does not authorize any particular use, but rather authorizes the Secretary of the Interior to allow uses only when they are compatible and “under such regulations as he may prescribe.” This law specifically identifies certain public uses that, when compatible, are legitimate and appropriate uses within the Refuge System. The law states “. . . it is the policy of the United States that . . .compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System . . .compatible wildlife-dependent recreational uses are the priority general public uses of the System and shall receive priority consideration in refuge planning and management; and . . . when the Secretary determines that a proposed wildlife-dependent recreational use is a compatible use within a refuge, that activity should be facilitated . . . the Secretary shall . . . ensure that priority general public uses of the System receive enhanced consideration over other general public uses in planning and management within the System . . . .” The law also states “in administering the System, the Secretary is authorized to take the following actions: . . . issue regulations to carry out this Act.” This policy implements the standards set in the Act by providing enhanced consideration of priority general public uses and ensuring other public uses do not interfere with our ability to provide quality, wildlife-dependent recreational uses.

Refuge Recreation Act of 1962, 16 U.S.C. 460k. The Act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.

Other Statutes that Establish Refuges, including the Alaska National Interest Lands Conservation Act of 1980 (ANILCA) (16 U.S.C. §410hh - 410hh-5, 460 mm - 460mm-4, 539-539e, and 3101 - 3233; 43 U.S.C. 1631 et seq.).

Executive Orders. The Service must comply with Executive Order 11644 when allowing use of off-highway vehicles on refuges. This order requires the Service to designate areas as open or closed to off-highway vehicles in order to protect refuge resources, promote safety, and minimize conflict among the various refuge users; monitor the effects of these uses once they are allowed; and amend or rescind any area designation as necessary based on the information gathered. Furthermore, Executive Order 11989 requires the Service to close areas to off-highway vehicles when it is determined that the use causes or will cause considerable adverse effects on the soil, vegetation, wildlife, habitat, or cultural or historic resources. Statutes, such as ANILCA, take precedence over executive orders.

Definitions:

Appropriate Use
A proposed or existing use on a refuge that meets at least one of the following four conditions.

1) The use is a wildlife-dependent recreational use as identified in the Improvement Act.
2) The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Improvement Act was signed into law.
3) The use involves the take of fish and wildlife under state regulations.
4) The use has been found to be appropriate as specified in section 1.11.

*Native American***.** American Indians in the conterminous United States and Alaska Natives (including Aleuts, Eskimos, and Indians) who are members of federally recognized tribes.

Priority General Public Use. A compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

Quality. The criteria used to determine a quality recreational experience include:

- Promotes safety of participants, other visitors, and facilities.
- Promotes compliance with applicable laws and regulations and responsible behavior.
- Minimizes or eliminates conflicts with fish and wildlife population or habitat goals or objectives in a plan approved after 1997.
- Minimizes or eliminates conflicts with other compatible wildlife-dependent recreation.
- Minimizes conflicts with neighboring landowners.
- Promotes accessibility and availability to a broad spectrum of the American people.
- Promotes resource stewardship and conservation.
- Promotes public understanding and increases public appreciation of America's natural resources and the Service's role in managing and protecting these resources.

- Provides reliable/reasonable opportunities to experience wildlife.
- Uses facilities that are accessible and blend into the natural setting.
- Uses visitor satisfaction to help define and evaluate programs.

*Wildlife-Dependent Recreational Use***.** As defined by the Improvement Act, a use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Buck Island National Wildlife Refuge

Use: Research, Investigation, Surveys, and Monitoring

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with Territorial fish and wildlife agency. **Yes** X **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ___ Appropriate X

Refuge Manager: Signed _____ Date 12 July 2010

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor: Signed _____ Date: 8/31/10

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Sandy Point National Wildlife Refuge

Use: Beachcombing, sunbathing, relaxing, playing, and swimming

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with Territorial fish and wildlife agency. **Yes** X **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ___ Appropriate X

Refuge Manager: Signed Date: 12 Feb 2010

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor: Signed Date: 8/31/10

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Green Cay National Wildlife Refuge

Use: Research, Investigation, Surveys, and Monitoring

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with Territorial fish and wildlife agency. **Yes** X **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ____ Appropriate X

Refuge Manager: Signed _____ Date: 12 Aug 2010

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor: Signed _____ Date: 8/31/10

A compatibility determination is required before the use may be allowed.

Refuge Name: Green Cay National Wildlife Refuge

Use: Commercial services supporting the six priority wildlife-dependent public uses

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with Territorial fish and wildlife agency. **Yes** X **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ___ Appropriate X

Refuge Manager: Signed ___ Date 12 Aug 2010

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor: Signed ___ Date: 8/31/10

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Buck Island National Wildlife Refuge

Use: Research, Investigation, Surveys, and Monitoring

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with Territorial fish and wildlife agency. **Yes** X **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ___ Appropriate X

Refuge Manager: Signed Date 12 July 2010

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor: Signed Date: 8/31/10

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Buck Island National Wildlife Refuge

Use: Commercial services supporting the six priority wildlife-dependent public uses

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with Territorial fish and wildlife agency. **Yes** X **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ____ Appropriate X

Refuge Manager: Signed ____ Date 12 July 2010

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor: Signed ____ Date: 8/31/10

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Buck Island National Wildlife Refuge

Use: Hiking and sightseeing on informal trails around island

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	x	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with Territorial fish and wildlife agency. **Yes** X **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ___ Appropriate X

Refuge Manager Signed Date 12 Aug 2010

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor: Signed Date: 8/31/10

A compatibility determination is required before the use may be allowed.

Appendix VI. Compatibility Determinations

COMPATIBILITY DETERMINATIONS FOR SANDY POINT NWR, ST. CROIX

Introduction: The Fish and Wildlife Service reviewed a number of uses for compatibility during the comprehensive conservation planning process for Sandy Point NWR. The descriptions and anticipated impacts of these uses are addressed separately. However, the "Uses" through "Public Review and Comment" sections and the "Approval of Compatibility Determinations" section apply to each use. If one of these uses is considered outside of the comprehensive conservation plan for Sandy Point NWR, then those sections become part of that compatibility determination.

Uses: The following uses were found to be appropriate and evaluated to determine their compatibility with the mission of the National Wildlife Refuge System (Refuge System) and the purposes of the refuge: (1) hunting; (2) fishing; (3) wildlife observation and photography; (4) environmental education and interpretation; (5) research, investigation, surveying, and monitoring; (6) beachcombing, sunbathing, relaxing, playing, and swimming; and (7) commercial services supporting the six priority wildlife-dependent public uses.

Refuge Name: Sandy Point NWR

Date Established: 1984.

Establishing and Acquisition Authority: Sandy Point NWR was established on August 30, 1984, for the protection of leatherback sea turtles. The Service purchased 340 acres from the West Indies Investment Company. Several other parcels totaling approximately 20 acres are in various stages of acquisition.

Refuge Purpose: The refuge was established "… to conserve (A) fish or wildlife which are listed as endangered species or threatened species …or (B) plants …" 16 U.S.C. 1534 (Endangered Species Act of 1973)

National Wildlife Refuge System Mission: The mission of the Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997, is:

> *to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.*

Other Applicable Laws, Regulations, and Policies:

Antiquities Act of 1906 (34 Stat. 225)
Migratory Bird Treaty Act of 1918 (15 U.S.C. 703-711; 40 Stat. 755)
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
Migratory Bird Hunting Stamp Act of 1934 (16 U.S.C. 718-178h; 48 Stat. 451)
Criminal Code Provisions of 1940 (18 U.S.C. 41)
Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; 54 Stat. 250)
Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat.1119)
Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

Wilderness Act (16 U.S.C. 1131; 78 Stat. 890)
Land and Water Conservation Fund Act of 1965
National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, et seq.; 80 Stat. 915)
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd, 668ee; 80 Stat. 927)
National Environmental Policy Act of 1969, NEPA (42 U.S.C. 4321, et seq; 83 Stat. 852)
Use of Off-Road Vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq; 87 Stat. 884)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
National Wildlife Refuge Regulations for the Most Recent Fiscal Year (50 CFR Subchapter C; 43 CFR 3101.3-3)
Emergency Wetlands Resources Act of 1986 (S.B. 740)
North American Wetlands Conservation Act of 1990
Food Security Act (Farm Bill) of 1990 as amended (HR 2100)
The Property Clause of the U.S. Constitution Article IV 3, Clause 2
The Commerce Clause of the U.S. Constitution Article 1, Section 8
The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, U.S.C. 668dd)
Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System, March 25, 1996
Title 50, CFR, Parts 25-33
Archaeological Resources Protection Act of 1979
Native American Graves Protection and Repatriation Act of 1990

Public Review and Comment: The compatibility determinations for Sandy Point NWR were part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for the Virgin Island Refuges, consisting of Sandy Point, Green Cay, and Buck Island National Wildlife Refuges. The availability of the Draft CCP/EA was announced in the *Federal Register* on September 17, 2009 (74 FR 47815) for a 30-day review and comment period. Copies of the Draft CCP/EA were posted at refuge headquarters and area locations, and copies were distributed to adjacent landowners, the general public, and local, island territory, and federal agencies.

Description of Use: *Hunting*

White-tailed deer occur on Sandy Point NWR and could be hunted as part of an island-wide effort to control the population of this ungulate.

Availability of Resources: Law enforcement presence is insufficient to manage this use in a safe manner.

Anticipated Impacts of the Use: In terms of a beneficial impact, this use could help control the number of white-tailed deer when their population becomes excessive, which, in turn, could help reduce potential damage to habitat that occurs when deer (or any herbivore) exceed their carrying capacity. However, other anticipated impacts are potentially adverse, including risks to public safety, trespass on neighboring property, minor habitat damage, litter, and disturbance of other indigenous wildlife, including sensitive species.

Determination (check one below):

__X__ Use is Not Compatible

_____ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: N/A

Justification: Hunting is one of the six wildlife-dependent, priority public uses of national wildlife refuges cited in the National Wildlife Refuge System Improvement Act of 1997, and was automatically considered an appropriate use of the refuge. However, it is incompatible with the purposes of Sandy Point NWR because of the refuge's very small size; insufficient law enforcement resources (staffing and budget); safety and security concerns for visitors, nearby residents, and staff; and potential risks to indigenous and endangered nongame species.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Fishing*

On Sandy Point NWR, fishing consists of surf fishing in the ocean. There is no freshwater sport fishing on the refuge and no fishing in the West End Salt Pond.

Availability of Resources: Minimal oversight would be necessary.

Anticipated Impacts of the Use: As one of the priority wildlife-dependent public uses identified in the National Wildlife Refuge System Improvement Act of 1997, fishing was automatically considered an appropriate use of the refuge. Anticipated impacts of this use include some litter and minor wildlife disturbance. Wildlife disturbance is generally limited to flushing individual or groups of feeding or resting wading birds, raptors, or seabirds to other locations on the refuge. Anticipated impacts on nesting sea turtles is negligible, because adults nest and hatchlings emerge from nests at night, after permitted fishing hours.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: Surf fishing from the shore will be permitted during open hours from 10 a.m. to 4 p.m. on weekends, when the refuge is open to the visiting public. The refuge will not normally be open to fishing during regular closed hours, including the seasonal closure that is intended to protect nesting sea turtles. However, fishing may be allowed during closed hours when it is part of a designated fishing program that is supervised or monitored by refuge staff, or is part of a fish monitoring or research program. Refuge staff will consider opening the refuge to shoreline fishing at other times, such as between 9 a.m. and 5 p.m., outside of the seasonal closure for turtle nesting. Refuge staff will work informally with anglers to ensure that they are abiding by refuge rules and conservation principles. The staff will also ensure that anglers pick up after themselves and do not leave behind line, hooks, and other tackle that are hazards to wildlife and other beach users, as well as an eyesore for the refuge. Management will establish a permit system for people wishing to fish on the refuge. If refuge beaches are opened to surf fishing during the week, the staff will conduct periodic patrols to establish a refuge and law enforcement presence.

Justification: Sport fishing is a priority public use identified in the Improvement Act and is generally considered compatible with national wildlife refuges. It represents a form of consumptive outdoor recreation that puts its practitioners into intimate contact with nature and wildlife, including fish, and it can be conducted with minimal adverse impacts on other important refuge resources and public uses.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Wildlife Observation and Photography*

Wildlife observation and photography have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses, provided they are compatible with the purposes of the refuge. This compatibility determination applies only to personal wildlife observation and photography. Commercial photography or videography, if allowed, would be covered under the Commercial Services compatibility determination and would require a special use permit by the refuge with specific restrictions.

Existing opportunities for wildlife observation and photography at Sandy Point NWR include controlled observation of nesting turtles and hatchlings as well as limited, largely informal opportunities for bird watching. In addition, all refuge visitors have casual opportunities for observing wildlife, ranging from marine mammals to termites.

Availability of Resources: In the case of turtle watching, refuge staff, part-time or temporary employees, and partners are capable of providing the needed presence to protect nesting and hatching leatherback turtles.

Anticipated Impacts of the Use: There is always the potential for disturbance of sensitive native wildlife, and even the potential for inadvertent direct harm, such as accidental trampling of ground-nesting bird or turtle nests, eggs, and hatchlings. Beneficial impacts include increasing personal knowledge of and appreciation for the refuge's wildlife species.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: With regard to turtle watching, continue to rigorously follow existing protocols when leading groups of visitors onto the beach to observe nesting females. These protocols include: limiting group size; each group is accompanied by a trained staff person, partner, or volunteer; group leader explains rules prior to leading group onto beach; no lights or photography permitted; and leader strictly controls movement of group and proximity to turtles. General wildlife observation and photography may be undertaken by visitors at all places on the refuge at permitted times (generally outside of the peak leatherback sea turtle nesting season).

Justification: Wildlife observation and photography are two of the priority wildlife-dependent public uses identified in the Improvement Act and generally considered compatible with national wildlife refuges. They represent non-consumptive outdoor recreation that put their practitioners into intimate contact with nature and wildlife, and they can be conducted with minimal adverse impacts on other important refuge resources and public uses.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Environmental Education and Interpretation*

Environmental education and interpretation have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses, provided they are compatible with the purposes of the refuge.

The refuge's existing environmental education and interpretation efforts include the very active turtle watch education program as well as periodic environmental education on- and off-refuge. A number of partners, both individuals and groups (agencies and non-governmental organizations), actively collaborate with the Service in providing environmental education and interpretation services. The new refuge headquarters, recently opened in 2007 near the southeast corner of the refuge, provides a base for expanding on-refuge environmental education and interpretation. Exhibits and materials will be available inside, and in the immediate vicinity the refuge may develop a short nature trail or other exhibits. The proposed observation deck and trail leading to it also represent an excellent

opportunity to provide additional environmental education and interpretation, including at the parking area, along the trail, and at the deck itself.

Availability of Resources: In the case of turtle watching, refuge staff, part-time or temporary employees, and partners are capable of providing the needed presence to protect nesting and hatching leatherback sea turtles while providing environmental education and interpretation.

Anticipated Impacts of the Use: There is some small potential for disturbance of sensitive native wildlife, and even the potential for inadvertent, direct harm, such as accidental trampling of ground-nesting bird or turtle nests, eggs, and hatchlings. Beneficial impacts include augmenting personal knowledge of and appreciation for the refuge's wildlife species, to include management's role in perpetuating and recovering those species and in maintaining and restoring the habitats and conditions upon which they depend.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: With regard to the turtle watch interpretative program, we will continue to rigorously follow existing protocols when leading groups of visitors onto the beach to observe nesting females. These protocols include: limiting group size; each group is accompanied by a trained staff person, partner, or volunteer; group leader explains rules prior to leading group onto beach; no lights or photography permitted; and leader strictly controls movement of group and proximity to turtles. Other environmental education and interpretation programs may be conducted at other places and times on the refuge by staff or refuge partners (e.g., non-governmental organizations, educational institutions, and other agencies).

Justification: Environmental education and interpretation are two of the priority wildlife-dependent public uses identified in the Improvement Act and are generally considered compatible with national wildlife refuges. They represent a form of non-consumptive outdoor recreation that puts its practitioners into intimate contact with nature and wildlife, including fish, and they can be conducted with minimal adverse impacts on other important refuge resources and public uses.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Research, Investigation, Surveying, and Monitoring*

Research, investigation, surveying, and monitoring are the planned, organized, and systematic gathering of data to discover or verify facts about biotic and abiotic resources on the refuge.

Monitoring implies a regularity of data collection to establish baseline conditions and long-term trends in some key variable, such as the size of a population over time. Surveys involve the use of standardized and scientifically valid techniques and methodologies in the field to derive estimates of the abundance and distribution of flora and fauna of interest.

In principle, any of these information-generating activities conducted on the refuge by universities, cooperative units, nonprofit organizations, and other research entities furthers refuge management and serves the purposes, vision, goals, and objectives of the refuge. The refuge hosts research from various research institutions supported by other non-governmental organizations.

All research activities, whether conducted by governmental agencies, public research entities, universities, private research groups, or any other entity, shall be required to obtain special use permits from the refuge. All research activities will be approved and overseen by the refuge manager.

Availability of Resources: The refuge has sufficient managerial resources to prepare and administer special use permits to conduct research, investigations, surveying, and monitoring.

Anticipated Impacts of the Use: Generally, adverse impacts from research, investigation, surveying, and monitoring are minimal. Occasionally, slight or temporary wildlife or habitat disturbances may occur (e.g., minor compression or trampling of covered turtle nests may occur when researchers move along the beach). However, these impacts are not significant, nor are they permanent. Also, a small number of individual plants or animals might be collected for further scientific study, but these collections are anticipated to have minimal impact on the populations from which they were derived. All collections will adhere to the Service's specimen collection. The data and information generated by research, investigation, surveying, and monitoring are often considered crucial to adaptive resource management and appropriate decision-making.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: Projects that are fish and wildlife management oriented, which will provide needed information to refuge operation and management, will receive priority consideration and will even be solicited. All research conducted on the refuge must further the purposes of the refuge and the mission of the National Wildlife Refuge System. All research will adhere to established refuge policy on collecting specimens. To ensure that research activities are compatible, the refuge requires that a special use permit be obtained before any research activity may occur.

Research proposals and/or research special use permit applications must be submitted in advance of the activity to allow for review by refuge staff to ensure minimal impacts to the resources, staff, and programs of the refuge. Each special use permit may contain conditions under which the research will be conducted. Each special use permit holder will submit annual reports to update the refuge on research activities, progress, findings, and other information. Further, each special use permit holder will provide copies of findings, final reports, publications, and/or other documentation at the end of each project.

The refuge will deny permits for research proposals that are determined to not serve the purposes of the refuge and the mission of the National Wildlife Refuge System. The refuge will also deny permits for research proposals that are determined to negatively impact resources or that materially interfere with or detract from the purposes of the refuge. All research activities are subject to the conditions of their permits.

Justification: Research activities provide important benefits to the refuge and to the natural resources supported by the refuge. Supporting management, research conducted on the refuge can lead to new discoveries, new facts, verified information, and increased knowledge and understanding of resource management, as well as track current trends in fish and wildlife habitat and populations to enable better management decisions. Research has the potential to advance the purposes of the refuge and the mission of the National Wildlife Refuge System.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: 02/23/2019

Description of Use: *Beachcombing, Sunbathing, Relaxing, Playing, and Swimming*

These activities are the most popular public activities at Sandy Point NWR, judged by the number of participants who participate in them. Sandy Point is the largest beach on St. Croix, and many islanders also believe it is the best beach, when considering its broad width, the quality of its sand, and the character of its adjacent water and waves. Every year thousands of residents and tourists visit the refuge's beaches to beachcomb, sunbathe, and swim.

Availability of Resources: At present the refuge only has sufficient staffing resources to open the beach for six hours each on Saturday and Sunday. It is crucial that collateral law enforcement staff patrol the beach when visitors are present, both to provide a sense of security and safety to visitors (because both violent and property crime were serious problems earlier) and to remind visitors that they are guests on a national wildlife refuge that is conserving important and sensitive wildlife resources.

Anticipated Impacts of the Use: Beach use may potentially disturb sensitive native wildlife, and also has the potential for inadvertent, direct harm, such as accidental trampling of ground-nesting bird or turtle nests, eggs, and hatchlings. Beach use will also increase the amount of aesthetically and environmentally damaging litter left on the refuge.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: The beach will be open to the public from 10 a.m. to 4 p.m. on Saturday and Sunday only, until or unless additional staffing is provided to secure public safety, at which time the open periods may be increased to other days of the week and maybe longer hours. In the meantime, the refuge will be closed to the public: (1) during peak leatherback nesting season; (2) during evening and night-time hours; and (3) from Monday-Friday year-round (until additional staffing can be provided).

Justification: These beach activities have traditionally been carried out at Sandy Point by local residents since before establishment of the refuge. Allowing the public access to the refuge's beaches at times and in a manner that minimizes adverse effects on nesting turtles and other wildlife is important

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: 02/23/2019

Description of Use: *Commercial services supporting the six priority wildlife-dependent public uses*

While not one of the six priority wildlife-dependent recreational uses named in the National Wildlife Refuge System Improvement Act of 1997, commercial services could potentially support wildlife viewing, interpretation, and environmental education and interpretation at Sandy Point NWR, as they do in many other national wildlife refuges around the United States.

The refuge would authorize commercial services through the issuance of special use permits. For the purpose of this document, a commercial provider is defined as a permittee who charges a client a fee for a program or service to generate a profit. This does not include individuals who perform these services for no fee, not-for-profit groups, schools, colleges, or other governmental agencies. This activity would provide recreational and educational opportunities for members of the public who desire a quality wildlife-dependent experience, but who may lack the necessary equipment, skills, knowledge, ability, or resources to obtain it themselves.

Potential commercial services on the refuge could include: motor vehicle tours; bird watching and turtle watching; boat, canoe and kayak tours; and filmmaking and professional photography or videography. Except for the fee charged to the customer by the commercial provider, or the payment to professional photographers or documentary filmmakers by the purchasers of their products, the impacts associated with these activities would not be different than other activities already occurring on the refuge. The named activities covered by this compatibility determination are similar to the activities covered by the wildlife observation and photography and environmental education and interpretation compatibility determinations, but this compatibility determination would provide additional guidance specific to commercial services.

As proposed, some commercial services would be permitted in the open areas of the refuge under a special use permit. Interpretive training and further guidelines may be developed and required in the future. Currently, no administrative facilities for the providers of these commercial services are planned for the refuge.

Availability of Resources: The program costs to refuge operations would include, but not be limited to, development and review of policy and procedure, administration of annual or one-time special use permits (e.g., addressing inquires, screening applicants, checking on insurance, and issuing permits), and enforcement and monitoring of permit holders. However, the size and scope of the program and number of permits issued would have to be balanced with the permit fee. Existing facilities, such as the refuge office, access road, and access routes to the beaches, could accommodate small-scale commercial services.

Anticipated Impacts of the Use: To date, there are no commercial service programs on the refuge. Guided tour activities might possibly conflict with other refuge visitors. For example, commercial tours would use the same areas as other visitors engaged in wildlife observation, photography, and interpretation. Unregulated, commercial operations could adversely affect the safety of other visitors and the quality of their experience, and could contribute to wildlife disturbance.

As in the case of wildlife observation and photography, commercial services in support of wildlife-dependent public uses always have the potential for disturbance of sensitive native wildlife, and even the potential for inadvertent, direct harm, such as accidental trampling of ground-nesting bird or turtle nests, eggs, and hatchlings. Beneficial impacts include increasing the public's knowledge of and appreciation for the refuge's wildlife species.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: Commercial operators shall be permitted only in the areas and at times open to the public. Seasonal or permanent closures in certain areas may be imposed on commercial operators if the level of use becomes excessive, conflicts occur with other users engaged in priority wildlife-dependent recreation, or wildlife impacts occur. In the future, interpretive training and other stipulations may be required of commercial operators to help the refuge achieve its outreach and educational objectives.

The fee for annual commercial use permits is $250. These fees are anticipated to be increased as the cost for administering the program increases. Commercial service providers would follow all refuge regulations along with additional special conditions stipulated in their permits. The following special conditions would be common to most commercial service providers:

- The permittee would provide proof of general liability insurance in the amount of $300,000.
- If using a boat, the permittee would provide proof of a Coast Guard Captain's license.
- The provider would supply the refuge with his/her fee schedule charged per client.
- The provider would supply the refuge with the number of trips provided per year (this would include the number of clients).
- A special use permit could be revoked for failure to comply with all conditions or for repeat violations of refuge regulations.

- Boat, canoe, and kayak tours would be permitted to use all designated launch sites. Tour routes would be approved in the permit. A concessionaire permit would be required for any tour operator accessing refuge lands.
- Filmmaking and professional photography would be permitted on a case-by-case evaluation.

Justification: Commercial operations could support wildlife observation and photography and environmental education and interpretation. Further, they could provide recreational and educational opportunities for members of the public who desire a quality wildlife-dependent experience, but who may lack the necessary equipment, skill, knowledge, ability, or resource to obtain it themselves. Providing opportunities for these activities would contribute toward fulfilling provisions of the Improvement Act. The stipulations outlined above should minimize potential impacts relative to wildlife/human interactions. At the current level of visitation, commercial operations would not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the refuge.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 10-Year Re-evaluation Date: 02/23/2019

COMPATIBILITY DETERMINATIONS, GREEN CAY NWR, ST. CROIX

Introduction: The Fish and Wildlife Service reviewed a number of uses for compatibility during the comprehensive conservation planning process for Green Cay NWR. The descriptions and anticipated impacts of these uses are addressed separately. However, the Uses through Public Review and Comment sections and the Approval of Compatibility Determinations section apply to each use. If one of these uses is considered outside of the comprehensive conservation plan for Green Cay NWR, then those sections become part of that compatibility determination.

Uses: The following uses were found to be appropriate and evaluated to determine their compatibility with the mission of the Refuge System and the purposes of the refuge: (1) hunting; (2) fishing; (3) wildlife observation and photography; (4) environmental education and interpretation; (5) research, investigation, surveying, and monitoring; and (6) commercial services supporting the six priority wildlife-dependent public uses.

Refuge Name: Green Cay NWR

Date Established: 1977

Establishing and Acquisition Authority: The refuge was purchased from Mrs. Virginia Bright on December 15, 1977, in order to protect the endangered St. Croix ground lizard. Green Cay NWR is 2.5 miles east of the town of Christiansted, St. Croix, U.S. Virgin Islands, and consists of the entire 14-acre island.

Refuge Purpose: The refuge was established "… to conserve fish or wildlife which are listed as endangered species or threatened species …" 16 U.S.C. 1534 (Endangered Species Act of 1973)

National Wildlife Refuge System Mission: The mission of the Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997, is:

> *to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.*

Other Applicable Laws, Regulations, and Policies:

Antiquities Act of 1906 (34 Stat. 225)
Migratory Bird Treaty Act of 1918 (15 U.S.C. 703-711; 40 Stat. 755)
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
Migratory Bird Hunting Stamp Act of 1934 (16 U.S.C. 718-178h; 48 Stat. 451)
Criminal Code Provisions of 1940 (18 U.S.C. 41)
Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; 54 Stat. 250)
Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat.1119)
Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)
Wilderness Act (16 U.S.C. 1131; 78 Stat. 890)
Land and Water Conservation Fund Act of 1965
National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, et seq.; 80 Stat. 915)
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd, 668ee; 80 Stat. 927)
National Environmental Policy Act of 1969, NEPA (42 U.S.C. 4321, et seq; 83 Stat. 852)

Use of Off-Road Vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq; 87 Stat. 884)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
National Wildlife Refuge Regulations for the Most Recent Fiscal Year (50 CFR Subchapter C; 43 CFR 3101.3-3)
Emergency Wetlands Resources Act of 1986 (S.B. 740)
North American Wetlands Conservation Act of 1990
Food Security Act (Farm Bill) of 1990 as amended (HR 2100)
The Property Clause of the U.S. Constitution Article IV 3, Clause 2
The Commerce Clause of the U.S. Constitution Article 1, Section 8
The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, USC668dd)
Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System, March 25, 1996
Title 50, CFR, Parts 25-33
Archaeological Resources Protection Act of 1979
Native American Graves Protection and Repatriation Act of 1990

Public Review and Comment: The compatibility determinations for Sandy Point NWR were part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for the Virgin Island Refuges, consisting of Sandy Point, Green Cay, and Buck Island National Wildlife Refuges. The availability of the Draft CCP/EA was announced in the *Federal Register* on September 17, 2009 (74 FR 47815) for a 30-day public review and comment period. Copies of the Draft CCP/EA were posted at refuge headquarters and area locations, and copies were distributed to adjacent landowners, the general public, and local, island territory, and federal agencies.

Description of Use: *Hunting*

Common ground doves occur on Green Cay NWR and could conceivably be hunted as the doves once were on Green Cay.

Availability of Resources: Law enforcement presence is insufficient to manage this use in a safe manner and protect other sensitive fauna on the island.

Anticipated Impacts of the Use: Anticipated impacts are clearly adverse, including risks to public safety, habitat damage, litter, and disturbance of other indigenous wildlife, including sensitive species such as the brown pelican, white-crowned dove, and St. Croix ground lizard.

Determination (check one below):

__X__ Use is Not Compatible

_____ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: N/A

Justification: As one of the priority wildlife-dependent public uses of national wildlife refuges cited in the National Wildlife Refuge System Improvement Act of 1997, hunting was automatically considered

an appropriate use of the refuge. However, it is incompatible with the purposes of Green Cay NWR because of the refuge's extremely small size; insufficient law enforcement resources; safety and security concerns; and impact on sensitive listed species.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Fishing*

There is no potential for freshwater fishing on Green Cay NWR, but saltwater fishing could be conducted from the shore and nearshore boats.

Availability of Resources: Minimal oversight would be necessary.

Anticipated Impacts of the Use: As one of the priority wildlife-dependent public uses identified in the National Wildlife Refuge System Improvement Act of 1997, fishing was automatically considered an appropriate use of the refuge. Anticipated impacts of this use include some litter along the shore, disturbance of sensitive shoreline habitats for the St. Croix ground lizard, and possible inadvertent mortality of the lizard itself from trampling. Allowing anglers on the island would also increase the probability of its recolonization by rats.

Determination (check one below):

__X__ Use is Not Compatible

_____ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: N/A

Justification: Sport fishing is one of the priority wildlife-dependent public uses generally considered compatible with national wildlife refuges. However, it is not compatible with the purpose of Green Cay NWR, which was established specifically to protect and recover the highly endangered St. Croix ground lizard.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Wildlife Observation and Photography*

Wildlife observation and photography have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses, provided they are compatible with the purposes of the refuge. This compatibility determination applies only to personal wildlife observation and photography. Commercial photography or videography, if allowed, would be covered under the Commercial Services compatibility determination and would require a special use permit by the refuge with specific restrictions.

Presently, no opportunities exist for wildlife observation and photography at Green Cay NWR, because the refuge and island are closed to public entry. However, those interested in the Cay's natural history, including its geologic formations, landform, and vegetative communities, and wildlife, can approach—but not land on—Green Cay in the surrounding marine waters using a boat, skiff, kayak or canoe. Although the surrounding waters are quite shallow and dotted with coral reefs and rock outcrops, cautious mariners in small craft can still approach closely enough to observe birds, such as pelicans and doves, especially if they use binoculars.

Availability of Resources: The absence of on-site staff would make it difficult to manage visitation.

Anticipated Impacts of the Use: As two of the six wildlife-dependent, priority public uses of national wildlife refuges cited in the National Wildlife Refuge System Improvement Act of 1997, wildlife observation and photography are automatically considered appropriate uses of the refuge. Anticipated impacts of these uses at Green Cay NWR include possible litter, disturbance of habitats for the St. Croix ground lizard, and possible inadvertent mortality of the lizard itself from trampling. Allowing visitors on the island would also increase the chance of rat recolonization. Furthermore, nesting and roosting of listed brown pelicans and roosting of the territorially endangered white crowned pigeon could be disturbed.

Determination (check one below):

___X__ Use is Not Compatible (directly on the refuge/Cay proper)

_____ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: N/A

Justification: Wildlife observation and photography are two of the six priority public uses generally considered compatible with national wildlife refuges. However, they are not compatible with the purpose of Green Cay NWR, which was established specifically to protect and recover the highly endangered St. Croix ground lizard. Permitting visitors in any numbers on the island itself would pose an unacceptable risk to the small, hard-to-see, and vulnerable ground lizards.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
___X___ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Environmental Education and Interpretation*

Environmental education and interpretation have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses, provided they are compatible with the purposes of the refuge.

Since Green Cay NWR is closed to the public, no visitor services, including environmental education and interpretation, are provided on the refuge itself. However, the staff does maintain a website for the refuge as well as provide off-refuge educational and outreach services. In addition, the staff works to educate nearby resorts and hotels concerning the prohibition on landing at Green Cay and the reasons for this ban on visits to the refuge. The refuge also maintains useful contacts with local outdoor equipment concessionaires, who provide valuable information on what they observe occurring on the island. In terms of education and outreach, staff also conducts occasional off-refuge presentations about Green Cay, the St. Croix ground lizard, control of invasive species like the rat, and habitat restoration efforts.

Availability of Resources: No staff is present on the refuge, but staff from nearby Sandy Point NWR conduct occasional environmental education off-refuge.

Anticipated Impacts of the Use: As two of the six wildlife-dependent, priority public uses of national wildlife refuges cited in the Improvement Act, environmental education and interpretation are automatically considered appropriate uses of the refuge. Anticipated impacts of these uses at Green Cay NWR would include possible disturbance of habitats for the St. Croix ground lizard, and possible inadvertent mortality of the lizard itself from trampling. Regular activities on the island proper would also increase the chance of inadvertent rat recolonization. Furthermore, even under the best of intentions, nesting and roosting of listed brown pelicans and roosting of the territorially endangered white crowned pigeon could be disturbed.

Determination (check one below):

__X__ Use is Not Compatible (directly on the refuge/Cay proper)

_____ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: N/A

Justification: Environmental education and interpretation are two of the six public uses generally considered compatible with national wildlife refuges. However, they are not compatible with the purpose of Green Cay NWR, which was established specifically to protect and recover the highly endangered St. Croix ground lizard. Permitting visitors in any numbers on the island itself, even for such ordinarily worthwhile efforts as environmental education and interpretation, would pose an unacceptable risk to the small, hard-to-see, and vulnerable ground lizards.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: 02/23/2019

Description of Use: *Research, Investigation, Surveying, and Monitoring*

Research, investigation, surveying, and monitoring are the planned, organized, and systematic gathering of data to discover or verify facts about biotic and abiotic resources on the refuge. Monitoring implies a regularity of data collection to establish baseline conditions and long-term trends in some key variable, such as the size of a population over time. Surveys involve the use of standardized and scientifically valid techniques and methodologies in the field to derive estimates of the abundance and distribution of flora or fauna of interest.

In principle, any of these information-generating activities conducted on the refuge by universities, co-op units, nonprofit organizations, and other research entities furthers refuge management and serves the purposes, vision, goals, and objectives of the refuge. The refuge could potentially host research from various research institutions supported by other non-governmental organizations.

Special use permits from the refuge shall be required for all research activities, whether conducted by governmental agencies, public research entities, universities, private research groups, or any other entity. All research activities will be approved and overseen by the refuge manager.

Availability of Resources: The refuge has sufficient managerial resources to prepare and administer special use permits to conduct research, investigations, surveying, and monitoring.

Anticipated Impacts of the Use: Generally, adverse impacts from research, investigation, surveying, and monitoring are minimal. Occasionally, slight or temporary wildlife or habitat disturbances may occur (e.g., minor compression or trampling of covered turtle nests may occur when researchers move along the beach). However, these impacts are not significant, nor are they permanent. Also, a small number of individual plants or animals might be collected for further scientific study, but these collections are anticipated to have minimal impact on the populations from which they were derived. All collections will adhere to the Service's specimen collection. The data and information generated by research, monitoring, surveying, and monitoring are often considered crucial to adaptive resource management and appropriate decision-making.

Determination (check one below):

_____ Use is Not Compatible

___X___ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: Projects that are fish and wildlife management oriented, which will provide needed information to refuge operation and management, will receive priority consideration and will even be solicited. All research conducted on the refuge must further the purposes of the refuge and the mission of the National Wildlife Refuge System. All research will adhere to established refuge policy on collecting specimens. To ensure that research activities are compatible, the refuge requires that a special use permit be obtained before any research activity may occur.

Research proposals and/or research special use permit applications must be submitted in advance of the activity to allow for review by refuge staff to ensure minimal impacts to the resources, staff, and programs of the refuge. Each special use permit may contain conditions under which the research will be conducted. Each special use permit holder will submit annual reports to update the refuge on research activities, progress, findings, and other information. Further, each special use permit holder will provide copies of findings, final reports, publications, and/or other documentation at the end of each project.

The refuge will deny permits for research proposals that are determined to not serve the purposes of the refuge and the mission of the National Wildlife Refuge System. The refuge will also deny permits for research proposals that are determined to negatively impact resources or that materially interfere with or detract from the purposes of the refuge. All researchers are subject to the conditions of their permits.

Justification: Research activities provide important benefits to the refuge and to the natural resources supported by the refuge. Supporting management, research conducted on the refuge can lead to new discoveries, new facts, verified information, and increased knowledge and understanding of resource management, as well as track current trends in fish and wildlife habitat and populations to enable better management decisions. Research has the potential to advance the purposes of the refuge and the mission of the National Wildlife Refuge System.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: 02/23/2019

Description of Use: *Commercial services supporting the six priority wildlife-dependent public uses*

While not one of the six priority wildlife-dependent recreational uses named in the National Wildlife Refuge System Improvement Act of 1997, commercial services could potentially support wildlife viewing, interpretation, and environmental education and interpretation at Green Cay NWR, as they do in many other national wildlife refuges around the United States.

The refuge would authorize commercial services through the issuance of special use permits. For the purpose of this document, a commercial provider is defined as a permittee who charges a client a fee for a program or service to generate a profit. This does not include individuals who perform these services for no fee, not-for-profit groups, schools, colleges, or other governmental agencies. This activity would provide recreational and educational opportunities for members of the public who desire a quality wildlife-dependent experience, but who may lack the necessary equipment, skills, knowledge, ability, or resources to obtain it themselves.

Potential commercial services on the refuge could include: bird watching and turtle watching; boat, canoe and kayak tours; and filmmaking and professional photography or videography. Except for the fee charged to the customer by the commercial provider, or the payment to professional photographers or documentary filmmakers by the purchasers of their products, the impacts associated with these activities would not be different than other activities already occurring on the refuge. The named activities covered by this compatibility determination are similar to the activities covered by the wildlife observation and photography and environmental education and interpretation compatibility determinations, but this compatibility determination would provide additional guidance specific to commercial services.

As proposed, some commercial services would be permitted in the open areas of the refuge under a special use permit. Interpretive training and further guidelines may be developed and required in the future. Currently, no administrative facilities for the providers of these commercial services are planned for the refuge.

Availability of Resources: The program costs to refuge operations would include, but not be limited to, development and review of policy and procedure, administration of annual or one-time special use permits (e.g., addressing inquires, screening applicants, checking on insurance, and issuing permits), and enforcement and monitoring of permit holders. However, the size and scope of the program and number of permits issued would have to be balanced with the permit fee.

Anticipated Impacts of the Use: To date, there are no commercial service programs on the refuge. As in the case of wildlife observation and photography, commercial services in support of wildlife-dependent public uses always have the potential for disturbance of sensitive native wildlife, and even the potential for inadvertent, direct harm, such as accidental trampling of ground-nesting bird or turtle nests, eggs, and hatchlings. Beneficial impacts include increasing the public's knowledge and appreciation for the refuge's wildlife species.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: Except for professional photographers, videographers, and documentary filmmakers, who would be covered by special use permit and are likely to occur infrequently and in very small numbers, no commercial operators would be permitted to actually land on Green Cay NWR itself, because of the potential for damage to the St. Croix ground lizard and its habitat that bringing people onto the island in any numbers would incur.

The fee for annual commercial use permits is $250. These fees are anticipated to be increased as the cost for administering the program increases. Commercial service providers would follow all refuge regulations along with additional special conditions stipulated in their permits. The following special conditions would be common to most commercial service providers:

- The permittee would provide proof of general liability insurance in the amount of $300,000.
- If using a boat, the permittee would provide proof of a Coast Guard Captain's license.
- The provider would supply the refuge with his/her fee schedule charged per client.
- A special use permit could be revoked for failure to comply with all conditions or for repeat violations of refuge regulations.
- Filmmaking and professional photography would be permitted on a case-by-case evaluation.

Justification: Commercial operations can support wildlife observation and photography and environmental education and interpretation. In particular, photographs, videos, and documentaries made by talented photographers and filmmakers can have a tremendously positive influence on educating the public, supporting the purpose of Green Cay NWR, and advancing the mission of the National Wildlife Refuge System.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: 02/23/2019

COMPATIBILITY DETERMINATIONS FOR BUCK ISLAND NWR, ST. THOMAS

Introduction: The Fish and Wildlife Service reviewed a number of uses for compatibility during the comprehensive conservation planning process for Buck Island NWR. The descriptions and anticipated impacts of these uses are addressed separately. However, the Uses through Public Review and Comment sections and the Approval of Compatibility Determinations section apply to each use. If one of these uses is considered outside of the comprehensive conservation plan for Buck Island NWR, then those sections become part of that compatibility determination.

Uses: The following uses were found to be appropriate and evaluated to determine their compatibility with the mission of the National Wildlife Refuge System and the purposes of the refuge: (1) hunting; (2) fishing; (3) wildlife observation and photography; (4) environmental education and interpretation; (5) research, investigation, surveying, and monitoring; (6) commercial services supporting the six priority wildlife-dependent public uses; and (7) hiking and sightseeing on informal trails around island.

Refuge Name: Buck Island NWR

Date Established: 1969

Establishing and Acquisition Authority: The Service obtained about 36 acres from the U.S. Navy in 1969 and the remaining 10 acres from the U.S. Coast Guard in 1981.

Refuge Purpose: The refuge was established for its "… particular value in carrying out the national migratory bird management program." 16 U.S.C. 667b (An act authorizing the transfer of certain real property for wildlife or other purposes)

National Wildlife Refuge System Mission: The mission of the National Wildlife Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997, is:

> *to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.*

Other Applicable Laws, Regulations, and Policies:

Antiquities Act of 1906 (34 Stat. 225)
Migratory Bird Treaty Act of 1918 (15 U.S.C. 703-711; 40 Stat. 755)
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
Migratory Bird Hunting Stamp Act of 1934 (16 U.S.C. 718-178h; 48 Stat. 451)
Criminal Code Provisions of 1940 (18 U.S.C. 41)
Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; 54 Stat. 250)
Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat.1119)
Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)
Wilderness Act (16 U.S.C. 1131; 78 Stat. 890)
Land and Water Conservation Fund Act of 1965
National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, et seq.; 80 Stat. 915)
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd, 668ee; 80 Stat. 927)
National Environmental Policy Act of 1969, NEPA (42 U.S.C. 4321, et seq; 83 Stat. 852)

Use of Off-Road Vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq; 87 Stat. 884)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
National Wildlife Refuge Regulations for the Most Recent Fiscal Year (50 CFR Subchapter C; 43 CFR 3101.3-3)
Emergency Wetlands Resources Act of 1986 (S.B. 740)
North American Wetlands Conservation Act of 1990
Food Security Act (Farm Bill) of 1990 as amended (HR 2100)
The Property Clause of the U.S. Constitution Article IV 3, Clause 2
The Commerce Clause of the U.S. Constitution Article 1, Section 8
The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, USC668dd)
Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System, March 25, 1996
Title 50, CFR, Parts 25-33
Archaeological Resources Protection Act of 1979
Native American Graves Protection and Repatriation Act of 1990

Public Review and Comment: The compatibility determinations for Sandy Point NWR were part of the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for the Virgin Island Refuges, consisting of Sandy Point, Green Cay, and Buck Island National Wildlife Refuges. The availability of the Draft CCP/EA was announced in the *Federal Register* on September 17, 2009 (74 FR 47815) for a 30-day public review and comment period. Copies of the Draft CCP/EA were posted at refuge headquarters and area locations, and copies were distributed to adjacent landowners, the general public, and local, island territory, and federal agencies.

Description of Use: *Hunting*

Common ground doves occur on Buck Island NWR and could conceivably be hunted.

Availability of Resources: Law enforcement presence is insufficient to manage this use in a safe manner and protect sensitive fauna on the island.

Anticipated Impacts of the Use: Anticipated impacts are clearly adverse, including risks to public safety, habitat damage, litter, and disturbance of other indigenous wildlife, including sensitive species such as the brown pelican, white-crowned dove, Caribbean roseate tern, peregrine falcon, slippery back skink, and Puerto Rican racer.

Determination (check one below):

__X__ Use is Not Compatible

_____ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: N/A

Justification: As one of the six wildlife-dependent, priority public uses of national wildlife refuges cited in the National Wildlife Refuge System Improvement Act of 1997, hunting was automatically considered an appropriate use of the refuge. However, it is incompatible with the purposes of Buck Island NWR because of the refuge's small size; lack of sufficient huntable game populations; insufficient law enforcement resources; safety and security concerns; and impact on sensitive listed species.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
___X___ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Fishing*

There is no potential for freshwater fishing on the small island, but saltwater fishing could be conducted from the shore and nearshore boats.

Availability of Resources: No staff is present on or near the refuge, and access from St. Croix is logistically difficult. Thus, there are insufficient law enforcement resources to manage the fishery and simultaneously protect sensitive fauna on the island.

Anticipated Impacts of the Use: As one of the six wildlife-dependent, priority public uses of national wildlife refuges cited in the National Wildlife Refuge System Improvement Act of 1997, fishing was automatically considered an appropriate use of the refuge. Anticipated impacts of this use include some litter along the shore and disturbance of shore-based wildlife.

Determination (check one below):

___X___ Use is Not Compatible

_____ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: N/A

Justification: Sport fishing is one of the six wildlife-dependent public uses generally considered compatible with national wildlife refuges. However, it is not compatible in the case of Buck Island NWR, because of the difficulty in managing this consumptive public use without staff onsite or nearby.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Wildlife Observation and Photography*

Wildlife observation and photography have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses, provided they are compatible with the purposes of the refuge. This compatibility determination applies only to personal wildlife observation and photography. Commercial photography or videography, if allowed, would be covered under the Commercial Services compatibility determination and would require a special use permit by the refuge with specific restrictions.

There are limited opportunities for wildlife observation and photography at Buck Island NWR at this time, and no facilities to support these activities. As noted in Chapter II of the CCP, considerable wildlife observation and photography takes place in the vicinity of the refuge, just offshore and just outside the refuge boundary, from boats anchored in several bays at Buck Island. These privately owned boats bring many thousands of visitors every year to the coral reefs surrounding Buck Island, for diving and snorkeling. Most of the visitors are brought by commercial guide services; some arrive in their own watercraft. A small but unknown number of these visitors make their way onto Buck Island itself to hike, sightsee, and observe and photograph wildlife.

Availability of Resources: The absence of on-site staff makes it impossible to manage these activities on a day-to-day basis.

Anticipated Impacts of the Use: As two of the priority wildlife-dependent public uses of national wildlife refuges cited in the Improvement Act, wildlife observation and photography are automatically considered appropriate uses of the refuge. Anticipated impacts of these uses at Buck Island NWR include some litter, minor disturbance of wildlife habitats, disturbance of bird nesting, and possible, accidental mortality of certain wildlife, such as nestlings of ground-nesting birds. Allowing visitors access to the island also increases the likelihood of rat recolonization.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: The refuge will place and maintain signs at regular intervals around the perimeter of the island advising all visitors that Buck Island is a national wildlife refuge under the management and protection of the Fish and Wildlife Service. Visitors will be requested to stay on existing paths and not to disturb or molest any wildlife, especially nesting birds.

Justification: Wildlife observation and photography are two of the priority wildlife-dependent public uses generally considered compatible with national wildlife refuges. They represent non-consumptive outdoor recreation that places their practitioners into intimate contact with nature and wildlife, and they can be conducted with minimal adverse impacts on other important refuge resources and public uses.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
___X___ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Environmental Education and Interpretation*

Environmental education and interpretation have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses, provided they are compatible with the purposes of the refuge.

Availability of Resources: At present, due to logistical difficulties and the absence of on-site staff, no formal environmental education or interpretation takes place on the refuge and there are no facilities for such. If programs are offered, the resources required to run the programs would be minimal and built into the refuge operation and maintenance budget.

Anticipated Impacts of the Use: As two of the six wildlife-dependent, priority public uses of national wildlife refuges cited in the Improvement Act, environmental education and interpretation are automatically considered appropriate uses of the refuge. There is some small potential for disturbance of sensitive native wildlife, and even the potential for inadvertent, direct harm, such as accidental trampling of ground-nesting bird. Beneficial impacts include increasing personal knowledge of and appreciation for the refuge's wildlife species and management's role in perpetuating and recovering those species, and in maintaining and restoring the habitats and conditions upon which they depend.

Determination (check one below):

_____ Use is Not Compatible (directly on the refuge/Cay proper)

___X___ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: While anticipated impacts are anticipated to be minimal, stipulations are required to ensure that wildlife resources are adequately protected. Any environmental education program activities at Buck Island NWR would avoid sensitive sites and sensitive wildlife populations. A section on wildlife etiquette would be built into all curriculums.

Environmental education programs and activities would be held at less sensitive sites on the island where impacts may be minimized. Evaluations of sites and programs should be conducted annually to assess if objectives are being met and to ensure that natural resources are not being adversely impacted.

Impacts associated with interpretive programs are also anticipated to be minimal. One overarching aspect of the interpretive program is to build understanding of and appreciation for the refuge and its natural and cultural resources. If use increases, some wildlife disturbance would be unavoidable, but through interpretive material (e.g., brochures, signs, and kiosk panels) proper wildlife etiquette would be stressed. Education is crucial for making visitors aware that their actions can have negative impacts on wildlife. Interpretive activities and programs will be conducted at developed sites where impacts can be minimized. Wildlife impacts on the Cox Ferry Recreation Area would be carefully monitored. If impacts are detected, adaptive strategies will be developed, such as seasonal trail closures to reduce wildlife disturbance. Annual evaluations would be conducted to assess if objectives are being met and that the natural resources are not being adversely affected. The refuge would modify or eliminate any uses that result in unacceptable impacts

Justification: Environmental education and interpretation are two of the six public uses generally considered compatible with national wildlife refuges. Environmental education and interpretation are used to encourage all citizens to act responsibly in protecting natural resources. Environmental education and interpretation activities are tools the refuge can use to build understanding of and appreciation and support for the refuge and the National Wildlife Refuge System.

Resources required to run the programs are minimal and are built into the refuge operation and maintenance budget. As long as stipulations to ensure compatibility are followed, the programs should remain compatible with the purposes of the refuge. At such time that the monitoring program identifies unacceptable wildlife impacts, the refuge would modify activities to minimize or eliminate the impacts.

Both programs would allow for the public to become knowledgeable of the missions of the Service, the Refuge System, and the purposes of the refuge. The programs highlight the areas which are most in line with the refuge's management philosophy proposed under the CCP. Considering the minimal anticipated impacts through implementation of the environmental education and interpretation programs and the benefits that should arise through public education, participation, and involvement, the program is deemed compatible.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: 02/23/2024

Description of Use: *Research, Investigation, Surveying, and Monitoring*

Research, investigation, surveying, and monitoring are the planned, organized, and systematic gathering of data to discover or verify facts about biotic and abiotic resources on the refuge. Monitoring implies a regularity of data collection to establish baseline conditions and long-term trends in some key variable, such as the size of a population over time. Surveys involve the use of standardized and scientifically valid techniques and methodologies in the field to derive estimates of the abundance and distribution of fauna or flora of interest.

In principle, any of these information-generating activities conducted on the refuge by universities, cooperative units, nonprofit organizations, and other research entities furthers refuge management and serves the purposes, vision, goals, and objectives of the refuge. The refuge could potentially host research from various research institutions supported by other non-governmental organizations.

All research activities, whether conducted by governmental agencies, public research entities, universities, private research groups, or any other entity, shall be required to obtain special use permits from the refuge. All research activities will be approved and overseen by the refuge manager.

Availability of Resources: The refuge has sufficient managerial resources to prepare and administer special use permits to conduct research, investigations, surveying, and monitoring.

Anticipated Impacts of the Use: Generally, adverse impacts from research, investigation, surveying and monitoring are minimal. Occasionally, slight or temporary wildlife or habitat disturbances may occur (e.g., minor compression or trampling of covered turtle nests may occur when researchers move along the beach). However, these impacts are not significant, nor are they permanent. Also, a small number of individual plants or animals might be collected for further scientific study, but these collections are anticipated to have minimal impact on the populations from which they were derived. All collections will adhere to the Service's specimen collection. The data and information generated by research, investigation, surveying, and monitoring are often considered crucial to adaptive resource management and appropriate decision-making.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: Projects that are fish and wildlife management oriented, which will provide needed information to refuge operation and management, will receive priority consideration and will even be solicited. All research conducted on the refuge must further the purposes of the refuge and the mission of the National Wildlife Refuge System. All research will adhere to established refuge policy on research and policy on collecting specimens. To ensure that research activities are compatible, the refuge requires that a special use permit be obtained before any research activity may occur.

Research proposals and/or research special use permit applications must be submitted in advance of the activity to allow for review by refuge staff to ensure minimal impacts to the resources, staff, and programs of the refuge. Each special use permit may contain conditions under which the research will be conducted. Each special use permit holder will submit annual reports to update the refuge on research activities, progress, findings, and other information. Further, each special use permit holder will provide copies of findings, final reports, publications, and/or other documentation at the end of each project.

The refuge will deny permits for research proposals that are determined to not serve the purposes of the refuge and the mission of the National Wildlife Refuge System. The refuge will also deny permits for research proposals that are determined to negatively impact resources or that materially interfere with or detract from the purposes of the refuge. All research activities are subject to the conditions of their permits.

Justification: Research activities provide important benefits to the refuge and to the natural resources supported by the refuge. Supporting management, research conducted on the refuge can lead to new discoveries, new facts, verified information, and increased knowledge and understanding of resource management, as well as track current trends in fish and wildlife habitat and populations to enable better management decisions. Research has the potential to advance the purposes of the refuge and the mission of the National Wildlife Refuge System.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: 02/23/2019

Description of Use: *Commercial services supporting the six priority wildlife-dependent public uses*

While not one of the six priority wildlife-dependent recreational uses named in the National Wildlife Refuge System Improvement Act, commercial services could potentially support wildlife viewing and environmental education and interpretation at Buck Island NWR, as they do in many other national wildlife refuges around the United States.

The refuge would authorize commercial services through the issuance of special use permits. For the purpose of this document, a commercial provider is defined as a permittee who charges a client a fee for a program or service to generate a profit. This does not include individuals who perform these services for no fee, not-for-profit groups, schools, colleges, or other governmental agencies. This activity would provide recreational and educational opportunities for the public who desire a quality wildlife-dependent experience, but who may lack the necessary equipment, skills, knowledge, ability, or resources to obtain it themselves.

Potential commercial services on the refuge could include birdwatching; boat, canoe and kayak tours; and filmmaking and professional photography or videography. Except for the fee charged to the customer by the commercial provider, or the payment to professional photographers or documentary filmmakers by the purchasers of their products, the impacts associated with these activities would not be different than other activities already occurring on the refuge. The named activities covered by this compatibility determination are similar to the activities covered by the wildlife observation and photography and environmental education and interpretation compatibility determinations, but this compatibility determination would provide additional guidance specific to commercial services.

As proposed, some commercial services would be permitted in the open areas of the refuge under a special use permit. Interpretive training and further guidelines may be developed and required in the future. Currently, no administrative facilities for the providers of these commercial services are planned for the refuge.

Availability of Resources: The program costs to refuge operations would include, but not be limited to: development and review of policy and procedure, administration of annual or one-time special use permits (e.g., addressing inquires, screening applicants, checking on insurance, and issuing permits),

and enforcement and monitoring of permit holders. However, the size and scope of the program and number of permits issued would have to be balanced with the permit fee.

Anticipated Impacts of the Use: To date, there are no commercial service programs on the refuge. As in the case of wildlife observation and photography, commercial services in support of wildlife-dependent public uses always have the potential for disturbance of sensitive native wildlife, and even the potential for inadvertent, direct harm, such as accidental trampling of ground-nesting bird or turtle nests, eggs, and hatchlings. Beneficial impacts include increasing the public's knowledge and appreciation for the refuge's wildlife species.

Determination (check one below):

_____ Use is Not Compatible

___X___ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: Commercial operators shall be permitted only in the areas and at times open to the public. Seasonal or permanent closures in certain areas may be imposed on commercial operators if the level of use becomes excessive, conflicts occur with other users engaged in priority wildlife-dependent recreation, or wildlife impacts occur. In the future, interpretive training and other stipulations may be required of commercial operators to help the refuge achieve its outreach and educational objectives.

The fee for annual commercial use permits is $250. These fees are anticipated to be increased as the cost for administering the program increases. Commercial service providers would follow all refuge regulations along with additional special conditions stipulated in their permits. The following special conditions would be common to most commercial service providers:

- The permittee would provide proof of general liability insurance in the amount of $300,000.
- If using a boat, the permittee would provide proof of a Coast Guard Captain's license.
- The provider would supply the refuge with his/her fee schedule charged per client.
- The provider would supply the refuge with the number of trips provided per year (this would include the number of clients).
- A special use permit could be revoked for failure to comply with all conditions or for repeat violations of refuge regulations.
- Boat, canoe, and kayak tours would be permitted to use all designated launch sites. Tour routes would be approved in the permit. A concessionaire permit would be required for any tour operator accessing refuge lands.
- Filmmaking and professional photography would be permitted on a case-by-case evaluation.

Justification: Commercial operations could support wildlife observation and photography and environmental education and interpretation. Further, they could provide recreational and educational opportunities for the members of the public who desire a quality wildlife-dependent experience, but who may lack the necessary equipment, skill, knowledge, ability, or resource to obtain it themselves. Providing opportunities for these activities would contribute toward fulfilling provisions of the Improvement Act. The stipulations outlined above should minimize potential impacts relative to wildlife/human interactions. At the current level of visitation, commercial operations would not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the refuge.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: 02/23/2019

Description of Use: *Hiking and sightseeing on informal trails around island*

As noted in Chapter II of the CCP, many boats carrying tourists, snorkelers, and divers visit the vicinity of Buck Island every year. These privately owned vessels bring many thousands of visitors every year to enjoy the coral reefs surrounding Buck Island, for diving and snorkeling. Most of the visitors are brought by commercial guide services; some arrive in their own watercraft. A small but unknown number of these visitors make their way onto Buck Island itself to hike, sightsee, and visit the historic lighthouse, erected in 1913 at about the highest point on Buck Island.

Availability of Resources: The absence of onsite staff makes it impossible to manage these activities on a day-to-day basis.

Anticipated Impacts of the Use: Hiking, sightseeing, and visiting historic/cultural sites are not by themselves wildlife-dependent activities, but they often occur in conjunction with wildlife observation and photography. Anticipated impacts of these uses at Buck Island NWR include some litter, minor disturbance of wildlife habitats, disturbance of bird nesting, and possible, accidental mortality of certain wildlife, such as nestlings of ground-nesting birds. Allowing visitors access to the island also increases the likelihood of rat recolonization.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: The refuge will place and maintain signs at regular intervals around the perimeter of the island and at least one along each trail advising all visitors that Buck Island is a National Wildlife Refuge under the management and protection of the Federal Government (United States Fish and Wildlife Service). Visitors will be requested to stay on existing paths and not to disturb or molest any wildlife, especially nesting birds. A sign at the lighthouse will inform visitors that it is a historic resource that is illegal to vandalize in any way. While the absence of onsite staff and the distance between where staff are located (Sandy Point NWR on St. Croix and Buck Island NWR) mean that these activities cannot be managed or supervised on a day-to-day basis, on their visits to Buck Island, and through the use of volunteers and other partners, Service staff will be able to assess whether or not trail overuse (leading to erosion), discarded litter, or other problems are occurring that require intervention and action.

Justification: Hiking, sightseeing, and visiting historic sites represent non-consumptive forms of outdoor recreation that place their practitioners into intimate contact with nature, and they can be conducted with minimal adverse impacts on other important refuge resources and public uses. In addition, these activities often expose participants to wildlife, which can lead to a greater appreciation of the role of Buck Island NWR and the Refuge System as a whole in conserving and restoring habitat and wildlife.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement
_____ Categorical Exclusion and Environmental Action Statement
___X___ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: 02/23/2019

APPROVAL OF COMPATIBILITY DETERMINATIONS

The signature of approval is for all compatibility determinations considered within the Comprehensive Conservation Plan for Sandy Point, Green Cay, and Buck Island National Wildlife Refuges. If one of the descriptive uses is considered for compatibility outside of the comprehensive conservation plan, the approval signature becomes part of that determination.

Refuge Manager: Signed 12 July 2010
(Signature/Date)

Regional Compatibility Coordinator: Pamela Horton 8/8/10
(Signature/Date)

Refuge Supervisor: Signed 09/14/2010
(Signature/Date)

Regional Chief, National Wildlife Refuge System, Southeast Region: Signed 9/15/2010
(Signature/Date)

Appendix VII. Intra-Service Section 7 Biological Evaluation

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Michael Evans
Telephone Number: 340-773-4554
E-Mail: Michael_Evan@fws.gov
Date: December 2008

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CARIBBEAN ISLANDS
REFUGES

PROJECT NAME:

I. Service Program:
___ Ecological Services
___ Federal Aid
___ Clean Vessel Act
___ Coastal Wetlands
___ Endangered Species Section 6
___ Partners for Fish and Wildlife
___ Sport Fish Restoration
___ Wildlife Restoration
___ Fisheries
_X_ Refuges/Wildlife

II. State/Agency: North Carolina Wildlife Resources Commission

III. Station Name: Sandy Point National Wildlife Refuge, St. Croix (also managing Green Cay NWR, St. Croix and Buck Island NWR, St. Thomas, in the U.S. Virgin Islands)

IV. Description of Proposed Action
The proposed Comprehensive Conservation Plan (CCP) would provide overall direction for management of wildlife populations, habitat, and public use at Sandy Point, Green Cay and Buck Island National Wildlife Refuges over the next 15 years. The preferred management alternatives for each refuge in the CCP would provide for balanced, appropriate and compatible wildlife/habitat management and public use activities. It would support the purposes for which the refuges were established, including conservation of endangered or threatened species such as the leatherback sea turtle and St. Croix ground lizard.

V. Pertinent Species and Habitat:

A. Include species/habitat occurrence map: Please see Figures 1-5, 9, and 10 of CCP in Section A of this document (attached in free-standing version of this Evaluation for submittal to USFWS Ecological Services at Boqueron Field Office, Puerto Rico).

B. Complete the following table:

SPECIES/CRITICAL HABITAT	STATUS[1]
Sandy Point National Wildlife Refuge	
Leatherback Sea Turtle (*Dermochelys coriacea*)	E
Atlantic Green Sea Turtle (*Chelonia mydas*)	T
Hawksbill Sea Turtle (*Eretmochelys mbricate*)	E
Brown Pelican (*Pelicanus occidentalis occidentalis*)	E
Caribbean Roseate Tern (*Sterna dougallii*)	E/T
Vahl's Boxwood (*Buxus vahlii*)	E
Green Cay National Wildlife Refuge	
Brown Pelican (*Pelicanus occidentalis occidentalis*)	E
St. Croix Ground Lizard (*Ameiva polops*)	E
Hawksbill Sea Turtle – (*Eretemechelys imbricata*)	E
Buck Island National Wildlife Refuge	
Brown Pelican (*Pelicanus occidentalis occidentalis*)	E
Caribbean Roseate Tern (*Sterna dougallii*)	E/T

[1]*STATUS: E=endangered, T=threatened, PE=proposed endangered, PT=proposed threatened, CH=critical habitat, PCH=proposed critical habitat, C=candidate species, S/A=Similar Appearance*

VI. Location (attach map): Please see Figures 1-5, 9, and 10 of CCP in Section A of this document (attached in free-standing version of this Evaluation for submittal to USFWS Ecological Services at Boqueron Field Office, Puerto Rico).

A. Ecoregion Number and Name: Caribbean

B. County and State: United States Virgin Islands (U.S. Territory, not State)

C. Section, township, and range (or latitude and longitude):
Sandy Point: 17° 43' N, 64° 53' W
Green Cay: 17° 45' N, 64° 42' W
Buck Island: 18° 20' N, 64° 55' W

D. Distance (miles) and direction to nearest town:
Sandy Point: 1 mile South Southwest of Frederiksted, St. Croix
Green Cay: 4 miles East Northeast of Christiansted, St. Croix
Buck Island: 5 miles South Southeast of Charlotte Amalie, St. Thomas

E. Species/habitat occurrence:

Leatherback Sea Turtle (Sandy Point) – The beaches at Sandy Point NWR support the largest leatherback nesting site in the entire United States and the northern Caribbean. In the 2007 nesting season, 193 turtles laid a total of 989 nests with an average of about 78 yolked eggs per clutch. This also represents the largest continuously studied population of nesting leatherbacks in the world – tagging began in 1977. Peak nesting season is from March through July, and nesting almost always takes place at night. During a single season at Sandy Point, females will nest every 9-10 days, typically laying 5-7 clutches in total. Figure 10 in the CCP shows the distribution of leatherback nests at Sandy Point. At the same time that the numbers of nesting female leatherbacks and overall hatchling production have increased, the nest hatch success rate has decreased.

Green Sea Turtle (Sandy Point) – Green sea turtles almost always nest at night; they may nest at any time of the year, although the peak nesting season is from August to October. Females emerge and crawl up the beach to dig their nests, usually near vegetation on the edge of the open beach, laying 3.5-4 clutches per year. Funding constraints do not allow for night time monitoring during green turtle nesting season at Sandy Point NWR, but green turtles are monitored and tagged on the refuge during monitoring activities for leatherback turtles. In a 2003 survey, mean clutch size was 114 eggs and mean hatch success was 84.0 percent.

Hawksbill Sea Turtle (Sandy Point and Green Cay) – In the US Virgin Islands, hawksbill turtles may nest throughout the year, although the peak nesting season is from July to October. Nesting usually occurs at night, but may take place during daytime as well. Because of their relatively smaller size and agility, female hawksbills can maneuver among rocks and other obstacles to crawl high up onto beaches. In contrast with other sea turtles, they dig nests under sea grape or other vegetation beyond the edge of the beach. Some hawksbills have even been documented making extensive excursions upland from the beach. Females lay between up to three clutches per year. As with green turtles, Sandy Point NWR monitors hawksbill turtle nesting activities in July and August. Monitoring activities include night time or day time patrols, tagging, collection of typical nesting data, and nest excavations. Nesting is not monitored at Green Cay NWR.

Brown Pelican (Sandy Point, Green Cay, Buck Island) – Although other subspecies were recently delisted, the Caribbean brown pelican is still listed as endangered by the USFWS. In the US Virgin Islands, breeding colonies occur at several Cays off the main islands, including Green Cay and Buck Island off northern St. Croix. Pelicans normally nest in trees and shrubs but after hurricanes may nest on fallen vegetation or on the ground. Bird surveys often documented over 100 pelicans roosting on the edge of the West End Salt Pond as well as roosting and feeding around the sandy shoreline of Sandy Point beach. During 2003 and 2004 brown pelicans nested on the western side of Green Cay. A total of 54 nests were documented in 2003 and 64 in 2004. Brown pelicans and magnificent frigatebirds feed off shore and roost year round in the trees, cliffs, and beaches of Green Cay. At Buck Island NWR, brown pelicans have been observed roosting, feeding, and resting, but not nesting.

Caribbean Roseate Tern (Sandy Point, Buck Island) – The largest breeding colonies of the Caribbean population occur on the Puerto Rican Bank, in Puerto Rico and the Virgin Islands; certain Cays tend to be favored. None of the 17 breeding sites recorded in the USVI since 1987 has been used every year. This unpredictability hinders attempts to manage and protect breeding colonies. Unlike the roseate terns of the northeastern U.S., which tend to nest under vegetation or other shelter, Caribbean populations nest in more open sites, such as narrow rock ledges, on steep slopes, or among coral rubble of rocky, offshore islands. Eggs are usually laid directly on the ground, rock, or vegetation with little or no nest material added. At both Sandy Point NWR and Buck Island NWR, the presence of roseate terns has not yet been documented, but they could potentially occur.

Vahl's Boxwood (Sandy Point) – At present there are six known populations of Vahl's boxwood, four in Puerto Rico and two in St. Croix (Frederiksted and Christiansted). The Sandy Point NWR population covers approximately 0.22 acre and consists of over 100 individuals. The species has the ability to adapt to different environmental conditions. Such adaptations include shrubby growth in dry areas where it grows as part of the understory versus an arborescent (tree-like) growth form in high precipitation areas. The specimens of the Sandy Point NWR population are shrubby because of the drier climate of this area and are part of the dry forest understory.

St. Croix Ground Lizard (Green Cay) – The endemic St. Croix ground lizard was once widespread and abundant in coastal areas of St. Croix. The lizard was extirpated from the main island as a result of predation by the introduced small Indian mongoose and habitat loss via encroaching coastal development. It survives on Green Cay and in one or two other locations, most recently nearby Buck Island National Monument, to which individuals were transplanted by the USFWS and National Park Service in 2008. On Green Cay, a 2003-2004 survey estimated the population at between approximately 1,170 to 2,180 individual lizards. The St. Croix ground lizard actively prowls, roots and digs for prey. It can tolerate a good deal of natural and unnatural disturbance in beach and dry forest, which is not altogether surprising, since hurricanes periodically affect these habitats. Key habitat components include bare ground (including sandy, exposed areas), high densities of leaf and tidal litter, woody debris, scrub, and forest with intermediate to high woody stem densities that permit dappling of sun and shade (canopied and exposed areas), and burrows including crab burrows.

VII. Determination of Effects:

A. Explanation of effects of the action on species and critical habitats in item V. B:

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Leatherback Sea Turtle	Visitation by beach goers could trample or compress nests and interfere with hatching and hatchling journey across the beach; predation by non-native animals; poaching of eggs or turtles by humans; disturbance of females arriving to nest by staff, volunteers, and wildlife observers, causing females to abandon attempt.
Atlantic Green Sea Turtle	Same as for leatherback turtles.
Hawksbill Sea Turtle	Same as for leatherback turtles.
Brown Pelican	At Sandy Point, potential disturbance of roost sites by visitors, watchers, and activities in West End Salt Pond; at Green Cay, disturbance of nesting by unauthorized visitation and predation by invasive or native animals, and damage to habitat by invasive rats.
Caribbean Roseate Tern	Presence of this species not yet documented at Sandy Point and Buck Island, and types of possible impacts not yet identified.
Vahl's Boxwood	No authorized activities have been identified that would deliberately or inadvertently harm this species at Sandy Point.
St. Croix Ground Lizard	Authorized or proposed management activities would not harm this species. Unauthorized activities, such as trespass or release of non-native and invasive animals, can pose a threat to its survival.

B. Explanation of actions to be implemented to reduce adverse effects:

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/MINIMIZE IMPACTS
Leatherback Sea Turtle	Close beach to all visitation during peak nesting season for leatherbacks; conduct regular patrols every day of the week, including night patrols; exercise strict control over all visitors allowed on the beach to observe nesting leatherbacks and help hatchlings; control invasive animals through trapping, and if necessary, shooting; conduct continuing education in schools and with public at large through a variety of means and venues.
Atlantic Green Sea Turtle	Implement all measures listed for leatherback turtle; outside peak leatherback nesting season, when funding/staffing permit, begin program of saturation tagging and more regular patrols to increase protection.
Hawksbill Sea Turtle	At Sandy Point, same as for leatherback and green turtle; at Green Cay, maintain closure of entire Cay, particularly the small beach on the south end, to all visitation; enforce against trespass; eliminate invasive species as needed.
Brown Pelican	At all three refuges, reduce disturbance in vicinity of roosting or nesting sites; at Sandy Point, continue to prohibit boats in refuge portion of West End Salt Pond; at Green Cay and Buck Island, increase efforts to restore habitat, primarily through reforestation.
Caribbean Roseate Tern	At both Sandy Point and Buck Island, monitor for the presence of this species. If determined to be using the refuges on a regular basis, take appropriate steps to reduce potential disturbance in vicinity of nesting or roosting sites.
Vahl's Boxwood	Continue to monitor the health and survival of the existing population at Sandy Point through annual surveys, including measurements. Use GPS and GIS to precisely map locations. Coordinate with St. George Botanical Garden and University of Puerto Rico's Botanical Garden on ongoing propagation and re-introduction efforts.
St. Croix Ground Lizard	Continue regular monitoring of rat presence on an annual or biannual basis; continue rat eradication efforts until success is obtained; continue regular censuses of St. Croix ground lizard population at a minimum of once every five years; monitor survival and growth of tree seedlings planted in 2004 as part of reforestation effort; remove competing vegetation around planted seedlings to improve their chances of survival; using partners, volunteers, and/or YCC crews from Sandy Point NWR, continuing planting new seedlings of native trees to reforest island; work with NPS to monitor success of the St. Croix ground lizards translocated from Green Cay to Buck Island Reef National Monument; continue to maintain closure of Green Cay to visitors.

VIII. Effect Determination and Response Requested:

SPECIES/CRITICAL HABITAT	DETERMINATION[1]			REQUESTED
	NE	NA	AA	
Leatherback Sea Turtle		X		Concurrence
Atlantic Green Sea Turtle		X		Concurrence
Hawksbill Sea Turtle		X		Concurrence
Brown Pelican		X		Concurrence
Caribbean Roseate Tern		X		Concurrence
Vahl's Boxwood		X		Concurrence
St. Croix Ground Lizard		X		Concurrence

[1]DETERMINATION/ RESPONSE REQUESTED:
NE = no effect. This determination is appropriate when the proposed action will not directly, indirectly, or cumulatively impact, either positively or negatively, any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested is optional but a "Concurrence" is recommended for a complete Administrative Record.

NA = not likely to adversely affect. This determination is appropriate when the proposed action is not likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources. Response Requested is a "Concurrence".

AA = likely to adversely affect. This determination is appropriate when the proposed action is likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested for listed species is "Formal Consultation". Response requested for proposed and candidate species is "Conference".

Signed

Signature (originating station)

23 FEB 2009

Date

Refuge Manager

Title

IX. Reviewing Ecological Services Office Evaluation:

A. Concurrence X 3/16/09 ALTK Nonconcurrence _____

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

Signed 3/16/09

Signature Date

Assistant Field Sup. Boquerón Field Office

Title Office

Appendix VIII. Wilderness Review

The Wilderness Act of 1964 defines a wilderness area as an area of federal land that retains its primeval character and influence, without permanent improvements or human inhabitation, and is managed so as to preserve its natural conditions and which:

1) generally appears to have been influenced primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;

2) has outstanding opportunities for solitude or primitive and unconfined types of recreation;

3) has at least 5,000 contiguous roadless acres or is of sufficient size to make practicable its preservation and use in an unimpeded condition; or is a roadless island, regardless of size;

4) does not substantially exhibit the effects of logging, farming, grazing, or other extensive development or alteration of the landscape, or its wilderness character could be restored through appropriate management at the time of review; and

5) may contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

The lands within Sandy Point, Green Cay, and Buck Island NWRs were reviewed for their suitability in meeting the criteria for wilderness, as defined by the Wilderness Act of 1964.

Sandy Point NWR

1. While the influence of nature is certainly evident in the refuge's shrubland and woodland, beaches, mangroves, and salt pond – as well as its wildlife – so is man's imprint, in the form of the unpaved refuge road, a Coast Guard tower, and the sights and sounds of human activities and infrastructure just outside the refuges' boundaries. When visitation is allowed, the refuge's road and beaches are quite busy. The refuge does not meet Wilderness criterion #1.

2. Opportunities for solitude and primitive types of recreation are very limited to nonexistent at Sandy Point. The refuge does not meet Wilderness criterion #2.

3. With a total area of 383 acres traversed by a road, the refuge is well under the standard Wilderness threshold of 5,000 contiguous, roadless acres of wildlands. The refuge does not meet Wilderness criterion #3.

4. Much of the vegetative cover on the refuge is second-growth scrub and shrub and modified dry forest. Over time, native vegetative communities could be restored to the site. The refuge could conceivably meet Wilderness criterion #4.

5. The refuge hosts rare and endangered wildlife, in particular nesting sea turtles, colonies of brown pelicans and least terns, as well as the endangered Vahl's boxwood. Its sandy beach formation is also unique and dynamic but stable. The Aklis archaeological site is a very important cultural resource. Thus, the refuge does contain outstanding features of ecological, geological, scientific, educational, scenic, and historic value, and therefore it does meet Wilderness criterion #5.

Overall, the lands within Sandy Point NWR do not meet three of the five Wilderness criteria. Therefore, the suitability of refuge lands for wilderness designation is not further analyzed in this CCP.

Green Cay NWR

1. Green Cay is encircled by coral reefs, bathed by the gentle blue waters of the Caribbean Sea, stroked by continuous waves and caressed by the breeze. Nature's influence is all around. Yet so is man's imprint. The developed shoreline of St. Croix is only a few hundred yards away and easily visible from virtually the entire Cay. The sound and sight of boat traffic, both small and mid-sized vessels, as well as jet skis, is nearly constant because of the proximity of the Green Cay Marina. Planes are regularly seen and heard overhead. Thus, Green Cay NWR does not meet Wilderness criterion #1.

2. Opportunities for solitude and primitive types of recreation are very limited to nonexistent at Green Cay due to the factors described in #1. The refuge does not meet Wilderness criterion #2.

3. With a total area of just 14 acres, the refuge is well under the standard Wilderness threshold of 5,000 contiguous, roadless acres of wildlands. The refuge does not meet Wilderness criterion #3.

4. The refuge was deforested a long time ago, and today is covered mostly with second-growth scrub-shrub, a remnant, emaciated dry forest and ruderal turf. Over time, native vegetative communities could be restored to the site. Thus, the refuge could conceivably meet Wilderness criterion #4.

5. The refuge hosts rare and endangered wildlife, in particular the critically endangered St. Croix ground lizard (a permanent resident) and occasional nesting colonies of brown pelicans, the Caribbean race of which is also endangered. In addition, the Cay has a prehistoric shell midden that represents an important cultural resource. Thus, the refuge does contain outstanding features of ecological, geological, scientific, educational, scenic, and historic value, and therefore it does meet Wilderness criterion #5.

Overall, the lands within Green Cay NWR do not meet three of the five Wilderness criteria. Therefore, the suitability of refuge lands for wilderness designation is not further analyzed in this CCP.

Buck Island NWR

1. Like Green Cay, Buck Island is surrounded by coral reefs and the Caribbean Sea, as well as continually subjected to wave and wind action. Nature's influence abounds, yet man's imprint omnipresent as well. The largest city in the USVI, Charlotte Amalie on St. Thomas, is about 3 miles to the north and easily visible from virtually the entire island. The sight and sound of boat and plane traffic is nearly incessant. Two lighthouses, one historic and the other contemporary, stand atop the island. Thus, Green Cay NWR does not meet Wilderness criterion #1.

2. Opportunities for solitude and primitive types of recreation are virtually nonexistent at Buck Island due to the factors described in #1. In addition, the waters immediately surrounding the island are visited by literally hundreds of snorkelers and scuba divers arriving by dozens of boats every day. The refuge does not meet Wilderness criterion #2.

3. With a total area of just 45 acres, the refuge is well under the standard Wilderness threshold of 5,000 contiguous, roadless acres of wildlands. The refuge does not meet Wilderness criterion #3.

4. Buck Island was deforested many years ago. Today it appears vegetated with shrubland and grassland interspersed with patches of poorly developed subtropical dry forest or woodland. Over time, native vegetative communities could be restored to the site. Thus, the refuge could conceivably meet Wilderness criterion #4.

5. The refuge hosts rare wildlife, in particular the brown pelican, Caribbean roseate tern, peregrine falcon, slipper back skink, and wooly nipple cactus. In addition, Buck Island has a historic lighthouse. Thus, the refuge does contain outstanding features of ecological, geological, scientific, educational, scenic, and historic value, and therefore it does meet Wilderness criterion #5.

Overall, the lands within Buck Island NWR do not meet three of the five Wilderness criteria. Therefore, the suitability of refuge lands for wilderness designation is not further analyzed in this CCP.

Appendix IX. Refuge Biota

BUCK ISLAND NWR

BIRDS

Common Name	Scientific Name
Brown Pelican	*Pelecanus occidentalis*
Red-bill Tropicbird	*Phaethon aethereus*
Magnificent Frigatebird	*Fregata magnificens*
Laughing Gull	*Leucophaeus atricilla*
Bridled Tern	*Onychoprion anaethetus*
Sooty Tern	*Onychoprion fuscatus*
American Oystercatcher	*Haematopus palliatus*
Brown Booby	*Sula leucogaster*
Zenaida Dove	*Zenaida aurita*
Common Ground Dove	*Columbina passerina*
Green-throated Carib	*Eulampis jugularis*
Pearly-eyed Thrasher	*Margarops fuscatus*
Peregrine Falcon	*Falco peregrinus*
Red-tailed Hawk	*Buteo jamaicensis*

REPTILES

Common Name	Scientific Name
Hawksbill Sea Turtle	*Eretmochelys imbricata*
Green Sea Turtle	*Chelonia mydas*
Slipperyback Skink	*Mabuya sloanii*
Puerto Rican Racer	*Alsophis portoricensis*
Crested Anole	*Anolis cristatellus*
Dwarf Gecko	*Sphaerodactylous macrolepis*
Wood Slave	*Hemidactylus mabouia*

MAMMALS

Common Name	Scientific Name
Black Rat	*Rattus rattus*
Norway Rat	*Rattus norvegicus*
Bats (one or more unidentified species)	N/A

PLANTS

Common Name	Scientific Name
Frangi pani	*Plumeria alba*
Pink Cedar	*Tabebuia heterophylla*
Pigeon berry	*Bourreria succulenta*
Orange manjack	*Cordia ricksecker*i
Casha	*Acacia tortuosa*
Stink cashsa	*Acacia macracantha*
Tan-tan	*Leucaena leucacephala*
Bread and cheese	*Pithecellobium ungui-cati*
Water mampoo	*Pisonia subcordota*
Black mampoo	*Guapira fragrans*
Pain killer	*Morinda citrifolia*
	Cordia stenophylla
Manchenil	*Hippomane mancinella*
Sea grape	*Cocoloba uvifera*
Jamaican caper	*Capparis indica*
Limber caper	*Capparis flexuosa*
	Heliotropium turnatum
	Rochefortia acanthopora
	Tournefortia seabra
Jumping cactus	*Opuntia repens*
Prickly pear cactus	*Opuntia rubescens*

Common Name	Scientific Name
Prickly pear	*Opunita dillenii*
Dildo cactus	*Pilosocereus royenii*
Wooly nipple cactus	*Mammilaria nivosa*
Turk's Cap	*Melacactus intortus*
	Commelina diffusa
Beach morning glory	*Ipomea pes-caprae*
	Cyperus planifolius
	Erythoxylum rotundifolium
	Adelia ricinella
	Croton flavens
Bushy spurge	*Euphorbia articulata*
	Desmanthus virgatus
	Aloe vera
	Stigmaphyllon periplocifolium
	Ficus citrifolia
	Boerhavia diffusa
Sea shore crab grass	*Sporobolus virginicus*
Guinea grass	*Urchloa maximum*
	Tillandsia
	Torniforcia microphylla
Yellow alder	*Turnera ulmifolia*

GREEN CAY NWR

BIRDS

Common Name	Scientific Name
Brown Pelican	*Pelecanus occidentalis*
Least Tern	*Sternula antillarum*
Wilson's Plover	*Charadrius wilsonia*
American Oystercatcher	*Haematopus palliatus*
White Cheek Pintail	*Anas bahamensis*
Ruddy Turnstone	*Arenaria interpres*
Little Blue Heron	*Egretta caerulea*
Cattle Egret	*Bubulcus ibis*
Great Egret	*Ardea alba*
Magnificent Frigatebird	*Fregata magnificens*
White Crowned Pigeon	*Patagioenas leucocephala*
Common Ground Dove	*Columbina passerina*
Zenaida Dove	*Zenaida aurita*
Yellow Warbler	*Dendroica petechia*
Gray Kingbird	*Tyrannus dominicensis*
Red Legged Thrush	*Turdus plumbeus*
Antillean Crested Hummingbird	*Orthorhyncus cristatus*
Green Throat Carib	*Eulampis jugularis*
American Kestrel	*Falco sparverius*
Peregrine Falcon	*Falco peregrinus*
Belted Kingfisher	*Megaceryle alcyon*
Osprey	*Pandion haliaetus*

REPTILES

Common Name	Scientific Name
St. Croix Ground Lizard	*Ameiva polops*
Crested Anole	*Anolis cristatellus*
Dwarf Gecko	*Sphaerodactylous macrolepis*
Slipperyback Skink	*Mabuya sloanii*
Wood Slave	*Hemidactylus mabouia*
Hawksbill Sea Turtle	*Eretmochelys imbricata*
Green Sea Turtle	*Chelonia mydas*

MAMMALS

Common Name	Scientific Name
Black Rat	*Rattus rattus*
Norway Rat	*Rattus norvegicus*

SANDY POINT NWR

BIRDS

Common Name	Scientific Name
Brown Pelican	*Pelecanus occidentalis*
Least Tern	*Sternula antillarum*
Wilson's Plover	*Charadrius wilsonia*
American Oystercatcher	*Haematopus palliatus*
White Cheek Pintail	*Anas bahamensis*
Ruddy Turnstone	*Arenaria interpres*
Little Blue Heron	*Egretta caerulea*
Cattle Egret	*Bubulcus ibis*
Great Egret	*Ardea alba*
Magnificent Frigatebird	*Fregata magnificens*
White Crowned Pigeon	*Patagioenas leucocephala*
Common Ground Dove	*Columbina passerina*
Zenaida Dove	*Zenaida aurita*
Yellow Warbler	*Dendroica petechia*
Gray Kingbird	*Tyrannus dominicensis*
Red Legged Thrush	*Turdus plumbeus*
Antillean Crested Hummingbird	*Orthorhyncus cristatus*
Green Throat Carib	*Eulampis jugularis*
American Kestrel	*Falco sparverius*
Peregrine Falcon	*Falco peregrinus*
Belted Kingfisher	*Megaceryle alcyon*
Osprey	Pandion haliaetus

REPTILES AND AMPHIBIANS

Common Name	Scientific Name
Crested Anole	*Anolis cristatellus*
Dwarf Gecko	*Sphaerodactylous macrolepis*
Blind Snake	*Typhlops richardii*
Legless Lizard	*Amphisbaenia fenestrata*
Wood Slave	*Hemidactylus mabouia*
Hawksbill Sea Turtle	*Eretmochelys imbricata*
Green Sea Turtle	*Chelonia mydas*
Leatherback Sea Turtle	*Dermochelys coriacea*
Mute frog	*Eleutherodactylus lentus*

MAMMALS

Common Name	Scientific Name
Javan mongoose	*Herpestes javanicus*
Black Rat	*Rattus rattus*
Norway Rat	*Rattus norvegicus*
Feral Dog	*Canis domesticus*
Feral Cat	*Felis catus*

Appendix X. Consultation and Coordination

This appendix summarizes the consultation and coordination that occurred in identifying the issues, alternatives, and proposed alternatives for the Sandy Point, Green Cay, and Buck Island NWRs, which were presented in the Draft CCP/EA. The meetings, contacts, and presentations described below were undertaken by the Fish and Wildlife Service during the preparation of the Draft CCP/EA.

Early planning for the three refuges began with a biological review and a visitor services review, which were conducted in 2002 and 2003, respectively. The biological review covered all nine refuges in the Caribbean Islands NWR Complex, including the three covered by this CCP. The visitor services review, on the other hand, covered Sandy Point NWR, the only one of the three Virgin Islands refuges with significant public use and with management of that use.

In the biological review, a diverse team of federal and territory personnel undertook a comprehensive examination of the habitat and wildlife management programs at the nine refuges of the Caribbean NWR Complex. The team then considered how each refuge might fit into accomplishing a number of relevant system-wide and landscape conservation needs. The biological review team included staff from the refuge, as well as Service fish and wildlife biologists from the Division of Ecological Services and Division of Migratory Birds. The team's goals and objectives, which are set forth in its final report entitled, *Caribbean Islands National Wildlife Refuge Complex Biological Review*, were instrumental in the planning process.

The visitor services review was conducted by several public use and outreach specialists from the Service. The visitor services review team toured the Sandy Point NWR, identified and discussed the current status of the refuge's public use programs, and debated the pros and cons of various recommendations for enhancing and improving these programs.

Work on developing the Draft CCP/EA for the three refuges was initiated in late 2006 with a site visit and kickoff meeting between the refuge manager and a contractor assisting the Service with CCP preparation. In early 2007, another meeting was held that included refuge staff, Caribbean NWR Complex staff, the refuge supervisor and the CCP contractor. This group discussed the composition of the core planning team, which would draft the visions, goals, objectives, and management alternatives for all three refuges. Representatives from the Virgin Islands Department of Planning and Natural Resources, Division of Fish and Wildlife, and two nongovernmental organizations—the West Indies Marine Animal Research and Conservation Service (WIMARCS) and the St. Croix Environmental Association (SEA)—were invited to join the core planning team. A notice of intent to prepare a comprehensive conservation plan for the Sandy Point, Green Cay, and Buck Island NWRs was published in the *Federal Register* on March 12, 2007.

The core planning team held two public scoping meetings, one in Charlotte Amalie, St. Thomas, on June 5, 2007, and the other in Christiansted, St. Croix, on June 7, 2007. Both of these public scoping meetings were advertised beforehand and both were well attended. Three local newspapers reported on the results of the meetings, further informing the public of the proceedings and the comprehensive planning process for the three refuges.

The Draft CCP/EA was released to the public in September 2009. In late February 2010, public meetings to receive comments on the Draft CCP/EA were held on St. Thomas and St. Croix.

The members of the Core CCP Planning Team, the Biological Review Team, and the Visitor Services Review Team are listed below.

CORE CCP PLANNING TEAM

The Core CCP Planning Team for the Sandy Point, Green Cay, and Buck Island NWRs consisted of the following members:

- Mike Evans, FWS, Sandy Point NWR
- Claudia Lombard, FWS, Sandy Point NWR
- Amy Mackay, FWS, Sandy Point NWR
- Al Woodson, FWS, Sandy Point NWR
- Susan Silander, FWS, Caribbean Islands NWR Complex
- Joe Schwagerl, FWS, Caribbean Islands NWR Complex
- Dave Olsen, Virgin Islands Department of Planning and Natural Resources
- Jen Valiulis, Virgin Islands Department of Planning and Natural Resources
- Toby Tobias, Virgin Islands Department of Planning and Natural Resources
- Will Coles, Virgin Islands Department of Planning and Natural Resources
- Steve Garner, West Indies Marine Animal Research and Conservation Service
- Carol Cramer-Burke, St. Croix Environmental Association
- Leon Kolankiewicz, Mangi Environmental Group

BIOLOGICAL REVIEW TEAM

A number of individuals supported the planning process through participation on the biological review team and other special topic discussions. Their comments, suggestions, and professional expertise were useful in developing the wildlife management and habitat management goals and objectives presented in this plan. Some members internal to the Service provided additional policy guidance in developing the CCP, as well.

- Steve Earsom, FWS, Caribbean Islands NWR Complex, Puerto Rico
- Cal Garnett, FWS, Southeast Regional Office, Atlanta, Georgia (Retired)
- Chuck Hunter, FWS, Southeast Regional Office, Atlanta, Georgia
- Claudia Lombard, FWS, Caribbean Islands NWR Complex, St. Croix
- Felix Lopez, FWS, Ecological Services Field Office, Boqueron, Puerto Rico
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- Joe Schwagerl, FWS, Caribbean Islands NWR Complex, Puerto Rico
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- Craig Watson, FWS, Atlantic Coast Joint Venture, Charleston, South Carolina
- Keith Watson, FWS, Nongame Migratory Birds, Asheville, North Carolina
- Beverly Yoshioka, FWS, Ecological Services Field Office, Boqueron, Puerto Rico

VISITOR SERVICES REVIEW TEAM

Three individuals with expertise in the Service's public use and outreach programs contributed comments and recommendations on the visitor services program at Sandy Point NWR.

- Garry Tucker, FWS, Southeast Regional Office, Atlanta, Georgia
- Ray Paterra, FWS, White River NWR
- Gisella Burgos, FWS, Okefenokee NWR

Appendix XI. Finding of No Significant Impact

Introduction

The U.S. Fish and Wildlife Service proposes to protect and manage certain fish and wildlife resources in the U.S. Virgin Islands, through the Sandy Point National Wildlife Refuge (St. Croix), Green Cay National Wildlife Refuge (St. Croix), and Buck Island National Wildlife Refuge (St. Thomas). An Environmental Assessment was prepared to inform the public of the possible environmental consequences of implementing the Comprehensive Conservation Plan (CCP) for Sandy Point, Green Cay, and Buck Island NWRs. A description of the alternatives, the rationale for selecting the preferred alternatives, the environmental effects of the preferred alternatives, the potential adverse effects of the actions, and a declaration concerning the factors determining the significance of effects, in compliance with the National Environmental Policy Act of 1969, are outlined below. The supporting information can be found in the Environmental Assessment, which was Section B of the Draft Comprehensive Conservation Plan.

Sandy Point NWR

Alternatives

In developing the CCP for Sandy Point NWR, the Service evaluated four alternatives:

The Service adopted Alternative D, the "Preferred Alternative," as the CCP to guide the direction of the refuge for the next 15 years. The overriding concern reflected in this CCP is that wildlife conservation, especially management and protection of endangered sea turtles, assumes first priority in refuge management; wildlife-dependent recreational uses are allowed if they are compatible with wildlife conservation. Wildlife-dependent recreation uses (e.g., fishing, wildlife observation, wildlife photography, and environmental education and interpretation) will be emphasized and encouraged.

Alternative A, No Action Alternative

Alternative A represented the status quo, that is, no change from current management: wildlife and habitat management, public use and visitor services would all remain the same as at present. The overall management emphasis of the refuge would continue to be the recovery of populations of threatened and endangered animal species, particularly the endangered leatherback sea turtle. Alternative A would also continue to protect cultural resources, especially the significant Aklis archaeological site.

Existing opportunities would continue for controlled observation of nesting leatherback turtles and hatchlings, as well as limited opportunities for bird watching. We would complete and open the new refuge headquarters to the public as a visitor contact station. Beach access would remain from 10 a.m. to 4 p.m. on weekends outside of the seasonal closure for leatherback turtle nesting.

Alternative B, Expanded Visitor Opportunities

Alternative B would emphasize expanded visitor opportunities and public use at Sandy Point NWR. Under this alternative, we would eliminate the refuge's seasonal beach closure – and allow the public to frequent the beach year-round on weekends during daylight hours – but continue saturation tagging of leatherback turtles, though with reduced nest management. We would continue night-time beach closures to protect turtles and nests from poaching and predation, and we would also continue to monitor nesting turtles. With regard to habitat and cultural resources management, Alternative B is almost identical to Alternative A.

Under this alternative, the refuge would expand its headquarters and visitor contact station or a nearby site into a full-fledged visitor center, including exhibits and a theatre. We would allow pedestrian access to the beach from 10 a.m. to 4 p.m. on weekends during the entire year. Adding a park ranger position would allow the refuge to increase education, outreach, and cooperative efforts. Within 15 years of CCP approval, the refuge would construct and begin to operate a visitor center distinct from the refuge headquarters and maintenance facility.

Alternative C, Exclusive Biological Program Emphasis
Under Alternative C, Sandy Point NWR would exclusively emphasize its biological program. Visitor services and public use would be reduced. Except for the headquarters and visitor contact station near the refuge entrance, the refuge would be closed to the public all year, as is the case at Green Cay NWR, in order to protect highly sensitive species of fauna.

With regard to the endangered leatherback sea turtle, Alternative C would be identical to current management direction (Alternative A). To encourage recovery of the hawksbill and green sea turtles, the refuge would begin saturation tagging and nest management. The refuge's year-round closure would reduce potential disturbance of nesting least terns, as well as other landbirds, shorebirds, and waterbirds.

Alternative C would begin to conduct status surveys for reptile and amphibian species of special concern, including bats and invertebrates. Bats would further benefit from habitat enhancement and installation of artificial nest structures. Further, we would implement refuge-wide control of non-native, invasive plants and animals as needed.

Alternative C would accelerate efforts to restore the structure, function and diversity of dry forest habitat. The refuge would also actively cooperate with the U.S. Geological Survey and other agencies to monitor sea level rise and its impacts on habitats.

Alternative D, Enhanced Biological and Visitor Service Programs (Preferred Alternative)
Alternative D will endeavor to enhance both the biological and visitor service programs at Sandy Point NWR. This is the Service's preferred alternative and is the basis for the objectives and strategies in Chapter IV of the CCP.

Recovery efforts for the endangered leatherback sea turtle will be the same as Alternative A. We will pursue hawksbill and green turtle recovery by implementing saturation tagging and nest management. We will continue to protect pelican roosting sites and manage least tern nesting sites, aiming to increase the number of nesting least terns. Landbirds, shorebirds, and waterbirds will benefit as well.

We will begin to conduct status surveys for invertebrates, and reptile and amphibian species of special concern. The presence or absence of bats will also be surveyed, we will enhance habitat and install artificial nest structures for bats. Refuge-wide control of non-native flora and fauna to protect indigenous flora and fauna will be carried out as needed.

The refuge will accelerate efforts to restore the structure, function and diversity of dry forest habitat. We will begin to actively monitor status and trends on West End Salt Pond as they affect mangroves, wetlands, and wildlife habitat. We will not only protect existing stands and specimens of Vahl's boxwood, but will also conduct recovery activities. Furthermore, we will investigate the potential for establishing a *Catesbaea melanocarpa* population on the refuge. We will actively cooperate with the U.S. Geological Survey and other agencies to develop and implement protocols for monitoring sea level rise and its impacts on habitats.

Under Alternative D, we will continue to manage and protect cultural resources, particularly the Aklis archaeological site. In addition, within 15 years of the date of this CCP, we will develop and begin to implement a Cultural Resources Management Plan.

Public use and visitor services will expand somewhat, though not as much as Alternative B, with its visitor emphasis. The refuge will develop an accessible trail and observation deck with expansive views of the salt pond. We will aim to develop environmental education and interpretive opportunities around the new refuge headquarters and a new visitor center constructed in the vicinity. Alternative D will continue to allow access to the beach from 10 a.m. to 4 p.m. on weekends outside of seasonal closure for leatherback turtle nesting. If staffing permits, this alternative will also provide pedestrian access to the beach during the entire week from 9 a.m. to 5 p.m., outside of the seasonal closure for turtle nesting.

We will continue the existing education and outreach program, such as the turtle watch program, YCC program, periodic news releases, news media interviews, website content, school visits, informal face-to-face contact with refuge visitors, and continuing development of the visitor contact station. Education and outreach efforts will increase. The YCC program will be maintained and expanded in size for two months during the summer. There will be more emphasis on developing partnerships and volunteers. Existing partnerships will continue and we will attempt to expand on existing partnerships and encourage development of a Friends of Sandy Point NWR organization. Within 15 years of the date of this CCP, Sandy Point NWR will add a visitor center distinct from, but close to, the refuge headquarters and maintenance facility.

Selection Rationale

The Service selected Alternative D as its preferred alternative for Sandy Point NWR. This choice is reflected in the CCP. While each of the alternatives provided in varying degrees for wildlife, habitat, and public use, Alternative D was more ambitious than Alternative A, supporting more wildlife and habitat management than Alternative B and more public use than Alternative C.

Environmental Effects of Implementing the CCP

Implementation of the Service's management action is expected to result in biophysical, social, and economic effects as outlined in the CCP. Habitat management, population management, land conservation, and visitor service management activities on Sandy Point NWR will result in mostly beneficial impacts on habitat, wildlife, and public use. These effects are detailed as follows:

The refuge leatherback population will likely continue its long-term recovery but at a slower rate, as indicated by recent trends, tagging data and studies. Likewise, stable or growing refuge populations of hawksbill and green turtles will be expected. In addition, long-term knowledge gained about refuge populations from saturation tagging may assist long-term viability on refuge. A stable or increasing population of brown pelicans at roost sites is considered likely. Similarly, stable or increasing numbers of nesting least terns on the refuge are expected. Landbirds, shorebirds, and waterbirds are likely to benefit more than in the No Action Alternative.

Amphibians and reptiles likely to benefit to some extent from continued protection and knowledge gained by increased surveys. Bat populations may benefit and increase both from habitat enhancement and installation of artificial nest structures. No change is predicted in the size of invertebrate populations on the refuge, though improved knowledge may benefit long-term management of invertebrates. Invasive animal species will continue to be a problem requiring long-term control.

The structure, function, and diversity of dry forest habitat would continue to increase at a faster pace than under the No Action Alternative. Monitoring the status and trends on West End Salt Pond related to mangroves, wetlands, and wildlife habitat will increase knowledge and provide insights for possible management actions. A proposed nursery germination and planting of *Buxus vahlii* will likely increase the number of specimens of this endangered plant species. In addition, a population of *Catesbaea melanocarpa* could be established on the refuge. A step-down plan on invasive plant control will provide for more comprehensive and perhaps effective treatment.

Sea level rise, and the impacts from sea level rise, are expected to occur, but to a relatively minor extent over the 15-year life of the plan. Impacts of this sea level rise on nesting sea turtles are uncertain, but not likely to be beneficial. Over the long term, sea level rise and climate change are anticipated to have much more pronounced effects on the refuge's habitats. Proposed monitoring could potentially help the refuge mitigate possible adverse impacts of sea level rise on beach habitat and nesting turtles.

Cultural resources, particularly the Aklis archaeological site, will continue to be protected from human activity, but not natural processes. Shoreline erosion will continue to damage the Aklis site. However, a step-down cultural resources management plan will lead to increased knowledge and perhaps could result in greater protection of cultural resources.

The CCP will benefit visitors by increasing access, facilities, and services. Anglers will benefit from expanded access and hours. Opportunities for wildlife observation and photography will increase, providing a benefit to refuge visitors. Expanded environmental education and interpretive opportunities will likewise represent a greater benefit to the public. The seasonal closure for turtle nesting will continue, but expanded daylight access during week will represent a modest benefit to the public. Regular patrols and law enforcement presence will continue to provide visitors with a sense of security and minimize both violent crime and property crimes, but these will not altogether disappear.

Increased efforts and collaboration with the public will likely yield greater benefits. Expanded partnerships and greater use of volunteers will also increase mutual benefits.

Green Cay NWR

Alternatives

In developing the CCP for Green Cay NWR, the Service evaluated two alternatives:

The Service selected Alternative B as its preferred alternative for Green Cay NWR. This choice is reflected in the CCP. While both alternatives will provide for wildlife and habitat, Alternative B will yield greater wildlife and habitat benefits overall than Alternative A, particularly for the St. Croix ground lizard, on whose behalf the refuge was originally established. Alternative B will also offer greater opportunities for the public, even while maintaining the general refuge closure.

Alternative A, No Action Alternative

Under Alternative A, current management direction would be maintained at Green Cay NWR. To promote recovery of the endangered St. Croix ground lizard, we would continue existing programs of reforestation, and rat and invasive plant control and population monitoring. We would also maintain closure of the island to public access to avoid the accidental direct mortality and habitat degradation this might cause.

We would also continue management efforts on behalf of nesting and roosting brown pelicans and white-crowned pigeons. Habitat recovery efforts would proceed as at present: we would continue to reforest the island using native tree species. An important part of habitat recovery would involve control of invasive species of plants and animals that damage habitat, such as the rat.

Alternative A would continue to manage Green Cay's cultural resources consistent with Section 106 of the National Historic Preservation Act. To conduct outreach and education, we would carry on maintaining the refuge website, distributing information, maintaining limited signage on the island identifying it as a national wildlife refuge closed to the public, and conducting periodic presentations off-refuge.

Alternative B, Preferred Alternative
In general, Alternative B for Green Cay NWR will maintain all programs of Alternative A and build on or expand them. To promote recovery of the endangered St. Croix ground lizard, Alternative B will continue existing programs of reforestation, and rat and invasive plant control and population monitoring. We will also maintain closure of the island to public access to avoid the accidental direct mortality and habitat degradation this might cause. In addition, we will develop a habitat restoration plan within 3 years of the date of this CCP, with the aim of improving the quality of the habitat for the ground lizard.

We will continue management efforts on behalf of nesting and roosting brown pelicans and white-crowned pigeons. Habitat recovery (reforestation) efforts will proceed, but at an accelerated rate, so as to complete 100 percent of the area intended for reforestation by the end of the 15-year planning period. An important part of accelerating habitat recovery will be to increase the control of invasive plants and invasive animals.

Alternative B will continue to protect and manage Green Cay's cultural resources. Also, we will develop and begin to implement a cultural resources management plan. To conduct outreach and education, we will continue to maintain the refuge website, distribute information, maintain signage on the island identifying it as a national wildlife refuge closed to the public, and conduct periodic presentations off-refuge. Under Alternative B, these efforts will be augmented by installing larger signs that could be seen and read from a greater distance, expanding outreach efforts to nearby hotels, and considering alternatives to visitation within the refuge itself, such as offering or promoting boat and kayak tours around the island.

Selection Rationale
The Service selected Alternative B as its preferred alternative for Green Cay NWR. This choice is reflected in the CCP. While both alternatives will provide for wildlife and habitat, Alternative B will yield greater wildlife and habitat benefits overall than Alternative A, particularly for the highly endangered St. Croix ground lizard, for which the refuge was established. Alternative B will also offer greater opportunities for the public, even while maintaining the general refuge closure.

Environmental Effects of Implementing the Plan
Implementation of the Service's management action is expected to result in biophysical, social, and economic effects as outlined in this CCP. Habitat management, wildlife population management, and land conservation activities on Green Cay NWR will result in mostly beneficial impacts on habitat, wildlife, and public appreciation. These effects are detailed as follows:

A gradual increase in the population size and viability of the St. Croix ground lizard is expected to continue under this CCP, although due to the relatively small size of the sanctuary and population, it will remain vulnerable to various uncontrollable factors such as disease or extreme weather events like

hurricanes. Restored forest habitat and continued closure of the Cay to visitation, thus avoiding trampling and disturbance by humans, will advance the continuing recovery of this highly endangered species. Implementation of a habitat restoration plan could result in faster habitat restoration and improved prospects for the St. Croix ground lizard.

Use of the island by both brown pelicans and white-crowned pigeons as a rookery and nesting colony will continue and may increase under this CCP. This will be promoted by the accelerated reforestation of the island with native tree species from an intensified program of active replanting. The CCP will continue the suppression and removal of invasive plants at a faster pace. Invasive animals, especially rats, will also continue to be controlled as infestations reoccur. Invasive plants will dominate a smaller portion of the Cay by the end of the 15-year planning horizon.

Cultural resources will continue to be protected from human disturbance but not natural processes, like weathering and erosion. In addition, implementation of a cultural resources management plan will likely improve knowledge and protection of the Cay's cultural resources. The refuge will remain closed to direct public visitation opportunities to maximize protection for the St. Croix ground lizard. None of the priority public uses as identified in the National Wildlife Refuge System Improvement Act of 1997 will be allowed directly on the Cay itself, because of the potential threat they could pose to the ground lizard. However, guided tours around the island by kayak or small boat – offered either by staff or ecotourism companies – will bring visitors to within close proximity of Green Cay. Occasional, brief episodes of trespass by unauthorized visitors, especially at the small beach on the southern edge of Green Cay, are not expected to pose a significant threat to the ground lizard. Increased outreach and educational efforts and collaboration with partners and the community could likely yield greater benefits in terms of public awareness and appreciation of the refuge's mission and purposes.

Buck Island NWR

Alternatives

In developing the CCP for Buck Island NWR, the Service evaluated two alternatives:

The Service selected Alternative B as its preferred alternative for Buck Island NWR. This choice is reflected in the CCP. While both alternatives will result in benefits to some extent for wildlife, habitat, and public use, Alternative B is more ambitious than Alternative A, and will thus yield greater benefits for both wildlife and the public.

Alternative A, No Action Alternative

In Alternative A, there would continue to be no active management of the slipperyback skink, Puerto Rican racer, or other herptiles on Buck Island NWR. Nor would there be active management of the magnificent frigatebird and the red-billed tropicbird. The Service would continue to monitor for rat reinvasions, after having eliminated rats from the island several years ago in an active trapping program. Other than controlling invasive species such as rats, we would not conduct any active habitat restoration on the island. There would be no active control program for invasive plant species.

The refuge would continue to manage cultural resources from afar, particularly the historic lighthouse. Staff would also continue to maintain the refuge website, distribute information, maintain limited signage on the island, and make periodic presentations off-refuge, primarily on St. Thomas.

Partnerships and volunteers would remain important to the refuge under this alternative. We would continue to cooperate with the Virgin Islands Department of Planning and Natural Resources on joint wildlife and habitat management efforts for Buck Island and adjacent Capella Island.

Alternative B, Preferred Alternative
In general, Alternative B will maintain and expand upon all programs of Alternative A. This is the Service's preferred alternative for managing Buck Island NWR and is the basis for the objectives and strategies in Chapter IV.

Alternative B will strive to provide more active management of the island's indigenous wildlife, particularly species of concern. We will draft and begin to implement an Inventorying and Monitoring Plan for the slipperyback skink, Puerto Rican racer, magnificent frigatebird, and red-billed tropicbird.

We will continue to monitor for rat reinvasions. To pursue and promote habitat recovery on Buck Island NWR, we will develop and begin to implement a habitat restoration plan. The aim will be to increase control of invasive plants and invasive animals using appropriate means, as well as evaluating the effectiveness of different methods of control.

We will continue to manage cultural resources, particularly the historic lighthouse. However, we will also evaluate the condition and safety of the historic lighthouse and decide on the feasibility of preservation or restoration. In addition, we will develop and begin to implement a cultural resources management plan.

With regard to conducting outreach and education, we will continue to maintain the refuge website, distribute information, maintain limited signage on the island, and make periodic presentations off-refuge. Partnerships and volunteers will continue to be important for the refuge. We will continue to cooperate with the Virgin Islands Department of Planning and Natural Resources on joint wildlife and habitat management efforts for Buck Island and adjacent Capella Island. Also, we will expand cooperative education and interpretive efforts with the city of Charlotte Amalie and ecotourism companies which bring visitors to offshore waters to explore coral reefs. We will also explore development of a friends group to provide a more active management presence on island.

Selection Rationale
The Service selected Alternative B as its preferred alternative for Buck Island NWR. This choice is reflected in this CCP. While both alternatives will result in benefits to some extent for wildlife, habitat, and public use, Alternative B is more ambitious than Alternative A, and will yield greater benefits for both wildlife and the public.

Environmental Effects of Implementing the Plan
Implementation of the Service's management action is expected to result in biophysical, social, and economic effects as outlined in this CCP. Habitat management, wildlife population management, and land conservation activities on Buck Island NWR will result in mostly beneficial impacts on habitat, wildlife, and public appreciation. These effects are detailed as follows:

No major changes are predicted in amphibian or reptile populations over the course of this CCP. Similarly, magnificent frigatebird and red-billed tropicbird populations and use of the refuge are not expected to change. However, in the case of both birds and herptiles, implementation of an inventorying and monitoring plan for Antillean skink, Puerto Rican racer, magnificent frigatebird, and red-billed tropicbird will increase our knowledge and perhaps allow for better management decisions that improve these populations' viability.

With regard to invasive animal species, impacts could be the same as those expected under Alternative A. Rat reinvasion(s) could potentially recur, with negative consequences for native species, but any such reinvasions will be treated by an active trapping program and probably will be reversed (i.e., rats eradicated again). Implementing a habitat restoration plan for Buck Island NWR

will allow for more active, rapid habitat restoration. Such a plan will probably entail active replanting and some initial care for the successful restocking of native species. Increased control of invasive plants will reduce their adverse impacts on native flora and fauna.

Cultural resources, particularly the historic lighthouse, will continue to be protected from human disturbance but not natural processes such as weathering, storms, and aging materials. However, implementation of a cultural resources management plan will likely improve knowledge and protection of the lighthouse and other yet undiscovered cultural resources.

Opportunities for informal wildlife observation and photography on the island will continue. Existing informal trails will continue to be open and provide access around the island, but no formal visitor facilities or services will be provided. An expanded outreach program will increase the level of awareness and appreciation for the refuge among USVI and St. Thomas residents as well as tourists from the American mainland and elsewhere. The marine waters and coral reefs immediately surrounding the refuge will continue to be heavily used by ecotourism and diving businesses, and under this alternative, the refuge itself might receive more visitors, either informal or guided. There may be opportunities for increasing visitation, public use, and enjoyment through greater collaboration with private ecotourism ventures. Expanded partnerships with private and public entities will increase mutual benefits for all parties.

Potential Adverse Effects and Mitigation Measures at all Three Refuges

At each of the three refuges, the plan has some unavoidable impacts. These impacts are expected to be minor and/or short-term in duration. Restrictions on visitation at Sandy Point NWR and Green Cay NWR will be long-term, but are needed to protect the endangered species for which the refuges were established. However, the refuges will attempt to minimize these impacts whenever possible. The following sections describe the measures the refuges will employ to mitigate and minimize the potential impacts that could result from implementation of this CCP.

Water Quality from Soil Disturbance and Use of Herbicides
Soil disturbance and siltation due to water management activities; road maintenance; and the construction of observation towers, trail(s), and a visitor center is expected to be minor and of short duration. To further reduce potential impacts, the refuges will use best management practices to minimize the erosion of soils into water bodies.

Foot traffic on new and extended foot trails at Sandy Point NWR and Buck Island NWR is expected to have a negligible impact on soil erosion. To minimize the impacts from public use, the refuges will include informational signs that request trail users to remain on the trails, in order to avoid causing potential erosion problems.

Long-term herbicide use for exotic plant control could result in a slight decrease in water quality in areas prone to exotic plant infestation. Through the proper application of herbicides, however, this is expected to have a minor impact on the environment, with the benefit of reducing or eliminating exotic plant infestations.

Wildlife Disturbance
Disturbance to wildlife is an unavoidable consequence of any public use program, regardless of the activity involved. While some activities such as wildlife observation may be less disturbing than others, all of the public use activities proposed under the plan will be planned to avoid unacceptable levels of impact.

The known and anticipated levels of disturbance from the plan are not considered to be significant. Nevertheless, the refuges will manage public use activities to reduce impacts. Providing access for fishing opportunities allows the use of a renewable natural resource without adversely impacting other resources. General wildlife observation and interpretation may result in minimal disturbance to wildlife. If Sandy Point NWR determines that impacts from the expected additional visitor uses are above the levels that are anticipated, those uses will be discontinued, restricted, or rerouted to other less sensitive areas.

Vegetation Disturbance
Negative impacts could result from the creation, extension, and maintenance of trails that require the clearing of non-sensitive vegetation along their length. This is expected to be a minor short-term impact.

Increased visitor use at Sandy Point NWR and Buck Island NWR may increase the potential for the introduction of new exotic species into areas when visitors do not comply with requests to stay on trails. The refuges will minimize this impact by installing informational signs that request users to stay on the trails.

User Group Conflicts
As public use increases, unanticipated conflicts between different user groups could potentially occur. If this should happen, Sandy Point NWR will adjust its programs, as needed, to eliminate or minimize any public use issues. The refuge will use methods that have proven to be effective in reducing or eliminating public use conflicts. These methods include establishing separate use areas, different use periods, and limits on the numbers of users in order to provide safe, quality, appropriate, and compatible wildlife-dependent recreational opportunities.

Effects on Adjacent Landowners
Implementation of this CCP is not expected to negatively affect the owners of private lands adjacent to Sandy Point NWR. (Green Cay NWR and Buck Island NWR have no adjacent private landowners.) Positive impacts that could be expected include higher property values, less intrusion of invasive exotic plants, and increased opportunities for viewing more diverse wildlife.

To minimize potential impacts on adjacent landowners, the refuge will provide informational signs that clearly mark refuge boundaries; maintain the refuge's existing parking facilities; use law enforcement; and provide increased educational efforts at the refuge office and visitor contact station.

Land Ownership and Site Development
Land acquisition efforts by the Service at Sandy Point NWR could lead to changes in land use and recreational use patterns. However, most of the non-Service-owned lands within the refuge's approved acquisition boundary are currently undeveloped. If these lands are acquired as additions to the refuge, they will be maintained in a natural state, managed for native wildlife populations, and opened to wildlife-compatible public uses, where feasible.

Coordination

The management action has been thoroughly coordinated with all interested and/or affected parties. Parties contacted include:

All affected landowners
Congressional representatives
National Park Service
Governor of U.S. Virgin Islands

U.S. Virgin Islands Department of Planning and Natural Resources
Local community officials
Interested citizens
Conservation organizations

Findings

It is my determination that the management action does not constitute a major federal action significantly affecting the quality of the human environment under the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). As such, an environmental impact statement is not required. This determination is based on the following factors (40 CFR 1508.27), as addressed in the Environmental Assessment for Sandy Point, Green Cay, and Buck Island NWRs:

1. Both beneficial and adverse effects have been considered and this action will not have a significant effect on the human environment. (Environmental Assessment, pages 167-188)

2. The actions will not have a significant effect on public health and safety. (Environmental Assessment, page 169)

3. The project will not significantly affect any unique characteristics of the geographic area such as proximity to historical or cultural resources, wild and scenic rivers, or ecologically critical areas. (Environmental Assessment, pages 168-169)

4. The effects on the quality of the human environment are not likely to be highly controversial. (Environmental Assessment, pages 167-188)

5. The actions do not involve highly uncertain, unique, or unknown environmental risks to the human environment. (Environmental Assessment, page 169)

6. The actions will not establish a precedent for future actions with significant effects nor do they represent a decision in principle about a future consideration. (Environmental Assessment, pages 169, 185, 186)

7. There will be no cumulatively significant impacts on the environment. Cumulative impacts have been analyzed with consideration of other similar activities on adjacent lands, in past action, and in foreseeable future actions. (Environmental Assessment, page 187)

8. The actions will not significantly affect any site listed in, or eligible for listing in, the National Register of Historic Places, nor will they cause loss or destruction of significant scientific, cultural, or historic resources. (Environmental Assessment, page 168)

9. The actions are not likely to adversely affect threatened or endangered species, or their habitats. (Environmental Assessment, pages 169-182)

10. The actions will not lead to a violation of federal, state, or local laws imposed for the protection of the environment. (Environmental Assessment, pages 167-188)

Supporting References

Fish and Wildlife Service. 2009. Draft Comprehensive Conservation Plan and Environmental Assessment for Sandy Point, Green Cay, and Buck Island National Wildlife Refuges, United States Virgin Islands, Caribbean Islands National Wildlife Refuge Complex. U.S. Department of the Interior, Fish and Wildlife Service, Southeast Region.

Document Availability

The Environmental Assessment was Section B of the Draft Comprehensive Conservation Plan for Sandy Point, Green Cay, and Buck Island National Wildlife Refuges and was made available in August 2009. Additional copies are available by writing: Caribbean National Wildlife Refuge Complex, P.O. Box 510, Boqueron, Puerto Rico, 00622; or Sandy Point National Wildlife Refuge, 3013 Estate Golden Rock, Suite 137, Christiansted, St. Croix, USVI, 00820-4355.

Signed

Cynthia K. Dohner
Regional Director, Southeast Region

SEP 16 2010

Date

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