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# **Culebra National Wildlife Refuge**

*Culebra, Puerto Rico*

## **DRAFT COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL ASSESSMENT**

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

*Southeast Region*  
**Atlanta, Georgia**

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## SECTION A. DRAFT COMPREHENSIVE CONSERVATION PLAN

### *I. Background*

#### INTRODUCTION

The Culebra National Wildlife Refuge (NWR) is managed by the Fish and Wildlife Service (Service) as a part of the Caribbean Islands National Wildlife Refuge Complex (Complex). The Complex consists of nine separate refuge units, each having unique characteristics and resources. Three of the units, Sandy Point, Green Cay, and Buck Island National Wildlife Refuges, are located in the U.S. Virgin Islands. Culebra, Desecheo, Laguna Cartagena, Cabo Rojo, and Vieques National Wildlife Refuges are in Puerto Rico, and Navassa Island is an isolated island located approximately 40 miles west of Haiti. In 1909, Culebra was the first site in the Caribbean to be designated as a federal wildlife reserve for the protection of native birds.

This Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Culebra NWR was prepared to guide management actions and direction for the refuge. 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 refuge or the purposes for which it was established.

A planning team developed a range of alternatives that best met the goals and objectives of the refuge and that could be implemented within the 15-year planning period. This Draft CCP/EA describes the Service's proposed plan, as well as other alternatives considered and their effects on the environment. The Draft CCP/EA will be made available to commonwealth and federal government agencies, conservation partners, and the general public for review and comment. Comments from each entity will be considered in the development of the final CCP.

#### *PURPOSE AND NEED FOR THE PLAN*

The purpose of the plan is to develop a proposed action that best achieves the refuge purpose; attains the vision and goals developed for the refuge; contributes to National Wildlife Refuge System (Refuge System) mission; addresses key problems, issues and relevant mandates; and is consistent with sound principles of fish and wildlife management.

Specifically, the plan is needed to:

- Provide a clear statement of refuge management direction;
- Provide refuge neighbors, visitors, and government officials with an understanding of Service management actions on and around the refuge;
- Ensure that Service 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 budget requests for operations, maintenance, and capital improvement needs.

#### *FISH AND WILDLIFE SERVICE*

The Service traces its roots to 1871 and 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.

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The Service also traces its roots to 1886 and 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, Bureau of Fisheries, was combined with the Department of Agriculture, 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 Fish and Wildlife Service in 1974.

The Fish and Wildlife Service, working with others, 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 requirements of comprehensive conservation plans that are prepared for each unit of the Refuge System;

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- Maintain the biological integrity, diversity, and environmental health of the Refuge System; and
  - 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 allow refuge managers authority to determine compatible public uses.

The following are just a few examples of your 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 over-hunting, competition with cattle, and natural disasters decimated once-abundant herds. The drought conditions of the 1930s “Dust Bowl” severely depleted breeding populations of ducks and geese. Refuges established during the Great Depression focused on waterfowl production areas (i.e., protection 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 had begun to focus on establishing refuges for endangered species.

Approximately 38 million people visited national wildlife refuges in 2002, most to observe wildlife in their natural habitats. As the number of visitors grows, there are significant economic benefits to local communities. In 2001, 82 million people, 16 years and older, fished, hunted, or observed wildlife, generating \$108 billion. In a study completed in 2002 on 15 refuges, visitation had grown 36 percent in seven years. At the same time, the number of jobs generated in surrounding communities grew to 120 per refuge, up from 87 jobs in 1995, pouring more than \$2.2 million into local economies. The 15 refuges in the study were Chincoteague (Virginia); National Elk (Wyoming); Crab Orchard (Illinois); Eufaula (Alabama); Charles M. Russell (Montana); Umatilla (Oregon); Quivira (Kansas); Mattamuskeet (North Carolina); Upper Souris (North Dakota); San Francisco Bay (California); Laguna Atascosa (Texas); Horicon (Wisconsin); Las Vegas (Nevada); Tule Lake (California); and Tensas River (Louisiana) – the same refuges identified for the 1995 study. Other findings also validate the belief that communities near refuges benefit economically. Expenditures on food, lodging, and transportation grew to \$6.8 million per refuge, up 31 percent from \$5.2 million in 1995. For each dollar spent on the Refuge System, surrounding communities benefited with \$4.43 in recreation expenditures and \$1.42 in job-related income (Caudill and Laughland, unpubl. data).

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 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 develop and implement a process to ensure an opportunity for active public involvement in the preparation and revision (every 15 years) of the plans.

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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 Service 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. Select legal summaries of treaties and laws relevant to administration of the Refuge System and management of the Culebra NWR are provided in Appendix C.

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; and provide a framework for cooperation between Culebra NWR and other partners, such as the Commonwealth of Puerto Rico Department of Natural and Environmental Resources, non-governmental organizations, and private landowners, etc.

Lands within the Refuge System are closed to public use unless specifically and legally opened. No refuge use may be allowed 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 mandates set forth in the Improvement Act. Those mandates are to:

- Contribute to ecosystem goals, as well as refuge purposes and goals;
- Conserve, manage, and restore fish, wildlife, and plant resources and their habitats;
- Monitor the trends of fish, wildlife, and plants;
- Manage and ensure appropriate visitor uses as those uses benefit the conservation of fish and wildlife resources and 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. These uses are: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. As priority public uses of the Refuge System, they receive priority consideration over other public uses in planning and management.

### *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. The policy is an additional directive for refuge managers to follow while achieving refuge purpose(s) and the Refuge System mission. It provides for the consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found on refuges and associated ecosystems. When evaluating the appropriate management direction

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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, refuge role within an ecosystem, applicable laws, and best available science, including consultation with others both inside and outside the Service.

#### *NATIONAL AND INTERNATIONAL CONSERVATION PLANS AND INITIATIVES*

Multiple partnerships have been developed among government and private entities to address the environmental problems affecting regions. There is a large amount of conservation and protection information that 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 declining trends of natural, physical, social, and economic environments. The conservation guidance described below, along with issues, problems, and trends, was reviewed and integrated where appropriate into this Draft CCP/EA.

This Draft CCP/EA supports, among others, the Partners-in-Flight Plan, the North American Waterfowl Management Plan, the Western Hemisphere Shorebird Reserve Network, and the National Wetlands Priority Conservation Plan.

**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. Although the Puerto Rico - U.S. Virgin Island Bird Conservation Region, BCR 69, is not officially under the framework of the North American Bird Conservation Initiative, it is recognized officially by the Service as a discrete planning region for the conservation of bird habitats and bird populations in the Caribbean Basin.

**Atlantic Coast Joint Venture.** The Atlantic Coast Joint Venture (ACJV) is one of fourteen habitat Joint Venture partnerships in the United States. The ACJV brings together public and private agencies, conservation groups, and other partners focused on the conservation of habitat for native birds in the Atlantic Flyway of the United States from Maine south to Puerto Rico. When Puerto Rico became a member of the ACJV, a new bird conservation relationship began, a relationship extending throughout the Caribbean Basin, the Atlantic Flyway, and others parts of North America, and which is based on the conservation needs of shared species and hemispheric bird conservation values. New partnerships are evolving between universities, non-governmental organizations, and federal agencies to protect land and to provide better information on conservation efforts in Puerto Rico.

**North American Waterfowl Management Plan.** The North American Waterfowl Management Plan (NAWMP) is an international action plan to conserve migratory waterfowl throughout the continent. NAWMP's goal is to return waterfowl populations to their 1970s levels by conserving wetland and upland habitat. Canada and the United States signed the NAWMP in 1986 in reaction to critically low numbers of waterfowl. Mexico joined in 1994, making it a truly continental effort. The NAWMP is a partnership of federal, provincial/state and municipal governments, non-governmental 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 NAWMP's projects are international in scope, but implemented at regional levels. These projects contribute to the protection

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of habitat and wildlife species across the North American landscape. While the focus of the NAWMP is on the protection and management of waterfowl species and their habitat within the continental portions of Canada, the U.S. and Mexico, some of these species migrate to the Caribbean Islands and the Service supports the goals of the NAWMP wherever they occur.

**Partners-in-Flight Bird Conservation Plan.** The Partners-in-Flight Conservation Plan identifies physiographic areas that have been used to develop a scientifically based land bird conservation effort that ensures long-term maintenance of healthy populations of native land birds, primarily non-game land birds. Non-game land birds have been vastly under-represented in conservation efforts, and many are exhibiting significant declines. 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. The Plan recognizes the Caribbean Islands as important habitat for many of the priority species that also utilize the physiographic areas of the eastern U.S. and Canada.

**U.S. Shorebird Conservation Plan.** The U.S. Shorebird Conservation Plan is a partnership effort throughout the United States to ensure that stable and self-sustaining populations of shorebird species are restored and protected. The plan was developed by a wide range of agencies, organizations, and shorebird experts for separate regions of the country, and 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.** This 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, introduced predators and invasive species, pollutants, mortality from fisheries and industries, disturbance, and conflicts arising from 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, and interior least terns. A key objective of this plan is the standardization of data collection efforts to better recommend effective conservation measures.

## **RELATIONSHIP TO STATE WILDLIFE AGENCY**

A provision of the Improvement Act, and subsequent agency policy, is that the Service shall ensure timely and effective cooperation and collaboration with state fish and game agencies and tribal governments during the course of acquiring and managing refuges. State wildlife management areas and national wildlife refuges provide the foundation for the protection of species, and contribute to the overall health and sustainment of fish and wildlife species in the Commonwealth of Puerto Rico. Within Puerto Rico, the agency responsible for management of the commonwealth's natural resources is the Department of Natural and Environmental Resources (Puerto Rico DNER) <http://www.drna.gobierno.pr> .

The Puerto Rico DNER mission is to protect, conserve, and administer the natural and environmental resources of Puerto Rico in a balanced manner to guarantee future generations their enjoyment and to stimulate a better quality of life. To accomplish this mission, the Puerto Rico DNER administers forest reserves, marine reserves, and wildlife refuges throughout the commonwealth

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The commonwealth's participation and contributions throughout this planning process will provide for ongoing opportunities and open dialogue to improve the ecological sustainment of fish and wildlife in the Commonwealth of Puerto Rico. An essential part of the development of the comprehensive conservation plan is the integration of common mission objectives where appropriate.



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## *II. Refuge Overview*

### **INTRODUCTION**

In 1909, portions of the Culebra Archipelago were designated as a wildlife reserve in accordance with an Executive Order signed by President Theodore Roosevelt. Administration of the Culebra lands was the responsibility of the U.S. Navy and the wildlife reserve designation was subject to naval and lighthouse purposes. Several of the small islands of the archipelago, as well as the Flamenco Peninsula, were used for gunnery and bombing practice by the U.S. Navy and Marine Corps until their departure in 1976. The following year, portions of the Navy-administered lands were transferred to the Commonwealth of Puerto Rico and jurisdiction over other portions was transferred to the Service. On-site administration of the refuge was established in 1983. Approximately one quarter of the Culebra archipelago's total land mass is now included within the Culebra NWR.

### *REFUGE HISTORY AND PURPOSE*

The original purpose for the refuge designation was established by Executive Order 1042, dated February 27, 1909. This document stated that the designated area provides "... a refuge and breeding ground for native birds." Additional purposes were identified when administration of the land was transferred to the Service because of its "... particular value in carrying out the national migratory bird management program." The National Wildlife Refuge System Administration Act provides further guidance for the management of all national wildlife refuges by identifying "... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." as refuge purposes.

### *SPECIAL DESIGNATIONS*

Portions of the Culebra NWR lands were used for military training activities including ship-to-shore and aerial bombardment from 1936 until late 1975. In response to concern about public safety hazards posed by live-fire training on Culebra, Congress included provisions in Section 204 of the Reserve Forces Facilities Authorization Act of 1974, directing the Navy to cease its operations on and around the island and to relocate them elsewhere. When the Navy departed, the lands were transferred to the Commonwealth of Puerto Rico and the Department of the Interior.

Under the Formerly Used Defense Site (FUDS) program, the Army Corps of Engineers (Corps) is responsible for cleanup of the sites to ensure the safety of the public. To protect public safety, the Corps has conducted limited surface removal of munitions on Culebra Island in publicly accessible areas since 1995. These areas include beaches and campgrounds where munitions have been found in the soil or have washed up on the beach. Investigations and clean-up on Culebra and the surrounding cays are continuing on refuge, commonwealth, and private lands where munitions may present a threat. The Corps conducts these removal actions in accordance with the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to address immediate threats.

Figure 1. Location of Culebra NWR

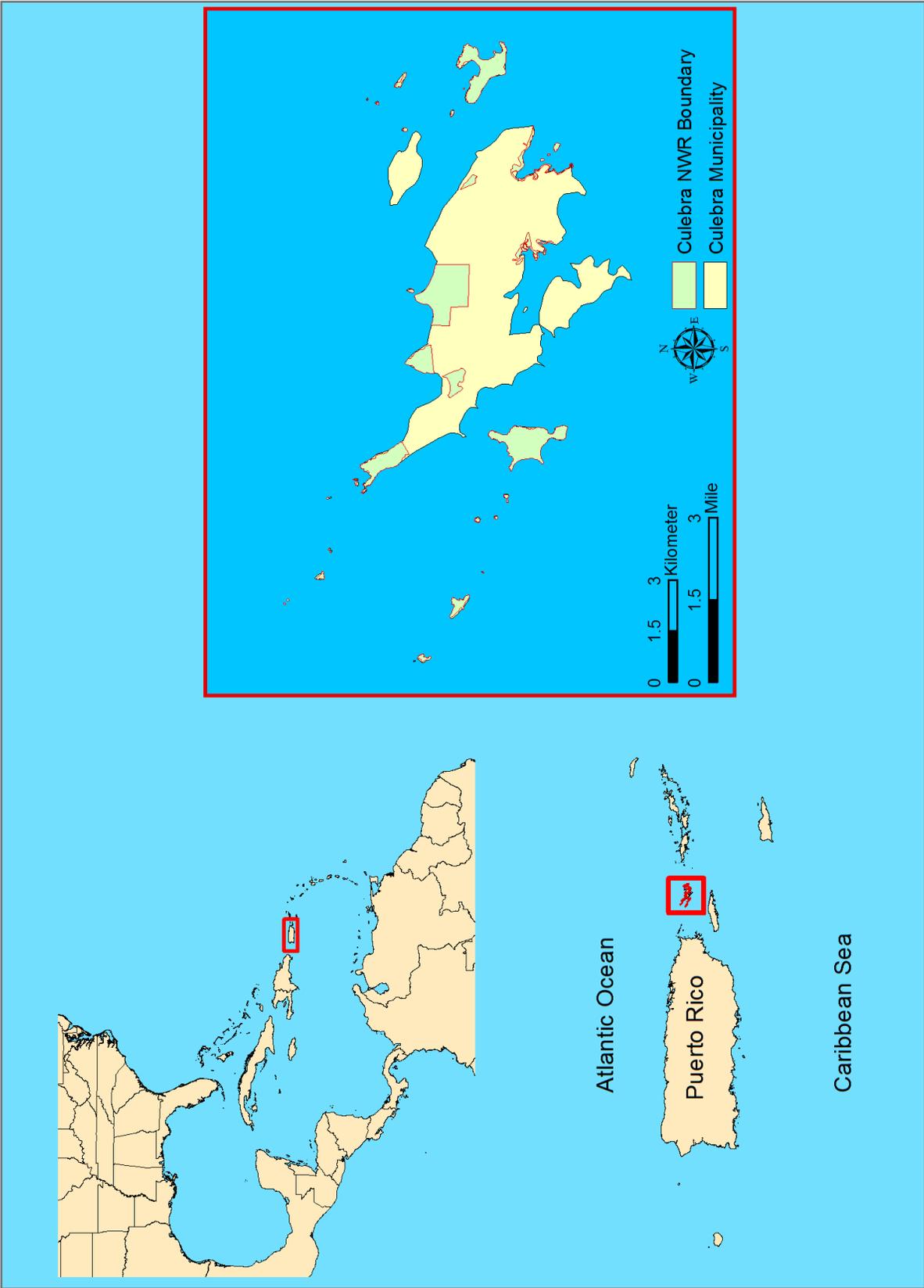
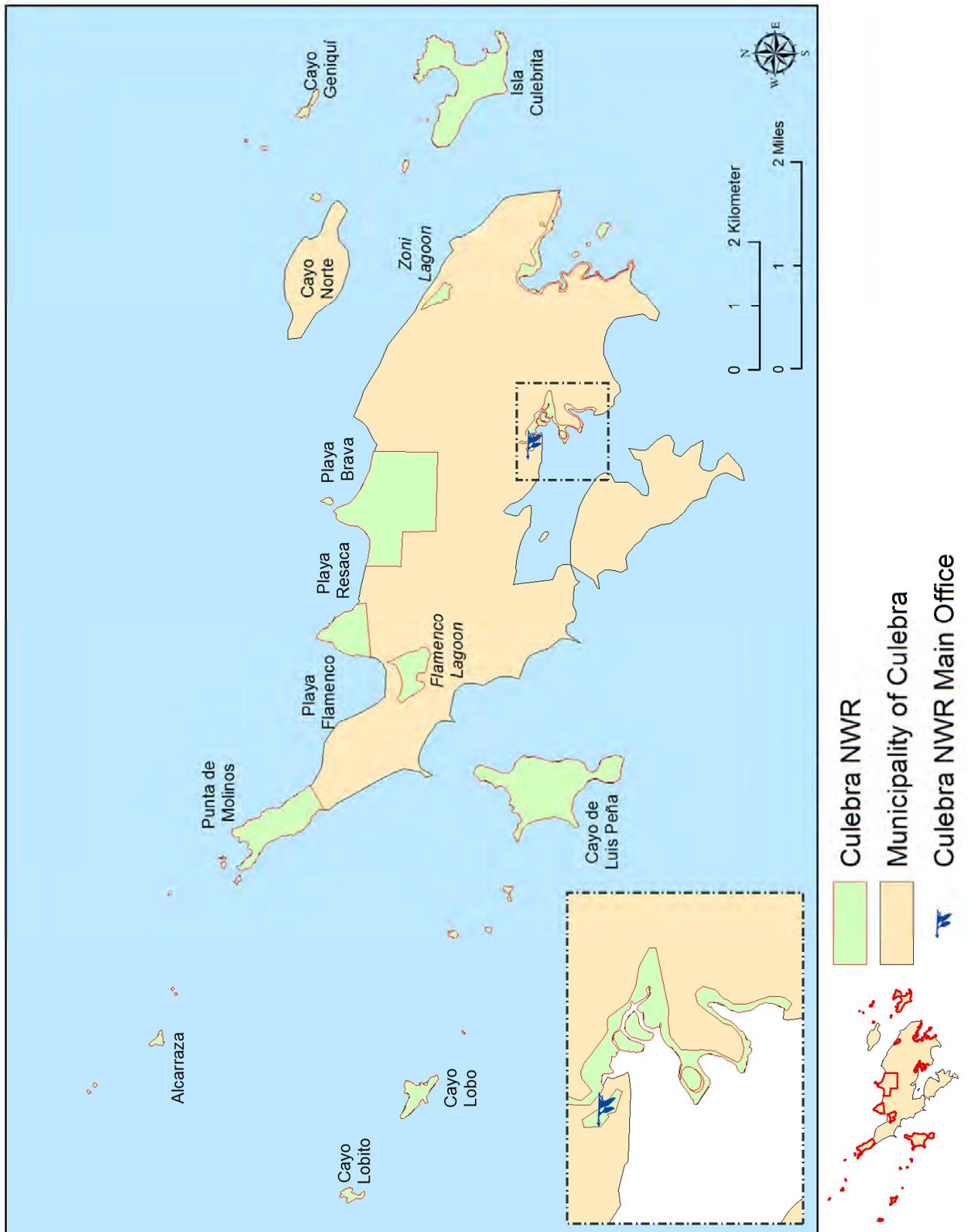


Figure 2. Approved boundaries of Culebra NWR



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## *ECOSYSTEM CONTEXT*

In approaching its mission to conserve wildlife and their habitats throughout the country, the Service found it useful to divide the entire United States into 53 distinct ecosystems, drawn primarily along watershed boundaries. Although they cannot be considered as a single watershed, the islands of the Caribbean under U.S. jurisdiction share resources and have similar threats and potential solutions to address the issues. For the purposes of developing plans and strategies for addressing resource problems, the Service included all lands and waters of the U.S. Virgin Islands, Puerto Rico, and Navassa Island (a small island west of Haiti) within Ecosystem Unit 35. Culebra NWR lies within the Caribbean ecosystem. The Ecosystem Plan identified issues such as control of invasive species, protection of sensitive species and their habitats, and restoration of critical ecosystem components.

Since the completion of the Ecosystem Plan, the Service has moved toward the development of Strategic Plans to address resource issues on a nationwide basis. One component in the development of the Strategic Plans is inclusion of an “Adaptive Management” process. Adaptive Management is a structured approach where managers and scientists team together to improve resource management over time by learning from management outcomes. This entails a multi-step process:

- Considering various actions to meet management objectives;
- Predicting the outcomes of these management actions based on what is currently known;
- Implementing management actions;
- Monitoring to observe the results of those actions; and
- Using the results to update knowledge and adjust future management actions accordingly.

By repeating this cycle and increasing to the body of knowledge about the system in question, managers are able to refine their management actions to better address the original objectives.

During the development of this Draft CCP/EA, the Service applied the principles of adaptive management to maximize the opportunity for successful accomplishment of the goals, objectives, and strategies identified in the Ecosystem Plan, Strategic Plans, and other relevant documents.

## *REGIONAL CONSERVATION PLANS AND INITIATIVES*

The State Wildlife Grants (SWG) program began in Fiscal Year 2002. Under this program, Congress provided a historic opportunity for state fish and wildlife agencies and their partners to design and implement a more comprehensive approach to the conservation of America’s wildlife. A requirement of the SWG was that each state would complete a Comprehensive Wildlife Conservation Strategy (CWCS) by October 1, 2005. Development of the CWCS was intended to identify and focus management on “species in greatest need of conservation.” Congress expects SWG funds to be used to manage and conserve declining species and avoid their potential listing under the Endangered Species Act.

In 2003, the Puerto Rico DNER, through its Bureau of Fisheries and Wildlife (BFW), initiated the development of the CWCS for Puerto Rico. This initial project sought an external organization to complete this task. The only bid to prepare the Conservation Strategy was much higher than available funding, so its development was assigned to Puerto Rico DNER staff. The development of the CWCS began in 2004 and was completed in 2005.

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The stated goals of the Puerto Rico CWCS are:

- To identify and address the greatest conservation needs of Puerto Rico's fish and wildlife.
- To prioritize efforts on species with the greatest conservation needs.
- To allow Puerto Rico DNER to work independently and in partnership to conserve, enhance, and protect Puerto Rico's diverse, but not necessarily rare or at risk, fish and wildlife species and habitats.
- To improve Puerto Rico DNER's ability to address present and future challenges and opportunities to conserve fish and wildlife species and their habitats.
- To integrate monitoring and management of hunted and non-hunted species.

The information in the CWCS was developed with the assistance of several divisions of the Puerto Rico DNER and drew information from several sources including; the Fisheries and Wildlife Strategic Plan (DNER 1996), the Regulation to Govern the Threatened and Endangered Species of the Commonwealth of Puerto Rico (DRNA 2004), the Puerto Rico Critical Wildlife Areas (Ventosa-Febles et al. 2005a), the Puerto Rico Waterfowl Focus Areas (Ventosa-Febles et al. 2005b), the Puerto Rico Gap Project, and the Puerto Rico and Virgin Islands Bird Conservation Plan (Núñez-García and Hunter 2000).

Among other issues, the Puerto Rico CWCS identifies threats, conservation opportunities, and potential management strategies, the "Species of Greatest Conservation Need," "Critical Wildlife Areas," and emphasizes the study and conservation of species classified as "Data Deficient" (i.e., information is lacking to determine their status and management needs).

The commonwealth's participation and contribution throughout this comprehensive conservation planning process provides for ongoing opportunities and open dialogue to improve the ecological health and diversity of fish and wildlife. A vital part of the comprehensive conservation planning process is integrating common mission objectives where appropriate.

#### *ECOLOGICAL THREATS AND PROBLEMS*

Throughout the Caribbean, the threats to wildlife include: habitat loss, degradation and alteration; increasing levels of pollution; burgeoning populations of nonnative species of plants and animals; an increasing human population with concurrent uses of marine, shoreline, and terrestrial areas; and a limited understanding of the role of natural resources and the need to protect and manage these resources. 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.

The incidental, accidental, or deliberate introduction of nonnative species of animals and plants to island ecosystems often leads to dramatic adverse impacts on native populations of flora and fauna, not only on Caribbean refuges, but around the world. On Culebra, nonnative and invasive species such as iguanas, white-tailed deer (*Odocoileus virginianus*), rats (*Rattus rattus* and *R. norvegicus*), feral dogs, goats and cats, and grazing livestock have had significant negative effects on reptile and bird populations as well as plant communities. Around the world, new introductions of plants and animals are occurring too frequently. In many locations, plants are introduced for landscaping or

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agricultural purposes. Where conditions are suitable, these plants may spread rapidly and out-compete native vegetation. On Culebra NWR, the most common invasive plants include acacia trees (*Acacia spp.*) and guinea grass (*Panicum maximum*).

Disposal of wastes and refuse is a major problem on populated islands. Accumulation of waste, combined with point and nonpoint source water pollution from cars leaking engine oil or radiator fluid, road spills, excessive exhaust emissions, runoff during heavy rains containing substances such as pesticides, fertilizers, and sediments, and inadequate sewer systems result in a continual influx of contaminants into the ecosystem.

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 forests, (2) coral reefs, (3) seagrass beds, and (4) 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. Some of the component species on Culebra, such as Wheeler's peperomia (*Peperomia wheeleri*) and a spineless cactus (*Leptocereus grantianus*) are endemic to Culebra (i.e., they are found nowhere else in the world). Many migratory birds depend on habitat found within the Complex, including a large number of birds considered to be of conservation concern by the Service and Department of Natural and Environmental Resources. Particularly notable are (1) Endemic species, (2) species spending part of the year in the neotropics (i.e., neotropical migrants), 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).

The Puerto Rico Critical Wildlife Conservation Strategy (PRCWCS), developed by the Commonwealth Department of Natural and Environmental Resources, identified numerous categories and classes of threats to wildlife and habitat throughout Puerto Rico. Many of these threats are real or potential issues for Culebra NWR and surrounding lands. The table of these threats from the PRCWCS is provided below.

**Table 1. Threat categories and classes used for Puerto Rico Critical Wildlife Conservation Strategy**

Threat Category	Threat Class
<p><b>Habitat Conversion:</b> Intentional conversion of natural habitat that is detrimental to wildlife use and survival by causing loss or degradation of wildlife habitat and available forage.</p>	<b>Housing and urban development</b>
	<b>Agricultural practices</b>
	<b>Recreational areas</b>
	<b>Intentional fires</b>
	<b>Illegal dumping areas</b>
	<b>Wetland filling</b>
<p><b>Transportation and Infrastructure:</b> Development of corridors/passages that increases wildlife mortality and fragmentation of wildlife habitat.</p>	<b>Roads</b>
	<b>Pier and harbor</b>
	<b>Power lines, aqueducts, gas ducts</b>
	<b>Wind power plants</b>
<p><b>Abiotic Resources Use:</b> Extraction or use of rocks, minerals, and water that causes direct or indirect negative impacts to wildlife habitats.</p>	<b>Land cover removal for construction material (e.g., sand, limestone, other rocks)</b>
	<b>Water use</b>
	<b>Drilling (wells)</b>
<p><b>Consumptive Use of Biological Resources:</b> Harvest or use of plant and animal populations in a manner that negatively impacts wildlife distributions and fitness, or the ecosystem.</p>	<b>Forest and woodland management</b>
	<b>Grazing</b>
	<b>Collection</b>
	<b>Illegal hunting and fishing practices</b>
<p><b>Non-consumptive Resources Use:</b> Activities that have an incidental, but negative impact on wildlife and their habitats.</p>	<b>Motor-powered recreation</b>
	<b>Non-motorized recreation</b>
<p><b>Pollution:</b> Introduction and spread of unwanted matter and energy into ecosystems from point and non-point sources that causes increased mortality of wildlife and degradation of their habitats and available forage.</p>	<b>Solid waste</b>
	<b>Chemicals and toxins</b>
	<b>Eutrophicants substances</b>
	<b>Noise pollution</b>
	<b>Waste or residual materials</b>
<p><b>Invasive Species:</b> Introduction and/or spread of unwanted exotic and native organisms into ecosystems that increases wildlife predation, competition, and reduced fitness or cause loss of wildlife habitat.</p>	<b>Invasive plants</b>
	<b>Invasive animals</b>
	<b>Pathogens</b>

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## CLIMATE CHANGE

In addition to the direct threats from human activities and exotic species, sensitive wildlife and habitat are also subjected to the vagaries of tropical weather conditions and the global climate change that is being generated by the worldwide anthropogenic emissions of greenhouse gases. Changes in precipitation, cloudiness, diurnal temperature extremes, biome boundaries, ocean chemistry, hydrology, and sea level are expected to accompany the continued warming (Griffith et al. 2009).

In order to mitigate the impacts of climate change on the refuge, the Service will include monitoring and adaptive management programs in this Draft CCP/EA and other planning efforts. Through the principles of Strategic Habitat Conservation (SHC), the Service sets biological goals for priority species populations, makes strategic decisions about conservation goals, and constantly reassesses and improves actions.

SHC incorporates five key principles in an ongoing process that changes and evolves:

- Biological Planning (setting targets)
- Conservation Design (developing a plan to meet the goals)
- Conservation Delivery (implementing the plan)
- Monitoring and Adaptive Management (measuring success and improving results)
- Research (increasing our understanding)

These are critical steps in dealing with a range of landscape-scale resource threats, such as development, invasive species, and water scarcity, all magnified by accelerating climate change.

Adaptive monitoring and management, as implemented by the Department of the Interior, explicitly recognize and attempt to reduce uncertainty (Nichols et al. 1995; Williams et al. 2001) and provide a formal framework for conservation and management decision-making (Williams et al. 2007).

Adaptive monitoring programs will provide refuges with information on the frequency and intensity of monitoring required for specified magnitudes of climate driven changes in species and critical habitats that are important to refuges. Adaptive management programs will help elucidate mechanisms of climate change action on species and habitats. For example: (1) Adaptive monitoring may be used to design the most efficient programs to detect the degree of association between climate-induced habitat change and wildlife populations, and (2) adaptive management may be used to estimate whether climate-induced seasonal habitat changes affect population levels in an additive or compensatory manner (Griffith et al. 2009).

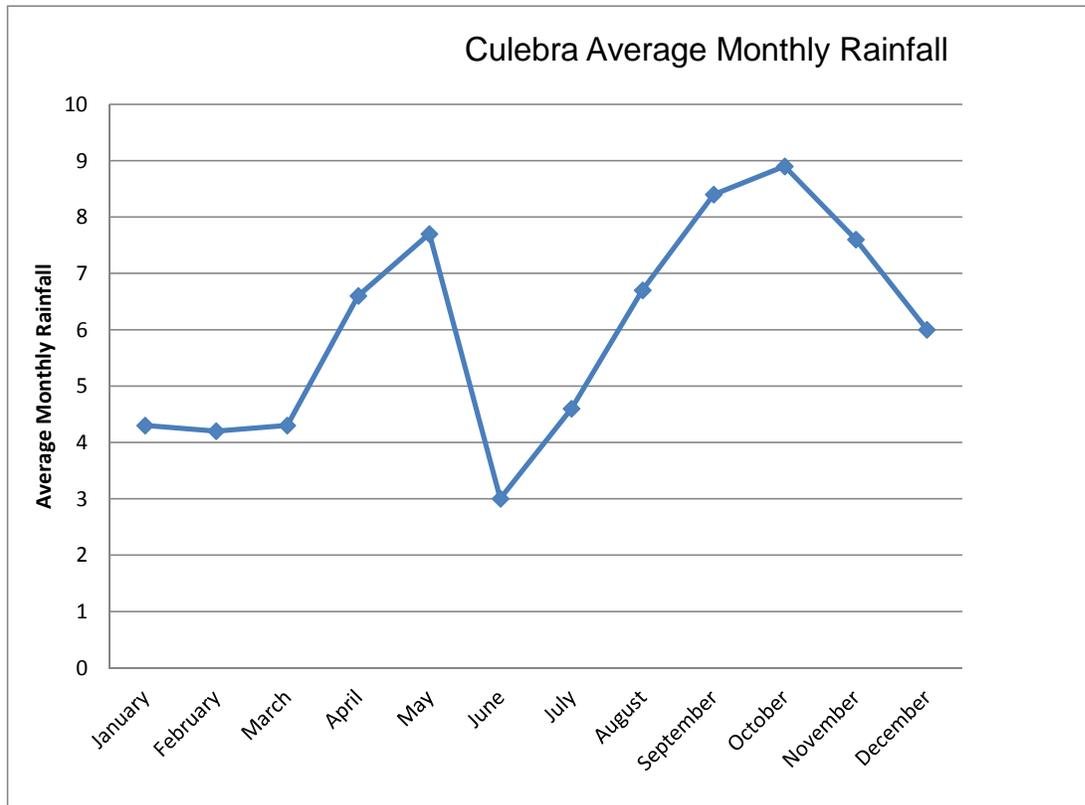
## PHYSICAL RESOURCES

### CLIMATE

The climate in Culebra is classified as “tropical-marine.” The easterly trade winds are the dominant factor affecting the climate of Puerto Rico and the rest of the Antilles islands. The temperature in Culebra remains relatively constant throughout the year, with an annual average temperature of 78 degrees Fahrenheit (°F) 25.5 degrees Centigrade (°C). The average high temperatures in the summer months are about 88°F (31.1°C). During the winter, the average high is approximately 83°F (28.3°C). The average low temperatures during summer and winter are 78°F (2.5°C) and 72°F (22.2°C) respectively. Normally, the warmest month is June and the coolest month of the year is February. It should be noted, however, that the record highest temperature of 99°F (37.2°C) was recorded in February, and the lowest reported temperature of 37°F (2.7°C) occurred in June (Data from Weather.com).

Rainfall in Culebra is distributed on a seasonal basis with a relatively dry season extending from December through April. During May, June, and July, localized thunderstorms are relatively common and tropical storms move through the Caribbean. From June to November (hurricane season), tropical storms can affect the regional climate for several days. Tropical storm force winds or hurricanes pass over Culebra Island at a frequency of once every two to three years (National Oceanic and Atmospheric Administration 2000). The peak period for these storms is during August and September.

**Figure 3. Culebra average monthly rainfall (in inches)**



**Data from: Southeast Regional Climate Center, Columbia, SC**

### *GEOLOGY AND TOPOGRAPHY*

The Culebra archipelago consists of the main island of Culebra and twenty-three smaller islands surrounding it. The largest of the cays are: Culebrita to the east, Cayo Norte to the northeast, and Cayo Luis Peña and Cayo Lobo to the west. The smaller islands include Cayo Ballena, Cayos Geniqui, Arrecife Culebrita, Las Hermanas, El Mono, Cayo Lobito, Cayo Botijuela, Alcarraza, Los Gemelos, and Piedra Steven. With the exception of Cayo Norte, the small islands of the archipelago are part of the Culebra NWR.

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## Geology

The Culebra archipelago is geologically associated with Puerto Rico. It was separated from the main island by fairly recent drowning of the more extensive Puerto Rico land mass during the melting of the late Pleistocene ice sheets of North America and Europe in the Holocene era. The rocks of Culebra Island are primarily volcanic and plutonic rocks of Late Cretaceous age. Andesite lava, lava breccia, and tuffs are the dominant volcanic rocks. These rocks were intruded by diorite and diorite porphyry. These plutonic type rocks crop out in the north-central part of the island. Earth movements have fractured these rocks and formed in a joint pattern. Some faulting is also present, with major faulting aligned in a northwest-southeast direction. Alluvium, predominately composed of silt and clay with minor quantities of sand and gravel, was subsequently deposited in the few existing river valleys near the coast. On the coast, alluvium interfingers with coral, beach, and mangrove deposits. Alluvium is also found in the high valley of east-central Isla de Culebra (Veve, et al. editors, 1996).

Culebra and the adjacent keys are underlain by volcanic and intrusive rocks of probable Upper Cretaceous age. Andesite lava and Andesite tuff are clearly dominant. Toward the north-central part of Culebra and on the east Cayo Luis Peña, the tuff and lava contain diorite porphyry inclusions. These volcanic rocks no longer exhibit porosity, due to compaction and the filling of pores with quartz and calcite (Veve, et al. editors, 1996).

## Topography

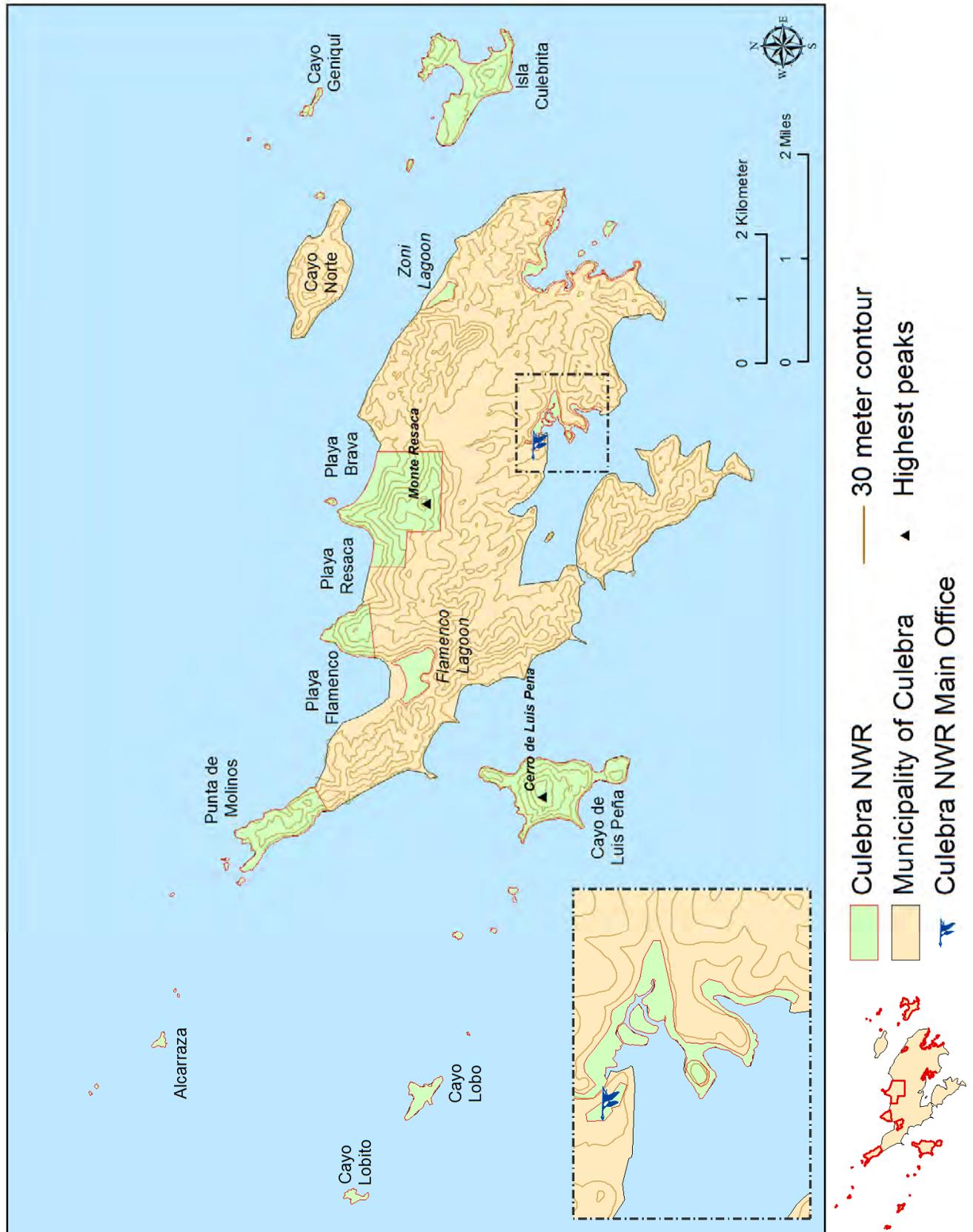
Culebra is characterized by an irregular topography resulting in a relatively long shoreline. The island has approximately 10 square miles of land area and measures about 7 miles from the northwest to southeast and 3 miles from the northeast to the southwest. The coastline is very irregular, with a protected natural harbor in the southeast sector. This protected area, Ensenada Honda, is the largest harbor on the island and is considered to be one of the most hurricane secure harbors in the Caribbean. The coastline around the island varies a great deal with rocky cliffs, sandy coral beaches, and mangrove forests. The highest point on the island is Mount Resaca, with an elevation of 650 feet (198 m).

## SOILS

Soils on the refuge are described in the *Soil Survey of Humacao Area of Eastern Puerto Rico* (Boccheciamp 1977). Culebra soils are in the Descalabrado-Guayama association that consists of soils formed in moderately fine-textured to fine residual material derived from basic volcanic rocks. These soils are shallow, well-drained, and strongly sloping to very steep. The soils of this association are used for pasture or are in brush. They have severe limitations for farming, recreation, and urban uses because they are shallow to bedrock, lack sufficient moisture, are steep, and are susceptible to erosion.

Eight different soils within this association are located at sites on the refuge. The predominant soil classifications are: Rockland (Rs) that is predominant at Mt. Resaca, Flamenco Point, and the smaller offshore cays; Descalabrado-Rockland complex (DrF) on portions of Culebrita and Cayo Luis Peña; and Descalabrado clay loam (DeE2) on Flamenco Peninsula and portions of Culebrita and Cayo Luis Peña. Tidal flats (Tf), tidal swamp (Ts), and coastal beach (Cm) soils are found around the coastal areas of the refuge units on the main island of Culebra and the larger cays. Small areas of Amelia gravely clay loam (AmC2) and Cataño loamy sand (Cf) are located on Culebrita and Cayo Luis Peña. Soils map and descriptions are included in Appendix L.

Figure 4. Topography of Culebra NWR



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## *HYDROLOGY AND WATER RESOURCES*

The hydrology of small tropical islands differs from that of temperate, continental areas. In the West Indies, precipitation, the origin of all freshwater resources, is controlled principally by the easterly trade winds, the passage of tropical storms, and orographic effects in the islands with high relief. The geology, topography, and relative size of the islands determine the degree to which they collect and retain the rainfall that ultimately provides island water supplies (U.S. Geological Survey, Zack, Allen and M. C. Larsen 1994). On Culebra, the fractured rock is considered to be a series of independent aquifers. The aquifer in each drainage basin is separated from adjacent basins by a groundwater divide. Although groundwater is scarce, existing or potential pollution of an aquifer will usually affect a single basin. The groundwater on Culebra is rich in mineral concentrations, which, in most cases, exceed EPA standards for drinking water. Dissolved solids' concentrations range from 500 to 1,000 mg/L. This condition is a result of airborne particulates that fall in the land surface and infiltrate the aquifer during periods of recharge, evapotranspiration in the soil zone, and the limited amount of recharge. The most serious potential threat to groundwater on Culebra is effluent from septic tanks. The effluents can quickly infiltrate through the thin soil and decomposed rock (saprolite) zone to enter the fractured bedrock aquifer in a nearly unfiltered, unaltered state. The greater the concentration of septic tanks in an area, the greater the potential threat to the aquifer. Although a wastewater treatment facility has been connected to many of the residences and businesses on the island, some areas are still using septic systems as their primary disposal method. Connection of any remaining sources to the treatment facility should lessen the potential for contamination of groundwater and near-shore coastal areas.

Because of their small size, the islands of the Culebra archipelago are arid with no rivers or streams and very limited groundwater resources. Fresh water for human consumption is brought by pipeline from the main island or is provided by a desalinization plant.

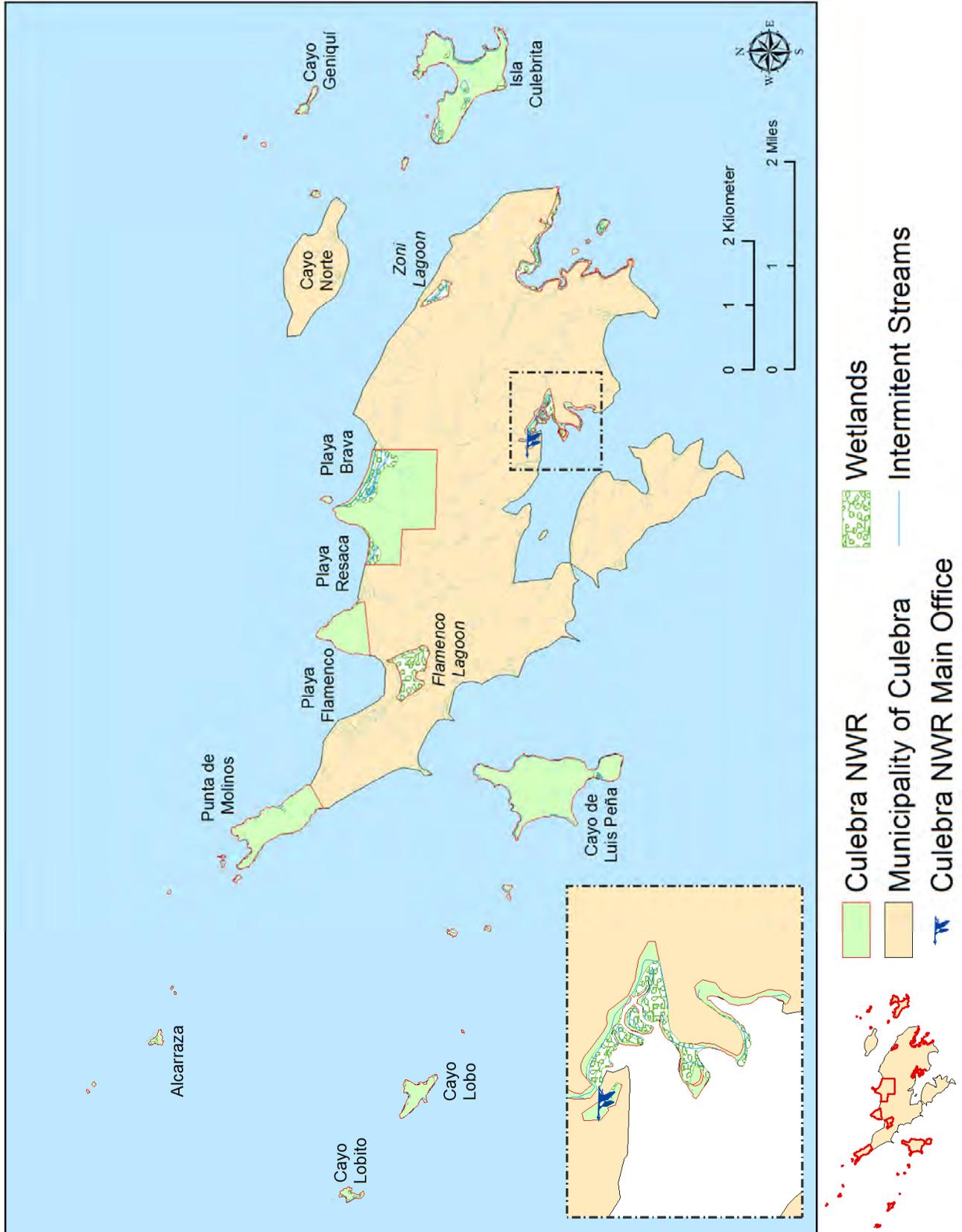
### **Air Quality**

The primary federal statute governing the control of air pollution is the Clean Air Act. This Act identifies six pollutants as "criteria pollutants." These are: respirable particulate matter, carbon monoxide, sulfur dioxide, nitrogen dioxide, lead, and ozone. Primary and/or secondary National Ambient Air Quality Standards have been established to protect the public health and welfare and to account for the effects of air pollution on soil, water, visibility, vegetation, and other materials exposed to air pollution. The standards are included in Appendix III. The Clean Air Act requires state or local air quality control agencies to adopt State Implementation Plans. These plans prescribe measures to eliminate or reduce the severity and number of National Ambient Air Quality Standards' violations and to achieve and/or maintain levels of the "criteria pollutants" at, or below, these standards.

A single air quality control region covers Puerto Rico, including Culebra. Based on ambient monitoring data collected mainly in the San Juan vicinity by the Puerto Rico Environmental Quality Board, the EPA classifies the air quality control region as in attainment or as unclassified/attainment (i.e., no data exist to determine the status for the six National Ambient Air Quality Standards criteria pollutants). Therefore, air pollutant concentrations are below these standards for all criteria pollutants (EPA 2000a).

Under the 1990 Clean Air Act amendments (42 U.S.C. 7476[c]), federal actions are required to conform to the applicable State Implementation Plans. The criteria and procedures used to demonstrate conformity are explained in 40 CFR 51 (Requirements for Preparation, Adoption, and Submittal of Implementation Plans) and 40 CFR 93 (Determining Conformity of Federal Actions to State or Federal Implementation Plans).

Figure 5. Surface hydrology of Culebra NWR



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Currently, regulations for implementing the general conformity rule have been promulgated only for non-attainment areas. Because Puerto Rico is classified as in attainment of the National Ambient Air Quality Standards for all pollutants, the general conformity rule is not applicable. Existing air pollutant emission sources at Culebra NWR are minor and scattered widely. Air pollutants are emitted during occasional operation of power equipment, motor vehicles, and boats, and during vehicle use on unpaved roads throughout the refuge.

## **BIOLOGICAL RESOURCES**

### *HABITAT*

The geologic history of Puerto Rico helps explain the variety and distribution of its vegetation. Puerto Rico sits at the eastern end of a massive oceanic volcanic mountain chain. During past glacial periods the climate is believed to have been drier and cooler. Sea levels fluctuated drastically, dropping as much as 100 meters during maximum glaciations. The Virgin Islands (except for the island of St. Croix), Culebra, and Vieques were connected with Puerto Rico as recently as the last ice advance approximately 11,000 years ago. This land mass formed the Puerto Rican bank, which encompassed an area twice the current size of Puerto Rico. With the rising of sea level, the separate islands retained many of the habitat components commonly found on the others while a few of the species survived at some locations and disappeared from others. Culebra has undergone significant changes during the past two hundred years through clearing for agriculture, military development and training, housing construction, and tourism. Most portions of the island have been altered by human activities with the possible exception of small portions of the boulder forest at Mount Resaca where steep rocky terrain makes access difficult. Unmanaged pastures and military ranges generally revert to dense thorn thickets and secondary growth forest. This vegetation is generally characteristic of the subtropical dry forest life zone.

For the purpose of this discussion, we have identified and provided general descriptions of six habitat communities that are found on Culebra Island and surrounding cays. These are: beach, coastal strand forests, mangroves, lagoons, dry forest and shrub (includes boulder forest), and grassland.

### **Beach**

Beach community vegetation occupies the upper open sandy beaches, rocky shorelines, and adjacent sea salt spray zones encompassing the island. This vegetation extends into some low-lying areas above the beach and is under the influence of saltwater, salt spray, and sea winds. Most of the species in this zone are pan-tropical and indigenous or secondarily distributed, such as *Ipomoea pes-caprae* and *Cocos nucifera*. Extending toward the shore, one finds the pioneering runners of *Sporobolus virginicus*, *Paspalum vaginatum* and *Spartina patens*, along with the two very common vines, *Ipomoea pes-caprae* and *Canavalia maritima*. On the less often disturbed upper beach, these three grasses and two vines occur along with other succulents, including the annual crucifer, *Cakile lanceolata*, and the Euphorb, *Chamaesyce buxifolia*, where they form dense mats. Further development in this area will exhibit *Scaevola plumieri*, *Suriana maritima*, and *Borrichia aborescens* and then the eventual colonization by sea grape (*Coccoloba uvifera*).

Although the sandy beaches are usually sterile in the intertidal zone, the rocky shores where the surf reaches are often covered with the alga *Turbinaria turbinata* and *Enteromorpha* sp. Where sand has accumulated within the rocks, *Chamaesyce buxifolia*, *Suriana maritima*, and *Borrichia arborescens* are found. Dense mats of *Fimbristylis spadicosa* and *Spartina patens* are common in the deeper open sands where dense stands of buttonwood mangrove, *Conocarpus erectus*, are absent.

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Above this disturbed area on pitted limestone slabs, spiny succulent vegetation occurs with: *Melocactus intortus*, *Opuntia rubescens*, *Cephalocereus royerii*, *Lemaireocereus hystrix*, and *Amaranthus spinosus*. This desert-like vegetation gives way to various xerophytic shrubs, especially *Coccoloba uvifera*.

### **Coastal Strand Forest**

This forest type is restricted to the narrow coastal areas behind the beaches and mangrove forests. In the protected lee of the occasional sand dunes a taller structurally complex and floristically rich xerophytic scrub develops. This is Beard's (1944) 'littoral woodland.' This snakebark (*Colubrina arborescens*) shrubland alliance is diverse with many species of lianas, the shrubs *Erithalis fruticosa*, *Suriana maritima*, and *Oplonia spinosa* and occasionally dense stands of *Bromelia pinguin*. The vegetation diversity of coastal strand forest is high and is composed of other characteristic species such as: *Coccoloba diversifolia*, *Coccoloba uvifera*, *Elaeodendron xylocarpus*, *Byrsonima lucida*, *Bucida buceras*, *Bursera simaruba*, *Tabebuia heterophylla* and several *Eugenia* spp.

### **Mangroves**

Mangroves may be Puerto Rico's most endangered ecosystem and worldwide are disappearing at rates comparable to those of tropical wet forests (1.5 percent/year) (Gillman et al. 2006). Mangrove stands host exceptionally diverse communities of benthic invertebrates and dense assemblages of resident and migratory birds. Mangroves on Culebra NWR are located primarily within the units on the north side of Ensenada Honda and along the shoreline of Puerto del Manglar.

In general, hydrologic pattern determines mangrove community structure and function. Stands of red mangrove (*Rhizophora mangle*) typically line the shorelines of the bays, lagoons, and channels. Red mangrove prop roots decrease shoreline erosion and provide shelter for marine fauna. On slightly higher ground, inland of the red mangroves, black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*) may be found. At Puerto del Manglar, small areas of sandy salt flats are located shoreward of the mangrove fringe. These salt flat areas generally support an herbaceous plant community that contains species such as: *Batis maritima*, *Sesuvium portulacastrum*, *Heliotropium curassavicum*, *Lantana involucrata*, *Ipomoea pes-caprae*, *Sporobolus virginicus*, and other grasses and sedges. Common woody vegetation includes the natives: *Randia aculeata*, *Pictetia aculeata*, *Coccoloba uvifera*, *Bucida buceras*, and *Tabebuia heterophylla*.

Erosion and sedimentation within the mangrove wetlands from the adjacent agricultural lands and roads have consistently been cited as a cause of adverse impacts to these ecologically sensitive areas. This has led to changes in microtopography that result in vegetation shifts from wetland to upland vegetation and loss of habitat. In addition, the Culebra mangroves are subjected to relatively frequent hurricane force winds and potential impacts from sea level rise.

### **Lagoons**

Lagoon systems on Culebra provide important feeding and resting habitat for waterfowl, shorebirds, and wading birds. They are generally fringed by red mangroves, black mangroves, white mangroves, buttonwood, and other wetland-associated species. These areas are intermittently open to the sea and are flooded by saltwater. Storm-deposited sands periodically form berms that isolate the lagoon from the regular exchange of waters from the sea. During periods when the lagoons are isolated, they may remain flooded through infiltration of sea water through the sand or by runoff from upland areas. During periods

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of high runoff from upland areas or storm surge from the sea, berms will wash out and permit tidal flushing until they are reestablished. Within the lagoon systems water salinity, oxygen content, and temperature are highly variable and dependent on rainfall, evaporation, and tidal flushing.

### **Dry Forest and Shrub**

Subtropical dry forest was the original dominant forest cover on Culebra. This vegetative association has been greatly modified by development, agriculture, grazing, fires, and military training activities. Much of the island may be characterized as dense, dry, spiny woodland and shrub. Dominant species include several *Acacia* species, *Bucida buceras*, *Prosopis juliflora*, *Leucaena leucocephala*, *Ziziphus mauritiana*, *Pithecellobium unguis-cati*, various *Croton* and *Lantana* species, and, *Randia aculeata*, among others.

The “boulder forest” located on the Mount Resaca unit of the refuge is the largest remaining forest block on the island of Culebra. While this area is classified as a subtropical dry forest, the northern slopes host microenvironments of tropical rain forest types. These areas, occurring chiefly in boulder-strewn canyons and ravines, are host to one of the most unique vegetative communities in Puerto Rico. These large boulder-covered areas contain forest of Cupey (*Clusia rosea*) and Jaguey (*Ficus citrifolia*) with their impressive stilt roots. The boulders support orchids, bromeliads, and the endemic peperomia (*Peperomia wheeleri*). Trees in this area have canopies of 50 feet or more, and trunk diameters of 3 feet.

Native species commonly found in the dry forest and shrub association include: *Coccoloba* spp, *Pisonia subcordata*, *Krugiodendron ferreum*, *Crossopetalum rhacoma*, *Bourreria succulenta*, *Gymnanthes lucida*, *Rauvolfia nitida*, and *Bursera simaruba*.

### **Grassland**

Flamenco Peninsula is currently in a grassland state. This peninsula was designated a “Critical Wildlife Area” by the Commonwealth of Puerto Rico, because it is considered an area that is “...necessary to perpetuate the existence of species of special interest for DNER.” The climax forest vegetation on Flamenco Peninsula was cut over for timber by the local residents and mechanically destroyed through bombardment and fires when used by the Navy. Communities of perennial grasses were historically maintained in pasture through grazing and fire. Other areas that were previously in grassland are now in the process of returning to woody vegetation. Weedy herbaceous and shrub species begin the succession process and are followed by several early tree species, such as *Leucaena leucocephala* and *Albizia lebbbeck*. The herbaceous community is dominated by short bunch grasses and several alliances occur including: the *Dichanthium annulatum* herbaceous alliance and the *Cenchrus ciliaris* herbaceous alliance. Several other mixed grass stands are common including: *Bothriochloa pertusa*, *Eleusine indica*, and *Sporobolus indicus*. The African guinea grass (*Panicum maximum*) herbaceous vegetation is also very common and is considered a tall grassland type. These grass complexes will revert to woody vegetation in the absence of disturbance or further management activity.

Figure 6. Vegetation of Culebra NWR

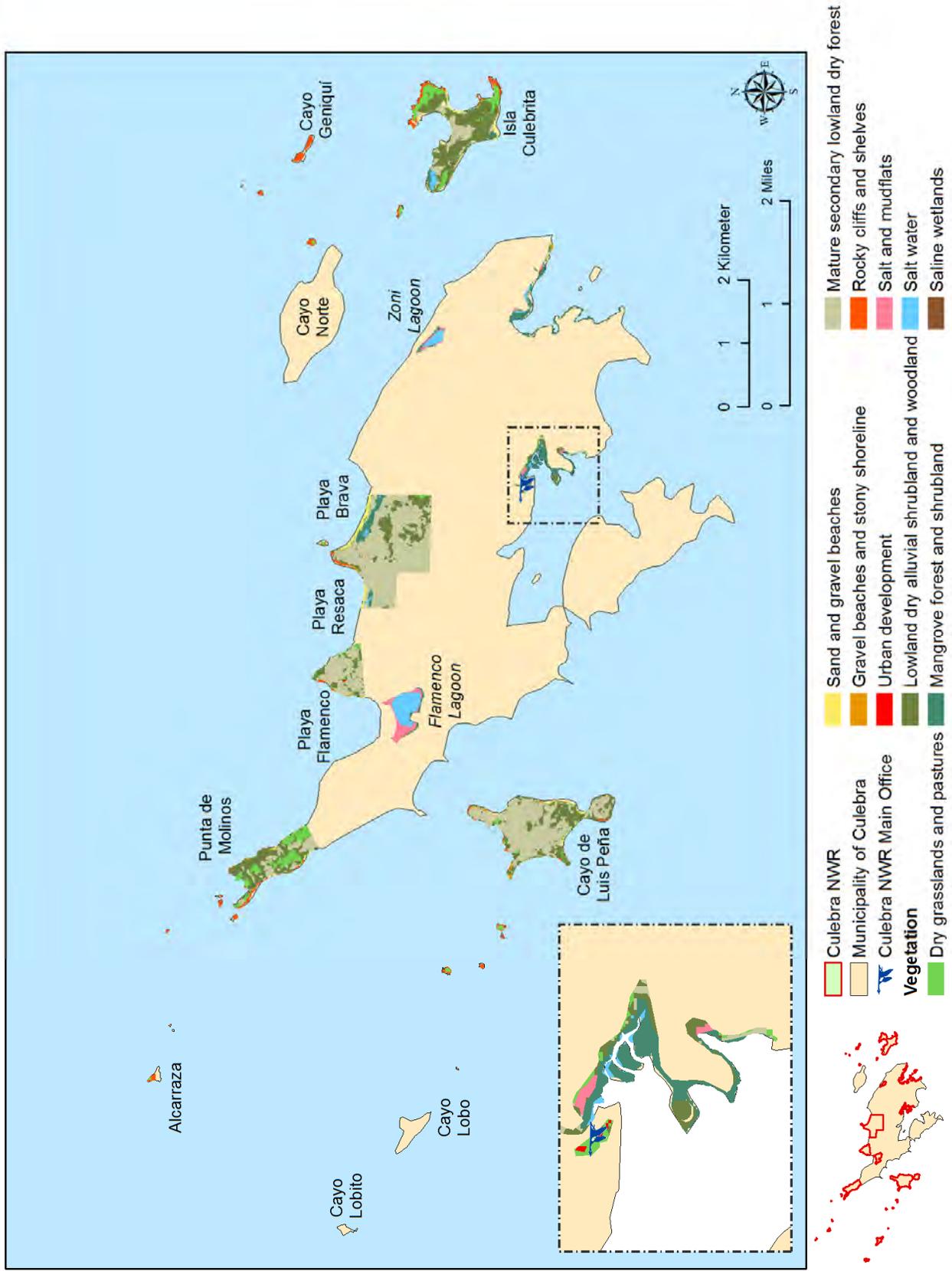
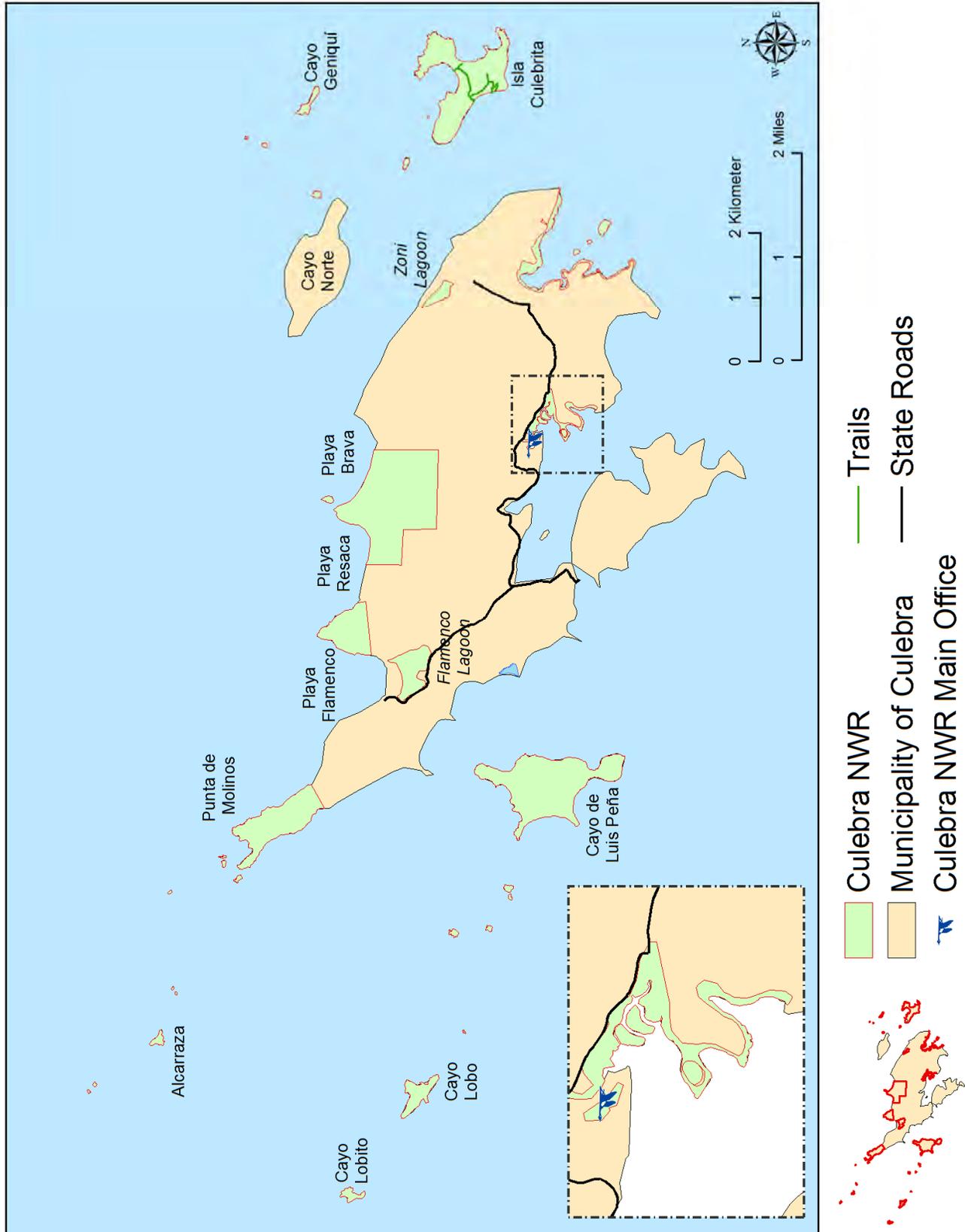


Figure 7. Roads and trails of Culebra NWR



## CRITICAL WILDLIFE AREAS

The Puerto Rico Comprehensive Wildlife Conservation Strategy (PRCWCS 2005) identified areas that are considered to be critical for the wildlife of Puerto Rico [Critical Wildlife Areas (CWAs)] and species within these areas for which there is insufficient data to determine their status, which are vulnerable to impacts on their habitat or are endangered or critically endangered. Several of the sites identified as CWAs are located on Culebra Island on or adjacent to the refuge and have been considered in the development of this plan. The following table provides a list of the Critical Wildlife Areas and species that were identified in the CWCS.

**Table 2. Data deficient, vulnerable, endangered, or critically endangered species found in CWAs on Culebra NWR**

Critical Wildlife Area	Species	
	Common Name	Scientific Name
<b>Flamenco Peninsula</b>	Slippery backed mabuya Roseate tern	<i>Mabuya mabouya</i> <i>Sterna dougallii</i>
<b>Flamenco Lagoon</b>	White cheeked pintail Ruddy duck Caribbean coot Least grebe White crowned pigeon	<i>Anas bahamensis</i> <i>Oxyura jamaicensis</i> <i>Fulica caribaea</i> <i>Tachybaptus dominicus</i> <i>Patagioenas leucocephala</i>
<b>Resaca Mountain</b>	Culebra giant anole	<i>Anolis roosevelti</i>
<b>Resaca Beach</b>	Leatherback sea turtle Hawksbill turtle	<i>Dermochelys coriacea</i> <i>Eretmochelys imbricata</i>
<b>Brava Beach</b>	Leatherback sea turtle Hawksbill turtle	<i>Dermochelys coriacea</i> <i>Eretmochelys imbricata</i>
<b>Larga Beach and Zoní Lagoon</b>	Leatherback sea turtle Hawksbill turtle Brown pelican White cheeked pintail Ruddy duck Caribbean coot Peregrine falcon	<i>Dermochelys coriacea</i> <i>Eretmochelys imbricata</i> <i>Pelecanus occidentalis</i> <i>Anas bahamensis</i> <i>Oxyura jamaicensis</i> <i>Fulica caribaea</i> <i>Falco peregrinus</i>
<b>Puerto del Manglar</b>	Brown pelican White crowned pigeon Roseate tern	<i>Pelecanus occidentalis</i> <i>Patagioenas leucocephala</i> <i>Sterna dougallii</i>
<b>Los Caños</b>	White crowned pigeon White cheeked pintail	<i>Patagioenas leucocephala</i> <i>Anas bahamensis</i>
<b>Culebra's Surrounding Cays</b>	Roseate tern Slippery backed mabuya Hawksbill turtle Green sea turtle	<i>Sterna dougallii</i> <i>Mabuya mabouya</i> <i>Eretmochelys imbricata</i> <i>Chelonia mydas</i>

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In addition to these Critical Wildlife Area designations, the Wildlife Conservation Strategy also identified several Culebra Island Lagoons, including Flamenco and Zoni, as waterfowl focus areas.

## *WILDLIFE*

Most of the terrestrial and marine fauna found on and around Culebra is common within Puerto Rico wherever suitable habitat for the species is available. The native terrestrial component is comprised mostly of birds, reptiles, and amphibians and a few bat species. The marine animal component is largely composed of near shore and pelagic fish species, sea turtles, marine mammals, mollusks, and crustaceans. Species lists are included in Appendix I.

## **BIRDS**

At least 115 bird species, including migratory and resident, have been reported to occur on Culebra NWR. Of these, at least 20 species are marine seabirds that depend on the near-shore/off-shore marine habitats for feeding. These birds use rocky shores, cliffs, cays, sandy beaches, and lagoons to nest and/or roost. For the purpose of this discussion, the birds that occur on Culebra are divided into four groups: (1) Land birds, (2) wading birds, shorebirds, and marsh birds, (3) waterfowl, and (4) seabirds. Appendix I provides a list of the species documented to occur on Culebra NWR and that are likely to be found.

### *LAND BIRDS*

This is the largest and most diverse group within the refuge, accounting for more than 45 species. The numbers in this group fluctuate throughout the year due to the spring and fall migrations. These species inhabit mangroves, upland forests, lowland forests, gallery forests, barren areas, grasslands, evergreen scrub, beach scrub, mixed thorn, and low scrub. Representatives of this group include the Ground Dove, Zenaida Dove, Scaly-napped Pigeon, White-winged Dove, White-crowned Dove, Gray Kingbird, Caribbean Elaenia, Mangrove Cuckoo, Smooth-billed Ani, Belted Kingfisher, Black-faced Grassquit, Bananaquit, Shiny Cowbirds, Yellow-rumped Warbler, Black-whiskered Vireo, Green-throated Carib, Antillean Crested Hummingbird, Peregrine Falcon, American Kestrel, Red-tailed Hawk, and others.

### *WADING BIRDS, SHOREBIRDS, AND MARSH BIRDS*

With more than 30 species, wading birds make up the second largest group of bird species found in the refuge. This category loosely groups marsh birds, shorebirds, egrets, and herons. With the exception of cattle egrets that are found in inland grassy areas often with livestock, the majority of wading birds on the refuge are associated with mangrove-lagoon complexes and shorelines bordering the Culebra coast. The numbers of birds within this category on the refuge also vary throughout the year with migratory patterns. Many of these species, however, are found on Culebra NWR during all seasons of the year, with greater numbers during winter when migrants from northern areas are present.

Greater Flamingos were once found on Culebra and the Flamenco Lagoon is names for this species. Flamingos are now only rare visitors to the island. Other representatives of this group include the Great Egret, Snowy Egret, Tricolored Heron, Little Blue Heron, Great Blue Heron, Yellow-crowned Heron, Least Bittern, Clapper Rail, Sora Rail, Common Moorhen, Caribbean Coot, Semipalmated Plover, Snowy Plover, Wilson's Plover, Killdeer, Common Snipe, Spotted Sandpiper, Lesser and Greater Yellowlegs, Semipalmated Sandpiper, Short-billed Dowitcher, Black-necked Stilt, and others.

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## WATERFOWL

Waterfowl generally refers to swans, geese, and ducks, however, the first two are not present on Culebra, but ducks do occur as both resident and migratory species. The most frequently seen waterfowl species on the refuge areas is the White-cheeked Pintail. White-cheeked Pintails are often seen at Flamenco Lagoon and nesting of this species on Cayo Motojo has been documented. West Indian Whistling Ducks and Ruddy Ducks are considered residents, while Blue-winged Teal and Lesser Scaup, and other less frequently seen species, are winter migrants.

## SEABIRDS

Seabird nesting colonies on Culebra were the primary reason for the establishment of the refuge. This group of birds utilizes grasslands, rocky shores, small islands or cays, sandy beaches, mangroves, and occasionally lagoons near the coast. Fourteen species of seabirds nest in the Culebra Archipelago including Audubon's Shearwater, Masked Booby, Brown Booby, Red-footed Booby, White-tailed Tropicbird, Red-billed Tropicbird, Laughing Gull, Royal Tern, Sandwich Tern, Cayenne Tern, Roseate Tern, Bridled Tern, Sooty Tern, and Brown Noddy. Flamenco peninsula and nearby cays annually support nesting colonies totaling 30-40,000 pairs of Sooty terns, while other portions of the refuge provide habitat for Brown noddies, with estimated nesting populations of 800 pairs (Saliva 2009), Tropicbirds (White-tailed and Red-billed), Boobies, Frigatebirds (no nesting documented), Laughing Gulls, and others.

## REPTILES AND AMPHIBIANS

The herpetofauna (amphibian and reptiles) on Culebra is composed of approximately 24 species. These species include four species of marine sea turtles (of which three nest on Culebra beaches). Additional information on the sea turtles, Culebra Giant Anole (*Anolis roosevelti*), and the Virgin Islands Boa (*Epicrates monensis granti*) is provided in the section on endangered species.

Species known or expected to occur on Culebra include: Cane toad (*Bufo marinus*) (an invasive species), *Leptodactylus albilabris*, Coquis (*Eleutherodactylus antillensis*, *Eleutherodactylus coqui*), *Hemidactylus mabouia*, *Sphaerodactylus macrolepis*, *Sphaerodactylus nicholsi*, PR Ameiva (*Ameiva exsul*), *Anolis pulchellus*, *Anolis stratulus*, *Anolis cristatellus*, *Mabuya mabouya sloani*, *Alsophis portoricensis richardi*, and Iguana iguana,

## MAMMALS

With the exception of bats, there are no native land mammals on Culebra. The most visible mammals are domestic livestock (cattle, horses, goats, and sheep), cats, and dogs. Nonnative invasive mammals that have been on the island for years include rats, mice, and deer. The white-tailed deer was introduced to Culebra in 1966. Bat species known to exist on Culebra are *Molossus molossus fortis* (Pallas's Mastiff Bat), *Artibeus jamaicensis* (Jamaican Fruit Bat), and *Noctilus leporinus* (fisher bat). Others that may be found on Culebra with further surveys and investigations include: *Stenoderma rufum* (Red Fruit Bat or Red Fig-eating Bat), *Tadarida brasiliensis* (Brazilian free-tailed bat), *Brachyphylla cavernarum* (Antillean fruit-eating bat), and *Eptesicus fuscus* (Big Brown Bat).

A number of marine mammals is known to occur in the near shore and the deep waters surrounding Culebra Island. These include the sperm whale, the blue whale, humpback whale, the sei whale, and several dolphin species. The West Indian manatee is very rarely sighted in the waters surrounding Culebra.

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## ENDANGERED SPECIES

Federally listed threatened and endangered species documented on or adjacent to the refuge lands are: Roseate Tern; Culebra Giant Anole; Sea Turtles (Green, Hawksbill, Leatherback); Virgin Islands Boa; *Leptocereus grantianus* (an endemic cactus); and *Peperomia wheeleri* (an endemic herbaceous plant). A short background description of these species and their status based on information in the recovery plans is provided below. Designated “Critical Habitat” for the Culebra giant anole, hawksbill sea turtle, and green sea turtle is provided in Appendix J. Critical habitat for other listed species has not been designated on or around Culebra.

### Roseate Tern

The Roseate Tern is a pale, medium-sized, black-capped tern with a wide distribution in tropical seas. It is local and usually uncommon over most of its range. It received its name from the rosy tinge it has when in its spring breeding plumage.

The Roseate Tern is a specialized diver, feeding on small, schooling marine fish. It usually forages over reefs, sandbars, or tide rips, or in association with predatory fish that force smaller fish to the surface. Adapted for fast flight and relatively shallow diving, the Roseate Tern briefly submerges completely when diving for fish.

The Roseate Tern has a scattered distribution in the Atlantic, Indian, and Pacific Oceans, including Australia. Although it is primarily tropical, Atlantic populations extend well into the temperate zone in North America and Europe. This species nests mainly on small islands, with only a few large colonies in any region. In North America, it breeds in two discrete areas: from Nova Scotia to New York and around the Caribbean Sea (including Florida). Although found in early winter in northern South America, and later in small numbers along the Brazilian coast, the major wintering area remains a mystery. In 1996, however, Hays et al. (1997), found large numbers on the coast of Bahia, Brazil.

The Canadian Wildlife Service lists this species as threatened. The Department of the Interior lists the northeastern population as endangered and the Caribbean population as threatened, and the global status of the Roseate Tern is considered “near threatened.”

### Culebra Giant Anole

The Culebra “Giant” anole (*Anolis roosevelti*) is a large brownish-gray lizard that grows to about 160 mm snout to vent length. It was first described by Chapman Grant based on a specimen collected in 1931. The natural history and ecology of this species are unknown. The species has not been collected since 1932 and is believed by some to be extinct. The recovery plan for the species (USFWS 1982) identifies several actions to confirm the presence or absence of the species and management of its habitat. The first of these is to conduct field studies on Culebra, with a minimum of 3-5 surveys per year during all seasons for 2-3 years. Critical habitat for this species includes the Mount Resaca and Flamenco Point units of the Culebra NWR and surrounding areas. A year-long study conducted in 1986 (results published in 2010) to determine if the Culebra Giant Anole was present on Culebra did not find any anoles and recommended the Culebra population of *Anolis roosevelti* be designated as extinct (Kessler 2010).

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## Virgin Islands Tree Boa

A 5-year review of the status of the Virgin Islands Tree Boa (*Epicrates monensis granti*) was completed by the Service in 2008. That document provided the following information relative to the population of this species in Culebra. On Culebra Island, Tolson (1992) observed that the boas appear to be most numerous along a road running through a cattle pasture just downhill and east from the desalinization plant facility, on private land. He found one boa in 30 minutes of night searching at Punta Soldado, in a human altered area adjacent to the shoreline. This level of occurrence within one hour is considered high. García (1992) estimated at Culebra Island the ratio of boas per person/hour of searching (effort) at 0.72/hr or one boa per 1.4 hours of search. In addition, Puente-Rolón (2001) captured two Virgin Islands boas in Culebra, estimating the searching (effort) at one boa per 100 hours of search. Based on the information from the reports, the lack of consistency in reporting (density versus searching efforts), and limited information about the methodology used during searches, a determination of a population estimate of the species in Culebra is not practical. However, Tolson (1992) and García (1992) considered the Virgin Islands boa population on this island as one of the most significant of all the disjunctive demes (a local population of organisms of one species that actively interbreed with another and share a distinct gene pool) of this species.

The Virgin Islands Boa Recovery Plan contains criteria for reclassification: the maintenance of a stable or growing population of the Virgin Islands boa at selected major locations during a 5- to 10-year period; the introduction as necessary of the Virgin Islands boa to mongoose-free uninhabited islands within its theorized historical range; and the effective control or eradication of boa predators, such as feral mammals, located in Virgin Islands boa habitat.

## Sea Turtles (Hawksbill, Leatherback, Green)

### Hawksbill:

The hawksbill is found in tropical and subtropical regions of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean. The hawksbill sea turtle has experienced global population declines of 80 percent or more during the past century and continued decline is projected. Most populations are declining, depleted, or remnants of larger aggregations

Hawksbills frequent rocky areas, coral reefs, shallow coastal areas, lagoons or oceanic islands, and narrow creeks and passes. They are seldom seen in water deeper than 65 feet. Hatchlings are often found floating in masses of sea plants, and nesting may occur on almost any undisturbed deep-sand beach in the tropics. Adult females are able to climb over reefs and rocks to nest in beach vegetation.

Critical habitat for the hawksbill sea turtle is designated in 50 CFR 17.95 for the following areas on Culebra Island and surrounding cays: the beachfront on the north shore of Culebra Island from mean high tide to a point 150 meters from shore including Playa Resaca, Playa Brava, and Playa Larga; adjacent to Cayo Norte including the south beach, from mean high tide inland to a point 150 meters from shore; Culebrita Island including all beachfront areas on the southwest facing shore, east facing shore, and northwest facing shore of the island from mean high tide inland to a point 150 meters from shore.

Monitoring of hawksbill nesting on the Culebra archipelago has been somewhat inconsistent during the past several years, with changes in the level of effort, the number, and experience of the researchers involved. A survey of hawksbill nesting activities during 2009 determined that there were approximately 36 nests and 20 false crawls during the survey period (Hawksbill Nesting Surveys: Preliminary Report for September-December 2009). This is comparable to the data from previous years (1993-2006), when an average of 58 nesting activities was reported for this area.

Leatherback:

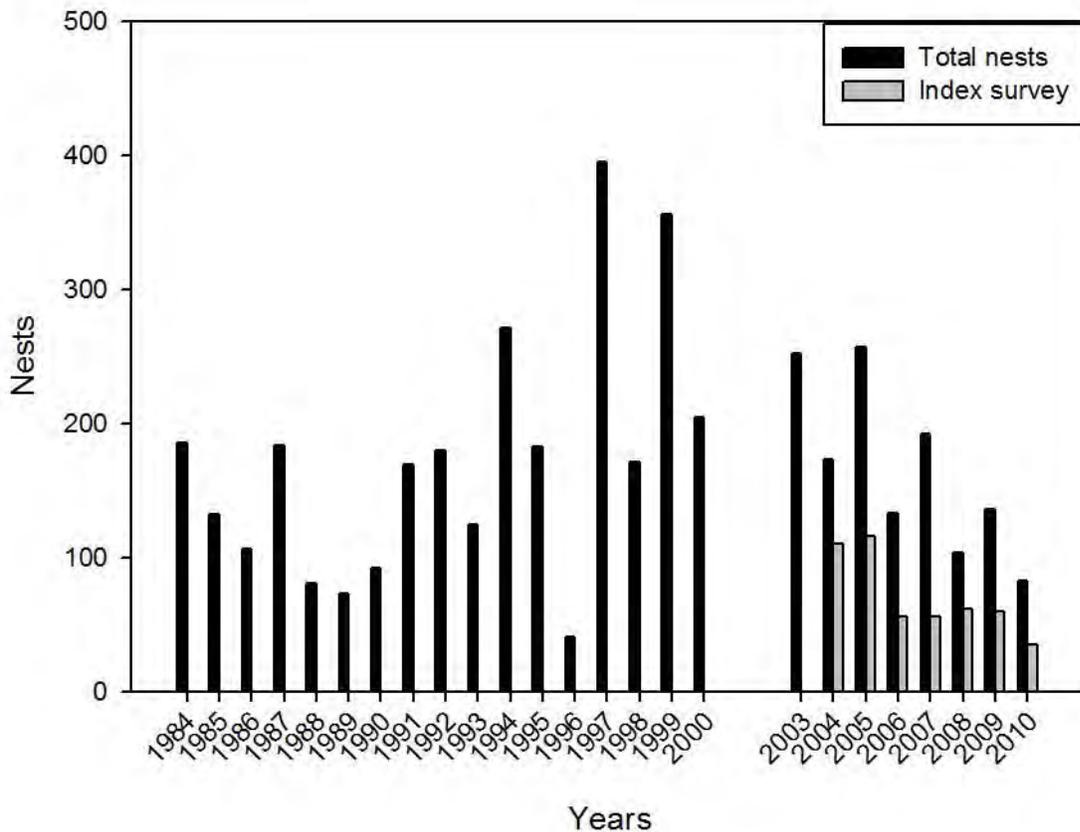
The leatherback turtle is distributed worldwide in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. It is also found in small numbers as far north as British Columbia, Newfoundland, and the British Isles, and as far south as Australia, Cape of Good Hope, and Argentina. Recent estimates of global nesting populations indicate 26,000 to 43,000 nesting females annually, which is a dramatic decline from the 115,000 estimated in 1980. In the United States, small nesting populations occur on the Florida east coast (35 females/year), Sandy Point, U.S. Virgin Islands (50 to 100 females/year), and Puerto Rico (30 to 90 females/year).

The leatherback is the most pelagic of the sea turtles. Adult females require sandy nesting beaches backed with vegetation and sloped sufficiently so the crawl to dry sand is not too far. The preferred beaches have proximity to deep water and generally rough seas. Culebra Playa Resaca and Playa Brava have been documented as significant nesting sites for leatherback sea turtles. During the 2009 nesting season, there were approximately 60 nesting activities on these beaches.

Critical habitat has not been designated for this species on Culebra; however, ongoing studies have documented the use of Culebra beaches by nesting leatherbacks that also nest on St. Croix where critical habitat has been designated.

The following figure provides leatherback nesting activities (number of nests) on Culebra beaches for the 1984 to 2010 seasons. Data for the nesting seasons 2001 and 2002 were not available (Diez, Soler 2010, Unpublished data).

**Figure 8. Culebra leatherback sea turtle nesting data**



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## Green:

The green sea turtle is a circum-global species in tropical and sub-tropical waters. In the U.S., green turtles are found around the U.S. Virgin Islands and Puerto Rico, and in the continental U.S. from Texas to Massachusetts. Green turtles nest in small numbers in the U.S. Virgin Islands and in Puerto Rico.

Adult female green turtles nest on high-energy oceanic beaches. The juvenile turtles are pelagic, living in the open ocean convergence zones. Once the turtles reach a carapace length of approximately 20 to 25 cm, they leave the pelagic habitat and enter benthic feeding grounds where they feed almost exclusively on sea grasses and algae. Due to the importance of the sea grasses as foraging sites for these turtles, the coastal waters around Culebra were designated as critical habitat by NOAA in 1998.

### **Leptocereus grantianus**

*Leptocereus grantianus* is a spineless cactus endemic to Culebra. It is currently designated as endangered, as it is known from one population consisting of about 50 individuals, plus a couple of isolated sites and planted individuals. The most significant population occurs in dry thickets along a rocky shoreline on the southwestern part of Culebra. It is located only 8 to 10 meters from high tide and is threatened by agricultural, residential, and tourist development on adjacent uplands, as well as by damage from heavy storm surges. It may have been cut in the past for use as livestock feed. Because it is an attractive and almost spineless cactus, it may be subject to collection for use as an ornamental. The recovery plan for this species calls for the creation of self-perpetuating populations of the plant within the Culebra NWR as well as other actions to ensure the continued survival of the existing population.

### **Peperomia wheeleri**

*Peperomia wheeleri* is an endemic species known only from Culebra, Isabela, and Quebradillas, Puerto Rico. It is an herbaceous plant that is found on large granodiorite boulders beneath the semi-evergreen forest of the Monte Resaca area of the Culebra NWR and on nearby privately owned lands in the vicinity. It is federally listed as endangered and is limited to its current location as a result of deforestation and grazing that reduced the availability of suitable habitat.

## **CULTURAL RESOURCES**

Only limited archaeological investigations have been conducted on Culebra; however, as a result of the destruction of facilities by Hurricane Hugo in September 1989, the Culebra NWR needed to replace its office and residence facilities. Prior to construction of the new facilities, an archaeological survey was conducted by Garrow and Associates, Inc., with José R. Oliver leading the work. The office and residence are located on lands the Service leased from the Commonwealth. Although detailed archaeological surveys have not been conducted on the refuge lands, the following summary of the report provides some conclusions about the prehistoric inhabitants of Culebra who may have utilized refuge lands as well as other sites on Culebra.

The survey and excavation at the office and residence sites revealed remnants of prehistoric ceramics (pottery), shell, stone, and coral artifacts, along with an abundance of prehistoric food remains. A charcoal sample from the bottom of the deposit was radiocarbon dated to A.D. 642 (1,350 years ago).

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Over 2,000 ceramic fragments and nearly 9,000 items of food remains, such as crab claws and fish bones were recovered. The artifacts include small shell beads, a shell pendant, and stone flakes used to cut and scrape. Some coral fragments appear to have been used as grinding instruments. The site yielded an abundance of well-made but mostly undecorated ceramic vessel fragments including necked jars, open bowls, boat-shaped vessels, platters, and several other receptacles.

A comparison of artifacts found at the bottom of an excavation with those near the top revealed few changes, suggesting that the site was occupied for a relatively short-time period, perhaps 100 to 200 years.

Food remains, analyzed by Yvonne Narganes Storde at the University of Puerto Rico, indicate the primary foods consisted of marine life including parrot fish, groupers, wrasses, snappers, sea turtles, conchs, and clams. In addition to its food value, the Queen Conch also provided a hard shell for manufacturing objects, such as beads and shell discs. The most abundant terrestrial food resource was the *juey*, or land crab.

The early inhabitants of Culebra were direct descendants of Saladoid groups that migrated from the Orinoco River in Venezuela to Guianas-Trinidad and then through the Lesser Antilles, reaching Puerto Rico around 250 B.C. Initially the Saladoid peoples shared a culture rooted in mainland South America. Their material culture (ceramics, etc.) and ways of adapting to the environment were fairly uniform from one community to another. They settled in coastal areas protected from the trade winds, facing reef barriers, and near river outlets.

Archaeologists believe that by 400 A.D. (about 1,600 years ago), the Saladoid culture had begun to diverge. On the larger islands such as Puerto Rico, as the descendants of early migrants became more familiar with the local environment and more efficient in exploiting local resources, they began to develop new cultural traditions adapted to their surroundings. With an expanding population, preferred locations were quickly occupied and some groups were forced to settle in more remote sites. Some migrated from the more bountiful islands to those on which agriculture was far more difficult, and water and raw materials scarce. Around A.D. 640, one such group settled on Culebra. After 100 to 200 years, the Culebra site was abandoned and the site remained unoccupied until about 1881, when the Spanish colonial town of San Ildefonso was established.

In 2006, field investigation of Cayo Lobo and Culebrita was conducted by Southeastern Archaeological Research, Inc., for the Army Corps of Engineers. That investigation, which was carried out to determine if there were any cultural resources that might be impacted by the clean-up of ordnance or equipment from former military training activities, did not reveal any evidence of historic or prehistoric activities on those cays.

## **SOCIOECONOMIC ENVIRONMENT**

### *POPULATION*

The U.S. Census Bureau estimated the population of Culebra to be 2,138 in July 2008. The most recent actual count was made during the U.S. Census of 2000, when the population count was 1,868. The following table provides selected data from the 2000 census.

**Table 3. Culebra selected population characteristics (U.S. Census 2000\*)**

<b>CULEBRA SELECTED POPULATION CHARACTERISTICS 2000</b>		
<b>SUBJECT</b>	<b>NUMBER</b>	<b>PERCENT</b>
<b>Total population</b>	1,868	100.0
<b>Male</b>	970	51.9
<b>Female</b>	898	48.1
<b>Median Age</b>	36	(X)
<b>Under 5 years of age</b>	138	7.4
<b>65 year and over</b>	237	12.7
<b>Average family size</b>	3.24	(X)
<b>Percent high school graduate or higher (25 yrs or older)</b>		60.4
<b>Percent bachelor's degree or higher (25 yrs or older)</b>		11.7
<b>Language at home Spanish</b>	1,445	82.9
<b>In the labor force (16 years and over)</b>	701	49.1
<b>Families below poverty level</b>	161	33.0
<b>Individuals below poverty level</b>	688	37
<b>Median household income</b>	\$17,008	(X)

*\*2010 Census data were not yet available when this document was prepared*

### **POLITICAL SETTING**

The Puerto Rico Constitution established a democratic form of government, divided into three branches: the legislative, executive, and judicial branches. The legislative branch consists of a bicameral Legislative Assembly with a Senate (27 members) and a House of Representatives (51 members). The constitution requires the total membership in the assembly to be expanded, if necessary, to increase minority representation whenever one party controls more than two-thirds of the seats.

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A Resident Commissioner serves as Puerto Rico's sole delegate to the U.S. Congress, holds limited powers as a member of the U.S. House of Representatives where he/she has a vote in committees, but does not have a vote with the full House. The executive authority is vested in a Governor.

Culebra is one of the 78 municipalities in Puerto Rico. Each municipality is administered by a mayor and a municipal assembly. All of these positions are elected. U.S. citizens, residents in Puerto Rico, age 18 and older, are eligible to vote in commonwealth and municipal elections.

The Governor nominates leaders for the Cabinet level and other executive branch and public corporation leadership positions under a highly centralized structure. The Secretary of State (who serves as acting governor in the chief executive's absence) must be confirmed by a majority vote of both the House and Senate.

### *EMPLOYMENT*

In Culebra the total employment experienced a general increasing tendency from 1990 to 2002 (Table 4). In the early 1990s, employment was at a low with 1,153 people employed. Later it recovered and in 1998 began to decline again, arriving at 1,292 people employed in 2001. In 2002, recovery returned with 1,389 people employed. The increases have been less significant than in Puerto Rico as a whole. Information from the Bureau of Labor Statistics shows that, in 2002, unemployment throughout Puerto Rico was about 12 percent. By the end of 2009, this figure had risen to over 15 percent.

### *INCOME*

Reports produced by the Puerto Rico Department of Labor indicate that salaries in Culebra are consistently lower than the average for other municipalities in Puerto Rico. In 2007, average salaries were \$16,840. This amount is approximately 68 percent of the Puerto Rico average. The economic downturn that has occurred since the referenced data were collected has undoubtedly affected Culebra as it has other municipalities in Puerto Rico.

### **Cost of Living**

The high cost of living has been one of the most frequent concerns expressed by the Culebrenses. The necessity of transporting the major part of the products to the islands causes an increase in their costs. The existence of limited retail distribution channels may also contribute to price increases.

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### *III. Plan Development*

In accordance with Service guidelines and NEPA recommendations, public involvement has been an important factor during the development of this Draft CCP/EA for Culebra NWR. This Draft CCP/EA has been written with input and assistance from interested citizens, conservation organizations, and representatives of commonwealth agencies. The Service, as a whole, and the refuge staff, in particular, are very grateful to each one who has contributed time, expertise, and recommendations during the planning process.

The planning team tasked with writing this Draft CCP/EA focused on identifying the issues and concerns relevant to refuge management. The team first met during November 2008 and continued to communicate and meet on several occasions during the development of this Draft CCP/EA.

Prior to the development of this Draft CCP/EA, the refuge conducted a biological review for the Caribbean Islands NWR Complex. In 2003, a public use review was conducted specifically for the Culebra NWR. Early in the process, the planning team identified a variety of issues, concerns, and opportunities that were provided by the two review teams.

The Caribbean Islands biological review was conducted during January 2002. The biological review team was composed of knowledgeable individuals from the Service's Southeast Regional Office, the Caribbean Ecological Services Field Office, and the Complex. The team conducted a critical examination of the Culebra NWR biological program as well as the other refuges within the Complex. The planning team reviewed and utilized information and recommendations from the biological review during the development of this Draft CCP/EA.

The public use review was prepared by a team of public use specialists from the Service's Regional Office and Southeast Region refuges. The team reviewed the existing public use programs, facilities, and opportunities available. Emphasis was placed on the priority six wildlife-dependent public uses. The public use review team prepared a public use review report that also provided recommendations for the short- and long-term public use program. These recommendations were taken into consideration during the development of this Draft CCP/EA.

A notice of intent to prepare the comprehensive conservation plan was published in the *Federal Register* on December 19, 2008 (73 FR 77827). The March 17, 2009, public scoping meeting was announced through local news media [Primera Hora (online), Culebra Calendar, La Regatta], through a radio interview on radio station WALO, and through the distribution of flyers throughout the island municipality. In addition, 44 letters were sent to elected officials; representatives of commonwealth, federal, and municipal agencies; educational organizations; and non-governmental organizations. E-mail notification was sent to an additional 46 addressees. The meeting was attended by 28 people; two representing elected officials, three representing government agencies, three representing organizations, and the remainder as individuals. Comments were received from eleven individuals and agency representatives.

#### **SUMMARY OF ISSUES, CONCERNS, AND OPPORTUNITIES**

The 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. Additionally, the planning team considered federal and state mandates, as well as applicable local ordinances, regulations, and plans. The team also directed the process of obtaining

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public input through public scoping meetings, comment packets, and personal contacts. All public and advisory team comments were considered; however, some issues important to the public fell outside the scope of the decisions to be made during this planning process. The team considered all issues that were raised throughout the planning process, and developed this Draft CCP/EA that attempts to balance the competing opinions regarding important issues. The team identified those issues that, in its best professional judgment, are most significant to the refuge. The following list includes the issues that were identified during the scoping process and were considered during the development of this Draft CCP/EA:

#### *FISH AND WILDLIFE POPULATION MANAGEMENT*

- Invasive species management, control or eliminate invasive species.
- Continue control of non-native predators such as cats.
- Resaca and Brava Beaches: In accordance with cooperative agreement between the Service and the Puerto Rico DNER, continue the Leatherback and Hawksbill sea turtle nest program and the patrol during breeding season.

#### *HABITAT MANAGEMENT*

- Monitor and manage seabird colonies.
- Establish a grassland management program to improve nesting sites.
- Identify management activities that may affect priority and extent of clean up of contamination and unexploded ordnance from prior military activities.

#### *RESOURCE PROTECTION*

- Flamenco Peninsula: Patrol the area and control public access in order to protect breeding seabird colonies.
- Mangrove Areas: Conduct law enforcement patrols to control any activities that could affect them.
- Offshore cays: To minimize disturbance to wildlife and ecology, patrol the cays in conjunction with DNER Law Enforcement Division during weekends and summer season.

#### *VISITOR SERVICES*

- Control access and utilization of Culebrita beaches and ensure a consistent policy for special use permits.
- Develop plans for repair and reutilization of the OP at Punta Flamenco.
- Develop hiking trails.

#### *REFUGE ADMINISTRATION*

- Complete boundary verification process, clarify all unresolved boundary issues.
- Work with Army Corps FUDS program to maximize clean up of military ordnance.
- Increase funding for sea turtle projects;
- Development of renewable energy projects (particularly wind energy) on the refuge.

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## **WILDERNESS REVIEW**

Refuge planning policy requires a wilderness review as part of the comprehensive conservation planning process. The lands within the Culebra NWR were reviewed for their suitability in meeting the criteria for wilderness, as defined by the Wilderness Act of 1964. The definition in the Act states that a wilderness is recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. It is further defined as an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

The Culebra NWR contains a total of 1,510 acres of land; portions have been utilized as a bombing range; and portions receive significant visitation. Although the refuge contains significant natural resources that can be managed or restored to provide an approximation of their historic character, it does not meet the criteria established by the Act. Therefore, the suitability of Culebra NWR for wilderness designation is not considered further in this Draft CCP/EA.



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## 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 the refuge over the next 15 years. This proposed management direction contains the goals, objectives, and strategies that will be used to achieve the refuge vision.

Three alternatives for managing the refuge were considered: Alternative A was described as the Current Management or No Action alternative. Under this alternative Culebra NWR would continue to be managed as it is at present for the 15-year lifetime of the CCP. Alternative B described as the Wildlife Management Emphasis alternative, emphasized increased wildlife management on Culebra NWR. Alternative C emphasized both wildlife and increased public uses and would utilize any increase in staffing and budgetary resources to expand wildlife and habitat management and to provide additional visitor services and facilities.

Each of these alternatives is described in the Alternatives section of the Environmental Assessment. The Service chose Alternative C as the proposed management direction.

The proposed alternative will result in the implementation of management activities to improve wildlife populations and habitat conditions while increasing opportunities for wildlife-dependent public uses. The following summary highlights some of the management activities and programs to be implemented. In addition to the direction provided in this Draft CCP/EA, the Culebra MWR will be developing a series of “step down plans” that will further refine the strategies provided here.

To accomplish the goal for fish and wildlife population management, the plan calls for expanding seasonal surveys to determine seabird abundance, research on nesting success, and nesting habitat quality. It also provides for manipulation of vegetation to improve nesting habitat and the potential for use of decoys to encourage re-nesting by seabirds and control of invasive predators that eat seabird eggs, young, and adults. As appropriate, staff will consider translocation of certain species of seabirds to other cays to help ensure their survival and accelerate their recovery.

To benefit resident and migratory birds, annual surveys will be developed and implemented at selected locations throughout the refuge. We will also implement habitat management strategies to benefit target species of birds and cooperate with Puerto Rico DNER to conduct regular surveys and manage habitat for listed animal species. In addition, this plan provides for the establishment of additional populations of two species of listed plants – *Pepperomia wheelerii* and *Leptocereus grantianus* – at appropriate sites on the refuge. In cooperation with partners, the refuge will continue surveys and protection of nesting hawksbill, green, and leatherback turtles and their nests/eggs.

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Some of the activities proposed to accomplish the habitat management goal include the restoration of hydrology to specified areas of degraded mangrove habitat and the restoration of dry forest on portions of the refuge through selective invasive species removal and planting of propagated native trees typical of the area. Refuge staff will intensify efforts at invasive species control and eradication, and pursue opportunities for habitat restoration on offshore cays. Wetlands will continue to be protected, and this alternative will intensify efforts at their restoration through activities such as planting and restoration of hydrology.

Under the resource protection goal, the refuge will continue current activities and initiate new strategies to protect its natural and cultural resources. Within 5 years of CCP approval, refuge staff will, to the maximum extent possible, clearly delineate all refuge boundaries both on maps and on the ground. Where appropriate, the refuge will pursue opportunities for boundary expansion with acquisitions from willing sellers and will work with adjacent owners to resolve boundary issues. Partnerships with DNER and other partners will be strengthened and formalized.

To achieve the visitor services goal, the Culebra NWR will provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history. The refuge will maintain its current schedule (open to the public during daylight hours only) for areas open to the public and continue to permit water taxis under special use permit for access. On a case-by-case basis, the potential for opening additional areas to the public will be evaluated, considering both visitor safety and the potential for resource impacts. The refuge will investigate opportunities to develop partnerships to restore and reopen the Observation Post for environmental research and/or education purposes.

The refuge will continue to provide for opportunistic wildlife observation and photography throughout the refuge and at the tower near the refuge headquarters. In addition, the refuge will develop more facilities such as trails, towers, boardwalks, and blinds to increase opportunities for wildlife observation and photography at sites that are open to the public. Staff will continue to respond to incidental requests for talks, walks, and other environmental education and interpretive programs, develop interpretive programs and interpretive materials, and develop and implement more environmental education (e.g., curriculum, teacher training) both on and off the refuge. A public use specialist would be added to the staff to accomplish this. Contingent upon adding a public use specialist, within 5 years of CCP approval, the refuge will develop and begin to implement a communications plan that outlines the refuge's approach and strategies for outreach to the public. Within 10 years of CCP approval, a new headquarters/visitor contact station will be constructed.

The administration goal for the refuge is to provide adequate staffing and funding to accomplish refuge goals and objectives while encouraging cooperative efforts with other agencies, non-governmental organizations, universities, and other partners. Culebra NWR will increase efforts with the Corps of Engineers to certify additional areas as cleared and safe for public access. We would also continue to protect visitors and staff from illegal activities. Current staffing of one refuge manager, one maintenance worker, and one law enforcement officer will be maintained and one public use specialist, one biologist, 1.5 bio-technician positions, and one maintenance worker will be added for a total of 7.5 full-time equivalent staff.

An important component of the CCP is to facilitate the formation of a friends group within 5 years of CCP approval. The CCP will also result in an increased cooperation with partners in habitat and wildlife management as well as public use, through the establishment of formal agreements where appropriate.

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## VISION

The Culebra National Wildlife Refuge is part of a scenic tropical island archipelago with a unique collection of natural and cultural resources. The refuge is managed to restore, protect, and conserve fish and wildlife resources and habitats, with special emphasis on seabirds, other migratory birds, endangered species, and forest communities. It also provides opportunities for compatible wildlife-dependent recreational uses. The refuge works in partnership with others to achieve this vision. Conservation of the refuge is the Fish and Wildlife Service's commitment to present and future generations.

## GOALS, OBJECTIVES, AND STRATEGIES

The goals, objectives, and strategies presented are the Service's response to the issues, concerns, and needs expressed by the planning team, the refuge staff and partners, and the public and are presented in 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 vision of Culebra NWR. The Service intends to accomplish these goals, objectives, and strategies within the next 15 years. The objectives and strategies identified in this Draft CCP/EA will be further refined and developed in "step down plans" as identified in Chapter V. Among the additional plans to be completed is a "Habitat Management Plan" that will provide additional detailed strategies for accomplishment of most of the objectives and strategies identified under Goals 1 and 2.

### *FISH AND WILDLIFE POPULATION MANAGEMENT*

**Goal 1:** Monitor, protect, and recover special status plants and animals and species of management interest.

*Background:* Culebra NWR provides a variety of habitats for resident and migratory birds including federal and commonwealth listed threatened and endangered species. Flamenco Peninsula is primarily vegetated in grasslands and provides habitat for a nesting colony of Sooty Terns (30,000-40,000 birds) located on the northwest tip of this peninsula. The Monte Resaca portion of the refuge is dominated by a unique "boulder forest" that is habitat for the endangered plant, *Pepperomia wheeleri*, and the endangered Virgin Islands boa (*Epicrates monensis granti*). This unit also provides a buffer between the developed portions of Culebra and important sea turtle nesting beaches (Resaca and Brava). Two mangrove units of the refuge help assure protection of these vital links between terrestrial and marine ecosystems. The Ensenada Honda unit consists mainly of red mangroves and is the largest mangrove tract in the archipelago. The Puerto del Manglar unit is a fringe of mangroves around a highly productive bay. It is an important area for brown pelicans and protects the coastal fringe of a phosphorescent bay, which is a nursery and feeding area for marine life including green turtles and spiny lobster. Numerous small cays, some of which provide nesting sites for seabirds, are also included in the refuge. The largest of these, Culebrita and Cayo Luis Peña, contain small patches of deciduous, semi-evergreen forest consisting of *Bursera simaruba*, *Pisonia subcordata*, *Bouyeria succulent*, and *Exostema caribaeum*.

**Objective 1-1: Seabirds.** Monitor seabird populations and manage habitats to maintain or increase seabird nesting success on Flamenco Peninsula and offshore cays.

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*Discussion:* Periodic surveys are currently conducted to determine the relative abundance of the nesting seabirds. In order to ensure quality habitat is maintained for the seabirds, routine comprehensive surveys should be conducted in conjunction with any management practices to improve habitat or utilization of the refuge. Since major portions of the areas utilized by nesting seabirds on Flamenco Peninsula and the offshore cays are currently contaminated with unexploded ordnance, management activities and plan development will be coordinated with the Army Corps of Engineers to ensure safety of personnel conducting management activities.

*Strategies:*

- Conduct expanded seasonal surveys to determine seabird abundance, research on nesting success, and nesting habitat quality.
- Manipulate vegetation where needed to improve nesting habitat and consider use of decoys to encourage re-nesting.
- Implement control of invasive predators that eat eggs, young, and adults.
- Consider translocation of certain species to unoccupied cays previously used by those species.

**Objective 1-2: Sea turtles.** In cooperation with partners, continue surveys and protection of nesting hawksbill, green, and leatherback turtles and their nests/eggs.

*Discussion:* The Culebra NWR staff has worked cooperatively with the Puerto Rico DNER and volunteers to conduct sea turtle nesting surveys, to monitor and tag nesting turtles on beaches adjacent to refuge lands, and to protect nesting sea turtle and their eggs from poaching.

*Strategy:*

- In cooperation with partners, standardize and formalize the monitoring, tagging, record keeping, and law enforcement programs to ensure the continuation of an effective sea turtle recovery program at Culebra NWR.

**Objective 1-3: Resident and migratory birds.** Develop and implement annual surveys for resident and migratory birds at selected locations, representing all habitat types throughout the refuge. Implement habitat management strategies to benefit target species.

*Discussion:* Periodic surveys of neotropical migratory and resident birds that have been conducted in the past will be increased, and procedures will be documented to ensure that standardized techniques are utilized and that data will be comparable so population fluctuations and trends can be monitored over time.

*Strategies:*

- Develop a wildlife inventory plan within 5 years of CCP approval.
- Coordinate survey activities with Service's Migratory Bird Program and Ecological Services personnel, DNER and SOPI.
- As appropriate, develop formal agreements with partners to assist with implementation of the inventory plan.

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**Objective 1-4: Listed Animal Species.** In cooperation with DNER and Service Ecological Services personnel, conduct regular surveys and manage habitat for listed species.

*Discussion:* Federally listed species that have been identified on and around Culebra NWR are Roseate terns, Virgin Island boas, Culebra giant anoles, and Leatherback, Hawksbill, and Green sea turtles. The commonwealth has identified several additional “Critical” species for which population data is insufficient, they are vulnerable, or are critically endangered. Included in the commonwealth list of “critical” species are: White cheeked pintail (*Anas bahamensis*), Ruddy duck (*Oxyura jamaicensis*), Caribbean coot (*Fulica caribaea*), Least grebe (*Tachybaptus dominicus*), White crowned pigeon (*Patagioenas leucocephala*), and Slippery backed mabuya (*Mabuya mabouya*). Management programs developed for federally listed or commonwealth designated “critical” species will be coordinated with the Service’s Ecological Services office in Boquerón and the Puerto Rico DNER.

Information on populations of listed species on and around Culebra NWR is collected infrequently by both Puerto Rico DNER and Service personnel. In order to conduct effective management activities for threatened or endangered animals, routine surveys are needed to determine distribution, population trends, and habitat utilization. Information from the surveys will be utilized to develop and implement management programs to benefit the species.

*Strategies:*

- Develop a monitoring plan for all listed species within 3 years of CCP approval.
- As needed, develop cooperative agreements with Puerto Rico DNER and non-governmental organizations to ensure personnel and equipment are available for surveys and management activities.
- As population and habitat utilization data on listed species is collected, develop species-specific management programs to improve habitat conditions and survival potential.

**Objective 1-5: Listed Plant Species.** Establish additional populations of these two species at appropriate sites on the refuge.

*Discussion:* Federally listed plant species on Culebra NWR are *Peperomia wheeleri*, an evergreen herb found only in the Mt. Resaca unit of the refuge, and *Leptocereus grantianus*, a spineless cactus found at only one location on the island of Culebra (not currently on refuge lands). Activities directed at the recovery of these species on Culebra will be conducted in accordance with the recovery plans and in cooperation with the Service’s Ecological Services office in Boquerón and the Puerto Rico DNER.

*Strategies:*

- Conduct surveys of refuge lands to identify appropriate sites for establishment of additional populations of *Leptocereus grantianus* and *Peperomia wheeleri*.
- Maintain and improve existing nursery facilities to ensure an adequate supply of plants for introduction.
- As needed, develop cooperative agreements with Puerto Rico DNER and non-governmental organizations to assist with propagation and planting of listed plant species.

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## HABITAT MANAGEMENT

**Goal 2:** Conserve, enhance, and restore native plant communities, including wetlands and their associated fish and wildlife, representative of the native biological diversity that would have been found on Culebra NWR lands prior to major development and historical uses of the lands.

*Background:* Healthy, high-quality habitats are key to healthy fish and wildlife populations. Since the late 1800s, Culebra has been subjected to a variety of activities that have altered much of the habitat. These activities have included agricultural practices, domestic livestock and feral animals, military training (including use as a bombing range), urban development, and introduction of invasive plants and animals. Conditions that existed prior to the 1800s provide a reference point for comparison with existing conditions. The assumption is that, at that point in time, ecological processes were operating at a natural frequency and intensity and were not influenced as much by human disturbances (land clearing, burning, development, etc.) as they are today. Restoration of native conditions is a desired direction for management, but may not always be achieved in the short term because soils or other environmental factors may be altered so they no longer support native species. Active and passive management approaches will be used to restore and maintain native conditions. Completion of some of the habitat management objectives will take longer than the life of this CCP (15 years) to achieve.

**Objective 2-1: Mangroves:** Restore hydrology to specified areas of degraded mangrove habitat.

*Discussion:* In the past, the mangrove areas at Ensenada Honda were altered by sedimentation from upland runoff and a roadway that altered the hydrology within the unit. To maximize the value of the refuge mangrove forest at Ensenada Honda, the magnitude of the previous impacts will be documented and where necessary restoration efforts will be initiated.

*Strategies:*

- Within 5 years of CCP approval, an evaluation of the extent and impact of the modifications will be conducted and a restoration plan will be developed in cooperation with the Army Corps of Engineers and the Puerto Rico DNER.
- Coordination with the municipality of Culebra and adjacent landowners will be required when any proposed activities may affect facilities or lands under their control.

**Objective 2-2: Dry Forest:** Restore dry forest on portions of the refuge through selective invasive species removal and planting of propagated trees.

*Discussion:* As a result of military and agricultural activities, competition from invasive species, feral animals, and storm events, dry forest areas of the refuge are less productive than they were prior to these alterations. To restore damaged dry forest habitat components, monitoring, invasive species control or eradication, and reintroduction of native plants may be required.

*Strategies:*

- Evaluate dry forest habitats to identify sites needing active management (e.g., clearing or removal of selected plants, and seeding or planting of nursery stocks).
- Maintain and improve the nursery facilities at Lower Camp to provide plant material for forest restoration projects.
- Develop management programs for the removal of invasive plant species and feral animals.

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**Objective 2-3: Offshore Cays.** Continue to protect land and resources on offshore cays and practice limited invasive species removal. Intensify efforts at invasive species control and eradication, and pursue opportunities for habitat restoration.

*Discussion:* Several of the offshore cays are utilized by nesting seabirds and occasionally sea turtles. These cays are not currently open to public access and only limited law enforcement patrols by Service and Puerto Rico DNER are conducted to ensure compliance. To maximize the potential for nesting success of native species on these islands, predators and invasive plants may need to be controlled.

*Strategies:*

- Conduct detailed surveys of offshore cays to determine presence of invasive plants or introduced predators that may affect nesting potential.
- As appropriate, initiate control or eradication measures.

**Objective 2-4: Wetland Plant Communities.** Continue to protect wetlands through identification of refuge boundaries and enforcement patrols. Intensify efforts at restoration of wetlands.

*Discussion:* Wetland plant communities on Culebra NWR are limited. The major refuge wetlands are associated with Flamenco and Zoni Lagoons. Small wetland areas are also located inland of Brava, and Resaca beaches, on Culebrita and at Puerto del Manglar. The wetlands serve as groundwater recharge areas, are important to the food web for native fish and wildlife species, and provide nursery and feeding areas for species of management importance such as White-cheeked pintails and Ruddy ducks.

*Strategies:*

- Conduct surveys of all wetland areas on refuge units to determine their extent, species composition and ecological function, and establish a baseline for identification of future changes.
- At least every 5 years, resurvey all wetland areas to determine if adverse or beneficial changes to the wetland composition and functions are occurring.
- As needed, implement management programs to ensure maintenance of wetland functions. These programs could include activities such as restoration of hydrology or vegetative communities.

**Objective 2-5: Invasive Species Management.** Intensify invasive species management of plants and animals that are most damaging to habitats and wildlife.

*Discussion:* Executive Order 13112 defines an invasive species as: “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” Invasive species may prey upon, displace, or otherwise harm native species. Invasive species on the refuge include rats, goats, deer, and nonnative vegetation. While some of the nonnative plant species provide food and shelter for the native species and do not represent a threat, others constitute direct competition, adversely affect the habitat or are predators on the species of management interest. Limited projects have historically been conducted to remove nonnative vegetation and animals where impacts to habitats and nesting sites have been identified. When invasives adversely affect the reproduction, survival, or habitat of the managed species, control measures are warranted.

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*Strategies:*

- Monitor sea bird and listed species populations to document or identify potential adverse impacts from invasives and provide for early detection of any new threats.
- Survey selected refuge sites (especially nesting areas and sites known to harbor at risk plants and animal species) of to determine presence and/or population levels of invasive species.
- When adverse impacts to species of management concern are identified, potential control or elimination of the invasives will be evaluated and a control program will be developed.
- Develop and implement control plans (Invasive Species Management Plan to be completed by 2012) and post control monitoring to evaluate effectiveness.

**RESOURCE PROTECTION**

**Goal 3:** In cooperation with partners, protect the refuge's natural and cultural resources from illegal activity.

*Background:* In order to accomplish the vision of the refuge, the Service needs to restore, protect, and conserve fish and wildlife resources and their habitats, as well as cultural resources on all refuge lands. Several objectives have been developed to help meet goal three and achieve the vision. One of the most critical objectives under this goal is to ensure that the boundaries of the refuge are clearly defined and identified.

**Objective 3-1: Refuge boundary definition.**

*Discussion:* Although the Culebra Reserve was first designated in 1909, the lands were under the administrative jurisdiction of the Navy until 1976, when portions were transferred to the commonwealth and administrative jurisdiction over other portions was transferred to the Service. The original boundaries and descriptions of the lands currently administered by the Service were based on an 1887 survey. The descriptions of the refuge parcels were, in some cases, unclear and not consistent with other land records. Realty personnel from the Service's Atlanta Regional Office have been working to clarify the boundary issues for several years.

*Strategies:*

- Coordinate with regional realty personnel and adjacent landowners to ensure resolution of boundary issues.
- Within 5 years of CCP approval, clearly delineate all refuge boundaries both on maps and on the ground.

**Objective 3-2: Refuge boundary expansion and acquisition.**

*Discussion:* Culebra NWR does not have a major land acquisition program; however, there are adjacent properties with significant resource values that could be added to the refuge to enhance resource protection and habitat values. In addition, in areas where boundaries are unclear or illogical, land exchanges or acquisition could benefit both refuge management and private land owners.

*Strategy:*

- Pursue opportunities for boundary expansions with acquisitions from willing sellers and to resolve boundary issues.

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### **Objective 3-3: Law enforcement and patrol.**

*Discussion:* In order to ensure refuge resources are protected from illegal or inappropriate uses, it is necessary to maintain adequate law enforcement coverage. This coverage is provided by trained Service personnel with assistance from other agencies. While enforcement of federal and commonwealth laws on refuge lands is an important function, the ability to contact visitors, provide guidance and information about refuge resources, and compliance with regulations are also critical to minimize adverse resource impacts.

*Strategy:*

- Strengthen and formalize partnership with Puerto Rico DNER and other partners, and restore 1.0 FTE law enforcement officer position to protect refuge resources.

### **Objective 3-4: Cultural resources.**

*Discussion:* The Service values and protects its archaeological and historical resources as defined in the National Historic Preservation Act of 1966 (NHPA) and the Archaeological Resources Protection Act of 1979 (ARPA). Cultural resources have been identified at the headquarters site located on leased commonwealth lands. Archaeological investigations indicate that this site was occupied by a Saladoid community after A.D. 640. The site was later abandoned and it is not known if the community moved to another location on Culebra or to some other island. Since Culebra is a relatively small island with limited freshwater resources, major cultural sites are not expected. Additional surveys will need to be conducted to determine if any significant cultural resources are located on other refuge lands.

*Strategies:*

- As necessary, conduct Level 1 Archaeological surveys at any project sites.
- Within 15 years of CCP approval, complete and begin to implement a Cultural Resources Management Plan for the refuge.

### **VISITOR SERVICES**

**Goal 4:** Provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history.

*Background:* The Improvement Act states that compatible wildlife-dependent recreational uses are the priority public uses of the Refuge System (e.g., hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation) and will receive enhanced consideration over the other general public uses. The Service will permit other uses only when they have been proven to be both appropriate and compatible (See Refuge Manual 605 FW 1, General Guidance, and 603 FW 1, Appropriate Refuge Uses). A high priority for the Service's Southeast Region, is "connecting people with nature." Portions of Culebra NWR are currently available for a variety of public use opportunities; however, significant areas are closed to public access because of safety issues related to the presence of unexploded ordnance from former military activities and accessibility. Existing public uses may continue, if they are determined to be appropriate and compatible with the purposes and wildlife objectives of the refuge. Appropriate use and compatibility determinations for proposed public use activities are included in this Draft CCP/EA.

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**Objective 4-1: Develop a Visitor Services Plan.**

*Discussion:* A visitor services review was conducted for Culebra NWR in 2003. That review identified the need to develop and implement a Visitor Services Management Plan. The Visitor Services Management Plan will identify resource needs and establish visitor service programs based on goals, objectives, and strategies identified in this Draft CCP/EA.

*Strategy:*

- Designate staff to develop and implement a Visitor Services Management Plan. This plan should be completed by the year 2013.

**Objective 4-2: Public Access.** On a case-by-case basis, evaluate potential for opening additional areas to priority public use activities, considering both safety and biological factors.

*Discussion:* Currently, public access by boat for wildlife observation and photography is permitted on Cayo Luis Peña and Culebrita. Access to portions of these islands and other refuge sites is limited because of potential wildlife conflicts, unsafe terrain, and unexploded ordnance hazards. In conjunction with the development of the Visitor Services Management Plan, areas that could potentially be opened will be identified and evaluated.

*Strategies:*

- Identify sites for location of access trails on Luis Peña and Culebrita.
- Identify potential sites on other refuge units where access might be compatible and safe for visitors.

**Objective 4-3: Observation Post.** Develop partnerships to restore and reopen the Observation Post for environmental research and/or education purposes.

*Discussion:* The former Observation Post located on Flamenco Point is seriously deteriorated and unsafe for any public use. It is currently closed to public access. This site offers panoramic views of the beach at Playa Flamenco, Flamenco Peninsula, and the waters to the north of Culebra. The site has been identified as a potential location for a research and/or environmental education facility. In order to develop any facilities or programs at this site, the Service will need to establish an agreement for access through adjacent private property and develop partnerships for the restoration or construction of facilities. Any development of the site will require an engineering evaluation to determine if the existing facilities can be restored and utilized, or if new construction would be required. Potentially, the site could be used for an environmental education center for classroom and outdoor activities or a research station with facilities for visiting researchers working on Service and Puerto Rico DNER wildlife programs.

*Strategies:*

- Contact adjacent property owners regarding the potential for development and maintenance of public access to the Observation Point site.
- If access can be obtained, solicit proposals for partnerships to develop appropriate and compatible facilities and programs for the site.

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**Objective 4-4:** Provide opportunities for wildlife observation and photography throughout the refuge.

*Discussion:* Wildlife observation and wildlife photography on the refuge occurs mainly on Luis Peña and Culebrita Islands, at the tower near the refuge headquarters, at Flamenco Lagoon, and the Ensenada Honda mangroves (also known as Canos de Bruly). In order to improve access and facilitate these activities, additional facilities such as trails, observation towers, boardwalks, and photography blinds should be developed at appropriate sites.

*Strategies:*

- In cooperation with the Culebra Conservation and Development Authority and the highway authority, identify an appropriate location for parking and construction of a boardwalk trail within the mangrove unit at Ensenada Honda.
- Identify appropriate locations and construct observation towers/photography blinds on Luis Peña and Culebrita Islands, and at Flamenco Lagoon and the Ensenada Honda mangroves.

**Objective 4-5:** Increase opportunities for environmental education and interpretation.

*Discussion:* Limited refuge staff currently responds to requests for talks, walks, and other environmental education and interpretive programs when requested. Signs and interpretive materials provide additional information to refuge visitors. Since these are high-priority programs, the refuge should increase environmental education and interpretive contacts whenever possible.

*Strategies:*

- Continue to respond to incidental requests for talks, walks, and other environmental education and interpretive programs.
- Maintain and replace existing signage and interpretive materials as needed.
- Develop and install an interpretive panel on Culebrita Island.
- Develop interpretive programs and materials for distribution to individuals and groups.
- Develop and implement environmental education programs and materials (e.g., curriculum, teacher training) for use both on and off the refuge.
- Add one full-time public use specialist to the Culebra NWR staff.

**Objective 4-6:** Public outreach and communication.

*Discussion:* In order to enhance communication with users of the refuge and inform the public of programs, activities, and wildlife events on the refuge, the refuge should develop and implement a communications plan (as part of the Visitor Services Management Plan to be completed in 2013) to identify mechanisms and critical contacts for dissemination of information. The increased program activities, coordination, and communication with contacts will require additional refuge staff.

*Strategy:*

- Contingent upon adding a public use specialist, within 5 years of CCP approval, develop and begin to implement a communications plan.

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## **Objective 4-7: Visitor Center**

*Discussion:* The current refuge visitor facilities are located in a maintenance building with a small office space for refuge staff. A facility designed to separate visitors from the maintenance activities and provide space for office functions will establish an appropriate environment for orientation to the refuge and its wildlife resources.

*Strategy:*

- Within 10 years of CCP approval, build new headquarters/visitor contact station.

## **REFUGE ADMINISTRATION**

**Goal 5:** Provide adequate staffing and funding to accomplish refuge goals and objectives while encouraging cooperative efforts with other agencies, non-governmental organizations, universities, and other partners.

*Background:* The administrative functions associated with the refuge include a wide range of activities that are critical to the mission of the Refuge System and the purposes of the refuge. These include staffing, training, budgeting, planning, law enforcement, facility and infrastructure management, community relations, partnering, and equipment maintenance. To carry out these functions, the refuge must have the appropriate level of staffing and resources available.

**Objective 5-1:** Ensure safety of visitors, staff, and wildlife.

*Discussion:* Effective natural resource management, wildlife-dependent recreational uses and other potential future uses of the refuge cannot be realized without an environment that is safe. Current efforts under the provisions of the Formerly Used Defense Site (FUDS) program are being carried out to address the contaminants issues on portions of Culebra NWR, as well as on commonwealth lands. Clean up activities will likely continue beyond the time frame of this plan.

*Strategies:*

- Increase coordination with the Corps of Engineers during its clean-up activities to reduce the risk to human health and the environment from unexploded ordnance.
- Maintain signing of closed areas to ensure visitors are aware of hazards.
- Continue to protect visitors and staff from illegal activities.

**Objective 5-2: Staffing:** Over the 15-year life of the CCP, provide needed support by supplementing staffing.

*Discussion:* The current Culebra NWR staff includes a manager, a biologist, and a maintenance worker. In order to fulfill the goals and objectives of this plan, additional staff will be required to develop and implement biological programs, public use programs, to maintain equipment and facilities, and to perform law enforcement activities.

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*Strategy:*

- Add the following positions: 1 law enforcement officer; 1.5 biological technician positions; 1 maintenance mechanic; and 1 refuge ranger (public use), for a total of 7.5 FTEs.

**Objective 5-3:** Maintain and improve equipment and facilities for the refuge during the 15-year term of the CCP.

*Discussion:* Culebra NWR currently has limited facilities and equipment to support management operations. These facilities include a combined office/maintenance building, two residences, nursery facilities, and an observation tower along with vehicles, boats, mowers, and miscellaneous power tools. Additional facilities proposed in this plan include a new office/visitor center, a boardwalk trail, observation towers, and interpretive trails.

*Strategies:*

- Maintain current equipment and facilities including vehicles, three boats, and office and residence buildings.
- Ensure that one boat is available and dedicated to wildlife management activities.
- Develop and maintain new facilities (e.g., trails, towers, boardwalks, blinds).
- Within 10 years of CCP approval, build new headquarters/visitor contact station.

**Objective 5-4:** Facilitate establishment of a Friends group.

*Discussion:* A Friends group is a private, nonprofit organization created to support the mission of a particular refuge. They are usually formed and managed by local citizens, such as 501(c)3 nonprofit organizations. Culebra NWR does not currently have a formal Friends group. Each Friends group is unique and may provide such functions as:

- Community Relations/Outreach – offering opportunities for the public to learn about the Refuge System and refuges in their local area; assist refuge staff with trail guides and information kiosks.
- Fundraising – Friends may operate bookstores or gift shops in the community and seek other ways to raise money.
- Education and interpretation for children, schools, and the general public to instill a conservation ethic in the community
- Citizen science – assisting refuge staff in research and wildlife surveys and conservation projects
- Special events – organizing festivals, celebrations, tours, and programs to highlight the refuge

*Strategies:*

- Identify opportunities and activities that might be appropriate for involvement of a Friends group.

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- Solicit input from existing organizations and individuals regarding potential involvement with a Friends group.
  - Facilitate formation of a Friends group within 5 years of CCP approval.

**Objective 5-5:** Increase partnerships with private landowners, non-governmental organizations, federal, and commonwealth agencies.

*Discussion:* Development of partnership with private landowners, federal and state agencies, and non-governmental organizations can facilitate accomplishment of wildlife management goals of the Service and its partners.

*Strategies:*

- Increase cooperation with partners in habitat and wildlife management and public use programs.
- Establish formal agreements where appropriate.

**Objective 5-6:** Refuge Special Uses

*Discussion:* When requested, special use permits may be issued by the refuge manager for activities that are both appropriate and compatible with the refuge purposes. These permits are considered for activities such as: researching and monitoring by students, universities, or other non-Service organizations; commercial visitor services conducted by outfitter/guides for hunting, fishing, canoeing, kayaking, and other visitor services; commercial production of audio, video, and photographic products with a monetary value; and special events including weddings, fishing tournaments, one-time events, and others.

*Strategy:*

- Continue to consider issuing special use permits for appropriate and compatible activities.

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## V. Plan Implementation

### INTRODUCTION

Refuge lands are managed as defined under the Improvement Act. 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 purpose, vision, goals, and objectives contained in this Draft CCP/EA for Culebra NWR, this chapter identifies projects, funding and personnel needs, volunteers, partnership opportunities, step-down management plans, a monitoring and adaptive management plan, and plan review and revision.

### PROPOSED PROJECTS

Listed below are the 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 the refuge's objectives and strategies. The objectives and strategies linked to each of the projects are listed at the end of the project description and the funding needs to accomplish the projects are provided in Tables 4 and 5.

#### *FISH AND WILDLIFE POPULATION MANAGEMENT*

##### 1. Inventorying and Monitoring

Inventorying and monitoring of plant and animal populations are critical to ensuring the biological integrity and effective management of the refuge. The information collected through a systematic inventorying and monitoring program forms the basis for developing, implementing, revising, and evaluating management actions; enables informed decisions; and guides all refuge management activities. Although inventories to determine seabird nesting populations and occasional surveys of neotropical migratory birds have been conducted, the methodology and frequency of these activities need to be standardized and increased.

This project will address the need for increased inventorying and monitoring species of concern through the addition of biological staffing and the funding of several important surveys. As a result, Culebra NWR will be able to adapt management practices to provide valuable long-term contributions to national and regional objectives for threatened and endangered species, seabirds, and other species of management concern.

This project will provide the necessary staff, equipment, and materials for developing and implementing the inventorying and monitoring plan and will result in the development of habitat and species utilization maps for all refuge lands.

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Objectives and Strategies linked to this project. 1.1-3.a, 1.3.b, 1.4. a, 1.4.c, 1.5.a, 2.1-4.a, 2.4.b, 5.2.a

## 2. Invasive and Exotic Species Control

Invasive and exotic species on Culebra include both plants and animals that may alter habitat, provide direct competition or prey upon native species of management concern. Whenever exotic or invasive species are adversely affecting the reproduction, survival, or habitat of the managed species, control measures are warranted. Depending on the species involved and the magnitude of impacts documented, control measures will vary. On small cays with nesting birds that are being impacted by rat predation, elimination of the rats may be both feasible and practical. Where an invasive plant is affecting nesting habitat, elimination may not be possible and periodic control will be most effective.

The invasive species control project will identify the priority species and areas for implementation of control measures. This project will provide staff, equipment, materials, and funding for contracts to remove harmful invasive species from managed areas.

Objectives and Strategies linked to this project. 1.1.c, 1.4.c, 1.5.a, 2.2.c, 2.3.a-b, 2.5.a-d, 5.2.a

## *HABITAT MANAGEMENT*

### 3. Restore Mangrove Areas on Refuge

The mangrove forests within the refuge at Ensenada Honda, Puerto del Manglar, Flamenco Lagoon, and Zoni Lagoon have been impacted by roads, runoff from adjacent development, sedimentation, and storm events. Maintenance of high-quality productive mangrove forests requires the restoration of hydrology and enhanced water quality. The initial step of this project will be an evaluation to determine where and how much material will need to be removed to restore adequate hydrological connections to maintain the mangroves. Refuge staff may conduct the restoration efforts where limited material removal is required or contract excavation may be necessary. In addition, partnerships with adjacent landowners could be developed to implement measures to minimize impacts of activities conducted on private lands to refuge resources.

Objectives and Strategies linked to this project. 2.1.a-b, 2.4.a-c, 4.4.a, 5.2.a

### 4. Maintain Seabird Nesting Habitat

Maintenance of quality seabird nesting habitat will be accomplished through long-term monitoring of bird populations, nesting success, and habitat changes. Manipulation of vegetation through mechanical means, prescribed burns, or chemical treatment (if recommended and approved) will be carried out to main a favorable vegetation succession stage. Predator control, the use of decoys to encourage re-nesting, and translocation of some species to new appropriate sites will also be considered during the implementation of this project.

Objectives and Strategies linked to this project. 1.1.a-d, 2.3.a-b, 2.5.a-d, 5.2.a,

### 5. Improve and Maintain Plant Propagation and Nursery Facilities

Culebra NWR has a need for improved nursery facilities to propagate endangered species and native trees for expanding populations and replanting of damaged areas or where invasive species have been removed. This project will provide materials and supplies for the upgrading of an existing nursery and construction of new nursery facilities.

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Objectives and Strategies linked to this project. 1.5.b, 2.2.b, 2.4.c, 5.2.a, 5.4.a-c, 5.5.a-b

### *RESOURCE PROTECTION*

#### 6. Boundary Verification Surveys and Posting

To ensure refuge resources are adequately protected, all boundaries need to be clearly delineated to the maximum extent possible on maps and on the ground. Since portions of the refuge lands have not been adequately delineated and ownership is disputed in some cases, a thorough search of all records and a detailed survey will need to be conducted. In those cases where the records are not clear, the staff and the Service's Regional Realty office will work with adjacent landowners to establish a mutually agreeable boundary. In addition, lands adjacent to the refuge that are identified as high value for wildlife management, or lands that will facilitate management control, may be proposed for acquisition from willing sellers. Upon completion of any surveys, boundaries will be properly posted, mapped, and maintained in accordance with Service policy.

Objectives and Strategies linked to this project. 1.2.b, 3.1.a-b, 3.2.a, 4.3.a-b, 5.1.b

#### 7. Cultural Resource Surveys

Cultural resource surveys conducted on Culebra indicate that portions of the island were inhabited by descendants of the Saladoid culture from about 640 AD to 840 AD. After that period, permanent human occupation was not reestablished until the Spanish established the settlement of San Ildefonso in the late 1800s. To ensure proper identification and protection of any prehistoric or historic cultural resources on the refuge lands, additional cultural resource surveys will be conducted and a Cultural Resource Management Plan will be developed during the term of this CCP. Surveys will be conducted at refuge project sites potentially containing cultural resources that might be impacted by the projects. As appropriate, information on cultural resources will continue to be incorporated into interpretive materials and programs provided by the refuge.

Objectives and Strategies linked to this project. 3.4.a-b, 4.2.a-b, 4.3.a-b, 4.7.a

#### 8. Landowner and Management Agreements

To optimize the effectiveness of its management programs, the Service works cooperatively with a wide variety of partners including other resource agencies, federal and commonwealth, non-government organizations, landowners, and individuals. On Culebra, Service partners include the Puerto Rico DNER, the Corps of Engineers, NOAA, Culebra Conservation and Development Authority, non-governmental organizations such as Chelonia, the Culebra Foundation, the Puerto Rican Ornithological Society, Inc. (SOPI), adjacent landowners, and volunteers. To ensure that the role of each partner is clearly defined, formal agreements will be developed as appropriate.

Objectives and Strategies linked to this project. 1.3.b-c, 1.4.b, 1.5.c, 2.1.a-b, 3.3.a, 4.3.a-b, 4.4.a, 5.4.a-c, 5.5.a-b,

### *VISITOR SERVICES*

#### 9. Visitor Center/Visitor Contact Station/Office

Existing facilities at Culebra NWR provide very limited opportunities for contact with visitors and interpretation of refuge resources. In addition, the existing office is located within the

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maintenance/shop building and does not provide adequate space for the proposed staffing. This project will provide for the development of a Visitor Center/Contact Station/Office with appropriate informational and interpretive displays to give visitors an orientation of the refuge and its resources.

Objectives and Strategies linked to this project. 4.1.a, 4.5.a-f, 4.7.a, 5.2.a, 5.3.c-d

#### 10. Interpretive Trails, Observation Towers, and Blinds

Access to open portions of the refuge is often limited by the nature of the resources visitors come to enjoy. To provide information, safe access, and facilitate observation and photography of the wildlife, this project will develop trails, towers, boardwalks, blinds, and interpretive information at the Ensenada Honda Mangroves, the boulder forest at Mt. Resaca, Cayo Luis Peña and Culebrita. Access trails at the mangroves and boulder forests will require elevated boardwalks. Sites for observation towers/blinds will be identified during the design phase of this project. Interpretive information will be provided on all trails with an information kiosk provided at the high-visitation area on Culebrita. Construction of the facilities will be accomplished by personnel from the Caribbean Islands NWR Complex with the aid of cooperating organizations and volunteers or through competitive contracts.

Objectives and Strategies linked to this project. 4.2.a-b, 4.4.a-b, 4.5.a-f, 5.2.a, 5.3.c

#### 11. Environmental Education and Interpretation Program Development.

The current environmental education and interpretation program on Culebra is limited by staff availability and is conducted without guidance from a formal Visitor Services Plan. Implementation of this project will fund development of a Visitor Services Management Plan to provide direction for environmental education activities and interpretive programs and additional staff to conduct these activities.

Objectives and Strategies linked to this project. 4.1.a, 4.2.a-b, 4.3.b, 4.4.a-b, 4.5.a-f, 4.6.a

##### Visitor Services Plan Development

Development of environmental education and interpretation materials (resupply after initial year)

Establish Friends group and volunteer programs

#### *REFUGE ADMINISTRATION*

#### 12. Maintain Facilities/Acquire and Maintain Equipment

This project provides significant funding for an additional maintenance worker (0.7-FTE) to assist with the maintenance of existing facilities and equipment as well as the additional facilities to be developed in accordance with this plan. In addition, with the development of new visitor facilities and expansion of programs, this project provides equipment, materials, and supplies such as tractors, mowers, shop tools, and maintenance supplies to perform necessary maintenance and repairs of all refuge facilities. Equipment, materials, and supplies needed for specific projects identified in this plan are included in those projects.

#### 13. Visitor and Resource Protection

A law enforcement office position previously assigned to Culebra NWR is no longer funded. Historically, problems have occurred with poaching of sea bird and sea turtle eggs, illegal hunting

activities on the refuge, vandalism, plant collecting, trespass into closed areas, removal of vegetation, theft of personal and refuge property, and conflicts between refuge visitors, among others. The reestablishment of the refuge law enforcement officer position will help ensure a law enforcement presence and minimize the potential resource losses, reduce the occurrence of illegal activities, and improve the safety of visitors.

Objectives and Strategies linked to this project. 1.1.c, 1.2.c, 3.3.a, 5.1.b-c, 5.2.a, 5.6.a

#### 14. Provide Staffing to Accomplish Program Objectives

Staffing to conduct the additional activities proposed in this plan is included in the project descriptions.

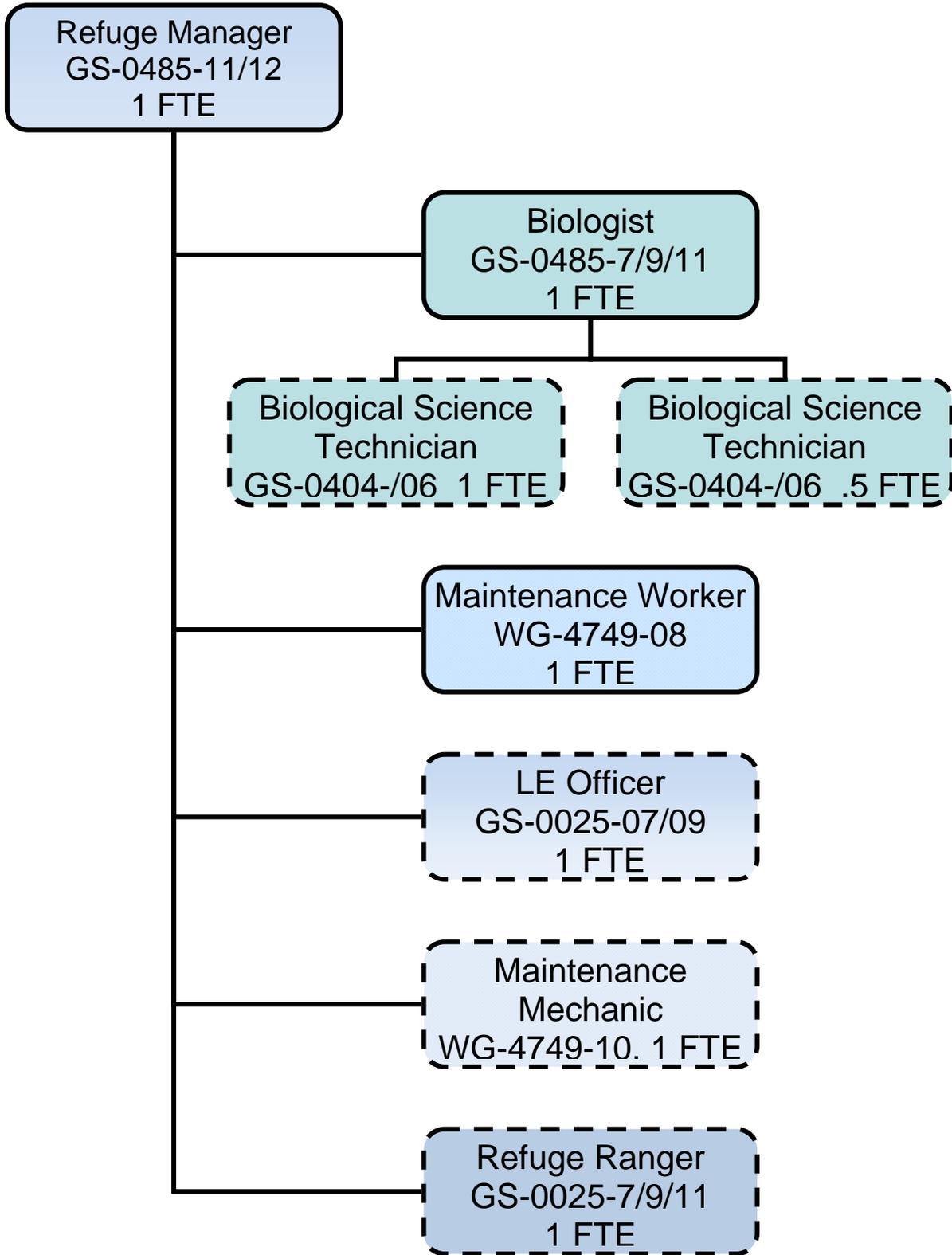
Objectives and Strategies linked to this project. 5.2.a

**Table 4. Project cost summary**

<b>Project Number</b>	<b>Project Title</b>	<b>First Year Cost</b>	<b>Recurring Annual Cost</b>	<b>Staff (FTE'S)</b>
1	<i>Inventorying and Monitoring</i>	\$75k	\$75k	0.6
2	<i>Invasive and Exotic Species Control</i>	\$100k	\$50k	0.6
3	<i>Restore Refuge Mangrove Areas</i>	\$80k	\$30k	0.4
4	<i>Maintain seabird nesting habitat</i>	\$120k	\$75k	0.7
5	<i>Improve and Maintain Plant propagation and nursery facilities</i>	\$70k	\$40k	0.2
6	<i>Boundary Verification Surveys and Posting</i>	\$150k	\$15k	Contract
7	<i>Cultural Resource Surveys</i>	\$100k		Contract
8	<i>Land Owner Management Agreements</i>	\$25k	\$20k	0.2
9	<i>Visitor Center/Visitor Contact Station Office</i>	\$2M	\$150k	contract
10	<i>Interpretive Trails, Observation Towers, and Blinds</i>	\$145k	\$15k	contract
11	<i>Environment Education and Interpretation Program Development</i>	\$125k	\$85k	1
12	<i>Maintain Facilities/Acquire and Maintain Equipment</i>	\$170k	\$78k	1
13	<i>Visitor and Resource Protection</i>	\$95k	\$75k	.8
14*	<i>Provide Staffing to Accomplish Program Objectives</i>			5.5

\*Project 14 is a summary of staff required for complete implementation of all the projects included in the CCP. Existing staff are not included in this project.

Figure 9. Current and proposed staffing chart



\* Proposed staffing shown in dashed outline

**Table 5. Approximate annual costs of proposed new staff positions in 2010 dollars**

<b>Title</b>	<b>Project Numbers</b>	<b>Grade</b>	<b>Annual Cost (\$)</b>
<b>Biologist</b>	1,2,3,4,5,8,12	GS-0485-7/9/11 1 FTE	125,000
<b>Biological Science Technicians</b>	1,2,3,4,5,8,12	GS-0404-/06 1.5 FTEs	70,000
<b>Maintenance Mechanic</b>	3,4,5,6,10,12	WG-4749-10 1 FTE	78,000
<b>Refuge Ranger (Public Use)</b>	7,10,11,12	GS-0025-07 1 FTE	85,000
<b>Refuge Law Enforcement Officer</b>		GS-0025-07/09 1 FTE	100,000

*Notes: FTE = Full Time Equivalent. These staff costs are included in the project descriptions and their associated costs in Table 4. They are not additional costs.*

## **PARTNERSHIP/VOLUNTEER OPPORTUNITIES**

A key element of this Draft CCP/EA is to establish partnerships with local volunteers, landowners, private organizations, and state and federal natural resource agencies. In the immediate vicinity of the refuge, opportunities exist to establish partnerships with organizations such as: the Culebra Conservation and Development Authority, Chelonia, and the Culebra Foundation. At regional and state levels, partnerships may be established or enhanced with organizations such as the Puerto Rico DNER, the Puerto Rico Conservation Trust, academic institutions, research entities, and the Puerto Rican Ornithological Society, Inc. (SOP).

## **STEP-DOWN MANAGEMENT PLANS**

A comprehensive conservation plan is a strategic plan that guides the direction of the refuge. A step-down management plan provides specific guidance on activities, such as habitat, fire, and visitor services. These plans (Table 6) are also developed in accordance with NEPA, which requires the identification and evaluation of alternatives and public review and involvement prior to their implementation. The "Habitat Management Plan" will refine most of the objectives and strategies included under Goals 1 and 2 of this Draft CCP/EA.

**Table 6. Step-down management plans related to the goals and objectives of this Draft CCP/EA**

<b>Step-down Plan</b>	<b>Completion and/or Revision Date</b>
<i>Law Enforcement Plan</i>	<b>2012</b>
<i>Visitor Services Plan</i>	<b>2013</b>
<i>Fire Management Plan</i>	<b>2016</b>
<i>Wildlife Inventory Plan</i>	<b>2013</b>
<i>Habitat Management Plan</i>	<b>2014</b>
<i>Invasive Species Control Plan</i>	<b>2013</b>
<i>Forest Management Plan</i>	<b>2015</b>
<i>Station Safety Plan (includes communications plan)</i>	<b>Annually</b>
<i>Sign Plan</i>	<b>2012</b>

## **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 surveying, inventorying, and monitoring protocols will be adopted for the refuge. 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**

The final comprehensive conservation plan will be reviewed annually as the refuge’s 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 refuge expansion. The final plan will be augmented by detailed step-down management plans to address the completion of specific strategies in support of the refuge’s goals and objectives. Revisions to the comprehensive conservation plan and the step-down management plans will be subject to public review and NEPA compliance.

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## SECTION B. ENVIRONMENTAL ASSESSMENT

### *I. Background*

#### INTRODUCTION

The Service prepared this Environmental Assessment (EA) for Culebra NWR in compliance with NEPA and the Improvement Act. The Improvement Act requires the development of comprehensive conservation plans for all refuges. Following a public review and comment period on the Draft CCP/EA, a final decision will be made by the Service that will guide Culebra NWR management actions and decisions over the next 15 years, provide understanding about the refuge and management activities, and incorporate information and suggestions from the public and refuge partners.

This Draft CCP/EA proposes a management direction, which is described in detail through a set of goals, objectives, and strategies. This Draft CCP/EA addresses current management issues, provides long-term management direction and guidance for the refuge, and satisfies the legislative mandates of the Improvement Act. While the final CCP will provide general management direction, subsequent step-down plans will provide more detailed management direction and actions.

This EA determines and evaluates a range of reasonable management alternatives. The intent is to support informed decision-making regarding future management of the refuge. Each alternative presented in this EA was generated with the potential to be fully developed into a final CCP. The predicted biological, physical, social, and economic impacts of implementing each alternative are analyzed in this EA. This analysis assists the Service in determining if the alternatives represent no significant impacts, thus requiring the preparation of a Finding of No Significant Impact, or if the alternatives represent significant impacts, thus requiring more detailed analysis through an Environmental Impact Statement and a Record of Decision. Following public review and comment, the Fish and Wildlife Service will select an alternative to be fully developed for this refuge.

The final CCP is needed to address current management issues, to provide long-term management direction for the refuge, and to satisfy the legislative mandates of the Improvement Act, which requires the preparation of a comprehensive conservation plan for all national wildlife refuges.

#### *PURPOSE AND NEED FOR ACTION*

The purpose of the EA is to meet the purpose(s) of the refuge and the goals identified in the comprehensive conservation plan (for which we evaluate each alternative). The refuge purpose is to ensure that Culebra NWR provides habitat for native birds, helps carry out the national migratory bird management program, and allows for the conservation, management, and restoration of fish, wildlife, and plant resources and their habitats for the benefit of present and future generations of Americans. The need of this EA is to adopt a 15-year management plan that provides guidance for future management and that meets the mandates of the Improvement Act.

This EA addresses the need to adopt a 15-year management plan for Culebra NWR that provides guidance for future refuge management and meets the requirements of the Improvement Act.

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## *DECISION FRAMEWORK*

Based on the assessment described in this document, the Service will select an alternative to implement the CCP for Culebra NWR. The final plan will include a Finding of No Significant Impact (FONSI), which is a statement explaining why the selected alternative will not have a significant effect on the quality of the human environment. This determination will be based on an evaluation of the Service and Refuge System mission, the purpose(s) for which the refuge was established, and other legal mandates. Assuming no significant impact is found, implementation of the CCP will begin and will be monitored annually and revised when necessary.

## *PLANNING STUDY AREA*

Culebra NWR is comprised of lands on the main island of Culebra and twenty-two smaller islands in the same vicinity. All are located about 25 miles to the east of the main island of Puerto Rico in the Caribbean Sea.

This EA will identify management on refuge lands, as well as those lands proposed for acquisition by the Service.

## *AUTHORITY, LEGAL COMPLIANCE, AND COMPATIBILITY*

The Service developed this plan in compliance with the Improvement Act and Part 602 of the Fish and Wildlife Service Manual (National Wildlife Refuge System Planning). The actions described within this Draft CCP/EA also meet the requirements of NEPA. The refuge staff achieved compliance with NEPA through the involvement of the public and the incorporation of this EA in this document, with a description of the alternatives considered and an analysis of the environmental consequences of the alternatives (Chapters III and IV in this section). When fully implemented, the CCP will strive to achieve the vision and purposes of Culebra NWR.

The final CCP's overriding consideration will be to carry out the purposes for which the refuge was established. The laws that established the refuge and provided the funds for acquisition state the purposes. Fish and wildlife management is the first priority in refuge management, and the Service allows and encourages public use (wildlife-dependent recreation) as long as it is compatible with, or does not detract from, the refuge's mission and purposes.

## *COMPATIBILITY*

The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, states that national wildlife refuges must be protected from incompatible or harmful human activities to ensure that Americans can enjoy Refuge System lands and waters. Before activities or uses are allowed on a national wildlife refuge, the uses must be found to be compatible. A compatible use "...will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge." In addition, "wildlife-dependent recreational uses may be authorized on a refuge when they are compatible and not inconsistent with public safety."

An interim compatibility determination is a document that assesses the compatibility of an activity during the period of time the Service first acquires a parcel of land to the time a formal, long-term management plan for that parcel is prepared and adopted. The Service has completed an interim compatibility determination for the six priority general public uses of the system, as listed in the

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Improvement Act. These uses are hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

## **PUBLIC INVOLVEMENT AND THE PLANNING PROCESS**

In accordance with Service guidelines and NEPA recommendations, public involvement has been a crucial factor throughout the development of this Draft CCP/EA for Culebra NWR. This Draft CCP/EA has been written with input and assistance from interested citizens, conservation organizations, and employees of local and state agencies. The participation of these stakeholders and their ideas has been of great value in setting the management direction for Culebra NWR. The Service, as a whole, and the refuge staff, in particular, are very grateful to each one who has contributed time, expertise, and ideas to the planning process. The staff remains impressed by the passion and commitment of so many individuals for the lands and waters administered by the refuge.

Public scoping was conducted during the development of the Draft CCP/EA in March and April 2009. A total of 11 comment letters were received by U.S. mail, fax, and email. These communications addressed a variety of topics and issues facing the refuge.

A complete summary of the issues and concerns is provided in Section C, Appendix D, Public Involvement - Summary of Public Scoping Comments.



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## *II. Affected Environment*

For a description of the affected environment, see Section A, Chapter II, Refuge Overview.



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### *III. Description of Alternatives*

#### **FORMULATION OF ALTERNATIVES**

Alternatives are different approaches or combinations of management objectives and strategies designed to achieve the refuge's purpose and vision, and the goals identified in the comprehensive conservation plan; the priorities and goals of the Caribbean Ecosystem Team; the goals of the Refuge System; and the mission of the Service. Alternatives are formulated to address the significant issues, concerns, and problems identified by the Service and the public during public scoping.

The three alternatives identified and evaluated represent different approaches to provide permanent protection, restoration, and management of the refuge's fish, wildlife, plants, habitats, and other resources, as well as compatible wildlife-dependent recreation. Refuge staff assessed the biological conditions and analyzed the external relationships affecting the refuge. This information contributed to the development of refuge goals and, in turn, helped to formulate the alternatives. As a result, each alternative presents different sets of objectives for reaching refuge goals. Each alternative was evaluated based on how much progress it would make and how it would address the identified issues related to fish and wildlife populations, habitat management, resource protection and conservation, visitor services, and refuge administration. A summary of the three alternatives is provided in Table 7.

#### **DESCRIPTION OF ALTERNATIVES**

Serving as a basis for each alternative, a number of goals and sets of objectives were developed to help achieve the refuge's purpose and the mission of the Refuge System. Objectives are desired conditions or outcomes that are grouped into sets and, for this planning effort, consolidated into three alternatives. These alternatives represent different management approaches for managing the refuge over a 15-year time frame while still meeting the refuge purposes and goals. The three alternatives are summarized below. A comparison of each alternative follows the general description.

##### *ALTERNATIVE A - (CURRENT MANAGEMENT - NO ACTION)*

Under Alternative A, the Current Management or No Action Alternative, over the 15-year lifetime of the CCP, Culebra NWR would continue to be managed as it is at present.

As with the other alternatives, the refuge would pursue five goals under Alternative A. The first goal calls for the refuge to monitor, protect, and recover special status plants and animals and species of management interest. We would continue with periodic efforts to survey and manage for seabird populations. In cooperation with partners, the refuge would also continue surveys and protection of nesting hawksbill, green, and leatherback turtles and their nests/eggs. There would, however, be no active program for resident and migratory birds. In terms of listed animal species, Alternative A would continue to protect habitat and conduct periodic opportunistic surveys for the Virgin Islands and Puerto Rican boas and giant anole. On behalf of listed plant species, this alternative continues to protect, propagate, and monitor existing populations of *Peperomia wheelerii* and *Leptocereus grantianus*.

The second goal calls for conserving, enhancing, and restoring native plant communities, including wetlands, and their associated fish and wildlife, representative of the native biological diversity that would have been found on Culebra NWR lands prior to major development and historical uses of the lands. Alternative A would continue to protect wetlands as well as maintain the existing area of mangroves and dry forest on the refuge. It would also protect land and resources on offshore cays

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and practice limited invasive species removal. With respect to the latter point, the refuge would continue to focus invasive species management on those plants and animals that are most damaging to habitats and wildlife.

Under Goal 3, the refuge would strive to protect its natural and cultural resources. However, refuge boundaries would remain not clearly defined in a number of areas. Culebra NWR would maintain its existing acquisition boundaries with no further acquisition within the boundary. We would continue to work informally with Puerto Rico DNER and other partners, and reestablish 1.0 FTE law enforcement officer to protect refuge resources. We would also maintain the current level of protection for the refuge's cultural and historic resources.

Culebra NWR's fourth goal is to provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history. The refuge would maintain its current schedule (open to the public during daylight hours only) and areas open to the public and continue to permit water taxis under special use permit for access. Certain areas of the refuge would remain closed under Alternative A. The Observation Post, for example, would stay closed to the public. We would continue to provide for opportunistic wildlife observation and photography throughout the refuge and at the tower near refuge headquarters. Staff would also continue to respond to incidental requests for talks, walks, and other environmental education and interpretive programs. Existing signage and interpretive materials would be maintained. The refuge would continue to provide public outreach and communication through press releases and interviews for print and broadcast media. We would continue to operate the refuge without a visitor center.

Goal 5 is to provide adequate staffing and funding to accomplish refuge goals and objectives, while encouraging cooperative efforts with other agencies, non-governmental organizations, universities, and other partners. The refuge would continue to work with the Corps of Engineers in removing hazardous materials and unexploded ordnance from the refuge. Visitors and staff would continue to be protected from illegal activities. Alternative A would maintain the following positions: one refuge manager; and one maintenance worker; and would reestablish one law enforcement officer position, for a total of 3.0 FTEs. We would maintain current equipment and facilities, including two boats and the office and residence buildings).

Under Alternative A, the refuge would continue to operate without a Friends group. It would also continue to cooperate with agencies, municipality, educational institutions, non-governmental organizations, and volunteers in refuge management. Staff would continue to consider issuing special use permits for non-wildlife dependent uses.

#### *ALTERNATIVE B - WILDLIFE MANAGEMENT EMPHASIS*

Alternative B would emphasize increased wildlife management on Culebra NWR with any additional availability of budgetary and staffing resources.

As in the case of Alternative A, the refuge would pursue five goals under Alternative B. The first goal calls for the refuge to monitor, protect, and recover special status plants and animals and species of management interest. In pursuit of this goal, the refuge would conduct expanded seasonal surveys to determine seabird abundance, research on nesting success, and nesting habitat quality. We would also manipulate vegetation to improve seabird nesting habitat, consider use of decoys to encourage re-nesting, and implement control of invasive predators that eat seabird eggs, young, and adults. Staff would consider translocation of certain species of seabirds to other cays to help ensure their survival and accelerate their recovery.

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As with Alternative A, under Alternative B, in cooperation with partners, the refuge would also continue surveys and protection of nesting hawksbill, green, and leatherback turtles and their nests/eggs. To benefit resident and migratory birds, annual surveys would be developed and implemented at selected locations throughout the refuge. We would also implement habitat management strategies to benefit target species of birds and cooperate with Puerto Rico DNER to conduct regular surveys and manage habitat for listed animal species. In addition, Alternative B would establish additional populations of two species of listed plants – *Peperomia wheelerii* and *Leptocereus grantianus* – at appropriate sites on the refuge.

Culebra NWR's second goal calls for conserving, enhancing, and restoring native plant communities, including wetlands, and their associated fish and wildlife, representative of the native biological diversity that would have been found on refuge lands prior to major development and historical uses of the lands. Alternative B would restore hydrology to specified areas of degraded mangrove habitat, as well as restore dry forests on portions of the refuge through selective invasive species removal and planting of propagated trees. Like Alternative A, Alternative B would continue to protect land and resources on offshore cays and practice limited invasive species removal. In addition, this alternative would intensify efforts at invasives' control and eradication, and pursue opportunities for habitat restoration on offshore cays. Wetlands would continue to be protected, and this alternative would intensify efforts at their restoration. It would also intensify invasive species management on plants and animals that are most damaging to habitats and wildlife on Culebra NWR.

Under Goal 3, the refuge will strive to protect its natural and cultural resources. Within 5 years of CCP approval, we would clearly delineate all refuge boundaries, both on maps and on the ground. We would also pursue opportunities for boundary expansion with acquisitions from willing sellers and we would work to resolve boundary issues. Our partnership with Puerto Rico DNER and other partners would be strengthened and formalized, and we would maintain 1.0 FTE law enforcement officer to protect refuge resources. Like Alternative A, Alternative B would maintain the current level of protection for refuge's cultural and historic resources.

Culebra NWR's fourth goal is to provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history. In pursuit of this goal, Alternative B's efforts would closely resemble those of Alternative A. The refuge would maintain its current schedule (open to the public during daylight hours only) and areas open to public and continue to permit water taxis under special use permit for access. Certain areas of refuge would remain closed as under Alternative A. The Observation Post, for example, would stay closed to the public. We would continue to provide for opportunistic wildlife observation and photography throughout the refuge and at the tower near the refuge headquarters. Staff would also continue to respond to incidental requests for talks, walks, and other environmental education and interpretive programs. Existing signage and interpretive materials would be maintained. The refuge would continue to provide public outreach and communication through press releases and interviews for print and broadcast media. We would continue to operate the refuge without a visitor center.

Goal 5 is to provide adequate staffing and funding to accomplish refuge goals and objectives while encouraging cooperative efforts with other agencies, non-governmental organizations, universities, and other partners. Under Alternative B, the refuge would continue to work with the Corps of Engineers in removing hazardous materials and unexploded ordnance from the refuge, just as in Alternative A. Visitors and staff would continue to be protected from illegal activities. Alternative B would maintain the same positions mentioned for Alternative A – one refuge manager; one maintenance worker; and one law enforcement officer – and add the following positions: one biologist; 1.5 biological technicians, and one maintenance worker, for a total of 6.5 FTEs. In addition

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to maintaining the current equipment and facilities, including two boats and the office and residence buildings, we would ensure that one boat is available and dedicated to wildlife management activities.

Under Alternative B, the refuge would facilitate the formation of a Friends group within 5 years of CCP approval. It would also increase cooperation with partners focused on wildlife management and establish formal agreements where appropriate. Finally, staff would continue to consider issuing special use permits for non-wildlife-dependent uses.

#### *ALTERNATIVE C - (PROPOSED ALTERNATIVE)*

Under Alternative C, Culebra NWR would utilize any increase in staffing and budgetary resources to expand both wildlife and habitat management and public use activities.

As in the case of Alternatives A and B, the refuge would pursue five goals under Alternative C. The first goal calls for monitoring, protecting, and recovering special status plants and animals and species of management interest. In pursuit of this goal, Alternative C is virtually identical to Alternative B. It would conduct expanded seasonal surveys to determine seabird abundance, research on nesting success, and nesting habitat quality. We would also manipulate vegetation to improve nesting habitat and consider using decoys to encourage re-nesting by seabirds. We would implement control of invasive predators that eat seabird eggs, young, and adults. Staff would consider translocation of certain species of seabirds to other cays to help ensure their survival and accelerate their recovery.

As with Alternatives A and B, under Alternative C, in cooperation with partners, the refuge would also continue surveys and protection of nesting hawksbill, green, and leatherback turtles and their nests/eggs. To benefit resident and migratory birds, annual surveys would be developed and implemented at selected locations throughout the refuge. We would also implement habitat management strategies to benefit target species of birds and cooperate with Puerto Rico DNER to conduct regular surveys and manage habitat for listed animal species. In addition, Alternative C would establish additional populations of two species of listed plants – *Pepperomia wheelerii* and *Leptocereus grantianus* – at appropriate sites on the refuge.

Culebra NWR's second goal calls for conserving, enhancing, and restoring native plant communities, including wetlands, and their associated fish and wildlife, representative of the native biological diversity that would have been found on refuge lands prior to major development and historical uses of the lands. In pursuing this goal, Alternative C would implement the same programs and actions as Alternative B. Alternative C would restore hydrology to specified areas of degraded mangrove habitat, as well as restore dry forest on portions of the refuge through selective invasive species removal and planting of propagated trees. Like Alternatives A and B, Alternative C would continue to protect land and resources on offshore cays and practice limited invasive species removal. In addition, this alternative would intensify efforts at invasives' control and eradication, and pursue opportunities for habitat restoration on offshore cays. Wetlands would continue to be protected, and this alternative would intensify efforts at their restoration. It would also intensify invasive species management on plants and animals that are most damaging to habitats and wildlife at Culebra.

Under Goal 3, the refuge would strive to protect its natural and cultural resources. Within 5 years of CCP approval, we would clearly delineate all refuge boundaries both on maps and on the ground. We would also pursue opportunities for boundary expansion with acquisitions from willing sellers and we would work to resolve boundary issues. Our partnership with Puerto Rico DNER and other partners would be strengthened and formalized, and we would reestablish 1.0 FTE law enforcement

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officer position to protect refuge resources. In order to enhance protection, discovery, and awareness of cultural resources, within 15 years of CCP approval, Alternative C would complete and begin to implement a Cultural Resources Management Plan for the refuge.

Culebra NWR's fourth goal is to provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history. Under Alternative C, the refuge would maintain its current schedule (open to the public during daylight hours only) and areas open to public and continue to permit water taxis under special use permit for access. On a case-by-case basis, the potential for opening additional areas to the public would be evaluated, considering both safety and biological factors. The refuge would develop partnerships to restore and reopen the Observation Post for environmental research and/or education purposes.

Alternative C would continue to provide for opportunistic wildlife observation and photography throughout the refuge and at the tower near the refuge headquarters. In addition, the refuge would develop more facilities such as trails, towers, boardwalks, and blinds to increase opportunities for wildlife observation and photography. Staff would continue to respond to incidental requests for talks, walks, and other environmental education and interpretive programs. We would also develop interpretive programs and non-personal interpretive materials and develop and implement more environmental education (e.g., curriculum, teacher training) both on and off the refuge. A 1.0 FTE public use specialist would be added to accomplish this. Contingent upon adding a public use specialist, within 5 years of CCP approval, Alternative C would develop and begin to implement a communications plan that would outline the refuge's approach and strategies for outreach to the public. Within 10 years of CCP approval, a new headquarters/visitor contact station would be constructed under Alternative C.

Goal 5 is to provide adequate staffing and funding to accomplish refuge goals and objectives while encouraging cooperative efforts with other agencies, non-governmental organizations, universities, and other partners. Under Alternative C, Culebra NWR would increase efforts with the Corps of Engineers to certify additional areas as cleared and safe for public access. We would also continue to protect visitors and staff from illegal activities. Alternative C would maintain the same positions identified by Alternative A – one refuge manager; one maintenance worker; and one law enforcement officer – and add the following positions: one public use specialist; one biologist; 1.5 biological technician positions; and one maintenance worker, for a total of 7.5 FTEs.

In terms of equipment and facilities, Alternative C would maintain all current equipment and facilities, including two boats and the office and residence buildings, and would ensure that one boat is available and dedicated to wildlife management activities. In addition, this alternative would develop and maintain more facilities such as trails, towers, boardwalks, blinds, and as noted, build a new headquarters/visitor contact station.

As under Alternative B, Alternative C would facilitate the formation of a Friends group within 5 years of CCP approval. It would also increase cooperation with partners in habitat and wildlife management as well as public use, and establish formal agreements where appropriate. Finally, staff would continue to consider issuing special use permits for non-wildlife-dependent uses as long as they are appropriate and compatible.

## **FEATURES COMMON TO ALL ALTERNATIVES**

Although the alternatives differ, there are similarities among them as well. These common features are listed below to reduce the length and redundancy of the individual alternative descriptions.

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## *ENVIRONMENTAL JUSTICE*

Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” was signed by President Bill Clinton on February 11, 1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities’ access to public information and participation in matters relating to human health or the environment. This assessment has not identified any adverse or beneficial effects for any alternative unique to minority or low-income populations in the affected area. None of the alternatives will disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low-income populations.

## *SPECIES OF CONCERN*

In general, each of the alternatives would monitor, protect, and recover special status plants and animals and species of management interest. Periodic efforts to survey and manage for seabird populations would continue, as would surveys and protection of nesting hawksbill, green and leatherback turtles and their nests/eggs. All three alternatives would continue to protect habitat and conduct periodic opportunistic surveys for the Virgin Island and Puerto Rican boas and giant anole. Protection, propagation, and monitoring existing populations of *Pepperomia wheelerii* and *Leptocereus grantianus* would occur under each alternative.

## *CONSERVING NATIVE PLANT COMMUNITIES*

In general, each of the alternatives would conserve, enhance, and restore native plant communities, including wetlands, and their associated fish and wildlife, representative of the native biological diversity that would have been found on Culebra NWR lands prior to major development and historical uses of the lands. Mangroves, other wetlands, dry forest and offshore cays would all continue to be protected. All three alternatives would manage invasive species to some extent.

## *RESOURCE PROTECTION*

In general, each alternative would strive to protect the refuge’s natural and cultural resources in cooperation with partners. We would continue to work with Puerto Rico DNER and other partners, and maintain 1.0 FTE law enforcement officer to protect refuge resources.

## *PUBLIC USE*

In general, all three alternatives would try to provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history.

**Table 7. Comparison of alternatives by management issues for Culebra NWR**

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Wildlife Management Emphasis	Alternative C (Proposed Alternative)
<b>Goal 1: Monitor, protect, and recover special status plants and animals and species of management interest.</b>			
<b>Seabird management</b>	Continue with periodic efforts to survey and manage for seabird populations.	Conduct expanded seasonal surveys to determine seabird abundance, research on nesting success, and nesting habitat quality. Manipulate vegetation to improve nesting habitat and consider use of decoys to encourage re-nesting. Implement control of invasive predators that eat eggs, young, and adults. Consider translocation of certain species to other cays.	Same as Alternative B.
<b>Sea turtles</b>	In cooperation with partners, standardize and formalize the monitoring, tagging, record keeping and law enforcement programs.	Same as Alternative A.	Same as Alternative A.
<b>Resident and migratory birds</b>	No active program.	Develop and implement annual surveys for resident and migratory birds at selected locations throughout the refuge. Implement habitat management strategies to benefit target species.	Same as Alternative B.
<b>Listed animal species</b>	Continue to protect habitat and conduct periodic opportunistic surveys for the VI and PR boas and giant anole.	Cooperate with DNER to conduct regular surveys and manage habitat for listed species.	Same as Alternative B.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Wildlife Management Emphasis	Alternative C (Proposed Alternative)
<b>Listed plants</b>	Continue protect, propagate, and monitor existing populations of <i>Pepperomia wheelerii</i> and <i>Leptocereus grantianus</i> .	Establish additional populations of these 2 species at appropriate sites on the refuge.	Same as Alternative B.
<b>Goal 2: Conserve, enhance, and restore native plant communities, including wetlands, and their associated fish and wildlife, representative of the native biological diversity that would have been found on Culebra NWR lands prior to major development and historical uses of the lands.</b>			
<b>Mangroves</b>	Continue to protect and maintain the existing area of mangroves on the refuge.	Restore hydrology to specified areas of degraded mangrove habitat.	Same as Alternative B.
<b>Dry forest</b>	Continue to protect and maintain the existing area of dry forest on the refuge.	Restore dry forest on portions of the refuge through selective invasive species removal and planting of propagated trees.	Same as Alternative B.
<b>Offshore cays</b>	Continue to protect land and resources on offshore cays and practice limited invasive species removal.	Same as Alternative A, and in addition, intensify efforts at invasives' control and eradication, and pursue opportunities for habitat restoration.	Same as Alternative B.
<b>Wetland plant communities</b>	Continue to protect wetlands on the refuge.	Same as Alternative A, and in addition, intensify efforts at restoration of wetlands.	Same as Alternative B.
<b>Invasive species management</b>	Continue to focus invasive species management on plants and animals that are most damaging to habitats and wildlife.	Intensify invasive species management on plants and animals that are most damaging to habitats and wildlife.	Same as Alternative B.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Wildlife Management Emphasis	Alternative C (Proposed Alternative)
<b>Goal 3: In cooperation with partners, protect the refuge’s natural and cultural resources.</b>			
<b>Refuge boundary definition</b>	Refuge boundaries not clearly defined in a number of areas.	Within 5 years of CCP approval, clearly delineate all refuge boundaries both on maps and on the ground.	Same as Alternative B.
<b>Refuge boundary expansion and acquisition</b>	Maintain existing acquisition boundaries with no further acquisition within boundary.	Pursue opportunities for boundary expansions with acquisitions from willing sellers and to resolve boundary issues.	Same as Alternative B.
<b>Law enforcement and patrol</b>	Continue to work informally with DNER and other partners, and maintain 1.0 FTE law enforcement officer to protect refuge resources.	Strengthen and formalize partnership with DNER and other partners, and maintain 1.0 FTE law enforcement officer to protect refuge resources.	Same as Alternative B.
<b>Cultural resources</b>	Maintain current level of protection for refuge’s cultural and historic resources.	Same as Alternative A.	Within 15 years of CCP approval, complete and begin to implement a CRMP for the refuge.
<b>Goal 4: Provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history.</b>			
<b>Public access</b>	Maintain current schedule (open to public during daylight hours only) and areas open to public and continue to permit water taxis under S.U.P. for access. Certain areas of refuge stay closed.	Same as Alternative A.	On a case by case basis, evaluate potential for opening additional areas to the public, considering both safety and biological factors.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Wildlife Management Emphasis	Alternative C (Proposed Alternative)
<b>Observation Post (OP)</b>	Maintain OP closed to the public.	Same as Alternative A.	Develop partnerships to restore and reopen the OP for environmental research and/or education purposes.
<b>Wildlife observation and photography</b>	Continue to provide for opportunistic wildlife observation and photography throughout the refuge and at the tower near refuge headquarters.	Same as Alternative A.	In addition to Alternative A, develop more facilities (e.g., trails, towers, boardwalks, blinds) to provide opportunities for wildlife observation and photography.
<b>Environmental education (EE) and interpretation</b>	Continue to respond to incidental requests for talks, walks, and other EE and interpretive programs. Maintain existing signage and interpretive materials.	Same as Alternative A.	In addition to Alternative A, develop interpretive programs and non-personal interpretive materials and develop and implement more EE (e.g., curriculum, teacher training) on and off the refuge. Add 1.0 FTE public use specialist.
<b>Public outreach and communication</b>	Continue to provide public outreach and communication through press releases and interviews for print and broadcast media.	Same as Alternative A.	Contingent upon adding a public use specialist, within 5 years of CCP approval, develop and begin to implement a communications plan that would outline the refuge's approach and strategies for outreach to the public.
<b>Visitor center</b>	Continue to operate refuge without a visitor center.	Same as Alternative A.	Within 10 years of CCP approval, build new HQ/visitor contact station.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Wildlife Management Emphasis	Alternative C (Proposed Alternative)
<b>Goal 5: Provide adequate staffing and funding to accomplish refuge goals and objectives while encouraging cooperative efforts with other agencies, non-governmental organizations, universities, and other partners.</b>			
<b>Safety</b>	Continue to work with Corps of Engineers in removing hazardous materials and unexploded ordnance from refuge. Continue to protect visitors and staff from illegal activities.	Same as Alternative A.	Increase coordination with the Corps of Engineers during their clean-up activities to reduce the risk to human health and the environment from unexploded ordnance. Continue to protect visitors and staff from illegal activities.
<b>Staffing</b>	Maintain the following positions: 1 refuge manager; and 1 maintenance worker for a total of 2.0 FTEs.	Add the following positions: 1 biologist; 1 law enforcement officer; 1.5 biotech positions, and 1 maintenance worker, for a total of 6.5 FTEs.	Add the following positions: 1 public use specialist; 1 biologist; 1 law enforcement officer; 1.5 biotech positions; and 1 maintenance worker, for a total of 7.5 FTEs.
<b>Equipment and facilities</b>	Maintain current equipment and facilities (2 boats and office and residence buildings).	Ensure that 1 boat is available and dedicated to wildlife management activities.	In addition to Alternatives A and B, develop and maintain more facilities (e.g., trails, towers, boardwalks, blinds), and within 10 years of CCP approval, build new headquarters/visitor contact station.
<b>Friends group</b>	Refuge continues to operate without a Friends group.	Facilitate formation of a Friends group within 5 years of CCP approval.	Same as Alternative B.

<b>Issues</b>	<b>Alternative A (Current Management – No Action Alternative)</b>	<b>Alternative B – Wildlife Management Emphasis</b>	<b>Alternative C (Proposed Alternative)</b>
<b>Partnerships</b>	Continue to cooperate with agencies, municipality, educational institutions, non-governmental organizations, and volunteers in refuge management.	Increase cooperation with partners focused on wildlife management and establish formal agreements where appropriate.	Increase cooperation with partners in habitat and wildlife management as well as public use, and establish formal agreements where appropriate.
<b>Refuge special uses</b>	Continue to consider issuing special use permits for non-wildlife dependent uses.	Same as Alternative A.	Same as Alternative A.

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## ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

The alternatives' development process under NEPA and the Improvement Act is designed to allow consideration of the widest possible range of issues and potential management approaches. During the alternatives' development process, many different solutions were considered. The following alternative components were considered but not selected for detailed study in this Draft CCP/EA for the reason(s) described.

Close the refuge to the public – The planning team briefly considered closing the refuge to visitation, as are several other island refuges in the Caribbean NWR Complex, among them Desecheo NWR and Green Cay NWR. It was acknowledged that eliminating all public access might benefit local populations of certain indigenous wildlife species by removing disturbances that adversely impact their condition. However, the planning team decided that the probable benefits of such a closure were outweighed by its costs, in terms of foregone public benefits and appreciation and support for the refuge. As long as a given public use was deemed appropriate and compatible, it would be allowed at Culebra NWR.

Open the refuge to renewable energy development (wind energy) – While most environmental scientists endorse the rapid deployment of diverse renewable energy sources around the world as an imperative if societies are serious about “sustainable development,” most environmental scientists would also concur that renewable energy is not without impacts, and that not all renewable energy facilities are appropriate in all places. Over the years, Culebra NWR and the Caribbean NWR Complex have been approached by advocates for “green energy” with proposals to develop such energy sources on the refuges themselves. In order for a commercial use to be considered “appropriate” within the definition provided by refuge guidance, the use must be a wildlife-dependent recreational use, contribute to fulfilling the refuge purposes, or the refuge manager must determine that the use is appropriate through an evaluation of several criteria provided in the guidance. These criteria include consideration of whether the use is consistent with refuge goals and objectives, whether the use contributes to the public's understanding and appreciation of the refuge's natural or cultural resources, or if the use is beneficial to the refuge's natural or cultural resources. An evaluation for appropriateness of commercial wind energy production on the refuge was conducted (Appendix E) and a determination was made that this use does not meet the criteria and would not be appropriate.



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## *IV. Environmental Consequences*

### **OVERVIEW**

This chapter analyzes and discusses the potential environmental effects or consequences that can be reasonably expected by the implementation of each of the three alternatives described in Chapter III of this EA. For each alternative, the expected outcomes are portrayed through the 15-year life of the CCP.

### **EFFECTS COMMON TO ALL ALTERNATIVES**

A few potential effects will be the same under each alternative and are summarized under seven categories: environmental justice, climate change, other management, land acquisition, cultural resources, refuge revenue-sharing, and other effects.

#### *ENVIRONMENTAL JUSTICE*

Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” was signed by President Clinton on February 11, 1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations, with the goal of achieving environmental protection for all communities. The order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities with access to public information and opportunities for participation in matters relating to human health or the environment.

None of the management alternatives described in this environmental assessment will disproportionately place any adverse environmental, economic, social, or health impacts on minority and low-income populations. Implementation of any action alternative that includes public use and environmental education is anticipated to provide a benefit to the residents residing in the surrounding communities.

#### *CLIMATE CHANGE*

The U.S. Department of the Interior issued an order in January 2001 requiring federal agencies under its direction that have land management responsibilities to consider potential climate change impacts as part of long-range planning endeavors.

The increase of carbon within the earth’s atmosphere has been linked to the gradual rise in surface temperatures commonly referred to as global warming. In relation to comprehensive planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy’s *Carbon Sequestration Research and Development* (U.S. Department of Energy 1999) defines carbon sequestration as “...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere.”

The land is a tremendous force in carbon sequestration. Terrestrial biomes of all sorts – grasslands, forests, wetlands, tundra, perpetual ice, and desert – are effective both in preventing carbon emissions and in acting as a biological “scrubber” of atmospheric carbon monoxide. The conclusions of the

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Department of Energy's report noted that ecosystem protection is important to carbon sequestration and may reduce or prevent the loss of carbon currently stored in the terrestrial biosphere.

Conserving natural habitat for wildlife is the heart of any long-range plan for national wildlife refuges. The actions proposed in this comprehensive conservation plan would conserve or restore land and water, and would thus enhance carbon sequestration. This, in turn, contributes positively to efforts to mitigate human-induced global climate changes.

#### *OTHER MANAGEMENT*

All management activities that could affect the refuge's natural resources, including subsurface mineral reservations, utility lines and easements, soils, water and air, and historical and archaeological resources, would be managed to comply with all laws and regulations. In particular, any existing and future oil and gas exploration, extraction, and transport operations on the refuge would be managed identically under each of the alternatives. Thus, the impacts would be the same.

#### *LAND ACQUISITION*

Funding for land acquisition from willing sellers of lands appropriate for inclusion in the Culebra NWR would come from the Land and Water Conservation Fund, the Migratory Bird Conservation Fund, Corps of Engineers mitigation programs, or donations from conservation and private organizations. Conservation easements and leases can be used to obtain the minimum interests necessary to satisfy refuge objectives if the refuge staff can adequately manage uses of the areas for the benefit of wildlife. The Service can negotiate management agreements with local, state, and federal agencies, and accept conservation easements. Some tracts within the refuge acquisition boundary may be owned by other public or private conservation organizations. The Service would work with interested organizations to identify additional areas needing protection and provide technical assistance if needed. The acquisition of private lands is contingent on the landowners and their willingness to participate.

#### *CULTURAL RESOURCES*

All alternatives afford additional land protection and low levels of development, thereby producing little negative effect on the refuge's cultural and historic resources. Potentially negative effects could include logging, construction of new trails or facilities, and development of water impoundments. In most cases, these management actions would require review by the Service's Regional Archaeologist in consultation with the Commonwealth of Puerto Rico's Historic Preservation Office (*Oficina Estatal de Conservación Histórica*), as mandated by Section 106 of the National Historic Preservation Act. Therefore, the determination of whether a particular action within an alternative has the potential to affect cultural resources is an on-going process that would occur during the planning stages of every project.

Service acquisition of land with known or potential archaeological or historical sites provides two major types of protection for these resources: protection from damage by federal activity and protection from vandalism or theft. The National Historic Preservation Act requires that any actions by a Federal agency which may affect archaeological or historical resources be reviewed by the State Historic Preservation Office, and that the identified effects must be avoided or mitigated. The Service's policy is to preserve these cultural, historic, and archaeological resources in the public trust, and avoid any adverse effects wherever possible.

Land acquisition by the Service could provide some degree of protection to significant cultural and historic resources. If acquisition of private lands does not occur and these lands remain under private ownership, the landowner would be responsible for protecting and preserving cultural resources. Development of off-

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refuge lands has the potential to destroy archaeological artifacts and other historical resources, thereby decreasing opportunities for cultural resource interpretation and research.

### *REFUGE REVENUE-SHARING*

Currently there are no annual refuge revenue-sharing payments to the Commonwealth of Puerto Rico for the Culebra NWR lands. If any privately owned lands are acquired by the refuge in the future, revenue-sharing payments would be initiated based on the appraised value of the lands acquired.

### *OTHER EFFECTS*

Each of the alternatives would have similar effects or minimal to negligible effects on soils, water quality and quantity, noise, transportation, human health and safety, children, hazardous materials, waste management, aesthetics and visual resources, and utilities and public services.

### **SUMMARY OF EFFECTS BY ALTERNATIVE**

The following section describes the environmental consequences of adopting each refuge management alternative. Table 8 summarizes and addresses the likely outcomes for the specific issues, and is organized by broad issue categories.

#### *ALTERNATIVE A - (CURRENT MANAGEMENT - NO ACTION)*

Under Alternative A, the Current Management or No Action Alternative, over the 15-year lifetime of the CCP, Culebra NWR would continue to be managed as it is at present.

Under this alternative, seabird abundance on the refuge would be likely to remain unchanged or to increase slightly. Continued surveys and protection of nesting hawksbill, green, and leatherback turtles and their nests/eggs would maintain sea turtles numbers and utilization of refuge beaches. Seasonal presence of migratory landbirds is unlikely to change. Continuing to protect habitat for the Virgin Islands tree boa and the giant anole would likely maintain their populations. Existing populations of *Pepperomia wheelerii* and any *Leptocereus grantianus* located on the refuge would likely remain.

Alternative A would maintain existing area of mangroves on the refuge. The existing area of dry forest on the refuge would not change. Offshore cays would continue to be protected, but limited invasive species removal would not eliminate the problem they pose for habitat and native wildlife species. Wetlands on the refuge would continue to be protected. Invasive species would continue to be controlled but their encroachment would remain a problem for native flora and fauna through completion and displacement.

Under Alternative A, refuge boundaries would continue to be undefined and unmarked in a number of areas, leaving the refuge vulnerable to misplaced activities on adjacent private lands. That is, adjacent landowners, and the Service, may not realize that activities or developments believed to be on these lands are actually taking place on the refuge. There would be no further acquisition within the refuge boundary and no expansion of the acquisition boundary under this alternative.

Currently there are no law enforcement personnel stationed at the Culebra NWR. Enforcement is provided by personnel from the Caribbean Refuge Headquarters in collaboration with the Puerto Rico DNER, Commonwealth police and other partners. Alternative A would provide for the current level of protection for the refuge's cultural and historic resources.

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In terms of providing access to the refuge, Alternative A would maintain the current schedule and certain areas of refuge would remain closed. The Observation Post would be kept closed to the public. This alternative would continue to provide for opportunistic wildlife observation and photography throughout the refuge and at the tower near refuge headquarters. It would continue to respond to incidental requests for talks, walks and other environmental education and interpretive programs. It would also maintain existing signage and interpretive materials. However, no visitor center would be built, which would limit opportunities for environmental education and interpretation.

Continuing to work with the Corps of Engineers in removing hazardous materials and unexploded ordnance would adequately protect public safety on the refuge. In most but not all instances, law enforcement efforts would protect visitors and staff from illegal activities. Special use permits for non-wildlife-dependent uses would continue to limit the impacts of these uses to acceptable, non-significant levels.

### *ALTERNATIVE B - WILDLIFE MANAGEMENT EMPHASIS*

Alternative B would emphasize increased wildlife management on Culebra NWR with any increased availability of budgetary and staffing resources.

Under this alternative, a number of measures are to be taken to benefit seabirds, including surveys, vegetation manipulation, use of decoys, and predator control. As a result, seabird numbers and diversity are likely to increase on the refuge. Seabird nesting attempts and success may both increase as well. Continued surveys and protection of nesting hawksbill, green, and leatherback turtles and their nests/eggs would in all likelihood serve to maintain sea turtle numbers and utilization of refuge beaches.

Implementing habitat management strategies to benefit target species of resident and migratory birds would likely increase their numbers and diversity. Protecting habitat for the Virgin Islands and Puerto Rican boas and the giant anole would likely maintain their populations. Establishing additional populations of these two species at appropriate sites on the refuge would enhance their chances for survival and expansion.

Under Alternative B, restoration of hydrology to specified areas of degraded mangrove habitat would increase the area and health of mangrove stands on the refuge. Selective invasive species removal and planting of propagated trees would also expand and restore the refuge's dry forest. Intensifying efforts at invasive species control and eradication and pursuing opportunities for habitat restoration would enhance the values and functions of offshore cays for native habitats and wildlife.

If done properly, intensified efforts at restoration of wetlands would probably increase the quantity and improve the quality of wetlands on refuge. Intensified invasive species management would reduce problems they pose, but this problem will never entirely be solved; it will persist for the indefinite future and require continual attention at some level.

Clearly delineating all refuge boundaries both on maps and on the ground would safeguard the refuge against the possibility of misplaced harmful activities occurring accidentally on the refuge. Both boundary expansion and acquisition may occur under Alternative B, increasing the amount of land and resources under protection.

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Law enforcement would continue to be coordinated through the Caribbean NWR headquarters and partnerships with the Puerto Rico DNER and other partners would be strengthened and formalized to enhance protection of refuge resources. Alternative B would also provide for the reestablishment of an on-site officer to enforce regulations and protect the refuge's biological, cultural and historic resources.

In terms of providing access to the refuge, Alternative B would maintain the current schedule and certain areas of refuge would remain closed. The Observation Post would be kept closed to the public. This alternative would continue to provide for opportunistic wildlife observation and photography throughout the refuge and at the tower near refuge headquarters. It would continue to respond to incidental requests for talks, walks, and other environmental education and interpretive programs. It would also maintain existing signage and interpretive materials. However, no visitor center would be built, which would limit opportunities for environmental education and interpretation.

Alternative B would continue to work with the Corps of Engineers in removing hazardous materials and unexploded ordnance. It is expected that this would adequately protect public safety on the refuge. In most but not all instances, law enforcement efforts would protect visitors and staff from illegal activities. Special use permits for non-wildlife-dependent uses would continue to limit the impacts of these uses to acceptable, non-significant levels.

#### *ALTERNATIVE C - (PROPOSED ALTERNATIVE)*

Under Alternative C, Culebra NWR would utilize any increase in staffing and budgetary resources to expand both wildlife and habitat management. With regard to wildlife and habitat management, but not public use, Alternative C would be virtually identical to Alternative B.

A number of measures would be taken to benefit seabird use and nesting, including surveys, vegetation manipulation, use of decoys, and predator control. As a result, seabird numbers and diversity are likely to increase on the refuge. Seabird nesting attempts and success may both increase as well. Continued surveys and protection of nesting hawksbill, green, and leatherback turtles and their nests/eggs would in all likelihood serve to maintain sea turtle numbers and utilization of refuge beaches.

Implementing habitat management strategies to benefit target species of resident and migratory birds would likely increase their numbers and diversity. Protecting habitat for the Virgin Islands and Puerto Rican boas and the giant anole would likely maintain their populations. Establishing additional populations of these three species at appropriate sites on the refuge would enhance the probability of their survival and expansion.

Under Alternative C, restoration of hydrology to specified areas of degraded mangrove habitat would increase the area and health of mangrove stands on the refuge. Selective invasive species removal and planting of propagated trees would also expand and restore the refuge's dry forest. Intensifying efforts at invasives' control and eradication and pursuing opportunities for habitat restoration would enhance the values and functions of offshore cays for native habitats and wildlife.

When done properly, restoration of wetlands will increase the quantity and improve the quality of wetlands on the refuge. Intensified invasive species management would reduce problems they pose, but this problem will never entirely be solved; it will persist for the indefinite future and require continual expenditure of staffing/budgetary resources at some level.

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Clearly delineating all refuge boundaries would safeguard the refuge against the possibility of misplaced harmful activities occurring accidentally on the refuge. Both boundary expansion and acquisition may occur under Alternative C, increasing the amount of land and resources protected.

Like Alternative B, Alternative C would restore the on-site law enforcement officer position and strengthen and formalize the partnership with the Puerto Rico DNER and other partners to enhance protection of refuge resources. Alternative C would also increase the level of protection for cultural and historic resources on the refuge through the implementation of a Cultural Resources Management Plan (CRMP) for the refuge. The CRMP would improve protection and appreciation of the refuge's historic and cultural resources.

With regard to public access, Alternative C differs from the previous two alternatives. On a case-by-case basis, rather than maintaining all existing closed areas, it would evaluate the potential for opening additional areas to the public, considering both safety and biological factors. Similarly, restoring and reopening the Observation Post for environmental research and/or education purposes would be a benefit for the refuge and the surrounding community.

Under Alternative C, developing more facilities (e.g., trails, towers, boardwalks, blinds) would increase the refuge's opportunities for wildlife observation and photography. Furthermore, developing interpretive programs and non-personal interpretive materials and developing and implementing more environmental education on and off the refuge would represent a public benefit. Likewise, building a new headquarters and visitor contact station would increase environmental education and interpretation opportunities.

Increased efforts with the Corps of Engineers to certify additional areas as safe for public access would increase public use without compromising safety. Continued protection of visitors and staff from illegal activities would maintain public health and safety. Special use permits for non-wildlife-dependent uses would continue to limit the impacts from such uses to acceptable, non-significant levels.

## **UNAVOIDABLE IMPACTS AND MITIGATION MEASURES**

Under Alternative A – the no-action alternative – there are various unavoidable impacts, including inadequate nesting habitat and protection for seabirds; law enforcement that is not adequate for protecting refuge natural resources and any significant increase in visitor use; continued degradation of the biological functions of native plant communities and wildlife habitat due to the invasion of exotic plants and nuisance animals; unknown and unmarked boundaries and the transgressions these could engender; and a continuing long-term decline in biodiversity. Over time, if these issues are not addressed, they will continue to impact refuge resources. The chief drawback of this alternative is that by maintaining the management status quo, a status quo refuge environment is likely to be the result, which would not go as far as attaining the refuge's purposes as Alternatives B and C.

Alternative B – wildlife management emphasis – avoids the shortcomings and unavoidable impacts on habitat and wildlife listed for Alternative A. However, it does not realize the refuge's potential for expanding public use.

Alternative C, the proposed alternative, also has some unavoidable impacts. These impacts are generally expected to be minor and/or short-term in duration. However, the refuge will attempt to minimize these impacts whenever possible. The following sections describe the measures the refuge will employ to mitigate and minimize the potential impacts that would result from implementation of the proposed alternative.

**Table 8. Summary of environmental effects by alternative, Culebra NWR**

<b>Issues</b>	<b>Alternative A (Current Management – No Action Alternative)</b>	<b>Alternative B – Wildlife Management Emphasis</b>	<b>Alternative C (Proposed Alternative)</b>
<b>Seabirds</b>	Seabird abundance on refuge likely to remain unchanged or increase slightly.	Seabird numbers and diversity are likely to increase on the refuge. Seabird nesting attempts and success may both increase as well.	Same as Alternative B.
<b>Sea turtles</b>	Continued surveys and protection of nesting hawksbill, green and leatherback turtles and their nests/eggs would maintain sea turtle numbers and utilization of refuge beaches.	Same as Alternative A.	Same as Alternative A.
<b>Resident and migratory birds</b>	Seasonal presence of migratory landbirds unlikely to change.	Implementing habitat management strategies to benefit target species of resident and migratory birds would likely increase their numbers and diversity.	Same as Alternative B.
<b>Listed animal species</b>	Protecting habitat for the VI and PR boas and giant anole would likely maintain their populations.	Same as Alternative A.	Same as Alternative A.
<b>Listed plants</b>	Existing populations of <i>Pepperomia wheelerii</i> and <i>Leptocereus grantianus</i> would probably continue.	Establishing additional populations of these 2 species at appropriate sites on the refuge would enhance their chances for survival and expansion.	Same as Alternative B.
<b>Mangroves</b>	Existing area of mangroves on the refuge would be maintained.	Restoration of hydrology to specified areas of degraded mangrove habitat would increase area and health of mangrove stands on the refuge.	Same as Alternative B.

<b>Issues</b>	<b>Alternative A (Current Management – No Action Alternative)</b>	<b>Alternative B – Wildlife Management Emphasis</b>	<b>Alternative C (Proposed Alternative)</b>
<b>Dry forest</b>	Existing area of dry forest on the refuge would not change.	Selective invasive species removal and planting of propagated trees would expand and restore dry forest on the refuge.	Same as Alternative B.
<b>Offshore cays</b>	Offshore cays would continue to be protected, but limited invasive species removal would not eliminate the problem they pose for habitat and native wildlife species.	Intensifying efforts at invasives' control and eradication and pursuing opportunities for habitat restoration would enhance values and functions of offshore cays.	Same as Alternative B.
<b>Wetland plant communities</b>	Wetlands on the refuge would continue to be protected.	Intensified efforts at restoration of wetlands would probably increase quantity and improve quality of wetlands on refuge.	Same as Alternative B.
<b>Invasive species</b>	Invasive species would continue to be controlled but would remain a problem for native flora and fauna.	Intensified invasive species management would reduce problems they pose.	Same as Alternative B.
<b>Refuge boundaries</b>	Refuge boundaries would continue undefined and unmarked in a number of areas, leaving the refuge vulnerable to misplaced activities on adjacent private lands.	Clearly delineating all refuge boundaries both on maps and on the ground would safeguard the refuge against the possibility of misplaced harmful activities occurring on the refuge.	Same as Alternative B.
<b>Refuge boundary expansion and acquisition</b>	There would be no further acquisition within the boundary and no expansion of the acquisition boundary.	Both boundary expansion and acquisition may occur, increasing the amount of land and resources under protection.	Same as Alternative B.
<b>Illegal activities</b>	Continue to collaborate with DNER and other partners to deter and reduce, but not eliminate illegal activities.	Restore 1 LE officer position. Strengthen and formalize partnerships with DNER and others to enhance protection of refuge resources.	Same as Alternative B.

<b>Issues</b>	<b>Alternative A (Current Management – No Action Alternative)</b>	<b>Alternative B – Wildlife Management Emphasis</b>	<b>Alternative C (Proposed Alternative)</b>
<b>Cultural resources</b>	Current level of protection for refuge's cultural and historic resources would be provided.	Same as Alternative A.	Implementing a CRMP for the refuge would improve protection and appreciation of the refuge's historic and cultural resources.
<b>Public access</b>	Current schedule would be maintained and certain areas of refuge would remain closed.	Same as Alternative A.	On a case by case basis, evaluate potential for opening additional areas to the public, considering both safety and biological factors.
<b>Observation Post (OP)</b>	OP would be kept closed to the public.	Same as Alternative A.	Restoring and reopening the OP for environmental research and/or education purposes would be a benefit for the refuge and the surrounding community.
<b>Wildlife observation and photography</b>	Would continue to provide for opportunistic wildlife observation and photography throughout the refuge and at the tower near refuge headquarters.	Same as Alternative A.	Developing more facilities (e.g., trails, towers, boardwalks, blinds) would increase opportunities for wildlife observation and photography.
<b>Environmental education (EE) and interpretation</b>	Would continue to respond to incidental requests for talks, walks, and other EE and interpretive programs. Would also maintain existing signage and interpretive materials.	Same as Alternative A.	Developing interpretive programs and non-personal interpretive materials and developing and implement more EE on and off the refuge would represent a public benefit.
<b>Visitor center</b>	No visitor center would be built, limiting opportunities for EE and interpretation.	Same as Alternative A.	Building a new headquarters/visitor contact station would increase EE and interpretation opportunities.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Wildlife Management Emphasis	Alternative C (Proposed Alternative)
<b>Human health and safety</b>	Continuing to work with the Corps of Engineers in removing hazardous materials and unexploded ordnance would adequately protect public safety. Law enforcement efforts would continue to be limited, without an on-site law enforcement position for the refuge.	Same as Alternative A plus restore a law enforcement position to improve safety and protect resources and visitors from illegal activities.	Increased efforts with Corps to certify additional areas as cleared and safe for public access would increase public use without compromising safety. Restore the Culebra NWR law enforcement position to improve safety and protect resources and visitors from illegal activities.
<b>Impacts from refuge special uses</b>	Special use permits for non-wildlife dependent uses would continue to limit these impacts.	Same as Alternative A.	Same as Alternative A.

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## *SOIL DISTURBANCE IMPACTS ON VEGETATION AND WATER QUALITY*

Soil disturbance, erosion, damage to vegetation from crushing and shearing, and siltation due to visitation, possible trail construction and use, and dispersed movement on foot by visitors would be minor. To further reduce potential impacts, the refuge will use best management practices to minimize the erosion of soils into water bodies. Refuge staff would monitor use patterns and if necessary to protect landforms, soils, plants, and water quality from overuse, would construct one or more engineered trails designed to withstand foot traffic and require all visitor to confine themselves to trails.

Foot traffic on new and extended foot trails is expected to have a minor incremental impact on soil erosion. To minimize the impacts from public use, the refuge would include informational signs that request trail users to remain on the trails, in order to avoid causing potential erosion problems.

### *HERBICIDE USE*

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 disruptive than others, all of the public use activities proposed under the proposed alternative would be planned to avoid unacceptable levels of impact.

The known and anticipated levels of disturbance from the proposed alternative are not deemed significant. As indicated, some of the refuge remains closed, and during the 15-year planning horizon, if areas are opened, they would be opened gradually and deliberately. In any case, the refuge would manage public use activities to reduce impacts. General wildlife observation and photography, as well as environmental education and interpretation, could result in minimal or temporary disturbance to wildlife. If the refuge determines that impacts from the eventual expected additional visitor uses are above the levels that are anticipated, those uses would be discontinued, restricted, or rerouted to other less sensitive areas.

### *VEGETATION DISTURBANCE*

As noted above, negative impacts could result from the construction and maintenance of trails, towers, boardwalks, blinds, and a new headquarters/visitor contact station that require the clearing of non-sensitive vegetation. These are expected to result in minor, short-term impacts. At present, none of these facilities is planned, but they are a possibility during the 15-year life of the CCP if more of the refuge is cleaned and opened to the public.

Increased visitor use may also increase the potential for the introduction of new exotic species onto the island. The refuge would minimize this impact by installing educational and informational signs that inform visitors of the problems posed by invasive species and requesting users to stay on trails.

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## *USER GROUP CONFLICTS*

As public use grows, unanticipated conflicts between different user groups could occur. If this should happen, the refuge would adjust its programs, as needed, to eliminate or minimize any public use issues. The refuge would 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 the proposed alternative is not expected to negatively affect the owners of private lands adjacent to the refuge. Positive impacts that would be expected include higher property values, less intrusion of invasive exotic plants, and increased opportunities for landowners to view more diverse wildlife.

However, some negative impacts that may occur include a higher frequency of trespass onto adjacent private lands, and noise associated with increased traffic. To minimize these potential impacts, the refuge would 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 visitor contact station.

## *LAND OWNERSHIP AND SITE DEVELOPMENT*

Land acquisition efforts by the Service 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 would be maintained in a natural state, managed for native wildlife populations, and opened to wildlife-compatible public uses, where feasible.

Potential development of the refuge's buildings, trails, and other improvements could lead to minor short-term negative impacts on plants, soils, and some wildlife species. When building the observation towers, efforts would be made to use recycled products and environmentally sensitive treated lumber. The visitor center would be constructed to be aesthetically pleasing to the community and to avoid any additional impacts to native plant communities. Any restoration or construction at the "Observation Post" site will also consider the aesthetics of the facilities and their visibility from Flamenco Beach and the surrounding waters. All construction activities would comply with the requirements of Section 404 of the Clean Water Act; the National Historic Preservation Act; Executive Order 11988, Floodplain Management; and other applicable regulatory requirements.

## **CUMULATIVE IMPACTS**

A cumulative impact is defined as an impact on the natural or human environment, which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7).

Cumulative impacts are the overall, net effects on a resource that arise from multiple actions. Impacts can "accumulate" spatially, when different actions affect different areas of the same resource. They can also accumulate over the course of time, from actions in the past, the present, and the future. Occasionally, different actions counterbalance one another, partially canceling out each other's effect on a

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resource. But more typically, multiple effects add up, with each additional action contributing an incremental impact on the resource. In addition, sometimes the overall effect is greater than merely the sum of the individual effects, such as when one more reduction in a population crosses a threshold of reproductive sustainability, and threatens to extinguish the population.

A thorough analysis of impacts always considers their cumulative aspects, because actions do not take place in a vacuum: there are virtually always some other actions that have affected that resource in some way in the past, or are affecting it in the present, or will affect it in the reasonably foreseeable future. So any assessment of a specific action's effects must in fact be made with consideration of what else has happened to that resource, what else is happening, or what else will likely happen to it.

The refuge is not aware of any past, present, or future planned actions that would result in a significant cumulative impact when added to the refuge's proposed actions, as outlined in the proposed alternative.

### **DIRECT AND INDIRECT EFFECTS OR IMPACTS**

Direct effects are caused by an action and occur at the same time as the action. Indirect effects are caused by an action but are manifested later in time or further removed in distance, but still reasonably foreseeable.

The actions proposed for implementation under the proposed alternative include facility development, wildlife and population management, resource protection, public use, and administrative programs. These actions would result in both direct and indirect effects. Facility development, for example, would most likely lead to increased public use, a direct effect; and it, in turn, would lead to indirect effects such as increased littering, noise, and vehicular traffic.

Other indirect effects that may result from implementing the proposed alternative include minor impacts from siltation due to the disturbance of soils and vegetation while expanding or creating new foot trails; construction of the observation tower and visitor center; restoring or reconstructing the OP site; and providing greater visitor access through improvements to the boat ramps.

### **SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY**

The habitat conservation and restoration actions proposed under the proposed alternative are dedicated to maintaining the long-term productivity of refuge habitats. The benefits of this plan for long-term productivity far outweigh any impacts from short-term actions, such as the construction of observation towers and a new headquarters/visitor contact station, or creation of new trails. While these activities would cause short-term adverse impacts, the educational values and associated public support gained from the improved visitor experience would produce long-term benefits for the refuge's entire ecosystem.

The key to protecting and ensuring the refuge's long-term productivity is to find the threshold where public uses do not degrade or interfere with the refuge's natural resources. The plans proposed under the proposed alternative have been carefully conceived to achieve that threshold. Therefore, implementing the proposed alternative would lead to long-term benefits for wildlife protection and land conservation that far outweigh any short-term impacts.



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## V. Consultation and Coordination

### OVERVIEW

This chapter summarizes the consultation and coordination that has occurred to date in identifying the issues, alternatives, and proposed alternative, which are presented in this Draft CCP/EA. It lists the meetings that have been held with the various agencies, organizations, and individuals who were consulted in the preparation of this Draft CCP/EA.

The following meetings, contacts, and presentations were undertaken by the Service during the preparation of this Draft CCP/EA:

A March 2009 public scoping meeting was announced through local newspapers. A total of 11 comment letters (letters, faxes, and emails) were received in March and April 2009.

The following issues were raised during the internal (agency) and external (public) scoping process for Culebra NWR:

#### Internal (FWS and refuge staff):

- complete boundary verification process;
- invasive species management;
- monitor and manage seabird colonies;
- work with Army Corps Formerly Used Defense Site (FUDS) program to maximize clean up of military ordnance.

#### Commonwealth of Puerto Rico (information from 2005 report Puerto Rico Critical Wildlife Areas):

- Flamenco Peninsula: Patrol the area and control public access in order to protect breeding seabird colonies.
- Establish a grassland management program to improve nesting sites.
- Resaca and Brava Beaches: In accordance with cooperative agreement between Service and DNER, continue the Leatherback and Hawksbill sea turtles nest program and the patrol during breeding season.
- Continue control of nonnative predators such as cats.
- Mangrove Areas: Conduct law enforcement patrols to control any activities that could affect them.
- Offshore cays: To minimize disturbance to wildlife and ecology, patrol the cays in conjunction with DNER Law Enforcement Division during weekends and summer season.

#### Tribes: None

#### Partners: Army Corps of Engineers (conducting inventory of portions of the refuge as a Formerly Used Defense Site):

- identify management activities that may affect priority and extent of clean up of contamination and unexploded ordnance from prior military activities.

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Public:

- Control access and utilization of Culebrita beaches and ensure a consistent policy for special use permits;
- clarify all unresolved boundary issues;
- develop plans for repair and reutilization of the Observation Post at Punta Flamenco;
- increase funding for sea turtle projects;
- control or eliminate invasive species;
- develop hiking trails;
- permit the development of renewable energy projects (particularly wind energy) on the refuge.

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## APPENDICES

### *Appendix A. 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.

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<b>Comprehensive Conservation Plan:</b>	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).
<b>Concern:</b>	See Issue
<b>Cover Type:</b>	The present vegetation of an area.
<b>Cultural Resource Inventory:</b>	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).
<b>Cultural Resource Overview:</b>	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).
<b>Cultural Resources:</b>	The remains of sites, structures, or objects used by people in the past.
<b>Designated Wilderness Area:</b>	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).
<b>Disturbance:</b>	Significant alteration of habitat structure or composition. May be natural (e.g., fire) or human-caused events (e.g., aircraft overflight).
<b>Ecosystem:</b>	A dynamic and interrelating complex of plant and animal communities and their associated non-living environment.
<b>Ecosystem Management:</b>	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.

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<b>Endangered Species (Federal):</b>	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.
<b>Endangered Species (State):</b>	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.
<b>Environmental Assessment (EA):</b>	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).
<b>Environmental Impact Statement (EIS):</b>	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).
<b>Estuary:</b>	The wide lower course of a river into which the tides flow. The area where the tide meets a river current.
<b>Finding of No Significant Impact (FONSI):</b>	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).
<b>Goal:</b>	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).
<b>Habitat:</b>	Suite of existing environmental conditions required by an organism for survival and reproduction. The place where an organism typically lives.
<b>Habitat Restoration:</b>	Management emphasis designed to move ecosystems to desired conditions and processes, and/or to healthy ecosystems.
<b>Habitat Type:</b>	See Vegetation Type.
<b>Improvement Act:</b>	The National Wildlife Refuge System Improvement Act of 1997.
<b>Informed Consent:</b>	The grudging willingness of opponents to “go along” with a course of action that they actually oppose (Bleiker).

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<b>Issue:</b>	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)].
<b>Management Alternative:</b>	See Alternative
<b>Management Concern:</b>	See Issue
<b>Management Opportunity:</b>	See Issue
<b>Migration:</b>	The seasonal movement from one area to another and back.
<b>Mission Statement:</b>	Succinct statement of the unit's purpose and reason for being.
<b>Monitoring:</b>	The process of collecting information to track changes of selected parameters over time.
<b>National Environmental Policy Act of 1969 (NEPA):</b>	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).
<b>National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57):</b>	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).
<b>National Wildlife Refuge System Mission:</b>	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.
<b>National Wildlife Refuge System:</b>	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.

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<b>National Wildlife Refuge:</b>	A designated area of land, water, or an interest in land or water within the Refuge System.
<b>Native Species:</b>	Species that normally live and thrive in a particular ecosystem.
<b>Noxious Weed:</b>	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.
<b>Objective:</b>	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).
<b>Plant Association:</b>	A classification of plant communities based on the similarity in dominants of all layers of vascular species in a climax community.
<b>Plant Community:</b>	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.
<b>Preferred Alternative:</b>	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.
<b>Prescribed Fire:</b>	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.
<b>Priority Species:</b>	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.
<b>Public Involvement Plan:</b>	Broad long-term guidance for involving the public in the comprehensive conservation planning process.

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<b>Public Involvement:</b>	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.
<b>Public:</b>	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.
<b>Purposes of the Refuge:</b>	“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).
<b>Recommended Wilderness:</b>	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).
<b>Record of Decision (ROD):</b>	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).
<b>Refuge Goal:</b>	See Goal
<b>Refuge Purposes:</b>	See Purposes of the Refuge
<b>Songbirds: (Also Passerines)</b>	A category of birds that is medium to small, perching landbirds. Most are territorial singers and migratory.
<b>Step-down Management Plan:</b>	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).

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<b>Strategy:</b>	A specific action, tool, technique, or combination of actions, tools, and techniques used to meet unit objectives (Service Manual 602 FW 1.6 U).
<b>Study Area:</b>	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.
<b>Threatened Species (Federal):</b>	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.
<b>Threatened Species (State):</b>	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.
<b>Tiering:</b>	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).
<b>U.S. Fish and Wildlife Service Mission:</b>	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.
<b>Unit Objective:</b>	See Objective
<b>Vegetation Type, Habitat Type, Forest Cover Type:</b>	A land classification system based upon the concept of distinct plant associations.
<b>Vision Statement:</b>	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).

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**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)

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## ACRONYMS AND ABBREVIATIONS

BCC	Birds of Conservation Concern
BRT	Biological Review Team
CCP	Comprehensive Conservation Plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
DOI	Department of the Interior
DU	Ducks Unlimited
EA	Environmental Assessment
EE	environmental education
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
FTE	Full-time equivalent
FY	Fiscal Year
GIS	Global Information System
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
PFT	Permanent Full-time
PUNA	Public Use Natural Area
RM	Refuge Manual
RNA	Research Natural Area
ROD	Record of Decision
RONs	Refuge Operating Needs System
RRP	Refuge Roads Program
TFT	Temporary Full Time
USC	United States Code



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## Appendix B. References and Literature Citations

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## *Appendix C. Relevant Legal Mandates and Executive Orders*

<b>STATUTE</b>	<b>DESCRIPTION</b>
<b><i>Administrative Procedures Act (1946)</i></b>	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.
<b><i>American Antiquities Act of 1906</i></b>	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 United States.
<b><i>American Indian Religious Freedom Act of 1978</i></b>	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.
<b><i>Americans With Disabilities Act of 1990</i></b>	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.
<b><i>Anadromous Fish Conservation Act of 1965, as amended</i></b>	Authorizes the Secretaries of Interior and Commerce to enter into cooperative agreements with states and other non-federal 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.
<b><i>Archaeological Resources Protection Act of 1979, as amended.</i></b>	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.
<b><i>Architectural Barriers Act of 1968</i></b>	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.
<b><i>Bald and Golden Eagle Protection Act of 1940, as amended</i></b>	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
<b><i>Bankhead-Jones Farm Tenant Act of 1937</i></b>	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.
<b><i>Cave Resources Protection Act of 1988</i></b>	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.
<b><i>Clean Air Act of 1970</i></b>	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.
<b><i>Clean Water Act of 1974, as amended</i></b>	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.
<b><i>Coastal Barrier Resources Act of 1982 (CBRA)</i></b>	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.
<b><i>Coastal Barrier Improvement Act of 1990</i></b>	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.
<b><i>Coastal Wetlands Planning, Protection, and Restoration (1990)</i></b>	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
<b><i>Coastal Zone Management Act of 1972, as amended</i></b>	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.
<b><i>Emergency Wetlands Resources Act of 1986</i></b>	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.
<b><i>Endangered Species Act of 1973, as amended</i></b>	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.
<b><i>Environmental Education Act of 1990</i></b>	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.
<b><i>Estuary Protection Act of 1968</i></b>	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
<b><i>Estuaries and Clean Waters Act of 2000</i></b>	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.
<b><i>Food Security Act of 1985, as amended (Farm Bill)</i></b>	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.
<b><i>Farmland Protection Policy Act of 1981, as amended</i></b>	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.
<b><i>Federal Advisory Committee Act (1972), as amended</i></b>	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, non-duplicative function. Committees must be strictly advisory unless otherwise specified and meetings must be open to the public.
<b><i>Federal Coal Leasing Amendment Act of 1976</i></b>	Provided that nothing in the Mining Act, the Mineral Leasing Act, or the Mineral Leasing Act for Acquired Lands authorized mining coal on refuges.
<b><i>Federal-Aid Highways Act of 1968</i></b>	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.
<b><i>Federal Noxious Weed Act of 1990, as amended</i></b>	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
<b><i>Fish and Wildlife Act of 1956</i></b>	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.
<b><i>Fish and Wildlife Conservation Act of 1980, as amended</i></b>	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.
<b><i>Fish and Wildlife Coordination Act of 1958</i></b>	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.
<b><i>Improvement Act of 1978</i></b>	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.
<b><i>Fishery (Magnuson) Conservation and Management Act of 1976</i></b>	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.
<b><i>Freedom of Information Act, 1966</i></b>	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.
<b><i>Geothermal Steam Act of 1970, as amended</i></b>	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
<b><i>Lacey Act of 1900, as amended</i></b>	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.
<b><i>Land and Water Conservation Fund Act of 1948</i></b>	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.
<b><i>Marine Mammal Protection Act of 1972, as amended</i></b>	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.
<b><i>Migratory Bird Conservation Act of 1929</i></b>	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.
<b><i>Migratory Bird Hunting and Conservation Stamp Act of 1934</i></b>	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.
<b><i>Migratory Bird Treaty Act of 1918, as amended</i></b>	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.
<b><i>Mineral Leasing Act for Acquired Lands (1947), as amended</i></b>	Authorizes and governs mineral leasing on acquired public lands.

STATUTE	DESCRIPTION
<b><i>Minerals Leasing Act of 1920, as amended</i></b>	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.
<b><i>Mining Act of 1872, as amended</i></b>	Authorizes and governs prospecting and mining for the so-called “hardrock” minerals (i.e., gold and silver) on public lands.
<b><i>National and Community Service Act of 1990</i></b>	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.
<b><i>National Environmental Policy Act of 1969</i></b>	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.
<b><i>National Historic Preservation Act of 1966, as amended</i></b>	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.
<b><i>National Trails System Act (1968), as amended</i></b>	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.
<b><i>National Wildlife Refuge System Administration Act of 1966</i></b>	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
<p><b><i>National Wildlife Refuge System Improvement Act of 1997</i></b></p>	<p>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.</p>
<p><b><i>Native American Graves Protection and Repatriation Act of 1990</i></b></p>	<p>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.</p>
<p><b><i>Neotropical Migratory Bird Conservation Act of 2000</i></b></p>	<p>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.</p>
<p><b><i>North American Wetlands Conservation Act of 1989</i></b></p>	<p>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).</p>
<p><b><i>Refuge Recreation Act of 1962, as amended</i></b></p>	<p>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.</p>
<p><b><i>Partnerships for Wildlife Act of 1992</i></b></p>	<p>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 non-game species. The funding formula is no more than 1/3 federal funds, at least 1/3 foundation funds, and at least 1/3 state funds.</p>

STATUTE	DESCRIPTION
<b><i>Refuge Revenue Sharing Act of 1935, as amended</i></b>	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.
<b><i>Rehabilitation Act of 1973</i></b>	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.
<b><i>Rivers and Harbors Appropriations Act of 1899, as amended</i></b>	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.
<b><i>Sikes Act (1960), as amended</i></b>	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.
<b><i>Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948</i></b>	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.
<b><i>Transportation Equity Act for the 21st Century (1998)</i></b>	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.
<b><i>Uniform Relocation and Assistance and Real Property Acquisition Policies Act (1970), as amended</i></b>	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.

STATUTE	DESCRIPTION
<b><i>Water Resources Planning Act of 1965</i></b>	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.
<b><i>Wild and Scenic Rivers Act of 1968, as amended</i></b>	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.
<b><i>Wilderness Act of 1964, as amended</i></b>	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.
<b><i>Youth Conservation Corps Act of 1970</i></b>	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
<b><i>EO 11593, Protection and Enhancement of the Cultural Environment (1971)</i></b>	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.
<b><i>EO 11644, Use of Off-road Vehicles on Public Land (1972)</i></b>	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.
<b><i>EO 11988, Floodplain Management (1977)</i></b>	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.”
<b><i>EO 11989 (1977), Amends Section 2 of EO 11644</i></b>	Directs agencies to close areas negatively impacted by off-road vehicles.
<b><i>EO 11990, Protection of Wetlands (1977)</i></b>	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.
<b><i>EO 12372, Intergovernmental Review of Federal Programs (1982)</i></b>	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.
<b><i>EO 12898, Environmental Justice (1994)</i></b>	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
<p><b><i>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.</i></b></p>	<p>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.</p>
<p><b><i>EO 12962, Recreational Fisheries (1995)</i></b></p>	<p>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.</p>
<p><b><i>EO 13007, Native American Religious Practices (1996)</i></b></p>	<p>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.</p>
<p><b><i>EO 13061, Federal Support of Community Efforts Along American Heritage Rivers (1997)</i></b></p>	<p>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.</p>
<p><b><i>EO 13084, Consultation and Coordination With Indian Tribal Governments (2000)</i></b></p>	<p>Provides a mechanism for establishing regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications.</p>
<p><b><i>EO 13112, Invasive Species (1999)</i></b></p>	<p>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).</p>

EXECUTIVE ORDERS	DESCRIPTIONS
<p><b><i>EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. (2001)</i></b></p>	<p>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.</p>



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## *Appendix D. Public Involvement*

### **SUMMARY OF PUBLIC SCOPING COMMENTS**

A public scoping meeting was held on March 17, 2009, prior to development of the Draft CCP/EA. The meeting was announced through local news media [Primera Hora (online), Culebra Calendar, La Regatta], through a radio interview on radio station WALO, and through the distribution of flyers throughout the island municipality. Individual letters were sent to five elected officials; twelve commonwealth agency representatives; twelve federal agency representatives; five municipal agency representatives; five educational organizations; and five non-governmental organizations. E-mail notification was sent to an additional 46 addressees. The meeting was attended by 28 people; two representing elected officials, three representing government agencies, three representing organizations and the remainder as individuals. Ten completed comment sheets were received by mail, e-mail or were hand delivered.

The major issues identified during the scoping process were as follows:

Issues identified by the Service during internal scoping included: completion of the boundary verification process; development of an invasive species management program; monitoring and management of seabird colonies; and continued work with Corps of Engineers' FUDS program to maximize clean up of military ordnance.

Army Corps of Engineers (conducting inventory of portions of the refuge as a Formerly Used Defense Site) recommended the identification of Service management activities that may affect priority and extent of clean up of contamination and unexploded ordnance from prior military activities.

Commonwealth of Puerto Rico in the document entitled Puerto Rico Critical Wildlife Areas (2005) recommended: patrols on Flamenco Peninsula to control public access and provide protection for breeding seabird colonies; establishment of a grassland management program to improve Flamenco Peninsula seabird nesting sites; continuation of the Leatherback and Hawksbill sea turtles nest monitoring program and the patrols on Resaca and Brava Beaches during breeding season, in accordance with cooperative agreement between the Service and Puerto Rico DNER; continued control of nonnative predators such as cats; conducting law enforcement patrols to control any activities that could affect mangrove areas; and, patrol of offshore cays in conjunction with Puerto Rico DNER Law Enforcement Division during weekends and summer season, to minimize disturbance to wildlife and ecology.

Public comments received during the scoping process included recommendations for: controlling access and utilization of Culebrita beaches and ensuring a consistent policy for special use permits; clarification of all unresolved boundary issues; development of plans for repair and reutilization of the Observation Point at Punta Flamenco; increased funding for sea turtle projects; controlling or eliminating invasive species; development of hiking trails; and permitting the development of renewable energy projects (particularly wind energy) on the refuge.



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## *Appendix E. Appropriate Use Determinations*

### Culebra National Wildlife Refuge 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.

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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: Culebra National Wildlife Refuge

Use: Research, Studies and Scientific Collection

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 State fish and wildlife agencies.      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: \_\_\_\_\_

Date: \_\_\_\_\_

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: \_\_\_\_\_

Date: \_\_\_\_\_

A compatibility determination is required before the use may be allowed.

## FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Culebra National Wildlife Refuge

Use: Commercial Wind Energy Production

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 State fish and wildlife agencies. Yes \_\_\_ 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

Refuge Manager: \_\_\_\_\_ Date: \_\_\_\_\_

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: \_\_\_\_\_ Date: \_\_\_\_\_

A compatibility determination is required before the use may be allowed.

## FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Culebra National Wildlife Refuge

Use: Recreational Beach Use

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 State fish and wildlife agencies.      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: \_\_\_\_\_

Date: \_\_\_\_\_

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.

## FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Culebra National Wildlife Refuge

Use: Commercial Water Taxi Service

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 State fish and wildlife agencies. 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: \_\_\_\_\_

Date: \_\_\_\_\_

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.



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## Appendix F. Compatibility Determinations

### Culebra National Wildlife Refuge Compatibility Determination

#### INTRODUCTION

The Fish and Wildlife Service reviewed several uses for compatibility during the Comprehensive Conservation Plan (CCP) process for the Culebra National Wildlife Refuge (NWR). Descriptions and anticipated impacts of each of these uses are addressed separately. However, the following “Uses” through the “Other Applicable Laws, Regulations, and Policies” sections, the “Literature Cited” section, the “Public Review and Comment” section, 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 the Culebra National Wildlife Refuge, 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. Environmental Education and Interpretation
2. Wildlife Observation and Photography
3. Research, Studies, and Scientific Collection
4. Recreational Beach Use
5. Water Taxi Service
6. Hunting

**Refuge Name:** Culebra National Wildlife Refuge.

**Date Established:** February 27, 1909.

**Establishing and Acquisition Authority(ies):** Executive Order 1042, dated Feb. 27, 1909; 16 U.S.C. 667b (An Act Authorizing the Transfer of Certain Real Property for Wildlife; 16 U.S.C. 668dd(a)(2) National Wildlife Refuge System Administration Act;

**Refuge Purpose:** The above referenced establishing authorities identify the refuge purposes “... as a refuge and breeding ground for native birds...” of “... particular value in carrying out the national migratory bird management program...” and for the “... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans...”

#### **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.*

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### **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, Code of Federal Regulations, Parts 25-33  
Archaeological Resources Protection Act of 1979  
Native American Graves Protection and Repatriation Act of 1990

Compatibility determinations for each description listed were considered separately. Although for brevity, the preceding sections from "Uses" through "Other Applicable Laws, Regulations and Policies" and the succeeding sections, "Literature Cited," "Public Review," and the "Approval of Compatibility Determinations" are only written once within the plan, they are part of each descriptive use and become part of that compatibility determination if considered outside of the comprehensive conservation plan.

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**Description of Use:** Environmental Education and Interpretation

Environmental education and interpretation are those activities which seek to increase the public's knowledge and understanding of wildlife, national wildlife refuges, ecology, cultural and historical significance, and land management, as well as contribute to the conservation of natural resources. Environmental education/interpretation activities have been limited in previous years. With the implementation of this CCP, these programs will be increased with additional staff, volunteers and facilities to make them more accessible and available to the refuge visitors.

Some of the items included in the expanded environmental education and interpretation programs include: implementation of a Cultural Resource Management Plan to improve protection and appreciation of the refuge's historic and cultural resources; evaluation and where appropriate opening of additional areas to the public, considering both safety and biological factors; restoring and reopening the Observation Post (OP) at Flamenco Point for environmental research and/or education purposes; developing additional facilities to include trails, towers, boardwalks and blinds; developing new interpretive programs and interpretive materials; and developing and implementation of both on- and off-refuge environmental education programs. These activities will be facilitated by the development of a new refuge headquarters and visitor contact station. Environmental education and interpretation have been identified in the National Wildlife Refuge System Improvement Act as priority public use activities, provided they are appropriate and compatible with the purposes for which the refuge was established.

**Availability of Resources:** Annual refuge operation and maintenance funds currently support the refuge visitor service programs and activities. Implementation of the increased services and development of the additional facilities identified in the CCP will require additional staff to provide personal contact with visitors, develop materials, construct and maintain education and interpretation displays and facilities. In addition, funding will be required for the restoration of the OP site, the development of the headquarters/visitor contact station and development of trails, towers, boardwalks etc.

**Anticipated Impacts of the Use:** Construction of facilities, such as the headquarters/visitor contact facility, boardwalks, and observation platforms will alter localized portions of the natural environment on the refuge. Planning and proper location of facilities will ensure that wetlands, threatened or endangered species, or species of special concern are not negatively impacted. As appropriate, permits from municipal, commonwealth and federal regulatory agencies will be obtained prior to construction to ensure resource protection. During the conduct of environmental education and interpretative activities, low-level impacts to the resources in the immediate vicinity of the activities may occur. These impacts may include trampling of vegetation and temporary disturbance to wildlife species in the immediate area. Educational activities held off-refuge will not create any biological impacts on the resource.

**Determination (check one below):**

	Use is Not Compatible
X	Use is Compatible, with the Listed Stipulations

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**Stipulations Necessary to Ensure Compatibility:**

If future human impacts are determined through evaluation to be detrimental to important natural resources, actions will be taken to reduce or eliminate those impacts. Evaluations of sites and programs should be conducted annually to determine if objectives are being met and ensure that natural resources are not being adversely impacted. Major portions of the refuge will remain undeveloped, without public interpretive facilities. As use increases, wildlife disturbances are unavoidable, but through interpretive material (e.g., brochures, signs, and kiosk panels). The environmental education and interpretive program activities will avoid sensitive sites and sensitive wildlife populations. Program activities will be modified to avoid observed or potential impacts. Education activities will include a session on wildlife etiquette. Environmental education programs and activities will be held at or near established facilities where impacts may be minimized. Annual evaluations will be conducted to assess if objectives are being met and that the natural resources are not being adversely affected. The refuge will modify or eliminate any use that results in unacceptable impacts

**Justification:** Environmental education and interpretation represent two priority wildlife dependent recreational activities listed under the National Wildlife Refuge System Improvement Act. Environmental education and interpretation are used to encourage all citizens to act responsibly in protecting natural resources. They are tools the refuge can use to build understanding, appreciation, and support for the refuge and the National Wildlife Refuge System. Resources required to run the programs are minimal with cost built into the refuge operation and maintenance budget. Identified improvements will not be developed until adequate staff and budget are available to develop and operate them. As long as stipulations to ensure compatibility are followed, the programs should remain compatible with the purposes of the refuge. If the monitoring program identifies that unacceptable wildlife impacts are occurring, the refuge will modify the activity to minimize or eliminate the impacts.

**NEPA Compliance for Refuge Use Description:**

- Categorical Exclusion without Environmental Action Statement
- Categorical Exclusion and Environmental Action Statement
- Environmental Assessment and Finding of No Significant Impact
- Environmental Impact Statement and Record of Decision

**Mandatory 15-year Re-evaluation Date:**

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**Description of Use:** Wildlife Observation and Photography

Wildlife observation and photography are considered simultaneously in this compatibility determination. 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 photography. Commercial 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.

Wildlife observation and photography may occur during daylight hours throughout all open areas of the refuge.

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Approved forms of access for wildlife viewing and photography include motorized vehicles travelling on public roadways, hiking, and motorized and non-motorized boats. Access to certain areas is restricted to provide protection for migratory birds and because of hazards associated with unexploded ordnance and unstable terrain. Refuge brochures and maps provide the public with the locations of visitor facilities and information on open and closed areas. Informational displays and maps are located at refuge kiosk and visitor contact facilities.

**Availability of Resources:**

Operation and maintenance funds to support wildlife viewing and photography are taken from the refuge’s annual budget, which is adequate to sustain the program at the current level. Funding is not currently available to fully support all the planned wildlife observation and photography improvements identified in the CCP. To support the program and make improvements, the refuge in cooperation with other partners, will need to pursue additional funding opportunities to maintain access to areas open to the public; develop parking sites; construct a boardwalk trail and observation deck in the mangrove area; repair or replace existing observation towers and blinds; paint, repair, and replace signs; and develop and print updated brochures. Staff needed to assist with the administration of these activities is the refuge manager, a maintenance worker (current staff) and a portion of the time associated with additional staff proposed in the CCP; maintenance mechanic, refuge ranger (LE), biologist, and biological technician.

**Anticipated Impacts of Uses:**

Impacts associated with wildlife observation and photography are generally associated with disturbance of the natural activities of the wildlife. In general, activities that occur outside of vehicles tend to increase the disturbance potential for most wildlife species (Klein 1993, Gabrielson and Smith 1995, Burger 1981, Pease et al 2005). Wildlife photographers tend to cause greater disturbance impacts than vehicle passengers or walkers because they are more likely to approach wildlife on foot, attempt to get as close as possible and remain for extended periods of time (Klein 1993, Morton 1995, Dobb 1998).

Considering the level of use and variety of activities occurring at the refuge, appropriate solutions to minimize impacts need to be developed and monitored. During the peak tourism seasons, summer and winter, visitation to the refuge is expected to increase along with a concurrent increase in the disturbance of wildlife in the vicinity of accessible sites. To ensure disturbance is limited to an acceptable level, techniques to limit disturbance will be evaluated, implemented, and monitored. Current uses do not appear to be at a level that would cause a measurable shift in wildlife uses, but increases related to expanded population and growth of visitor opportunities could result in changes in wildlife habitats and availability of food and shelter.

**Determination (check one below):**

	Use is Not Compatible
<b>X</b>	Use is Compatible, with the Listed Stipulations

**Stipulations Necessary to Ensure Compatibility:**

By design wildlife observation and photography should have minimal wildlife and habitat impacts. However, as use increases, wildlife impacts are more likely to occur. Evaluation of the sites and programs will be conducted annually to determine if objectives are being met, if habitat impacts are

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minimized, and if wildlife populations are not being adversely affected. If evidence of habitat loss or declining wildlife use begins to appear, it will be necessary to change the activity or the program, relocate the activity or program, or eliminate the program.

Methodologies to ensure minimization of impacts include the following:

- Establishing buffer zones that minimize disturbance around sensitive areas and establishing no-entry zones.
- Providing or protecting existing vegetation to effectively conceal visitors and provides cover for wildlife to help minimize impacts in high use areas.
- Providing observation/photography blinds to reduce wildlife disturbance.
- Re-routing, modifying, or eliminating activities which have demonstrated direct wildlife impacts.
- Making visitors aware that their actions can have negative impacts on wildlife through an effective education program.
- Establishing well-marked trails to contain disturbance impacts to limited areas.

Individuals engaged in wildlife observation or photography will continue to be subject to all general and special refuge regulations, as well as, the state regulations for litter, behavior, and criminal activity.

**Justification:** Wildlife observation and photography are priority public uses of the National Wildlife Refuge System. Providing quality, appropriate, and compatible opportunities for these activities in areas where members of the public are generally allowed help fulfill provisions of the National Wildlife Refuge System Improvement Act. Wildlife Observation and photography provide excellent forums for promoting increased awareness, understanding, and support of refuge resources and programs and of the Service. The stipulations outlined above should minimize potential impacts relative to wildlife/human interactions. At the current level of visitation, these wildlife-dependent uses do not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the refuge.

**NEPA Compliance for Refuge Use Description:**

- Categorical Exclusion without Environmental Action Statement
- Categorical Exclusion and Environmental Action Statement
- Environmental Assessment and Finding of No Significant Impact
- Environmental Impact Statement and Record of Decision

**Mandatory 15-Year Re-evaluation Date:**

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**Description of Use:** Research, Studies, and Scientific Collection

Scientific research or studies conducted by or for the refuge to aid the administration of the refuge, advance the mission of the National Wildlife Refuge System, protect the health, biological integrity and diversity of the Culebra NWR, or the health and safety of the public visiting the refuge do not require a "Compatibility Determination." Other research activities and scientific studies are periodically conducted by local, state, or federal agencies; schools, and universities; and non-profit organizations.

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The assistance provide by the refuge may range from minimal to substantial depending on the benefits to the Service. The activities include; data gathering for hypothesis testing, modeling, monitoring, and surveys. This use also includes permitting the collection of animals, fish, plants, soils, and water for monitoring and research purposes. The research and collection activities will vary in scope and duration to satisfy the requirements of the research project or survey. Projects may involve everything from a limited one time sampling or survey to establishment of long-term study plots that are routinely visited.

During the course of these scientific investigations, all plants and animals will be captured, handled, released, collected, and curated following the best scientific practices and standards established by respected scientific societies, as well as the Service's policies and guidelines for scientific collecting and research.

Proposals for research and studies on the refuge that do not directly support the refuge or Service mission will be evaluated and if deemed beneficial, a special use permit will be issued as an agreement between the researcher and the refuge. The special use permit will outline the guidelines that the researcher must follow while conducting research on the refuge.

**Availability of Resources:**

The current and proposed refuge staff is adequate to administer permits and provide oversight for the level of request to conduct scientific studies that are currently received. Any request for additional support such as lodging, equipment, transportation or facility use will be evaluated based on the potential for benefit to the refuge management program and will be addressed in any permit issued.

**Anticipated Impacts of the Use:**

Research activities, like any other human intrusion, can disturb wildlife and their habitats. For example, the presence of researchers can cause birds to flush from resting, feeding or nesting sites. Efforts to capture animals can cause disturbance, injury, or death to groups of wildlife or to individuals. Repeated sampling activities can cause compaction of soils and the trampling of vegetation or the. Because of the limited numbers of researchers, the temporary nature of any disturbance, and the small number of plants and/or animals involved, impacts should not be significant.

Each proposal will be reviewed for appropriateness and consistency with the Service's policies for conducting research and this compatibility determination prior to issuance of a special use permit and annually thereafter for multi-year projects. There should be no significant adverse impacts from scientific research because factors such as project purpose, data collection methods, number of researchers, transportation, project timing and duration, and location of study sites will determine the extent of effects on the refuge. The knowledge gained from the research activities should provide information towards improving management techniques for trust resource species. .

There should not be any long-term negative impacts of approved research activities and long-term benefits associated with species' population trends and improved management techniques should outweigh any negative impacts which may occur.

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**Determination (check one below):**

	Use is Not Compatible
<b>X</b>	Use is Compatible, with the Listed Stipulations

**Stipulations Necessary to Ensure Compatibility:**

All research conducted on the refuge must not conflict with the purposes of the refuge and the mission of the National Wildlife Refuge System. Each request for use of the refuge for research will be examined on its individual merits. All research will adhere to established refuge policy on research and policy on collecting specimens (Directors Order Number 109). 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 the refuge updating 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 conflict with 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.

The following stipulations apply to special use permits issued for scientific research. Monitoring authorized research activities by the refuge manager or biologist will ensure compliance with the permit's general and special conditions.

- The permittee is responsible for ensuring that all employees, party members, and any other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of the permit.
- The permit may be cancelled or revised at any time by the Refuge Manager in case of emergency, unsatisfactory compliance, or determination of incompatibility with the purpose of the refuge.
- In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the removal or disturbance of archaeological or historic artifacts is prohibited. The excavation, disturbance, collection or purchase of historical, ethnological, or archaeological specimens or artifacts is prohibited.
- All waste materials and markers must be removed from the refuge upon the permittee's departure.
- Construction of structures is prohibited unless prior approval is obtained.

**Justification:**

Research activities provide important information that contributes to the general knowledge of the refuge and to the natural resources supported by the refuge. Even when not directly supporting management activities, 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 further the purposes of the refuge and the mission of the National Wildlife Refuge System. Research projects will be designed to minimize impacts and disturbance.

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**NEPA Compliance for Refuge Use Description:** *Place an X in appropriate space.*

- Categorical Exclusion without Environmental Action Statement
- Categorical Exclusion and Environmental Action Statement
- Environmental Assessment and Finding of No Significant Impact
- Environmental Impact Statement and Record of Decision

**Mandatory 10-year Re-evaluation Date:**

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**Description of Use:** Recreational Beach uses

These uses include picnicking and sunbathing and are often associated with fishing, boating, swimming, snorkeling and scuba diving in waters adjacent to the refuge. The primary areas of the refuge used for these activities are the sandy beaches of Culebrita Island, Cayo Luis Peña and Playa Zoni on Culebra. While the beach areas within the “Zona Maritima Terrestre” are under the jurisdiction of the Commonwealth of Puerto Rico, the boundary between that area and the refuge lands is not clearly defined. Management of the beach areas on and adjacent to the refuge lands is traditionally managed cooperatively by the Service and Commonwealth.

**Availability of Resources:**

The primary resources necessary to address the recreational beach uses on the Culebra NWR are law enforcement personnel and boats to provide access to the islands. These resources are limited under the current status, however, the CCP calls for restoring the law enforcement position assigned to Culebra and providing adequate equipment and maintenance to support this position. Personnel from the Puerto Rico DNER, municipality, and police periodically assist with management of recreational beach uses during periods of high visitation. Although existing resources are not optimum, funding, staffing and equipment are available to ensure minimal impact for recreational uses at the current levels. Proposals in the CCP as reflected in the stipulations section of this determination should help reduce problems and lessen workloads.

**Anticipated Impacts of the Use:**

Beach-related uses of the Culebra NWR can have a direct physical impact to islands and shore areas from disturbance of wildlife, trampling of vegetation, digging in sand where sea turtle nest may be located, building illegal fires, and littering. Since the preferred areas for use are the dynamic shorelines with sandy beaches, most impacts are temporary and minor. The most significant potential impacts to these sites result from failure of the visitors to comply with the refuge regulations. To ensure the impacts of this use are minimal and compliance with regulations, visitor contact, distribution of resource information, and enforcement of regulations are necessary.

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**Determination (check one below):**

	Use is Not Compatible
<b>X</b>	Use is Compatible, with the Listed Stipulations

**Stipulations Necessary to Ensure Compatibility:**

With assistance from the Puerto Rico DNER and local law enforcement personnel the refuge will continue to enforce general public use regulations to protect habitat and minimize disturbance to other refuge users. These regulations include:

1. The Refuge is open for daylight use only
2. Firearms are prohibited
3. All fires are prohibited
4. Horses and horseback riding are prohibited
5. Camping is prohibited
6. All off road vehicles are prohibited.
7. Hunting and possessing any animals (living or dead) is prohibited.
8. Littering on refuge lands is prohibited
9. Pets must be on a leash, under the owner's control at all times
10. Where posted, unauthorized entry is prohibited.
11. Searching for or removing any object of antiquity or artifacts is prohibited.
12. Removing plants, trees and wildlife for *any* use is prohibited.
13. No domestic or wild animals may be brought or released onto refuge lands.

In addition to these regulations, the refuge manager may close or restrict use on any area to minimize or eliminate identified problems or safeguard wildlife or habitat values.

**Justification:**

Permitting the non-wildlife-dependent utilization of the refuge beaches provides visitors with an opportunity for a wildland experience in an area with unique natural and scenic resources. The exposure of visitors who were not previously aware of the Service, the refuge, and their missions to these resources will help generate support for maintenance and protection of the Culebra NWR lands. Education of visitors about the values of the refuge and the importance of compliance with the refuge regulations coupled with enforcement efforts will ensure minimal impacts to resources.

**NEPA Compliance for Refuge Use Description:** *Place an X in appropriate space.*

- Categorical Exclusion without Environmental Action Statement
- Categorical Exclusion and Environmental Action Statement
- Environmental Assessment and Finding of No Significant Impact
- Environmental Impact Statement and Record of Decision

**Mandatory 10-year Re-evaluation Date:**

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**Description of Use:** Water taxi service

Culebra Island is a major tourist destination for visitors from the main island of Puerto Rico, the United States, and internationally. Commercial water taxi service has traditionally been utilized by visitors to the island to gain access to the surrounding waters and offshore cays including portions of the refuge. Water taxi service is provided to designated portions of the refuge by individual boat operators who are certified and licensed by the Commonwealth of Puerto Rico. The providers of this service are generally operating in the waters of the Commonwealth of Puerto Rico; however, since they pick-up and discharge passengers from the refuge, they are issued special use permits that clarify the conditions for operation and regulations regarding use of the refuge.

**Availability of Resources:**

Resources to administer this use are primarily personnel to develop and enforce special use permit conditions. At the current level of activity the existing refuge staff is adequate to perform these functions.

**Anticipated Impacts of the Use:**

Water taxi service provides access for individuals who would not otherwise visit the refuge. The majority of the impacts associated with the water taxi service would be slight incremental increases in the beach-related uses of Culebra NWR. The impacts identified for these uses include; disturbance of wildlife, trampling of vegetation, digging in sand where sea turtle nest may be located, building illegal fires, and littering. Since the preferred areas for use are the dynamic shorelines with sandy beaches, most impacts are temporary and minor. The most significant potential impacts to these sites result from failure of the visitors to comply with the refuge regulations. To ensure the impacts of this use are minimal and compliance with regulations, visitor contact, distribution of resource information, and enforcement of regulations are necessary.

**Determination (check one below):**

	Use is Not Compatible
<b>X</b>	Use is Compatible, with the Listed Stipulations

**Stipulations Necessary to Ensure Compatibility:**

1. No intrusive work (i.e., digging, poking, installing, planting, dragging) on the ground is permitted.
2. Cutting, removing, tying, or any other activity which could cause damage the vegetation is not permitted. Damage to the vegetation would also cause damage to sea turtle nesting habitat present in Luis Pena and Culebrita Cays.
3. Anchors will not be placed above the high tide line.
4. Clients of the water taxi service will be instructed to not feed fish or seabirds.
5. This permit can be voided at any time depending on the restrictions that may be required as part of work carried out by contractors under the Corps of Engineers as part of the clean-up of unexploded ordnance in Luis Pena Cay and surrounding waters.

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6. All other refuge regulations are applicable.
  7. The permittee must comply with other federal and commonwealth permits and regulations. This permit is not valid if the permittee is not in compliance with other required federal and commonwealth permits.
  8. All seagrass beds are designated critical habitat for sea turtles and coral reefs surrounding the Culebra archipelago are critical habitat for two coral species listed under the Endangered Species Act. To protect coral reefs, seagrass beds, and other sensitive and protected marine resources, vessel operators need to exercise extreme caution and anchor only on the sandy bottom offshore.
  9. To ensure safety, all operators and clients must be aware that unexploded ordnance was left from past military practices and some ordinance and scrap could be found on the Cays and in the water. If any suspect artifact is found, vessel operators and clients should leave the item in place and provide a description of the item and its location to a refuge official or the Culebra Police.

**Justification:**

Conditions imposed in the special use permits of water taxi operators ensure that these activities can occur without adverse effects to refuge resources or other visitors.

**NEPA Compliance for Refuge Use Description:** *Place an X in appropriate space.*

- Categorical Exclusion without Environmental Action Statement
- Categorical Exclusion and Environmental Action Statement
- Environmental Assessment and Finding of No Significant Impact
- Environmental Impact Statement and Record of Decision

**Mandatory 10-year Re-evaluation Date:**

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**Description of Use: Hunting**

Hunting in Puerto Rico generally focuses on doves, pigeons, waterfowl, and, in certain areas, goats and pigs. Parts of the Culebra NWR provide habitat for doves, pigeons, waterfowl, goats, and white-tailed deer. The major units of the refuge with potential for hunting include: Mt. Resaca (approx. 485 acres); Cayo Luis Peña (333 acres); Culebrita (260 acres); and, Flamenco Peninsula (approx. 164 acres).

**Availability of Resources:**

The primary resource necessary to address hunting on the Culebra NWR would be law enforcement personnel. Law enforcement personnel are very limited under the current status, however, the CCP calls for restoring a law enforcement position assigned to the Culebra NWR and providing adequate equipment and maintenance to support this position. Personnel from the Puerto Rico DNER Ranger

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Corps and Commonwealth Police are potentially available to assist with law enforcement activities. Existing resources are not adequate to effectively manage a hunting program.

**Anticipated Impacts of the Use:**

Flamenco Peninsula is the location of major sea bird nesting and is contaminated by unexploded ordnance from former military training activities. Mt. Resaca is heavily vegetated, difficult to access and hazardous to walk through because of uneven boulder strewn terrain. Because of the relatively small size of the Culebra NWR units and the proximity of potential hunting areas to sites utilized for other activities, hunting has a significant potential to impact other uses such as wildlife observation, wildlife photography, environmental education, or interpretative activities.

**Determination (check one below):**

<input checked="" type="checkbox"/>	Use is Not Compatible
<input type="checkbox"/>	Use is Compatible, with the Listed Stipulations

**Stipulations Necessary to Ensure Compatibility:** Not applicable.

**Justification:**

Although hunting is an appropriate use of national wildlife refuges, this evaluation has determined that it is not compatible with the ongoing and proposed activities for the Culebra NWR for the following reasons:

- Significant portions of the refuge are unsafe to use because of the continued presence of unexploded ordnance;
- Mt. Resaca terrain is hazardous to traverse, provides habitat for the endangered plant, *Peperomia wheeleri*, and is adjacent to sea turtle nesting beaches;
- Cayos Luis Peña and Culebrita are relatively small and subject to high visitation during both winter and summer months;
- Hunting within areas containing unexploded ordnance, hazardous terrain, or near other recreational uses could be hazardous to the hunters and other users.

**NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.***

- Categorical Exclusion without Environmental Action Statement
- Categorical Exclusion and Environmental Action Statement
- Environmental Assessment and Finding of No Significant Impact
- Environmental Impact Statement and Record of Decision

**Mandatory 15-year Re-evaluation Date:**

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**PUBLIC REVIEW AND COMMENT:**

These draft compatibility determinations will be available for review and comment during the public review period established for the Draft Comprehensive Conservation Plan and Environmental Assessment for Culebra National Wildlife Refuge. All comments will be addressed in the final determination.

**APPROVAL OF COMPATIBILITY DETERMINATIONS**

The signature of approval is for all compatibility determinations considered within the Comprehensive Conservation Plan for Culebra National Wildlife Refuge. 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: \_\_\_\_\_  
(Signature/Date)

Regional Compatibility  
Coordinator: \_\_\_\_\_  
(Signature/Date)

Refuge Supervisor: \_\_\_\_\_  
(Signature/Date)

Regional Chief, National  
Wildlife Refuge System,  
Southeast Region: \_\_\_\_\_  
(Signature/Date)

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# Appendix G. Intra-Service Section 7 Biological Evaluation

## INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

**Originating Person: Susan Silander**  
**Telephone Number: 787-851-7258**  
**E-Mail: susan\_silander@fws.gov**  
**Date: 1/28/2011**

**PROJECT NAME:** Culebra National Wildlife Refuge Comprehensive Conservation Plan

- 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
  - Refuges/Wildlife

**II. State/Agency:** U.S. Fish and Wildlife Service

**III. Station Name:** Culebra National Wildlife Refuge

**IV. Description of Proposed Action**

The proposed action would result in the implementation of the Comprehensive Conservation Plan (CCP) for the Culebra National Wildlife Refuge, composed of approximately 1,600 acres of lands within the Culebra archipelago, Puerto Rico. Approval and subsequent implementation of the CCP will direct management actions on the Refuge for the next 15 years.

V. Pertinent Species and Habitat:

A. Include species/habitat occurrence map:

B. Complete the following table:

SPECIES/CRITICAL HABITAT	STATUS <sup>1</sup>
Roseate Tern ( <i>Sterna dougallii dougallii</i> )	T
Culebra Giant Anole ( <i>Anolis roosevelti</i> )	E
Green Sea Turtle ( <i>Chelonia mydas</i> )	T
Hawksbill Sea Turtle ( <i>Eretmochelys imbricata</i> )	E
Leatherback Sea Turtle ( <i>Dermochelys coriacea</i> )	E
VI Boa ( <i>Epicrates monensis granti</i> )	E
<i>Leptocereus grantianus</i> (an endemic cactus)	E
<i>Peperomia wheeleri</i> (an endemic herbaceous plant).	E

<sup>1</sup>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):

A. Ecoregion Number and Name: Ecoregion #35 - Caribbean Ecosystem

B. County and State: Municipality of Culebra, Puerto Rico

C. Section, township, and range (or latitude and longitude: 18.31°N 65.3°W

D. Distance (miles) and direction to nearest town: N/A

**E. Species/habitat occurrence:**

Roseate tern- Habitat and species both occur

Culebra Giant Anole – Habitat occurs, species has not been seen since 1935 and is believed by some to be extinct.

Green sea turtle – Habitat and species both occur.

Hawksbill sea turtle - Habitat and species both occur.

Leatherback sea turtle – Habitat and species both occur.

VI boa – Habitat and species both occur.

*Leptocereus grantianus* – Habitat occurs and species has been introduced to refuge lands.

*Peperomia wheeleri* – Habitat and species both occur.

**VII. Determination of Effects:**

**A. Explanation of effects of the action on species and critical habitats in item V. B:**

<b>SPECIES/ CRITICAL HABITAT</b>	<b>IMPACTS TO SPECIES/CRITICAL HABITAT</b>
<b>Roseate Tern</b>	No negative impacts foreseen
<b>Culebra Giant Anole</b>	No negative impacts foreseen
<b>Green Sea Turtle</b>	No negative impacts foreseen
<b>Hawksbill Sea Turtle</b>	No negative impacts foreseen
<b>Leatherback Sea Turtle</b>	No negative impacts foreseen
<b>VI Boa</b>	No negative impacts foreseen
<b><i>Leptocereus grantianus</i></b>	No negative impacts foreseen
<b><i>Peperomia wheeleri</i></b>	No negative impacts foreseen

**B. Explanation of actions to be implemented to reduce adverse effects:**

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/MINIMIZE IMPACTS
<b>Roseate Tern</b>	No negative impacts are anticipated on refuge lands; surveys, monitoring and habitat improvements will be conducted.
<b>Culebra Giant Anole</b>	Designated habitat will continue to be protected and surveys will be conducted prior to initiation of any activities that could affect the species.
<b>Green Sea Turtle</b>	Monitoring, education and cooperation with partners will continue and enforcement of protection regulations will increase.
<b>Hawksbill Sea Turtle</b>	Monitoring, education and cooperation with partners will continue and enforcement of protection regulations will increase.
<b>Leatherback Sea Turtle</b>	Monitoring, education and cooperation with partners will continue and enforcement of protection regulations will increase.
<b>VI Boa</b>	Surveys and monitoring of existing populations will be conducted. Surveys for the species will be conducted prior to any ground disturbing activities.
<b><i>Leptocereus grantianus</i></b>	Plants on the refuge will be protected and, where possible, new populations in protected areas will be established to increase survival potential.
<b><i>Peperomia wheeleri</i></b>	Current population on the refuge will be protected and efforts to expand this population will be initiated.

**VIII. Effect Determination and Response Requested:**

SPECIES/CRITICAL HABITAT	DETERMINATION <sup>1</sup>			REQUESTED
	NE	NA	AA	
Roseate Tern		X		Concurrence
Culebra Giant Anole		X		Concurrence
Green Sea Turtle		X		Concurrence
Hawksbill Sea Turtle		X		Concurrence
Leatherback Sea Turtle		X		Concurrence
VI Boa		X		Concurrence
<i>Leptocereus grantianus</i>		X		Concurrence
<i>Peperomia wheeleri</i>		X		Concurrence

<sup>1</sup>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".

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**Signature** (originating station)

**Date**

**Title**

**IX. Reviewing Ecological Services Office Evaluation:**

**A. Concurrence** \_\_\_\_\_ **Nonconcurrence** \_\_\_\_\_

**B. Formal consultation required** \_\_\_\_\_

**C. Conference required** \_\_\_\_\_

**D. Informal conference required** \_\_\_\_\_

**E. Remarks (attach additional pages as needed):**

**Signature**

**Date**

**Title**

**Office**

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## *Appendix H. 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 Culebra National Wildlife Refuge were reviewed for their suitability in meeting the criteria for wilderness, as defined by the Wilderness Act of 1964.

No lands in the refuge were found to meet these criteria. Therefore, the suitability of refuge lands for wilderness designation is not further analyzed in this plan.



## Appendix I. Refuge Biota

### Birds / Aves

Family	English Name	Spanish Name	Scientific name
<b>PODICIPEDIDAE</b>	Least Grebe	Tigua	<i>Tachybaptus dominicus</i>
	Pied-billed Grebe	Zaramago	<i>Podylymbus podiceps</i>
<b>PROCELLARIIDAE</b>	Audubon's Shearwater	Pampero	<i>Puffinus lherminieri</i>
	Greater Shearwater	n/a	<i>Puffinus gravis</i>
	Herald Petrel	n/a	<i>Pterodroma arminjoniana</i>
<b>PHAETHONTIDAE</b>	Red-billed tropicbird	Rabijunco piquicolorado	<i>Phaethon aethereus</i>
	White-tailed tropicbird	Rabijunco coliblanco	<i>Phaethon lepturus</i>
<b>SULIDAE</b>	Brown Booby	Boba parda	<i>Sula leucogaster</i>
	Masked Booby	Boba enmascarada	<i>Sula dactylatra</i>
	Red-footed Booby	Boba patirroja	<i>Sula sula</i>
<b>PELECANIDAE</b>	Brown Pelican	Pelícano pardo	<i>Pelecanus occidentales</i>
<b>PHALACROCORACIDAE</b>	Double-crested Cormorant	Cormorán crestado	<i>Phalacrocorax auritus</i>
<b>FREGATIDAE</b>	Magnificent Frigatebird	Tijereta	<i>Fregata magnificens</i>
<b>ARDEIDAE</b>	Great Blue Heron	Garzón cenizo	<i>Ardea herodias</i>
	Green-backed Heron	Martinete	<i>Butorides striatus</i>
	Little Blue Heron	Garza Azul	<i>Egretta caerulea</i>

Family	English Name	Spanish Name	Scientific name
	Cattle Egret	Garza ganadera	<i>Bubulcus ibis</i>
	Great Egret	Garza real	<i>Casmerodius albus</i>
	Snowy Egret	Garza blanca	<i>Egretta thula</i>
	Tricolored Heron	Garza pechiblanca	<i>Egretta tricolor</i>
	Black-crowned Night Heron	Yaboa real	<i>Nycticorax nycticorax</i>
	Yellow-crowned Heron	Yaboa común	<i>Nycticorax violacea</i>
<b>PHOENICOPTERIDAE</b>	Greater Flamingo	Flamenco	<i>Phoenicopterus ruber</i>
<b>ANATIDAE</b>	West Indian Whistling Duck	Chiriría caribeña	<i>Dendrocygna arborea</i>
	White-cheeked Pintail	Pato quijada colorada	<i>Anas bahamensis</i>
	Blue-winged Teal	Pato zarcel	<i>Anas discors</i>
	Northern Shoveler	Pato cuchareta	<i>Anas clypeata</i>
	Lesser Scaup	Pato pechiblanco menor	<i>Aythya affinis</i>
	Ruddy Duck	Pato chorizo	<i>Oxyura jamaicensis</i>
<b>ACCIPITRIDAE</b>	Red tailed Hawk	Guaraguo colirrojo	<i>Buteo jamaicensis</i>
	Osprey	Aguila pescadora	<i>Pandion haliaetus</i>
<b>FALCONIDAE</b>	Peregrine Falcon	Falcón peregrino	<i>Falco peregrinus</i>
	American Kestrel	Falcón común	<i>Falco sparverius</i>
	Merlin	Falcón migratorio	<i>Falco columbarius</i>

Family	English Name	Spanish Name	Scientific name
<b>RALLIDAE</b>	Clapper Rail	Pollo de mangle	<i>Rallus longirostris</i>
	Yellow-breasted Crake	Gallito amarillo	<i>Porzana flaviventer</i>
	Black Rail	Gallito negro	<i>Laterallus jamaicensis</i>
	Caribbean Coot	Gallinazo caribeño	<i>Fulica caribaea</i>
	Common Moorhen	Garalleta común	<i>Gallinula chloropus</i>
	American Coot	Gallinazo americano	<i>Fulica americana</i>
<b>CHARADRIIDAE</b>	Semipalmated Plover	Playero acollarado	<i>Charadrius semipalmatus</i>
	Wilson's Plover	Playero marítimo	<i>Charadrius wilsonia</i>
	Killdeer	Playero sabanero	<i>Charadrius vociferus</i>
	Black-bellied Plover	Playero cabezón	<i>Pluvialis squatarola</i>
	Snowy Plover	Playero blanco	<i>Charadrius alexandrinus</i>
<b>HAEMATOPODIDAE</b>	American Oystercatcher	Ostrero	<i>Haematopus palliatus</i>
<b>RECURVIROSTRIDAE</b>	Black-necked Stilt	Viuda	<i>Himantopus mexicanus</i>
<b>SCOLOPACIDAE</b>	Ruddy Turnstone	Playero turco	<i>Arenaria interpres</i>
	Common Snipe	Becasina	<i>Gallinago gallinago</i>
	Spotted Sandpiper	Playero coleador	<i>Actitis macularia</i>
	Greater Yellowlegs	Playero guineilla mayor	<i>Tringa melanoleuca</i>
	Lesser Yellowlegs	Playero guineilla	<i>Tringa flavipes</i>

Family	English Name	Spanish Name	Scientific name
		menor	
	Willet	Playero aliblanco	<i>Catoptrophorus semipalmatus</i>
	White-rumped Sandpiper	Playero rabadilla blanca	<i>Calidris fuscicollis</i>
	Pectoral Sandpiper	Playero manchado	<i>Calidris melanotos</i>
	Semipalmated Sandpiper	Playero gracioso	<i>Calidris pusilla</i>
	Western Sandpiper	Playerito occidental	<i>Calidris mauri</i>
	Short-billed Dowitcher	Agujeta piquicorta	<i>Limnodromus griseus</i>
	Stilt Sandpiper	Playero patilargo	<i>Calidris himantopus</i>
<b>STERNIDAE</b>	Black Noddy	n/a	Anous minutus
	Sandwich Tern	Gaviota piquiaguda	Thalasseus sandvicensis
	Common Tern	Gaviota común	Sterna hirundo
	Arctic Tern	Gaviota ártica	Sterna paradisaea
	Least Tern	Gaviota pequeña	Sternula antillarum
	Black Tern	Gaviota ceniza	Chlidonias niger
	Bridled Tern	Gaviota monja	<i>Onychoprion anaethetus</i>
	Sooty Tern	Sterna fuscata	<i>Onychoprion fuscata</i>
	Royal Tern	Gaviota real	<i>Thalasseus maximus</i>
	Brown Noddy	Cervera	<i>Anous stolidus</i>

Family	English Name	Spanish Name	Scientific name
	Roseate tern	Palometa	<i>Sterna dougallii</i>
<b>LARIDAE</b>	Laughing Gull	Gaviota gallega	<i>Larus atricilla</i>
<b>STERCORARIIDAE</b>	Parasitic Skua	n/a	<i>Stercorarius parasiticus</i>
<b>COLUMBIDAE</b>	White-crowned Pigeon	Paloma cabeciblanca	<i>Patagioenas leucocephala</i>
	Scaly-naped Pigeon	Paloma turca	<i>Patagioenas squamosa</i>
	Mourning Dove	Tórtola rabilarga	<i>Zenaida macroura</i>
	Zenaida Dove	Tórtola cardosantera	<i>Zenaida aurita</i>
	White-winged Dove	Tórtola aliblanca	<i>Zenaida asiatica</i>
	Common Ground-Dove	Rolita	<i>Columbina passerina</i>
	Bridled quail-dove	Perdiz de Martinica	<i>Geotrygon mystacea</i>
<b>CUCULIDAE</b>	Mangrove Cuckoo	Pájaro bobo menor	<i>Coccyzus minor</i>
	Smooth-billed Ani	Judío	<i>Crotophaga ani</i>
<b>CAPRIMULGIDAE</b>	Nighthawk	Querequequé	<i>Chordeiles sp.</i>
<b>TROCHILIDAE</b>	Antillean Mango	Zumbador dorado	<i>Anthracothorax dominicus</i>
	Green Mango	Zumbador verde	<i>Anthracothorax viridis</i>
	Green-throated Carib	Zumbador pechiazul	<i>Eulampis holosericeus</i>
	Antillean Crested Hummingbird	Zumbadorcito crestado	<i>Orthorhynchus cristatus</i>
<b>TODIDAE</b>	Puerto Rican Tody	San pedrito	<i>Todus mexicanus</i>

Family	English Name	Spanish Name	Scientific name
<b>ALCEDINIDAE</b>	Belted Kingfisher	Martín pescador	<i>Ceryle alcyon</i>
<b>PICIDAE</b>	Puerto Rican Woodpecker	Carpintero de Puerto Rico	<i>Melanerpes portoricensis</i>
<b>TYRANNIDAE</b>	Gray Kingbird	Pitirre	<i>Tyrannus dominicensis</i>
	Puerto Rican Flycatcher	Juí de Puerto Rico	<i>Myarchus antillarum</i>
	Caribbean Elaenia	Juí blanco	<i>Elaenia martinica</i>
<b>HIRUNDINIDAE</b>	Caribbean Martin	Golondrina de iglesias	<i>Progne dominicensis</i>
	Barn Swallow	Golondrina de horquilla	<i>Hirundo rustica</i>
	Cave Swallow	Golondrina de cuevas	<i>Hirundo fulva</i>
<b>MIMIDAE</b>	Northern Mockingbird	Ruiseñor	<i>Mimus polyglottos</i>
	Pearly-eyed Thrasher	Zorzal pardo	<i>Margarops fuscatus</i>
<b>VIREONIDAE</b>	Black-whiskered Vireo	Bien-te-veo	<i>Vireo altiloquus</i>
<b>EMBERIZIDAE</b>	Black-throated blue Warbler	Reinita azul	<i>Dendroica caerulescens</i>
	Yellow-rumped Warbler	Reinita coronada	<i>Dendroica coronata</i>
	Ovenbird	Pizpita dorada	<i>Seiurus aurocapillus</i>
	Prairie Warbler	Reinita galana	<i>Dendroica discolor</i>
	Louisiana Waterthrush	Pizpita de río	<i>Seiurus motacilla</i>
	Northern Waterthrush	Pizpita de mangle	<i>Seiurus noveboracensis</i>

Family	English Name	Spanish Name	Scientific name
	American Redstart	Candelita	<i>Setophaga ruticilla</i>
	Bananaquit	Reinita común	<i>Coereba flaveola</i>
	Yellow-faced Grassquit	Gorrión barba amarilla	<i>Tiaris olivacea</i>
	Black faced Grassquit	Gorrión negro	<i>Tiaris bicolor</i>
	Yellow Warbler	Canario de mangle	<i>Dendroica petechia</i>
	Troupial	Turpial	<i>Icterus icterus</i>
	Bobolink	Chambergo	<i>Dolichonyx oryzivorous</i>
<b>ICTERIDAE</b>	Greater Antillean Grackle	Chango	<i>Quiscalus niger</i>
	Shiny Cowbird	Tordo lustroso	<i>Molothrus bonariensis</i>
<b>ESTRILDIDAE</b>	Bronze Mannikin	Diablito	<i>Lonchura cucullata</i>

Reptiles and Amphibians/Anfibios y Reptiles

English Name	Spanish Name	Scientific Name
<b>Crested anole</b>	<i>Lagartijo común</i>	<i>Anolis cristatellus</i>
<b>Garden Lizard or Snake Anole</b>	<i>Lagartijo jardinero</i>	<i>Anolis pulchellus</i>
<b>Barred or Banded Anole</b>	<i>Lagartijo manchado</i>	<i>Anolis stratulus</i>
<b>Culebra Island Giant Anole</b>		<i>Anolis roosevelti</i> *
<b>Big Scale Dwarf Gecko</b>		<i>Sphaerodactylus macrolepis macrolepis</i>
<b>Dwarf Gecko</b>		<i>Sphaerodactylus macrolepis</i>
<b>Dwarf Gecko</b>		<i>Sphaerodactylus nicholsi</i>
		<i>Sphaerodactylus klauberi</i> **
		<i>Mabuya mabuya sloani</i>
		<i>Hemidactylus brooki haitianus</i>
<b>Tropical House Gecko</b>		<i>Hemidactylus mabouia</i>
<b>Greater Puerto Rican Ameiva</b>	<i>Siguana</i>	<i>Ameiva exsul</i>
<b>Green Iguana</b>	<i>Gallina de Palo</i>	<i>Iguana iguana</i>
<b>Common Coquí</b>	<i>Coquí Común</i>	<i>Eleutherodactylus coqui</i>
<b>Antillean Coquí</b>		<i>Eleutherodactylus antillensis</i>
<b>Virgin Islands Tree Boa</b>		<i>Epicrates monensis granti</i>
<b>Cane toad</b>		<i>Bufo marinus</i>
<b>White-lipped frog</b>		<i>Leptodactylus albilabris</i>
<b>Puerto Rican Racer</b>	<i>Culebra Corredora</i>	<i>Alsophis portoricensis richardi</i>
		<i>Borikenophis ricardi</i>
<b>Puerto Rican Garden Snake</b>		<i>Arrhyton exiguum</i>
<b>Common Worm Snake or Richard's Blind Snake</b>	<i>Víbora Común</i>	<i>Typhlops richardi</i>
<b>Leatherback Sea Turtle</b>	<i>Tinglar</i>	<i>Dermochelys coriacea coriacea</i>
<b>Green Sea Turtle</b>	<i>Peje Blanco</i>	<i>Chelonia mydas mydas</i>
<b>Atlantic Hawksbill Turtle</b>	<i>Carey</i>	<i>Eretmochelys imbricata imbricata</i>

\*Possibly extinct . \*\*Reported as possible by Alejandro Rios

# Appendix J. Designated Critical Habitat for Listed Species, Culebra, Puerto Rico

Culebra Island Giant Anole (*Anolis roosevelti*)

Federal Register / Vol. 42, No. 184 / Thursday, September 22, 1977 (47840-47845)

US Fish and Wildlife Service

Note: No text. Map follows:

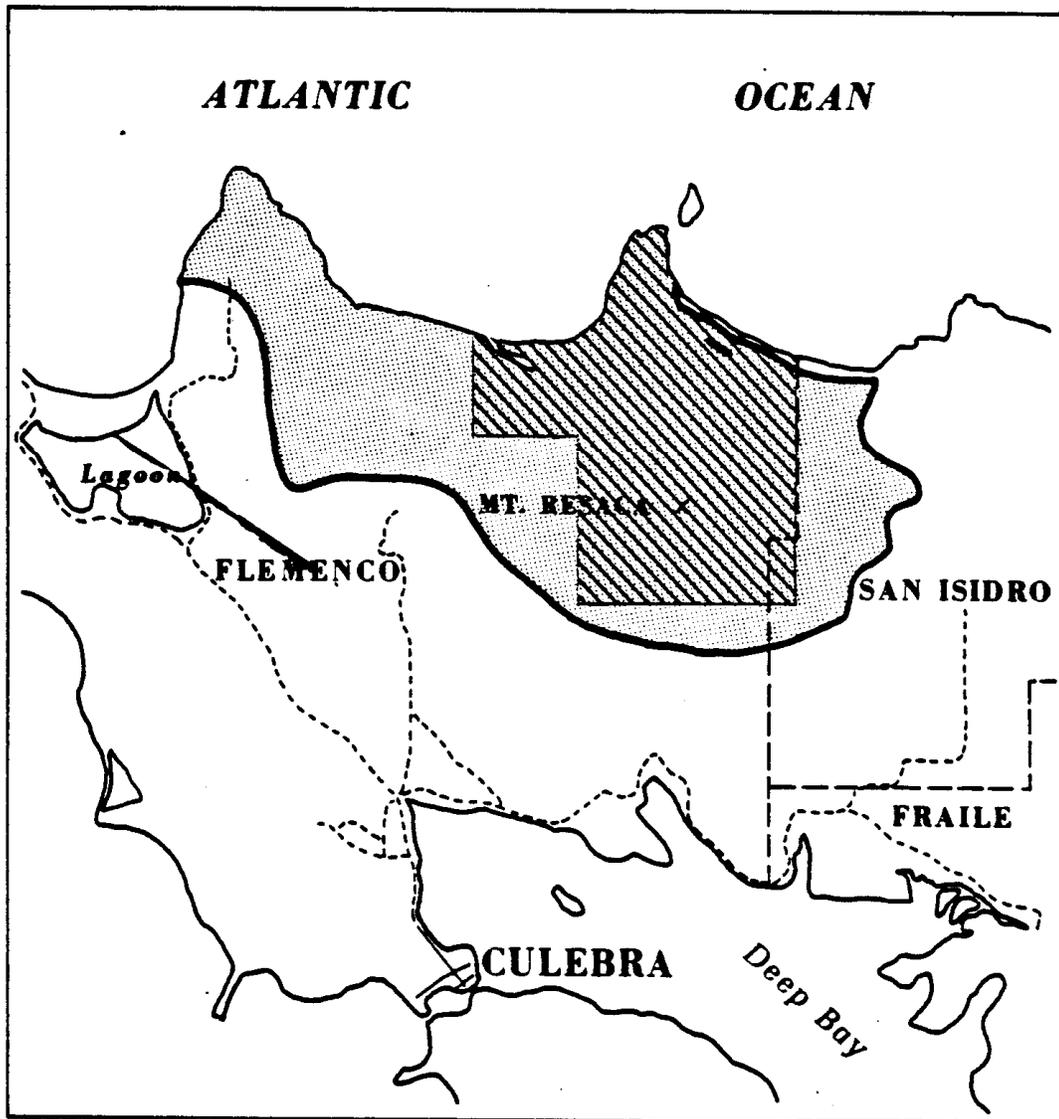
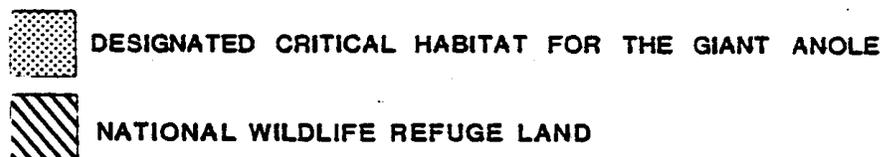
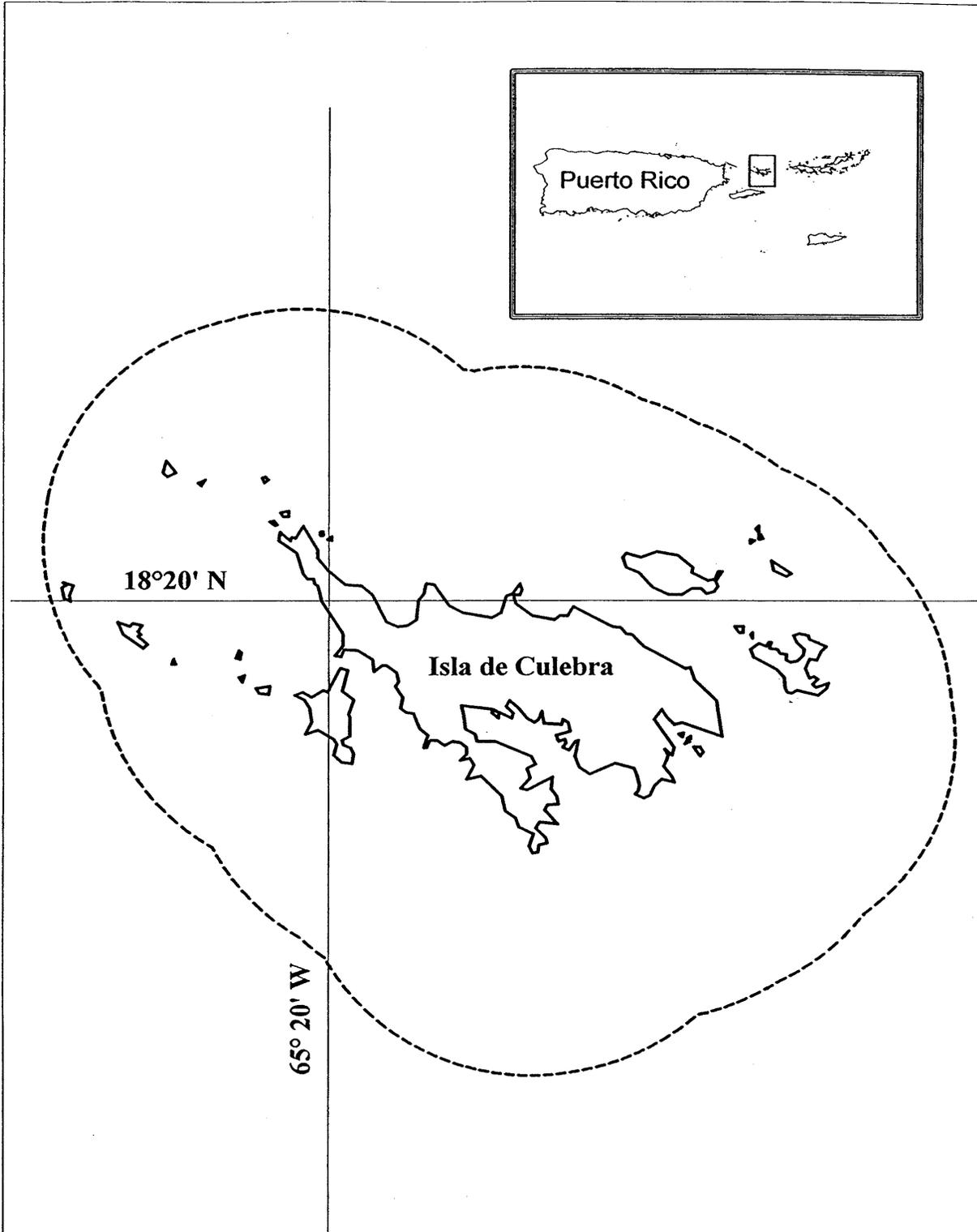


FIGURE 2



Green Sea Turtle

Federal Register /Vol. 63, No. 170 /Wednesday, September 2, 1998 /Rules and Regulations (46693-46701) Critical Habitat for Green Turtles. Culebra, Puerto Rico (NOAA/NMFS Designated)



Hawksbill Sea Turtle (*Eretmochelys imbricata*)

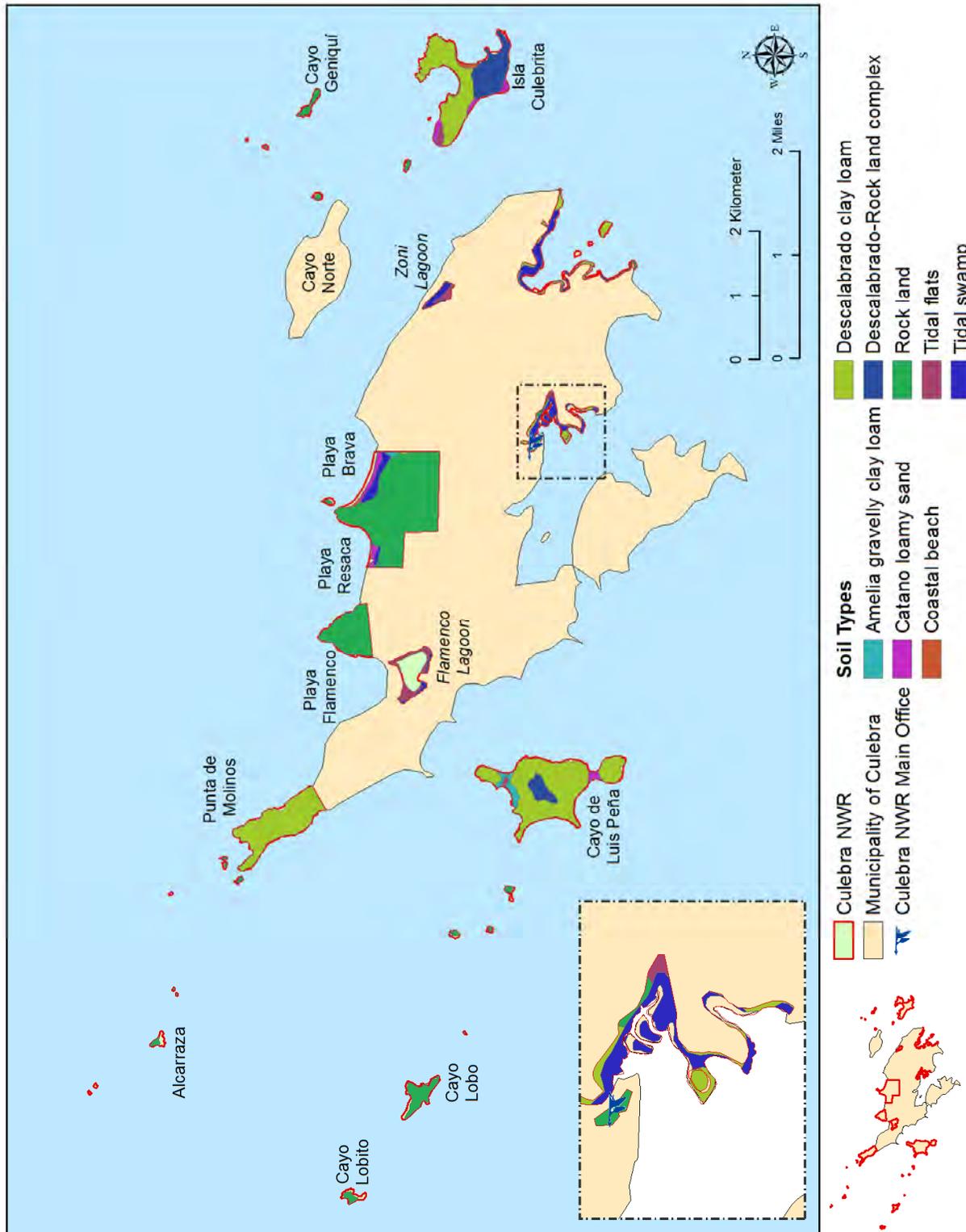
Culebra Island. Critical Habitat for the hawksbill sea turtle is described as: 1) the beachfront on the north shore of the island from mean high tide to a point 150 meters from shore: Playa Resaca, Playa Brava, and Playa Larga; 2) Cayo Norte: South beach, from mean high tide inland to a point 150 meters from shore; and 3) Culebrita Island: all beachfront areas on the southwest facing shore, east facing shore, and northwest facing shore of the island from mean high tide inland to a point 150 meters from shore. (see map)





# Appendix K. Culebra Soils

Figure 10. Soil Types of Culebra National Wildlife Refuge





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## *Appendix L. List of Preparers*

**Susan R. Silander**

*Project Leader, Caribbean Islands NWR*

**Ana Roman**

*Refuge Manager, Culebra NWR*

**James P. Oland**

*Contract Planner, (Retired FWS)*

**Joseph Schwagerl**

*Refuge Manager, Desecheo NWR*

**Gisella Burgos**

*Park Ranger, Visitor Services Specialist, Caribbean Islands NWR*

**William Hernandez**

*Fish and Wildlife Biologist (GIS), Caribbean Islands NWR*

