Desecheo National Wildlife Refuge

Draft Comprehensive Conservation Plan and Environmental Assessment

Mayaguez, Puerto Rico

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

Southeast Region
Atlanta, Georgia

May 2012

Table of Contents

SECTION A. COMPREHENSIVE CONSERVATION PLAN

I. BACKGROUND 1

Introduction 1
Purpose And Need For The Plan 1
Fish and Wildlife Service 1
National Wildlife Refuge System 2
Legal and Policy Context 4
National and International Conservation Plans and Initiatives 5
Relationship To State Wildlife Agency 6

II. REFUGE OVERVIEW 7

Introduction 7
Refuge History and Purpose 7
Special Designations 9
Ecosystem Context 9
Regional Conservation Plans and Initiatives 10
Ecological Threats and Problems 12
Physical Resources 15
Climate 15
Geology and Topography 16
Hydrology and Water resources 16
Air Quality 16
Biological Resources 19
Habitat 19
Wildlife 20
Listed Species 23
Cultural Resources 24
Socioeconomic Environment 24
Population 24
Political Setting 25
Employment 25
Refuge Administration and Management 26
Land Protection and Conservation 26
Visitor Services 26
Personnel, Operations, and Maintenance 26

III. PLAN DEVELOPMENT 27

Introduction 27
Summary of Issues, Concerns, and Opportunities 27
Fish and Wildlife Population Management 28
Habitat Management 28
Resource Protection 28
Visitor Services 28
Refuge Administration 28
Wilderness Review 28

IV. MANAGEMENT DIRECTION 29

Introduction 29
Vision 30
Goals, Objectives, and Strategies 30
Fish and Wildlife Population Management 31
Habitat Management 32
Resource Protection 33
Visitor Services 34
Refuge Administration 36

V. PLAN IMPLEMENTATION 39

Introduction 39
Proposed Projects 39
Fish And Wildlife Population Management 39
Habitat Management 40
Resource Protection 40
Visitor Services 41
Refuge Administration 41
Funding and Personnel 42
Partnership/Volunteers Opportunities 42
Step-Down Management Plans 42
Monitoring and Adaptive Management 43
Plan Review and Revision 43

SECTION B. ENVIRONMENTAL ASSESSMENT

I. BACKGROUND 45

Introduction 45
Purpose and Need for Action 45
Decision Framework 46
Planning Study Area 46
Authority, Legal Compliance, and Compatibility 46
Compatibility 46
Public Involvement and the Planning Process 47

II. AFFECTED ENVIRONMENT 49

III. DESCRIPTION OF ALTERNATIVES 51

Formulation of Alternatives 51
Description of Alternatives 51
Alternative A - (Current Management - No Action) 51
Alternative B - Public Use 52
Alternative C - Habitat and Wildlife Restoration and Limited Public Use (Proposed Alternative) 53

Features Common to all Alternatives 54
Environmental Justice 54
Species of Concern 55
Native Plant Communities 55
Resource Protection 55
Public Outreach 55
Public Safety 55
Comparison of the Alternatives by Issue 56
Alternatives Considered But Eliminated From Further Analysis 61

IV. ENVIRONMENTAL CONSEQUENCES 63

Overview 63
Effects Common to All Alternatives 63
Environmental Justice 63
Climate Change 63
Other Management 64
Land Acquisition 64
Cultural Resources 64
Refuge Revenue-Sharing 64
Other Effects 64
Summary of Effects by Alternative 65
Alternative A - (Current Management - No Action) 65
Alternative B - Public Use 65
Alternative C - Habitat and Wildlife Restoration and Limited Public Use (Proposed Alternative) 66
Unavoidable Impacts and Mitigation Measures 67
Soil Disturbance Impacts on Vegetation and Water Quality 68
Herbicide Use 68
Wildlife Disturbance 68
Vegetation Disturbance 68
User Group Conflicts 71
Cumulative Impacts 71
Direct and Indirect Effects or Impacts 71
Short-term Uses versus Long-term Productivity 72

V. CONSULTATION AND COORDINATION 73

Overview 73

APPENDICES

APPENDIX A. GLOSSARY **75**

APPENDIX B. REFERENCES AND LITERATURE CITATIONS **85**

APPENDIX C. RELEVANT LEGAL MANDATES AND EXECUTIVE ORDERS **87**

APPENDIX D. PUBLIC INVOLVEMENT **101**

Summary Of Public Scoping Comments 101

APPENDIX E. APPROPRIATE USE DETERMINATIONS **103**

APPENDIX F. COMPATIBILITY DETERMINATIONS **107**

APPENDIX G. INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION **113**

APPENDIX H. WILDERNESS REVIEW **119**

APPENDIX I. REFUGE BIOTA **121**

APPENDIX K. LIST OF PREPARERS **135**

LIST OF FIGURES

Figure 1. Location of Desecheo NWR 8
Figure 2. Geology of Desecheo NWR.....17
Figure 3. Topography of Desecheo NWR.....18
Figure 4. Vegetation of Desecheo NWR.....21

LIST OF TABLES

Table 1: Threat categories and classes for Puerto Rico CWCS 13
Table 2: Rincon temperature and rainfall (Period of Record: 6/ 1/1968 to 12/31/2008) 15
Table 3. Data deficient, vulnerable, endangered or critically endangered species on Desecheo NWR.....20
Table 4. 2000 Census data for Puerto Rico and municipalities near Desecheo NWR 24
Table 5. Summary of projects 42
Table 6. Step-Down Plans for Desecheo NWR 43
Table 7. Comparison of alternatives by management issues for Desecheo NWR 56
Table 8. Summary of environmental effects by alternative for Desecheo NWR 69

SECTION A. DRAFT COMPREHENSIVE CONSERVATION PLAN

I. Background

INTRODUCTION

This Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Desecheo National Wildlife Refuge (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 Fish and Wildlife 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 state 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 this Draft CCP/EA is to present the 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 Draft CCP/EA is needed to:

- Provide a clear statement of refuge management direction;
- Provide refuge neighbors, visitors, and government officials with an understanding of Fish and Wildlife Service (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.

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 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 Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) 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 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 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;
- 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 Awaterfowl 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 7 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 Atacosa (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 should serve as a model for habitat management with broad participation from others.

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

All lands of the Refuge System will be managed in accordance with an approved comprehensive conservation plan that will guide management decisions and set forth strategies for achieving refuge unit purposes. The final CCP 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 Desecheo NWR are provided in Appendix C.

Treaties, laws, and administrative 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 Desecheo NWR and other partners, such as the Commonwealth of Puerto Rico Department of Natural and Environmental Resources, the U.S. Army Corps of Engineers, the University of Puerto Rico, 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 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; role of refuge

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, North American Bird Conservation Initiative, 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.

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.

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 United States 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, interior least terns, and gulf coast populations of brown pelicans. A key objective of this plan is the standardization of data collection efforts to better recommend effective conservation measures.

RELATIONSHIP TO 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 other 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 (DNER) *http://www.drna.gobierno.pr*.

The Puerto Rico DNER's 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 DNER administers forest reserves, marine reserves, and wildlife refuges throughout the Commonwealth

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 CCP is the integration of common mission objectives where appropriate.

II. Refuge Overview

INTRODUCTION

Desecheo NWR is an island of approximately 360 acres (146 hectares) in the Mona Passage off the west coast of Puerto Rico approximately13 miles (21 kilometes) west of Punta Higüero. Although it is a relatively small island, the terrain is mountainous and rugged. The highest point on the Island is 683 feet (208 meters). The habitat on the island is predominately semi-deciduous dry forest with areas of grassland. Because of the porosity of the soils and the steep topography, there is no permanent fresh water on Desecheo NWR. The introduction of nonnative species such as goats, monkeys, and rats, and human uses of the island have had a substantial impact on the habitat and wildlife of Desecheo NWR. Future management will focus on the restoration, protection, and conservation of the habitat and wildlife resources, including seabirds, other migratory birds, and endemic species and plant communities.

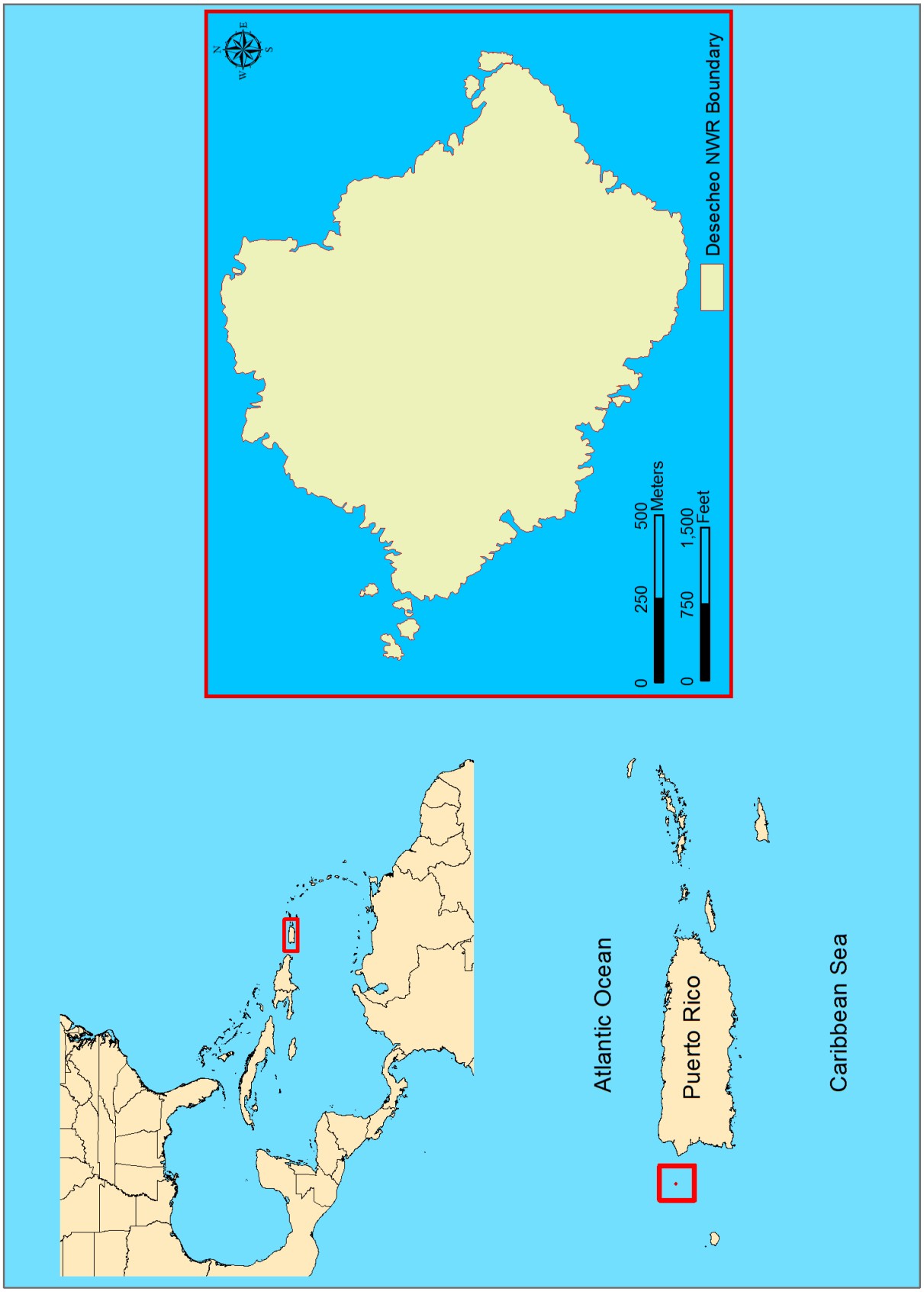
REFUGE HISTORY AND PURPOSE

No evidence of pre-Columbian settlement has been found on the island. An early description of the island provided by Fray Iñigo Abbad y Lasierra (1788) noted that it is “uninhabited but covered by trees, has many wild goats which are used to the benefit of smugglers as are the lobsters of the sea, snails, and other seafood, which are found in abundance.” Early naturalists (Gundlach 1878; Bowdish 1900 cited in Breckon 2002) who visited the island in the Nineteenth and Twentieth Century noted the island was a major seabird rookery. The significance of the seabird nesting on the island led to its designation as a preserve and breeding ground for these birds by President Taft in 1912. Although it was given the “preserve” status in the early part of the Twentieth Century, Desecheo was subsequently subjected to several human uses and disturbances that adversely affected both the habitat and wildlife.

In a 1918 article, Alexander Wetmore described the island based on his visits there in 1912. He noted that there was no trace of the goats that had been previously reported; and from the dense vegetation, he judged that they had disappeared many years before. He also reported that fishermen established camps on the island where they would live for short periods of time and salt their catch (Wetmore, 1918).

Attempts to farm portions of the island were reported in the 1920s (Struthers 1927). Although there is no documentation of the exact areas impacted or the length of time the farming was attempted, grazing of cattle in Long Valley and clearing of forests near Puerto de los Botes for cropland have been reported. During this period, a red-footed booby colony located in Long Valley was displaced about 500 feet to the east. The former cultivated area reverted to grassland that was maintained by visiting fishermen, who burned it periodically to maintain it as land crab habitat. The burning prevented the reestablishment of trees in the area (Breckon 2002).

Figure 1. Location of Desecheo NWR



In 1937, President Franklin Roosevelt transferred Desecheo to Puerto Rico to be managed as a forest and bird preserve. When the United States entered World War II, the island was transferred back to the Federal Government for use as a bombing and gunnery range. It continued to be used as an aerial bombing target until 1952. Between 1952 and 1964, Desecheo was used for survival training by the U.S. Air Force. In 1965, the island was declared as surplus property by the U.S. military. In July 1966, management jurisdiction was acquired by the Department of Health, Education, and Welfare, and the island became a facility for raising a colony of rhesus macaques for research purposes. In December 1976, administration of Desecheo was transferred to the Service and it received the designation of a national wildlife refuge.

The official purpose of the Desecheo NWR is derived from land acquisition documents, the authorities for national wildlife refuges, and the original designation of the island as a refuge and breeding ground for native birds. The act authorizing the transfer of real property for wildlife management or other purposes identifies lands that are of particular value in carrying out the national migratory bird management program as appropriate for transfer to the Service for management (16 U.S.C. 667b). Among other mandates, the National Wildlife Refuge System Administration Act [16 U.S.C. 668dd(a)(2)] directs the Refuge System to conserve, manage, and restore fish, wildlife, and plant resources and their habitats for the benefit of present and future generations of Americans.

SPECIAL DESIGNATIONS

In March 2000, the Puerto Rico Legislature passed Public Law 57. This law designated about 0.8-km (about 0.5-mile) of the coastal waters and marine ecosystems surrounding Desecheo Island as the Desecheo Marine Reserve. The waters surrounding Desecheo Island harbor some of the best developed and healthiest coral reefs in Puerto Rico. In order to ensure that proposed activities will not adversely affect the refuge or the Marine Reserve, Service representatives are coordinating with the Commonwealth Department of Natural and Environmental Resources during the development of this CCP and the planning for future management of the Marine Reserve.

From May 1940 until 1964, Desecheo was used for military training activities, including aerial bombardment and survival training. As a result of the military activities, there are still live munitions that create a safety hazard for anyone visiting the island. The Army Corps of Engineers (Corps) is responsible for evaluating and, as necessary, cleaning Formerly Used Defense Sites. To determine the nature and extent of the potential hazards on Desecheo, the Corps has initiated an evaluation of the island. Because of the continuing threat from unexploded ordnance, hazardous terrain and sensitive wildlife, Desecheo NWR is not open for public access.

ECOSYSTEM CONTEXT

The Service has been working for several years to develop collaborative resource management partnerships with private landowners, local communities, and interest groups, as well as state and federal agencies. The purpose of these partnerships is to maintain existing fish and wildlife resources and habitats, to reverse the trend of declining wildlife populations and species diversity, to establish conservation priorities, to clarify goals, and to address the threats and problems affecting fish and wildlife resources. Coordinated efforts of the partners in these conservation initiatives help to ensure the most important resource issues are addressed, and that duplication of efforts to achieve common goals is minimized.

REGIONAL CONSERVATION PLANS AND INITIATIVES

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. Desecheo NWR lies within the Caribbean ecosystem. The plan developed for the Caribbean ecosystem addresses the Service's priority resource initiatives for protection and management of wildlife and habitat throughout its area of jurisdiction in the Caribbean. 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 of 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 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, the Caribbean Landscape Conservation Cooperative, Strategic Plans, and other relevant documents.

The Caribbean Landscape Conservation Cooperative (CLCC) is part of a national network of Landscape Conservation Cooperatives (LCCs). The LCCs are applied conservation science partnerships among state and federal agencies, regional organizations, tribes, non-governmental organizations, universities, and other entities within a geographic area. They are designed to inform resource management decisions in an integrated fashion across landscapes – at a broader scale than any individual partner's responsibility. The partnership will consider landscape-scale stressors including climate change, habitat fragmentation, urban sprawl, invasive species, and water availability in order to assess the conservation status of species and habitats and provide a vision for sustainable landscapes under future scenarios. The CLCC includes the Puerto Rican archipelago and the U.S. Virgin Islands, and recognizes the connectivity of these islands with the greater Caribbean and the continental regions through shared species, habitats, and conservation opportunities and goals.

The CLCC is in the process of developing its organizational structure. The goal is to create avenues for input from all interested participants. The CLCC currently has a 10-member steering committee, with representatives from the Service, USGS, USDA Natural Resources Conservation Service and

Forest Service, NOAA, Puerto Rico DNER, and the U.S. Virgin Islands DPNR. Future components will include a science and technology advisory group and a stakeholder advisory group.

The State Wildlife Grants (SWG) program began in Fiscal Year 2002. Under this program, Congress provided an 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. The development of the CWCS began in 2004 and was completed in 2005.

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 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 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 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 species and threats identified in this document are also of concern to the Service, and several are located on Service-managed lands including Desecheo NWR. Cooperative efforts between the DNER and the Service to address the threats to the species and their habits are critical to ensure their survival.

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

One of the initial steps taken during the development of this Draft CCP/EA was the identification of threats and problems for the resources and management of Desecheo NWR. To ensure consideration of all significant issues, the planning team reviewed the Service's Ecosystem Plan, the Puerto Rico CWCS, and conducted both internal and public scoping meetings. Some of the major issues considered during the development of this Draft CCP/EA included the control of exotic and invasive plants and animals, control of illegal activities (including smuggling of aliens and drugs and poaching), and cleanup of military ordnance. These issues and others will be discussed in greater detail in Chapter III (Plan Development).

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 general lack of awareness and understanding of wildlife issues.

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. Nonnative and invasive species, such as rats (*Rattus rattus and R. norvegicus*), feral domestic dogs and cats, and grazing livestock, have had significant negative effects on reptile and bird populations as well as plant communities. New introductions of plants and animals are frequently occurring. Plants sometimes brought in for landscaping purposes may spread rapidly across the islands and out-compete native vegetation. The most common invasive plants include acacia trees (*Acacia spp*.) and guinea grass (*Panicum maximum*).

The Service's conservation efforts in the Caribbean are focused on the identified threats (USFWS 2002), with the following issues being listed as the greatest priorities (not ranked) in the region:

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

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

The Complex conserves wildlife and ecosystems found nowhere else in the United States. Some of the component species on Desecheo NWR include the endemic (i.e., they are found nowhere else in the world) lizards *Ameiva desechensis*, *Anolis desechensis* and *Sphaerodactylus levinsi* and a federally threatened cactus known as higo Chumbo (*Harrisia portoricensis*). 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 DNER. 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).

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 Desecheo NWR, the Service will include monitoring and adaptive management programs in this Draft CCP/EA and future planning efforts. 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 to detect 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).

The Puerto Rico CWCS identified numerous categories and classes of threats to wildlife and habitat throughout Puerto Rico. Although most of the identified threats are associated with developed areas and human uses, some of these threats are real or potential issues for Desecheo NWR and surrounding waters. The table of these threats from the Puerto Rico CWCS is provided below.

Table 1: Threat categories and classes for Puerto Rico CWCS

Threat Category	Threat Class
Habitat Conversion: Intentional conversion of natural habitat that is detrimental to wildlife use and survival by causing loss or degradation of wildlife habitat and available forage.	Housing and urban development
	Agricultural practices
	Recreational areas
	Intentional fires
	Illegal dumping areas
	Wetland filling

Threat Category	Threat Class
Transportation and Infrastructure: Development of corridors/passages that increases wildlife mortality and fragmentation of wildlife habitat.	Roads
	Pier and harbor
	Power lines, aqueducts, gas ducts
	Wind power plants
Abiotic Resources Use: Extraction or use of rocks, minerals, and water that causes direct or indirect negative impacts to wildlife habitats.	Land cover removal for construction material (e.g., sand, limestone, other rocks)
	Water use
	Drilling (wells)
Consumptive Use of Biological Resources: Harvest or use of plant and animal populations in a manner that negatively impacts wildlife distributions and fitness, or the ecosystem.	Forest and woodland management
	Grazing
	Collection
	Illegal hunting and fishing practices
Non-consumptive Resources Use: Activities that have an incidental, but negative impact on wildlife and their habitats.	Motor-powered recreation
	Non-motorized recreation
Pollution: Introduction and spread of unwanted matter and energy into ecosystems from point and non-point sources that cause increased mortality of wildlife and degradation of their habitats and available forage.	Solid waste
	Chemicals and toxins
	Eutrophicants substances
	Noise pollution
	Waste or residual materials

Threat Category	Threat Class
Invasive Species: 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.	Invasive plants
	Invasive animals
	Pathogens

PHYSICAL RESOURCES

CLIMATE

Desecheo NWR is situated off the west coast of Puerto Rico at approximately 18 degrees north latitude. This location ensures tropical weather throughout the year, with average daily temperatures of 26 °C (80 °F) throughout the year. Seasonal temperature variations are very slight. Although little site-specific rainfall data are available for the refuge, the seasonal distribution of precipitation is consistent with the other tropical islands with a dry season that extends from November to May and a wet season from June through October, coinciding with the Atlantic hurricane season. The following table is from the Southeast Regional Climate Center station at Rincon, Puerto Rico.

Table 2: Rincon temperature and rainfall (Period of Record: 6/ 1/1968 to 12/31/2008)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	85.3	85.3	85.6	86.2	87.5	88.6	89.5	89.2	89.3	88.9	87.4	85.7	87.4
Average Min. Temperature (F)	66.0	66.5	66.9	68.6	71.0	72.0	72.4	71.9	71.7	70.4	70.2	68.3	69.7
Average Total Precipitation (in.)	1.64	1.68	1.69	3.15	5.69	5.53	7.33	8.10	6.37	6.18	3.32	2.27	52.96

Source: Southeast Regional Climate Center, sercc@climate.ncsu.edu

Rainfall was estimated at 1,020 mm annually (Seiders et al. 1972) and records made on Desecheo in 1967-71 showed an average of 828 mm (range 750-1039 mm) (Morrison and Menzel 1972). Because of the steep topography and the islands relatively small size, there is neither permanent surface water nor springs on the island.

GEOLOGY AND TOPOGRAPHY

Desecheo is a small island with a mean diameter of 2 km (approximately 301 acres), located in the Mona Passage between Puerto Rico and Hispaniola about 17 km off the west coast of Puerto Rico. The Great Southern Puerto Rico Fault that passes south of Rincon also passes south of Desecheo. The island is a fault-controlled outcrop of the same volcanoclastic rocks (middle Eocene) as at Punta Jiguero. The shoreline is volcanoclastic and Pleistocene marine terrace rocks. (Morelock, J. et al. 2002)

Desecheo Island is composed of a peak of volcanic calcareous rock. The surface of the island is very jagged with sharp limestone rock edges. The slopes are steep ranging from 20 to 35 degrees (US FWS 2010) and the few small sand beaches on the southwest side of the island are very narrow. The highest point on Desecheo is nearly 700 feet (213 m) above sea level located on the northern ridge. Shallow caves are found along the shoreline. The island is underlain by folded and faulted volcaniclastic sandstone, mudstone, and breccia of Eocene age. Marine terrace deposits of calcite-cemented sand and gravel are intermittently exposed along the coast (Renken, Robert A. 2002). The majority of the surface features of the island are calcareous rocks. The soils are made up of gravelly or sandy material that likely weathered from the parent materials. This soil is very permeable and has a low available water capacity.

Seiders et al. (1972) noted that there is a discontinuous bench of assumed Pleistocene marine colluvium, part of which is phosphate-cemented, at 8-12 m above sea level. Portions of this bench above Puerto Canoas and Puerto de los Botes have collapsed. There is a lower bench of more recent Holocene beach deposits associated with protected coves and beaches (Seiders et al. 1972). Figure 2, below, provides a map and geologic information that has been georeferenced and digitized from the USGS publication “Geology of Isla Desecheo Puerto Rico” (Seiders et al. 1972)

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).

Since Desecheo is a small isolated island with a steep topography, there are no perennial streams nor standing water on Desecheo. Shallow basins in the coastal rock outcrops hold rainwater for short periods of time following storm events and have been reported as potential sources of limited fresh water for introduced species (rats, goats, monkeys).

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.

Figure 2. Geology of Desecheo NWR

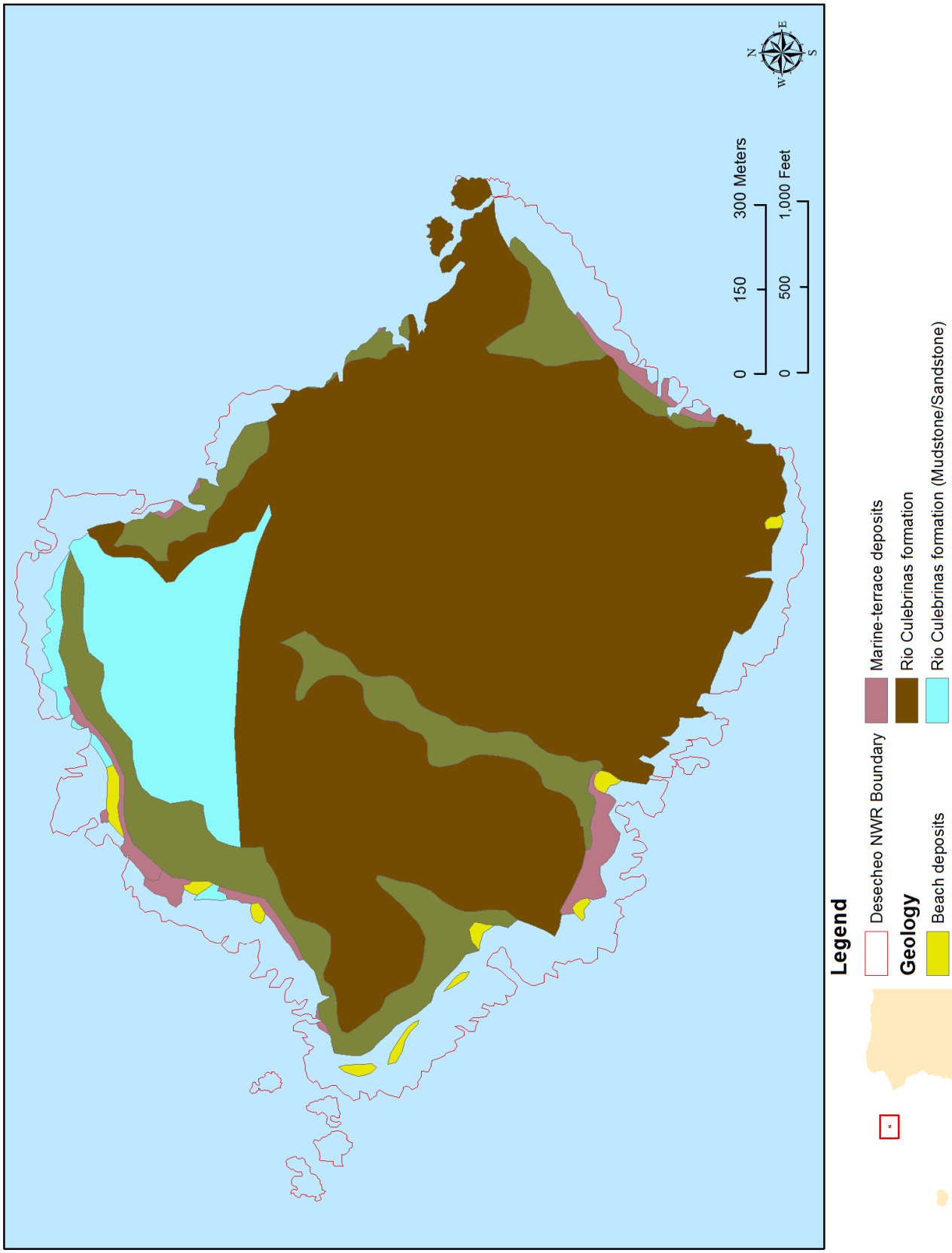


Figure 3. Topography of Desecheo NWR

A single air quality control region covers Puerto Rico, including Desecheo. Based on ambient monitoring data collected mainly in the San Juan vicinity by the Puerto Rico Environmental Quality Board, the Environmental Protection Agency 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).

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 Desecheo NWR are minor and scattered widely. Air pollutants are emitted during occasional operation of power equipment, motorized vessels, and aircraft used for access to the island and for conducting surveys.

BIOLOGICAL RESOURCES

HABITAT

Woodbury et al. (1971) reported the vegetation of the island to be a mosaic of grassy patches, shrublands, woodlands with candelabra cacti, and semideciduous forests. The grassy patches and shrublands are on exposed ridges and screes, especially on the northern and northeastern slopes, which face the prevailing winds. The woodlands generally are found on coastal slopes and upper east- and south-facing slopes. The semideciduous forest, dominated by *Bursera simaruba*, occurs in the more mesic valleys and ravines. A mixture of deciduous and evergreen trees is found in the relatively open understory. Figure 3 below gives an overview of the major vegetation communities on the island. A complete listing of the plant species found on Desecheo NWR (from Breckon 2000) is provided in Appendix I of this document.

Critical Wildlife Area

The Puerto Rico CWCS (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 that are vulnerable to impacts on their habitat, or are endangered or critically endangered. Desecheo NWR is identified as one of the CWAs in that document. The following table provides a list of the species that were identified in the CWCS.

Table 3. Data deficient, vulnerable, endangered or critically endangered species on Desecheo NWR

Species Identified in Desecheo Critical Wildlife Area	
Common Name	**Scientific Name**
Brown pelican	*Pelecanus occidentalis*
White crowned pigeon	*Patagioenas leucocephala*
Peregrine falcon	*Falco peregrinus*
Slippery backed mabuya	*Mabuya mabouya*
Desecheo's gecko	*Sphaerodactylus levinsi*
Higo chumbo	*Harrisia portoricensis*

WILDLIFE

Desecheo is a relatively small island that is separated from the main island of Puerto Rico. The native terrestrial component is comprised mostly of birds and reptiles. The marine animal component is largely composed of near shore and pelagic fish species, sea turtles, marine mammals, mollusks, and crustaceans.

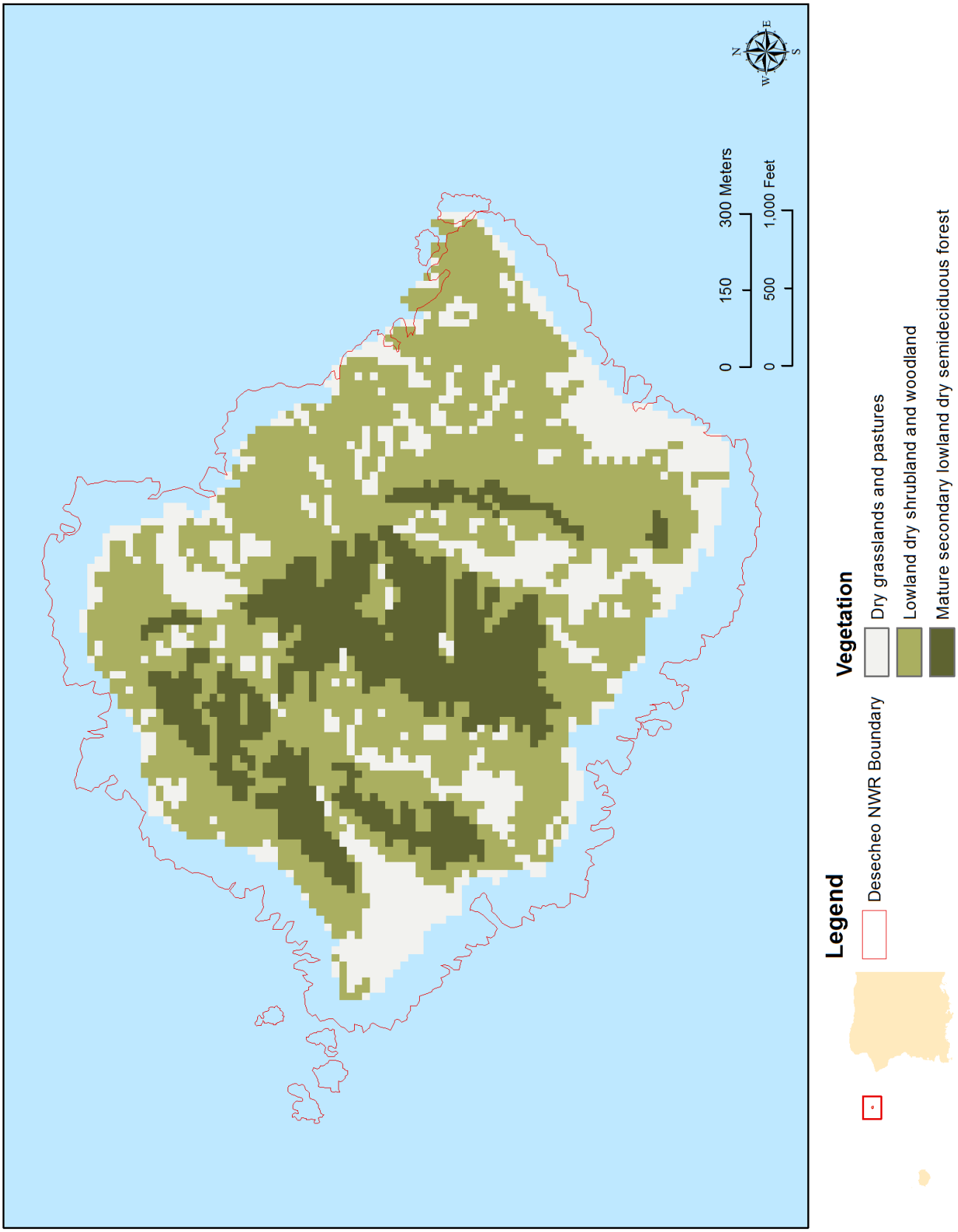
Birds

A total of 53 species of birds have been identified on Desecheo NWR. Of these species, only 10 are considered to be resident (Meier 1989). Of the “resident” species, most are seabirds that feed on marine resources. Only Pearly-eyed thrashers and cuckoos are terrestrial foragers. A complete list of the birds documented on Desecheo NWR is provided in Appendix I.

Desecheo was once an important seabird rookery. It was home to a large Brown booby colony, with over 15,000 individuals reported during the nesting season in 1927. Other seabirds historically present and/or nesting on the island include Red-footed boobies (2000 birds in 1918), Brown noddies (2000 in 1918), Bridled terns (1500 in 1918), Magnificent frigatebirds (300 in 1923), and Laughing gulls (700 in 1970).

Today, very few seabirds nest near Desecheo NWR on the rocky cays, and none are known to nest on the island itself. This is likely a result of a combination of factors, including disturbance from bombing, egg poaching by rhesus macaques and humans, and destruction of habitat by feral goats. The refuge has conducted numerous projects to remove the macaques and goats, to permit the restoration of habitat and seabird nesting. Continuation of control of invasive species and restoration of the habitat will be significant components of this Draft CCP/EA.

Figure 4. Vegetation of Desecheo NWR



Land Birds

Most species of birds identified on Desecheo NWR are considered to be land birds. This group of birds accounts for 36 of the species documented on the refuge, so far. As noted above, however, only a small percentage of these species are permanent residents on the refuge. The land birds found on Desecheo NWR include such species as common ground dove, Zenaida dove, scaly-napped pigeon, white-crowned pigeon, gray kingbird, yellow-billed and mangrove cuckoos, smooth-billed ani, belted kingfisher, black-whiskered vireo, American kestrel, red-tailed hawk, several warbler species, and others. The numbers of species and individuals in this group fluctuate throughout the year due to the spring and fall migrations.

Wading and Shore Birds

This category loosely groups shorebirds, egrets, and herons. With the exception of cattle egrets that may forage within the grassy areas and open slopes of the island, these birds will likely be found feeding along the shoreline or resting during migratory stopovers. The numbers of wading birds on the refuge also vary throughout the year with migratory patterns. While these birds may be found on the refuge at any time of year, there is a limited amount of shallow water foraging habitat and the greatest numbers of wading and shore birds is expected during the migration periods.

The species within this group identified on Desecheo NWR are: great blue heron, cattle egret, great egret, yellow-crowned night-heron, American oystercatcher, ruddy turnstone, upland sandpiper, and spotted sandpiper.

Waterfowl

No waterfowl have been identified on Desecheo NWR.

Seabirds

Seabird nesting colonies on Desecheo NWR were the primary reason for the initial designation of the island as a forest and bird preserve. At the time of its initial designation, the island was an important nesting site for brown boobies, red-footed boobies, brown noddies, bridled terns, and magnificant frigatebirds. As previously noted, the use of the island as a bombing range, the introduction of monkeys, goats, and rats, and human disturbance of the nest sites have nearly eliminated the former nesting colonies. During field surveys in 2009, no nesting seabirds were observed. In 2010, however, 13 pairs of nesting bridled terns and one nesting pair of brown noddy were found breeding on the coastal rocks and offshore islets (Island Conservation 2010).

Reptiles and Amphibians

The known terrestrial herptofauna of Desecheo NWR consists of the Puerto Rican racer (*Alsophis puertoricensis*), the Desecheo ground lizard (*Ameiva exsul desechensis*), Desecheo anole (*Anolis desechensis*), Desecheo dwarf gecko (*Sphaerodactylus levinsi*), and the slippery-back skink (*Mabuya mabouya*) (Meier and Noble, 1990). Of these species, the Desecheo anole, the Desecheo ground lizard, and the Desecheo dwarf gecko are endemic to the island. In addition, the snake (*Alsopnis portoricensis sp*.) is considered by some scientist as a sub-species of the *Alsophis* found on the main island of Puerto Rico. Although definitive genetic or taxonomic studies have not been completed for the Desecheo population of the Puerto Rican racer, some believe it may be the same species found

on Mona Island or it may be an endemic subspecies unique to Desecheo (Henderson and Powell 2009). To date, no introduced herptofauna have been identified on Desecheo.

Mammals

With the possible exception of bats, there are no native land mammals on Desecheo NWR. The most common mammals on the island are rats, goats, and monkeys for which removal projects have been initiated and will continue under the final CCP. During his visit to Desecheo in 1912 Wetmore (1918) reported that "few bats were seen but under conditions that did not allow identification."

A number of marine mammals are known to occur in the near shore and the deep waters surrounding Desecheo Island. These include the sperm whale, the blue whale, humpback whale, the sei whale, and several dolphin species.

LISTED SPECIES

The only federally listed threatened or endangered species documented on or adjacent to Desecheo NWR lands are the higo chumbo cactus (*Harrisia portoricensis*) and green and hawksbill sea turtles.

Higo Chumbo (Harrisia portoricensis)

Harnsia portoricensis is a slender, upright, columnar cactus, currently designated as threatened. It is usually unbranched and may reach up to 4.5 meters in height and 7 centimeters in diameter. It is currently known only from Mona, Monito, and Desecheo, all islands located in the Mona Passage between Puerto Rico and the Dominican Republic. Historically, the cactus was reported from the main island of Puerto Rico near Ponce.

Sea Turtles (Hawksbill and 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 a continued decline is projected. Most populations are declining, depleted, or remnants of larger aggregations.

This species frequents 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.

The critical habitat for the hawksbill sea turtle is designated in 50 CFR 17.95 for areas around Culebra and Mona Islands, Puerto Rico, but not on or around Desecheo NWR.

The hawksbill sea turtle nesting habitat on Desecheo NWR is limited to a few very small pocket beaches. Although the only surveys conducted have been in conjunction with other investigations or management activities, anecdotal information from researchers working on and around the island indicates that nesting does, at least occasionally, occur on the refuge.

Green Sea Turtle
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. In U.S. Atlantic waters, green turtles nest in small numbers in the Virgin Islands and 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.

CULTURAL RESOURCES

So far, no evidence of pre-Columbian human settlement has been found on Desecheo NWR. The most notable evidence of prior human activities is the remains of structures and munitions from the military training that occurred there from the 1940s to the 1960s.

SOCIOECONOMIC ENVIRONMENT

Desecheo NWR is separated from the west coast of Puerto Rico by the Mona Channel. Prior to it being actively managed as a national wildlife refuge and the creation of a Commonwealth Marine Reserve in the surrounding waters, the island was a popular fishing area, utilized by fishermen and scuba divers primarily from the municipalities of Aguadilla, Aguada, Rincon, Añasco, and Mayagüez. Fishing within the Marine Reserve is no longer permitted; however, tour boat operations focused on ecotourism, diving, and whale watching are increasingly popular in the vicinity.

POPULATION

The U.S. Census Bureau estimated the population of the five municipalities nearest to Desecheo NWR to be 253,733 in July 2009. The most recent actual count was made during the 2000 Census, when the population count was 248,276. The following table provides selected data from the 2000 Census with population estimates from 2009.

Table 4. 2000 Census data for Puerto Rico and municipalities near Desecheo NWR

Geographic area	Population	Housing units	Area in square miles			Density per square mile of land area	
			Total area	Water area	Land area	Pop-ulation	Housing units
Puerto Rico	3,808,610	1,418,476	5,324.50	1,899.94	3,424.56	1,112.1	414.2
Aguada Municipio	41,959	15,156	45.55	14.62	30.93	1,359.4	504.1
Aguadilla Municipio	60,949	23,552	75.56	38.97	36.59	1,767.8	680.0
Añasco Municipio	29,261	12,755	44.90	5.63	39.27	721.8	273.0

Geographic area	Population	Housing units	Area in square miles			Density per square mile of land area	
			Total area	Water area	Land area	Pop-ulation	Housing units
Mayagüez Municipio	89,080	42,825	274.09	196.46	77.63	1,267.9	507.1
Rincón Municipio	15,200	5,998	54.41	40.12	14.28	1,034.0	478.0

Source: U.S. Census Bureau, Census 2010

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.

A Resident Commissioner serves as Puerto Rico's sole delegate to the U.S. Congress, holds limited powers as a member of the 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.

Desecheo NWR is considered to be within the Municipality of Mayagüez, which is one of 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, resident in Puerto Rico, age 18 and older, are eligible to vote in commonwealth and municipal elections.

The Governor nominates leaders for the Cabinet level, 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

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.

REFUGE ADMINISTRATION AND MANAGEMENT

LAND PROTECTION AND CONSERVATION

Although Desecheo NWR was a “preserve” in 1912, over the years its status and management have changed significantly. While difficulty of access to the island has precluded the establishment of any permanent settlement or human presence, many of the human uses have been detrimental to the habitat and wildlife populations. These activities include its use as a military target and training range, limited attempts to develop areas for agriculture, unauthorized clearing and burning of vegetation to facilitate the production and harvest of land crabs, and the introduction of goats, rats and monkeys. Because of the remaining unexploded ordnance from the military training and the sensitivity of nesting birds to human activities, the refuge is closed to public access. The primary goals of the current management program are to restore and protect the wildlife resources and habitats. Removal of invasive species and the restoration of habitat are the major focuses of management.

VISITOR SERVICES

As noted previously, the refuge is not open to public access and use. Since the surrounding waters are designated as a Marine Reserve by the Commonwealth of Puerto Rico, visitation to the waters surrounding this small island refuge is expected to increase during the foreseeable future. However, during the duration of the CCP, we do not anticipate the completion of cleanup of unexploded ordnance or the opening of the refuge to routine visitor activities. Future access will be limited and will be contingent on cleanup of ordnance and certification that the area is safe for use.

During the timeframe of the final CCP, visitor services and environmental education activities will take place off-site and wildlife observation will be conducted from offshore.

PERSONNEL, OPERATIONS, AND MAINTENANCE

Administration of Desecheo NWR is accomplished by the Caribbean Islands NWR Complex. The headquarters of the complex is located in Boquerón, Puerto Rico. Refuge staff assigned to the complex headquarters conduct periodic surveys, posting of the refuge, habitat and species management activities, law enforcement patrols, and administrative oversight. Current staffing for the refuge is equivalent to 2 FTEs distributed among the complex manager, assistant managers, biologist, public use, law enforcement, and maintenance personnel. This plan will expand the staffing for the refuge by adding a 0.5-FTE manager and a 0.5-FTE biologist, with major duties related to the restoration and management of Desecheo NWR.

III. Plan Development

INTRODUCTION

Development of the Draft CCP/EA for Desecheo NWR was initiated in October 2008. The planning team responsible for the development of the Draft CCP/EA was formally established in January 2009. Natural resource management professionals from the Caribbean Islands NWR Complex, the Culebra NWR, the Caribbean Ecological Services Field Office, and the Puerto Rico DNER were invited to participate on the planning team (Appendix K). A Biological Review of the Caribbean NWR Complex, including Desecheo NWR, was completed in 2002 and some of the members of that review team are included on the Draft CCP/EA planning team.

Public input in the development of this Draft CCP/EA was obtained through a scoping meeting held in March 2009, from comment sheets that were distributed during the scoping process, and from verbal and written comments received from stakeholders. Comments received during the public scoping process are listed in Appendix D.

In identifying key issues to be addressed during the planning process, the planning team considered recommendations from the Biological and Visitor Services reviews, comments received through the public scoping meeting, and input from open planning team meetings, comment packets, and personal contacts of planning team members. In addition, the team considered opportunities for coordination with other relevant conservation plans; applicable legal mandates; the purposes of the Desecheo NWR; the mission, goals, and policies of the Refuge System as a whole; and evaluations and documentation required by Service procedures for refuge planning.

The major issues identified and included in the plan were derived from the members of the core planning team, representatives of elected officials from the Commonwealth Senate and House of Representatives, partners from other agencies, and the public. These issues are organized under five categories (Fish and Wildlife Population Management, Habitat Management, Resource Protection, Visitor Services, and Refuge Administration).

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, and management of threatened and endangered species. Additionally, the planning team considered state and federal mandates, as well as applicable local ordinances, regulations, and plans. The team also directed the process of obtaining public input through public scoping meetings, open planning team 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 decision to be made in this planning process. The team considered all issues that were raised throughout the planning process, and has developed a 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. A summary of the significant issues follows.

FISH AND WILDLIFE POPULATION MANAGEMENT

- Control of introduced species (monkeys, goats, rats, and plants)
- Monitor changes in density, distribution, and age structure of lizard species pre- and post-eradication
- Monitor population and breeding success of seabirds pre- and post-eradication
- Monitor land bird densities and diversity pre- and post-eradication
- Monitor plant diversity, biomass, and structure pre- and post-eradication
- Restore nesting booby colonies

HABITAT MANAGEMENT

- Restoration of native forest habitat

RESOURCE PROTECTION

- Control illegal activities (smuggling of aliens, drugs, and poaching)

VISITOR SERVICES

- Open refuge to the public or at least permit limited access
- Provide for ecotourism
- Provide boat access
- Permit periodic access to ham radio operators
- Camping both recommended and opposed

REFUGE ADMINISTRATION

- Coordinate activities with Marine Reserve planning efforts
- Coordinate with Corps to maximize cleanup of military ordnance
- Identify staffing needs

WILDERNESS REVIEW

Refuge planning policy requires a wilderness review as part of the comprehensive conservation planning process. The results of the wilderness review are included in Appendix H.

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 management direction for the refuge over the next 15 years. This proposed management direction contains the goals, objectives, and strategies that we believe will achieve the refuge vision.

During the development of this Draft CCP/EA, three alternatives for managing the refuge were considered:

- Alternative A is the current management or no action alternative. Under this alternative, over the 15-year lifetime of the CCP, Desecheo NWR would continue to be managed as it is at present.

- Alternative B was developed to provide a focus on public use and would emphasize public use of the refuge with any additional availability of budgetary and staffing resources.

- Alternative C emphasizes habitat and wildlife restoration with limited public use.

Each of these alternatives is described in the Alternatives section of the EA. We chose Alternative C as the proposed management direction.

Implementation of Alternative C would result in increased wildlife management programs to monitor, protect, and recover special status plants and animals and species of management interest. Within 15 years of CCP approval, the refuge would aim to provide the conditions that would allow for re-establishment of nesting seabird colonies. With respect to terrestrial reptiles, we would increase the frequency of monitoring and conduct life history studies in addition to improving habitat conditions. Sea turtle management efforts and monitoring would continue as they are currently. Although scheduled surveys are not conducted on Desecheo NWR, periodic checks of potential nest areas are conducted by Service or Puerto Rico DNER personnel. The refuge would implement seasonal surveys of migratory landbirds and would pursue opportunities for propagation, reintroduction, and removal of threats to the higo chumbo cactus.

To achieve the goal for conservation, enhancement, and restoration of native plant communities, and their associated wildlife, representative of the native biological diversity that would have been found on Desecheo Island prior to the introduction of exotic species and human activities on the island, we would increase the level of monitoring and efforts at removal of invasive species from the current level. Additional vegetation plots would be established and increased monitoring of the plots would be provided to measure the success of restoration efforts. During the plan period, we would complete the removal all invasive animal species that negatively impact both habitat and native

wildlife. The methods and impacts of removal of invasive animals have been discussed in detail in the Environmental Assessment for Restoring Wildlife Habitat on Desecheo Island (USFWS, 2010).

In cooperation with partners, we would increase efforts to protect the refuge's plant and animal resources and staff from illegal activity. The level of law enforcement staff to conduct surveillance and enforcement activities, and equipment to improve enforcement capabilities on the refuge, would be increased.

Opportunities for environmental education and interpretation, wildlife observation, and wildlife photography to enhance management programs, public appreciation, understanding, and recognition of the importance of the Desecheo NWR would be increased. Since the presence of unexploded ordnance precludes opening of the refuge for general uses, the public programs would focus on off-site environmental education and outreach to mainland communities and schools. Desecheo NWR would also increase the level of off-site interpretation through distribution of brochures and fact sheets. Also subject to safety concerns being met, Desecheo NWR would provide limited opportunities for refuge-guided wildlife observation and wildlife photography. Non-wildlife-dependent activities would be addressed on a case-by-case basis when they are determined to be appropriate and compatible.

In accordance with this Draft CCP/EA, the Service would attempt 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 cooperating agencies and partners to remove hazardous materials and increase safety on the refuge. Safety would be ensured by only permitting controlled, refuge-guided activities in cleared areas. Refuge personnel would continue to maintain existing partnerships, including those with Island Conservation, Army Corps of Engineers, DHS, FURA, and Puerto Rico DNER.

VISION

The Desecheo National Wildlife Refuge is a small, isolated, mountainous tropical island that historically supported a significant number of seabirds and still supports a unique assortment of plant and animal species. As a result of human activities and the introduction of nonnative species, wildlife utilization of the island has been greatly diminished. The refuge is managed to restore, protect, and conserve fish and wildlife resources and habitats, migratory birds, endemic species, and forest communities, with a special emphasis on seabirds. It also provides opportunities for scientific research. Restoration and conservation of the refuge habitats is the Service's commitment to present and future generations.

The refuge works in partnership with others to achieve this vision.

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 identifies the projects associated with the various strategies.

These goals, objectives, and strategies reflect our commitment to achieve the mandates of the Improvement Act, the mission of the Refuge System, and the purposes and vision of Desecheo NWR. The Service intends to accomplish these goals, objectives, and strategies within the next 15 years.

FISH AND WILDLIFE POPULATION MANAGEMENT

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

Discussion:

Desecheo NWR was designated as a reserve for native seabirds. As a result of the introduction of nonnative species, human activities, and possibly naturally occurring changes in the foraging areas utilized by seabirds, the utilization of the island by these birds has greatly diminished since it was first designated as a reserve. In addition to seabirds, several other species of management concern, including a federally threatened cactus, endemic reptiles, and migratory landbirds, are found on the island. A critical component of the overall management program for Desecheo NWR is the development of a monitoring plan to document the effectiveness of management activities on these species.

Objective 1-1: Seabirds - Within 15 years of CCP approval, the refuge would provide suitable nesting habitat and protection to encourage reestablishment of seabird nesting colonies including brown boobies, red footed boobies, brown noddies, and others.

Discussion: To restore the appropriate conditions for reestablishment of seabird nesting colonies, habitat management activities would focus on restoration of native plant species along with increased monitoring of bird populations, habitat changes, and predators. Habitat management would include planting and maintaining native tree species utilized by red footed boobies, vegetation control on potential sites for brown boobies and brown noddies, and predator control, as necessary. Where suitable nesting sites are identified, decoys may be utilized to attract nesting birds.

Strategies:

- Develop a wildlife inventory program to ensure changes in seabird populations are accurately monitored.
- Control invasive species (both plant and animal) through the use of recognized management practices.
- As appropriate, when sites are certified as clear of unexploded ordnance hazards, conduct habitat management and restoration utilizing plant materials propagated at the Cabo Rojo NWR facility.

Objective 1-2: Terrestrial Reptiles - Ensure maintenance of terrestrial reptiles through the monitoring of population levels and the monitoring and control of invasive species that may affect their populations.

Discussion: These efforts would focus on endemic species: (*Ameiva exsul desechensis, Anolis desechensis and Sphaerodactylus levinsi.*

Strategies:

- Conduct periodic surveys for reptiles on Desecheo NWR to determine population and habitat changes.
- Increase frequency of monitoring and conduct life history studies in addition to improving habitat conditions.

Objective 1-3: Sea Turtles - In cooperation with Puerto Rico DNER, continue to monitor and document sea turtle nesting activity and protect adults, nests, and habitat from predators, poaching, and environmental degradation.

Strategies:

- Conduct periodic surveys and maintain records of sea turtle nesting activities.
- Whenever possible, provide law enforcement coverage and assist Puerto Rico DNER with law enforcement activities on and around Desecheo NWR.

Objective 1-4: Migratory Birds - Maintain habitat and document the presence and usage of Desecheo NWR by migratory land birds.

Strategies:

- Continue to conduct opportunistic surveys and maintain records of landbird use of the refuge.
- Implement seasonal surveys of migratory landbirds.

Objective 1-5: Higo Chumbo Cactus - Maintain or expand current population of this threatened cactus on appropriate sites on Desecheo NWR.

Strategies:

- Continue opportunistic surveys to determine population changes.
- Pursue opportunities for propagation, reintroduction, and removal of threats.

HABITAT MANAGEMENT

Goal 2: Conserve, enhance, and restore native plant communities and their associated wildlife, representative of the native biological diversity that would have been found on Desecheo Island prior to the introduction of exotic species and human activities.

Discussion:

The habitat and wildlife utilization of the habitat on Desecheo NWR have been adversely affected by the introduction of goats, monkeys, rats, and its use as a military training range. Plans for removal of invasive animal species have been discussed and evaluated in an EA for restoring wildlife habitat on Desecheo Island, Puerto Rico (USFWS 2010). The staff believes that the assemblages of native wildlife could best be restored and maintained by providing the habitat diversity that was typical of the ecoregion prior to significant human intervention. The refuge would be managed to restore natural conditions and native species, with the recognition that complete restoration 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. The Service also recognizes that some of the habitat management objectives may take longer than the life of this plan (15 years) to achieve.

Objective 2-1: Native Forest Restoration - During the plan's 15-year life span, increase monitoring of habitat conditions, removal of invasive species, and restoration of native species.

Discussion:

Current management of the Desecheo NWR forest is limited to occasional inventories and surveys conducted opportunistically. Systematic monitoring in conjunction with management to remove invasive species and replant natives is needed to document successful restoration or the need to change management practices.

Strategies:

- Increase number of vegetation plots and number of visits to plots to more closely monitor and gage success of restoration efforts.
- Within 10 years of CCP approval, complete removal of all invasive animal species that negatively impact both habitat and native wildlife.
- During the 15-year life of the CCP, replant native species where invasives have been removed or where appropriate conditions have been restored.

Objective 2-2: Climate Change - During the 15-year life of the final CCP, monitor and address any adverse impacts arising from climate change.

Discussion:

Potential impacts from increased average temperatures, sea level rise, and altered weather patterns (increased or decreased rainfall, tropical storms, and hurricanes) could occur as a result of climate changes. In order to identify potential impacts and address them in a timely manner, a monitoring plan would be required.

Strategy:

- Develop and implement a plan for monitoring and mitigating the effects of climate change on the refuge.

RESOURCE PROTECTION

Goal 3: In cooperation with partners, protect the refuge's plant and animal resources and staff from illegal activity.

Discussion:

Although Desecheo NWR is closed to public visitation because of potential hazards from unexploded ordnance, there is documented evidence of illegal activities on the island. These activities include poaching of birds and their eggs, taking of land crabs, burning of grasslands, and smuggling of drugs and humans. These activities affect the refuge's resources both directly and indirectly through removal of wildlife, destruction of habitat, adverse impacts on restoration projects, and disturbance of wildlife.

Objective 3-1: Reduce or eliminate human and drug trafficking activities on and around the refuge.

Discussion:

The occurrence of human and drug trafficking on and around Desecheo NWR affects not only the natural resources of the refuge, but also creates an unsafe environment for visitors to the Marine Reserve surrounding the island and the staff who are conducting management and restoration projects on the refuge.

Strategies:

- Refuge staff would continue ongoing cooperation with partnering agencies to increase surveillance and enforcement that protects refuge resources, visitors to the area, and staff from illegal activities.
- The refuge would continue to monitor illegal hunting/harvesting and increase levels of law enforcement staff and equipment to improve enforcement capabilities on the refuge.
- As necessary, provide law enforcement coverage and assist Puerto Rico DNER with law enforcement activities on and around Desecheo NWR.

VISITOR SERVICES

Goal 4: Provide opportunities for environmental education and interpretation, wildlife observation, and wildlife photography to enhance management programs, public appreciation, understanding, and recognition of the importance of the Desecheo NWR.

Discussion:

Desecheo NWR is currently closed to public access because of unexploded ordnance and sensitive resources. Any access in the foreseeable future would be limited and contingent on cleanup of ordnance and certification that the area is safe for use. During the 15-year life of the CCP, visitor services and environmental education activities would take place off-site and wildlife observation would be conducted from boats. Cleanup of unexploded ordnance is not expected to be completed for several years; therefore, any activities permitted would be under the direct supervision of trained personnel and would only be conducted after the activity is determined to be safe, appropriate, and compatible with the wildlife objectives of the refuge.

Objective 4-1: During the 15-year life of the CCP, environmental education, as identified in the Improvement Act, would be increased and given priority consideration over other public uses.

Discussion:

Environmental education and interpretation programs are aimed at creating public awareness of the natural resources of the refuge, the relationship of those resources to the human environment, and the ways in which to minimize the effects of humans through sustainable practices. Improved environmental education and interpretation programs are expected to benefit the refuge through increased public awareness and appreciation of its resources.

Strategies:

- Continue to maintain and improve refuge website and fact sheets.
- Establish new programs and improve existing off-site environmental education and outreach to mainland communities and schools.

Objective 4-2: During the 15-year life of the CCP, interpretation activities would be increased consistent with the limitations due to prior uses of the refuge.

Strategies:

- Continue to maintain refuge website and fact sheets.
- Increase off-site interpretive programming through the use of brochures and fact sheets, and, subject to safety concerns being met, increase on-site interpretation through guided activities, signage, and brochures.

Objective 4-3: During the 15-year life of the CCP, wildlife observation and wildlife photography would be encouraged and facilitated provided they can be conducted safely and without disturbance to wildlife or habitat.

Discussion:

All access to Desecheo NWR is by boat and landing on the refuge is not permitted because of the hazards associated with unexploded ordnance, the potential for wildlife disturbance, and unsafe terrain. Until such time as safe access to the island could be provided, wildlife observation and wildlife photography must be conducted from the surrounding waters.

Strategies:

- Continue opportunistic wildlife observation from offshore vessels.
- Subject to safety concerns being met, provide limited opportunities for refuge-guided wildlife observation and wildlife photography.

Objective 4-4: Non-wildlife-dependent activities.

Discussion:

Public uses such as camping, picnicking, rock climbing, and radio communications are not priority uses of the Refuge System as defined by the Improvement Act. These uses are not normally permitted on national wildlife refuges, unless they are found to be both appropriate and compatible with the purposes of the refuge.

Strategy:

- Continue to respond to periodic, special requests to visit the refuge for non-wildlife- dependent uses that are appropriate and compatible.

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.

Discussion:

Administration of the Desecheo NWR is affected by the presence of unexploded ordnance, illegal activities (smuggling of drugs and illegal aliens), location that makes it accessible only by boat or helicopter, and rugged topography that makes conducting management activities difficult. To effectively manage the refuge's natural resources, to conduct needed research, or to permit limited public uses of the refuge would require reduction or elimination of some of these hazards. Evaluation of the potential hazards from unexploded ordnance is currently being investigated under the provisions of the Formerly Used Defense Site (FUDS) program. The potential for future activities on Desecheo NWR would be affected by the outcome of the investigations and any cleanup that occurs. In addition, the waters surrounding the refuge are designated as a Marine Reserve, administered by the Puerto Rico DNER. Because of these issues, coordination with the Army Corps of Engineers (FUDS program), DHS, FURA (illegal activities), and Puerto Rico (Marine Reserve) is an integral component of refuge administration.

Objective 5-1: Through cooperative efforts with Commonwealth and Federal partners, the refuge would provide an environment that is safe for wildlife, staff, and research personnel.

Discussion:

Hazards from the presence of unexploded ordnance and persons engaged in illegal activities need to be removed or controlled to ensure a safe environment for employees and other authorized personnel on the refuge. This would be accomplished primarily through cooperative efforts with other agencies noted in the discussion above.

Strategy:

- Continue to work with cooperating agencies and partners to clean up the refuge and increase safety. Safety will be ensured by only permitting controlled, refuge-guided activities in cleared areas.

Objective 5-2: Within 5 years of CCP approval, acquire necessary equipment, tools, and supplies to effectively manage the refuge.

Discussion:

Access to the refuge is currently limited by the availability of vessels capable of operating on open ocean waters during relatively calm weather. To effectively conduct management and research projects, the refuge needs to acquire a vessel capable of transporting personnel and equipment to the island for extended periods of time. Other needs include cameras and monitoring equipment, camping gear, and survey equipment.

Strategy:

- Acquire open-water boat capable of reaching the island for extended visits. In addition, provide automated camera equipment and other necessary tools and supplies for refuge management.

Objective 5-3: Within 5 years of CCP approval, provide staff positions necessary to administer refuge programs and activities.

Discussion:

Current staff for Desecheo NWR consists of 2 FTEs within the Caribbean Islands NWR Complex. These are shared positions with responsibilities for Desecheo NWR and other refuges within the Complex including Laguna Cartagena, Cabo Rojo, and Navassa. Additional personnel are needed to focus on management and biological restoration efforts on Desecheo NWR.

Strategy:

- Provide for 0.5-FTE manager position and 0.5-FTE biologist position.

Objective 5-4: Maintain existing partnerships and establish new ones as necessary to complete refuge objectives and strategies.

Discussion:

At the present time, the refuge works cooperatively with the Army Corps of Engineers (for evaluation and clean up of unexploded ordnance), DHS and FURA (for monitoring and intervention with illegal activities on the refuge, DNER (for management of the surrounding Marine Reserve and endangered species activities, Island Conservation (for control of invasive species), and other divisions of the Service (for wildlife management and endangered species and law enforcement activities). These activities would be maintained and, as appropriate, additional partnership efforts would be initiated when appropriate and beneficial to refuge resources and planned management programs of the refuge.

Strategy:

- Continue existing partnerships, including Island Conservation, Corps of Engineers, DHS, FURA, and Puerto Rico DNER.

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 Desecheo NWR, this section identifies projects, funding and personnel needs, volunteers, partnerships 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 primary linkages of these projects to those planning elements are identified in each summary.

FISH AND WILDLIFE POPULATION MANAGEMENT

Project 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 periodic inventories of seabirds, reptiles, and some plants have been conducted, the methodology and frequency of these activities need to be standardized and increased.

This project would address the need for increased inventorying and monitoring species of concern (including seabirds, endangered and threatened plants and animals, and invasive species) through the addition of biological staffing and the funding of several important surveys. As a result, Desecheo NWR would 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 would provide the necessary staff, equipment, and materials for developing and implementing the inventorying and monitoring plan, provide the information necessary for adapting management activities to accommodate changes, provide long-term data on population trends that can assist in determining regional population fluctuations and result in the development of habitat and species utilization maps for all refuge lands.

Objectives and Strategies linked to this project: 1.1.a, 1.2.a-b, 1.3.a, 1.4.a-b, 1.5.a, and 2.1.a

Project 2. Invasive and Exotic Species Control

Invasive and exotic species on Desecheo NWR include both plants and animals that may alter habitat, and provide direct competition or prey upon native species of management concern. In the past, projects were initiated to remove goats and monkeys from the island to permit habitat restoration and improve the chances for reestablishment of nesting seabird colonies. Effective management of Desecheo NWR wildlife is dependent on the successful control of goats, monkeys, rats, and invasive plants that affect these native species. Whenever exotic or invasive species are adversely affecting the reproduction, survival, or habitat of the managed species, control or elimination of the invasive species is warranted. Depending on the species involved and the magnitude of impacts, documented control measures may vary. Where an invasive plant is affecting nesting habitat, elimination may not be possible and periodic control would be most effective.

The invasive species control project would identify the priority species and areas for implementation of control measures. This project would provide staff, equipment, materials, and funding for contracts to remove harmful invasive species from managed areas. Details of this project are provided in Section B for habitat restoration on Desecheo Island, Puerto Rico (USFWS 2010).

Objectives and Strategies linked to this project: 1.1.b and 2.1.b

HABITAT MANAGEMENT

Project 3. Habitat Restoration and Plant Propagation

Historical human uses, introduced species, and weather events have affected the habitat of nesting seabirds and native plants on Desecheo NWR. Restoration of native plant associations is proposed for sites where the habitat has been damaged. To accomplish the needed restoration, the plant nursery facility at the Caribbean Islands NWR Headquarters in Cabo Rojo would be upgraded and maintained to provide appropriate plant materials for Desecheo NWR.

Objectives and Strategies linked to this project: 1.1.c, 1.2.b, 1.5.b, and 2.1.c

RESOURCE PROTECTION

Project 4. Law Enforcement, Safety, Environmental Compliance and Coordination

Although Desecheo NWR is closed to public visitation because of potential hazards from unexploded ordnance, there is documented evidence of illegal activities on the island. These activities include poaching of birds and their eggs, taking of land crabs, burning of grasslands, and smuggling of drugs and humans. These activities affect the refuge's resources both directly and indirectly through removal of wildlife, destruction of habitat, adverse impacts on restoration projects, and disturbance of

the wildlife. To ensure protection of the wildlife and habitat and compliance with the refuge regulations and management objectives, law enforcement patrols and coordination with cooperating agencies would be increased.

Objectives and Strategies linked to this project: 3.1.a-c, and 5.4.a

VISITOR SERVICES

Project 5. Outreach and Education Material Production

As noted previously, Desecheo NWR is closed to public visitation because of unexploded ordnance and environmental hazards. The refuge is, however, very visible from beaches and recreational sites on the northwestern coast of the Puerto Rico main island. Because of this visibility, both visitors and residents are interested in knowing about the island, its resources, and management. This project would provide for the development and production of informational and educational material to be used for environmental education activities and to provide basic refuge information. In addition to the development of new outreach and education materials, the refuge would periodically revise and update information on the Desecheo NWR website to reflect any changes in regulations or management.

Objectives and Strategies linked to this project: 4.1.a-b, 4.2.a-b, and 5.4.a

REFUGE ADMINISTRATION

Project 6. Equipment and Material Acquisition

Proposed wildlife and habitat management activities on Desecheo NWR require the refuge to have the ability to transport personnel, material, and supplies safely across the open ocean. To perform this function, the refuge would acquire an open-water boat capable of reaching the island for extended visits. Additional equipment such as automated cameras to monitor wildlife and possible illegal activities on the refuge, as well as tools and supplies for refuge management, are also included in this project.

Objectives and Strategies linked to this project: 1.1.a-c, 1.2.a-b, 1.3.a-b, 1.5.a-b, 2.1.a-c, 3.1.a-c, 5.1.a, and 5.2.a

Project 7. Staff Increase

Current staff for the Desecheo NWR consists of 2 FTEs within the Caribbean Islands NWR Complex. These are shared positions with responsibilities for Desecheo NWR and other refuges within the Complex, including Laguna Cartagena, Cabo Rojo, and Navassa. Expanded management activities proposed in this Draft CCP/EA would require additional personnel to focus on monitoring, surveying, and habitat restoration efforts, as well as coordination with cooperating agencies. To effectively conduct the proposed management, the refuge would need one additional 0.5-FTE management position and 0.5-FTE biologist position.

Objectives and Strategies linked to this project: All

FUNDING AND PERSONNEL

Table 5. Summary of projects

PROJECT NUMBER	PROJECT TITLE	FIRST YEAR COST	RECURRING ANNUAL COST	STAFF (FTEs)
1	Inventorying and Monitoring	30,000	12,000	0.2
2	Continued Invasive and Exotic Species Control	500,000	20,000	0.2
3	Habitat Restoration and Plant Propagation	55,000	32,000	0.3
4	Law Enforcement, Safety, Environmental Compliance, and Coordination	25,000	25,000	0.2
5	Outreach and Education Material Production	28,000k	8,000	0.1
6	Management Equipment and Material Acquisition	120,000	8,000	0
7*	Staff Increase*			1 FTE

**Project 7 is a summary of additional staff required for complete implementation of the projects included in this Draft CCP/EA.*

PARTNERSHIP/VOLUNTEERS OPPORTUNITIES

An important element of this Draft CCP/EA is to establish partnerships with local volunteers, landowners, private organizations, and state and federal natural resource agencies. Since there are no private lands in the immediate vicinity of the refuge, and access to the refuge is restricted because of hazards, opportunities for partnerships with landowners and non-governmental organizations are very limited. At regional and Commonwealth levels, partnerships may be established or enhanced with organizations such as: Commonwealth Department of Natural and Environmental Resources; Island Resources; Army Corps of Engineers; and FURA (Commonwealth Drug Interdiction Agency).

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. These step-down plans would incorporate strategies and help to achieve the goals and objectives of the comprehensive conservation plan.

Table 6. Step-Down Plans for Desecheo NWR

Step-down Plan	Completion Date
Law Enforcement Plan	2012
Fire Management Plan	2016
Wildlife Inventory Plan	2013
Habitat Management Plan	2014
Invasive Species Control Plan	2013
Forest Management Plan	2015
Station Safety Plan (includes communications plan)	Annually
Sign Plan	2012

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 would be adopted for the refuge. The habitat management strategies would be systematically evaluated to determine management effects on wildlife populations. This information would be used to refine approaches and determine how effectively the objectives are being accomplished. Evaluations would 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 would be made. Subsequently, the comprehensive conservation plan would be revised. Specific monitoring and evaluation activities would be described in the step-down management plans.

PLAN REVIEW AND REVISION

The final CCP would be reviewed annually as the refuge's annual work plans and budgets are developed. It would also be reviewed to determine the need for revision. A revision would 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 CCP would 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 final CCP and the step-down management plans would be subject to public review and NEPA compliance.

SECTION B. ENVIRONMENTAL ASSESSMENT

I. Background

INTRODUCTION

The Service prepared this Environmental Assessment (EA) for Desecheo 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 this Draft CCP/EA, a final decision will be made by the Service that will guide Desecheo 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.

The Draft CCP/EA proposes a management direction which is described in detail through a set of goals, objectives, and strategies. The 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 would provide general management direction, subsequent step-down plans would 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 Service will select an alternative to be fully developed for this refuge.

The 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 this 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 purpose is to ensure that Desecheo NWR affords particular value in carrying out the national migratory bird management program; manages special status plants and animals; conserves, enhances, and restores native plant communities and their associated wildlife; protects the refuge's plant and animal resources and staff from illegal activity; and provides for appropriate, compatible public uses. 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 Desecheo NWR that provides guidance for future refuge management and meets the requirements of the Improvement Act.

DECISION FRAMEWORK

Based on the assessment described in this document, the Service will select an alternative to implement the Comprehensive Conservation Plan for Desecheo National Wildlife Refuge. The finalized 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 is 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

Desecheo NWR is located approximately 14 miles west of Puerto Rico. The refuge encompasses the entire island of Desecheo, which has rugged topography and is 360 acres in size.

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 Draft CCP/EA 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 the document, with a description of the alternatives considered and an analysis of the environmental consequences of the alternatives. When fully implemented, the final CCP will strive to achieve the vision and purposes of Desecheo NWR.

The Draft CCP/EA's overriding consideration is 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

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 the Draft CCP/EA for Desecheo 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 Desecheo 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.

A public scoping meeting was held on March 19, 2009. This meeting was announced through local newspapers (*Primera Hora* [online] and *La Estrella*). Individual letters were sent to 17 Commonwealth officials; seven Municipalities, 15 federal agency personnel and 20 educational institutions, non-governmental organizations, and individuals. E-mail notification was sent to an additional 46 addressees. The meeting was attended by 16 individuals; two representing elected officials, three representing government agencies, three representing organizations and the remainder as individuals. To date, 26 comment sheets have been received by mail, e-mail, or hand delivered.

A complete summary of the issues and concerns is provided in Appendix D.

II. Affected Environment

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

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 Draft CCP; the priorities and goals of the Desecheo NWR 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 objectives was 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, Desecheo 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 concerns wildlife management: we will monitor, protect, and recover special status plants and animals and species of management interest. Under this goal and this alternative, Desecheo NWR would continue with periodic efforts to survey and manage for seabird restoration, as well as continue periodic surveys of endemic reptiles. We would also continue opportunistic surveys and protection of nesting hawksbill turtles and their nests/eggs, opportunistic surveys of migratory landbirds, and opportunistic surveys of the federally threatened higo chumbo cactus.

The second goal calls for the conservation, enhancement, and restoration of native plant communities, and their associated wildlife, representative of the native biological diversity that would have been found on Desecheo Island prior to the introduction of exotic species and human activities on the island. Under this goal, Alternative A, the refuge, as necessary, would continue with removal of invasive animal species as a means to the end of native forest restoration. We would also begin monitoring of 10 established vegetation plots across the island to evaluate success of forest

restoration efforts. As necessary, the refuge would continue removing invasive animal species. However, there would be no active monitoring of climate change.

Goal 3 concerns resource protection. In cooperation with partners, we would aim to protect the refuge's plant and animal resources and staff from illegal activity. With regard to human and drug trafficking, Desecheo NWR would continue cooperation with partnering agencies to provide surveillance and enforcement that protects refuge resources from illegal activities. In order to combat poaching (illegal hunting and harvesting), we would continue to monitor illegal hunting/harvesting and as necessary, conduct enforcement.

Goal 4 addresses public use, and calls for providing opportunities for environmental education, interpretation, and wildlife observation and photography to enhance management programs, public appreciation, understanding, and recognition of the importance of Desecheo NWR. Under this goal, Alternative A would continue to provide environmental education and interpretation by maintaining the refuge website and fact sheets. Opportunistic offshore wildlife observation and photography would continue to be available. In terms of non-wildlife-dependent activities, staff would continue to respond to periodic, special requests to visit the refuge for non-wildlife-dependent uses that are appropriate and compatible.

Under Goal 5, we would aim 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. Alternative A would continue to work with cooperating agencies and partners to clean up and increase safety on the refuge. For the foreseeable future, the refuge would continue to be closed to access to protect the public from unexploded ordnance and other hazards. Access to the refuge and refuge management would continue to be limited due to lack of open-water boats and other equipment. No staff would be specifically assigned to or stationed at the refuge, and it would be managed from Complex Headquarters in Boquerón, Puerto Rico, as it is now. The Service would continue existing partnerships collaborating on behalf of the refuge, including Island Conservation, Corps of Engineers, DHS, FURA, and Puerto Rico DNER.

ALTERNATIVE B - PUBLIC USE

Alternative B would emphasize public use of the refuge with any additional availability of budgetary and staffing resources.

Under Alternative B, the refuge would pursue the same five goals as in Alternative A. The first goal concerns wildlife management: we will monitor, protect, and recover special status plants and animals and species of management interest. Under this goal and this alternative, Desecheo NWR's efforts and actions would be identical to those of Alternative A, Current Management. That is, we would continue with periodic efforts to survey and manage for seabird restoration, as well as continue periodic surveys of endemic reptiles. We would also continue opportunistic surveys and protection of nesting hawksbill turtles and their nests/eggs, opportunistic surveys of migratory landbirds, and opportunistic surveys of the federally threatened higo chumbo cactus.

The second goal calls for the conservation, enhancement, and restoration of native plant communities and their associated wildlife, representative of the native biological diversity that would have been found on Desecheo Island prior to the introduction of exotic species and human activities on the island. Under this goal, Alternative B would also be quite similar to Alternative A. As necessary, the refuge would continue with removal of invasive animal species as a means to the end of native forest restoration. We would also implement efforts to avoid introduction of new invasive species from increased public visitation. Forest monitoring actions would be the same as Alternative

A. We would begin monitoring ten established vegetation plots across the island to evaluate success of forest restoration efforts. As under Alternative A, the refuge, as necessary, would continue removing invasive animal species. In addition however, we would also implement efforts to avoid introduction of new invasive species from increased public visitation. With regard to climate change, once again there would be no active monitoring under Alternative B.

Goal 3 concerns resource protection. In cooperation with partners, we would aim to protect the refuge's plant and animal resources and staff from illegal activity. Alternative B's approach to pursuing Goal 3 would be identical to Alternative A's. With regard to human and drug trafficking, Desecheo NWR would continue cooperation with partnering agencies to provide surveillance and enforcement that protects refuge resources from illegal activities. In order to combat poaching (illegal hunting and harvesting), we would continue to monitor illegal hunting/harvesting and, as necessary, conduct enforcement.

Goal 4 addresses public use, and calls for providing opportunities for environmental education, interpretation, and wildlife observation and photography to enhance management programs, public appreciation, understanding, and recognition of the importance of Desecheo NWR. Under this goal, Alternative B would step up the level of off-site environmental education and outreach to mainland communities and schools. We would also increase the level of off-site, non-personal interpretation such as brochures and fact sheets, and, subject to safety concerns being met, increase on-site, non-personal interpretation such as signage and kiosks. Subject to safety concerns being met, the refuge would increase opportunities for on-site wildlife observation and photography. We would also allow for appropriate and compatible non-wildlife-dependent uses on the refuge by means of special use permits.

Under Goal 5, we would aim 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, as portions of the refuge are cleared of unexploded ordnance and other safety issues have been addressed, these sites may be opened to the public. The refuge would acquire an open-water boat capable of reaching the island for extended visits. In addition, we would provide automated camera equipment and other necessary tools and supplies for refuge management. Alternative B would add a 0.5-FTE public use position or park ranger position. As in Alternative A, the Service would continue existing partnerships collaborating on behalf of the refuge, including Island Conservation, Corps of Engineers, DHS, FURA, and Puerto Rico DNER.

ALTERNATIVE C - HABITAT AND WILDLIFE RESTORATION AND LIMITED PUBLIC USE (PROPOSED ALTERNATIVE)

Under Alternative C, the proposed alternative, habitat and wildlife restoration would occur alongside limited public use. The refuge would pursue the same five goals as in Alternative A.

The first goal concerns wildlife management: We would monitor, protect, and recover special status plants and animals and species of management interest. Under Alternative C, within 15 years of CCP approval, the refuge would aim to provide the conditions that would allow for reestablishment of nesting seabird colonies. With respect to terrestrial reptiles, we would increase the frequency of monitoring and conduct life history studies in addition to improving habitat conditions. Sea turtle management efforts would be the same as Alternative A. We would continue opportunistic surveys and protection of nesting hawksbill turtles and their nests/eggs. The refuge would implement seasonal surveys of migratory landbirds. Alternative C would pursue opportunities for propagation, reintroduction, and removal of threats to the higo chumbo cactus.

The second goal calls for the conservation, enhancement, and restoration of native plant communities, and their associated wildlife, representative of the native biological diversity that would have been found on Desecheo Island prior to the introduction of exotic species and human activities on the island. Alternative C would increase the level of monitoring and efforts at removal of invasive species from Alternative A. It would increase the number of vegetation plots and number of visits to these plots to more closely monitor and gage success of restoration efforts. Within 15 years of CCP approval, we would complete the removal all invasive animal species that negatively impact both habitat and native wildlife. Alternative C would develop and implement a plan for monitoring and mitigating the effects of climate change on the refuge.

The third goal addresses resource protection. In cooperation with partners, we would aim to protect the refuge's plant and animal resources and staff from illegal activity. Alternative C would increase the level of surveillance and enforcement in cooperation with partners. It would also increase the level of law enforcement staff and equipment to improve enforcement capabilities on the refuge.

Goal 4 addresses public use, and calls for providing opportunities for environmental education, interpretation, and wildlife observation and photography to enhance management programs, public appreciation, understanding, and recognition of the importance of Desecheo NWR. Under this goal, like Alternative B, we would step up the level of off-site environmental education and outreach to mainland communities and schools. The refuge would increase the level of off-site, non-personal interpretation such as brochures and fact sheets, and, subject to safety concerns being met, increase on-site, non-personal interpretation such as signage and brochures. Also subject to safety concerns being met, we would intend to provide limited opportunities for refuge-guided wildlife observation and photography on the refuge. Concerning non-wildlife-dependent activities, Alternative C would be identical to Alternative A. The refuge would continue to respond to periodic, special requests by non-wildlife-dependent uses that are appropriate and compatible.

Under the fifth goal, we would aim 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 cooperating agencies and partners to clean up and increase safety on the refuge. Safety would be ensured by only permitting controlled, refuge-guided activities in cleared areas. As in Alternative B, Alternative C would acquire an open-water boat capable of reaching the island for extended visits. In addition, it would provide automated camera equipment and other necessary tools and supplies for refuge management.

With regard to staffing, we would provide for 0.5-FTE manager position and 0.5-FTE biologist position, for a total of 3.0 FTE's. In terms of partnerships, Desecheo NWR would continue existing partnerships, including those with Island Conservation, Corps of Engineers, DHS, FURA, and Puerto Rico DNER.

FEATURES COMMON TO ALL ALTERNATIVES

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

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 EA 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 would 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 surveys would continue for seabirds, terrestrial reptiles, sea turtles, migratory birds, and higo chumbo cactus. In particular, all three alternatives would continue opportunistic surveys and protection of nesting hawksbill turtles and their nests/eggs as well as opportunistic surveys for the federally endangered higo chumbo cactus. Ongoing invasive species management would continue under all alternatives. Impacts of the invasive species management program are covered in the Environmental Assessment for Restoring Wildlife Habitat on Desecheo Island (USFWS 2010).

NATIVE PLANT COMMUNITIES

In general, each of the alternatives would conserve, enhance, and restore native plant communities, and their associated wildlife, representative of the native biological diversity that would have been found on Desecheo Island prior to the introduction of exotic species and human activities on the island. Native forest restoration, forest monitoring, and invasive species control would be conducted under all three alternatives.

RESOURCE PROTECTION

In general, each of the alternatives would strive to protect the refuge's plant and animal resources and staff from illegal activity by working with partners. All three alternatives would take actions to address human and drug smuggling and illegal hunting and harvesting.

PUBLIC OUTREACH

In general, each of the alternatives would aim to provide certain opportunities for environmental education, interpretation, and wildlife observation and photography to enhance management programs, public appreciation, understanding, and recognition of the refuge's importance. The refuge website and fact sheets would be maintained under all three alternatives as would be opportunities for wildlife observation from offshore. Desecheo NWR would continue to respond to periodic, special requests for visits by non-wildlife-dependent users, as long as they are determined to be appropriate and compatible.

PUBLIC SAFETY

All three alternatives would continue to work with cooperating agencies and partners to clean up and increase safety on Desecheo NWR.

COMPARISON OF THE ALTERNATIVES BY ISSUE

Table 7. Comparison of alternatives by management issues for Desecheo NWR

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Public Use	Alternative C – Habitat and Wildlife Restoration and Limited Public Use (Proposed Alternative)
Goal 1: Monitor, protect, and recover special status plants and animals and species of management interest.			
Seabird management	Continue with periodic efforts to survey and manage for seabird restoration.	Same as Alternative A.	Within 15 years of CCP approval, provide the conditions that would allow for reestablishment of nesting seabird colonies.
Terrestrial reptiles	Continue periodic surveys of endemic reptiles.	Same as Alternative A.	Increase frequency of monitoring and conduct life history studies in addition to improving habitat conditions.
Sea turtles	Continue opportunistic surveys and protection of nesting hawksbill turtles and their nests/eggs.	Same as Alternative A.	Same as Alternative A.
Migratory birds	Continue opportunistic surveys of landbirds.	Same as Alternative A.	Implement seasonal surveys of migratory landbirds.
Higo chumbo cactus	Continue opportunistic surveys of federally threatened cactus.	Same as Alternative A.	Same as Alternative A and pursue opportunities for propagation, re-introduction, and removal of threats.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Public Use	Alternative C – Habitat and Wildlife Restoration and Limited Public Use (Proposed Alternative)
Goal 2: Conserve, enhance, and restore native plant communities and their associated wildlife, representative of the native biological diversity that would have been found on Desecheo Island prior to the introduction of exotic species and human activities on the island.			
Native forest restoration	As necessary, continue with removal of invasive animal species.	Same as Alternative A, plus implement efforts to avoid introduction of new invasive species from increased public visitation.	Increase level of monitoring and efforts at removal of invasive species from Alternative A.
Forest monitoring	Begin monitoring of 10 established vegetation plots across the island to evaluate success of forest restoration efforts.	Same as Alternative A.	Increase number of vegetation plots and number of visits to plots to more closely monitor and gage success of restoration efforts.
Invasive species control	As necessary, continue with removal of invasive animal species.	Same as Alternative A, plus implement efforts to avoid introduction of new invasive species from increased public visitation.	Within 10 years of CCP approval, complete removal of all invasive animal species that negatively impact both habitat and native wildlife.
Climate change	No active monitoring.	Same as Alternative A.	Develop and implement a plan for monitoring and mitigating the effects of climate change on the refuge.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Public Use	Alternative C – Habitat and Wildlife Restoration and Limited Public Use (Proposed Alternative)
Goal 3: In cooperation with partners, protect the refuge's plant and animal resources and staff from illegal activity.			
Human and drug trafficking	Continue cooperation with partnering agencies to provide surveillance and enforcement that protects refuge resources from illegal activities.	Same as Alternative A.	Increase level of surveillance and enforcement in cooperation with partners.
Poaching (illegal hunting and harvesting)	Continue to monitor illegal hunting/harvesting and as necessary, conduct enforcement.	Same as Alternative A.	Increase level of law enforcement staff and equipment to improve enforcement capabilities on the refuge.
Goal 4: Provide opportunities for environmental education, interpretation, and wildlife observation and photography to enhance management programs, public appreciation, understanding, and recognition of the importance of Desecheo NWR.			
Environmental education (EE)	Continue to maintain refuge website and fact sheets.	Step up level of off-site EE and outreach to mainland communities and schools.	Same as Alternative B.
Interpretation	Continue to maintain refuge website and fact sheets.	Increase level of off-site, non-personal interpretation such as brochures and fact sheets, and, subject to safety concerns being met, increase on-site, non-personal interpretation such as signage and kiosks.	Increase level of off-site, non-personal interpretation such as brochures and fact sheets, and, subject to safety concerns being met, increase on-site, non-personal interpretation such as signage and brochures.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Public Use	Alternative C – Habitat and Wildlife Restoration and Limited Public Use (Proposed Alternative)
Wildlife observation and photography	Continue opportunistic offshore wildlife observation.	Subject to safety concerns being met, increase opportunities for on-site wildlife observation and photography.	Subject to safety concerns being met, provide limited opportunities for refuge-guided wildlife observation and photography on the refuge.
Non-wildlife-dependent activities	Continue to respond to periodic, special requests to visit the refuge for non-wildlife-dependent uses that are appropriate and compatible.	Allow for appropriate and compatible non-wildlife-dependent uses on the refuge by means of special use permits.	Same as Alternative A.
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.			
Safety	Continue to work with cooperating agencies and partners to clean up and increase safety on the refuge. For foreseeable future, refuge continues to be closed to access to protect the public from unexploded ordnance and other hazards.	As portions of refuge are cleared of unexploded ordnance and other safety issues have been addressed, these sites may be opened to the public.	Continue to work with cooperating agencies and partners to clean up and increase safety on the refuge. Safety would be ensured by only permitting controlled, refuge-guided activities in cleared areas.
Equipment	Access to refuge and refuge management continue to be limited by lack of open-water boat and other equipment.	Acquire open-water boat capable of reaching the island for extended visits. In addition, provide automated camera equipment and other necessary tools and supplies for refuge management.	Same as Alternative B.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Public Use	Alternative C – Habitat and Wildlife Restoration and Limited Public Use (Proposed Alternative)
Staffing	No staff specifically assigned to or stationed at refuge; managed from Complex headquarters.	Add 0.5-FTE public use staff position or park ranger position.	Provide for 0.5-FTE manager position and 0.5-FTE biologist position. Increase of 1 FTE to 3.0 FTEs total.
Partnerships	Continue existing partnerships, including Island Conservation, Corps of Engineers, DHS, FURA, and Puerto Rico DNER.	Same as Alternative A.	Same as Alternative A.

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, various solutions to issues identified in scoping were considered.

The one distinct alternative that was considered but eliminated from more detailed analysis was immediately opening the entire refuge to a wide range of public uses. This alternative was rejected because of the lingering threat to public safety posed by the potential for unexploded ordnance on Desecheo Island. Until the entire refuge, or at least major portions of it, is certified as free from hazard, it cannot be opened to the general public.

IV. Environmental Consequences

OVERVIEW

This section 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 comprehensive conservation plan.

EFFECTS COMMON TO ALL ALTERNATIVES

A few potential effects will be virtually 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 non-discrimination 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 EA would 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 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 warning. 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

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 Draft CCP/EA 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

Since the refuge encompasses the entire island of Desecheo and there are no abutting private lands or inholdings, additional land acquisition is not contemplated in this Draft CCP/EA under any of the alternatives.

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 eventual construction of new trails or small-scale facilities. In most cases, these management actions would require review by the Service's Regional Archaeologist in consultation with the Commonwealth of Puerto Rico 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.

REFUGE REVENUE-SHARING

Since Desecheo has always been in the public domain, no annual refuge revenue-sharing payment is made to the Commonwealth of Puerto Rico taxing authority. Further, since there is no opportunity for acquisition of additional lands, no revenue sharing payments would be included under any of the alternatives.

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.

The effects of invasive species management and control activities are described and evaluated in the Environmental Assessment for Restoring Wildlife Habitat on Desecheo Island, Puerto Rico (USFWS, 2010).

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, Desecheo NWR would continue to be managed as it is at present. The probable environmental effects of this course of action are summarized below.

The presence of seabirds on Desecheo NWR is likely to increase somewhat under Alternative A, but nesting is still considered to be unlikely on the island. No changes are expected in the species diversity or numbers of terrestrial reptiles. Hawksbill turtle use, nesting, and reproductive success are all unlikely to change in this scenario. Likewise, the seasonal presence of migratory landbirds would probably not change. The status of the higo chumbo cactus appears unlikely to change under the conditions that would prevail with this alternative.

The proposed removal of invasive animal species would improve prospects for restoration of native forest habitat on Desecheo NWR. Invasive species would continue to be partially controlled but would also continue to pose a problem for native flora and fauna on the refuge. The refuge would be subjected to uncertain effects from climate change, both direct and indirect. These are impossible to predict with any specificity, but could include exposure to more frequent or stronger hurricanes, sea level rise, and the appearance of non-indigenous species of plants and animals, which would interact with and possibly displace indigenous flora and fauna through competition for resources and space, or through predation and parasitism. Over the 15 year life of the CCP, impacts from climate change to the refuge's ecology would probably not be substantial, but even this cannot be stated with complete certainty.

Alternative A's continued environmental education and interpretive services for the public, while at a relatively low level would nonetheless constitute a beneficial impact. Wildlife observation and photography opportunities would continue to be restricted to those available from boats offshore, since the refuge and island proper would remain generally closed to public visitation. Non-wildlife-dependent activities would continue to be permitted on a case-by-case basis; impacts to refuge resources from these infrequent activities would be minimal. By and large, the closure to public access would continue to safeguard the public from unexploded ordnance and other hazards.

ALTERNATIVE B - PUBLIC USE

Alternative B would emphasize public use of Desecheo NWR with any additional availability of budgetary and staffing resources. In general, impacts on habitat and wildlife from this alternative would be very similar to those of Alternative A. Seabird presence on Desecheo would likely to increase somewhat under Alternative B, but nesting is still considered to be unlikely on the island. No changes are expected in the species diversity or numbers of terrestrial reptiles. Hawksbill turtle use, nesting, and reproductive success are all unlikely to change in this scenario. Likewise, the seasonal presence of migratory landbirds would probably not change. The status of the higo chumbo cactus appears unlikely to change under the conditions that would prevail with this alternative.

As with Alternative A, under Alternative B the removal of invasive animal species would improve the prospects for restoration of native forest habitat on Desecheo NWR. However, under this alternative specifically, the refuge might face additional risks from introduction of new invasive species due to increased public visitation. Due to the refuge's isolation, visitation would probably never be heavy, so the risk of invasive species introduction related to visitation in any one year would be low, but over time, it would probably occur or be at a higher risk of occurring. Removal of invasive animal species would improve prospects for restoration of native forest habitat on Desecheo NWR. Overall, under Alternative B, invasive species would continue to be controlled but would remain a problem requiring some level of attention throughout the 15-year lifetime of the CCP.

As in the case of Alternative A, under Alternative B the refuge would also be subjected to uncertain effects from climate change, both direct and indirect. These are impossible to predict with any specificity, but could include exposure to more frequent or stronger hurricanes, sea level rise, and the appearance of non-indigenous species of plants and animals, which would interact with and possibly displace indigenous flora and fauna through competition for resources and space, or through predation and parasitism. Over the 15-year life of the CCP, impacts from climate change to the refuge's ecology would probably not be substantial, but even this cannot be stated with complete certainty.

Alternative B's expanded environmental education opportunities would increase beneficial impacts for the public, as would an expanded interpretive program. There would also be increased opportunities for on-site wildlife observation and photography in this alternative. As in Alternative A, non-wildlife-dependent activities would continue to be permitted on a case-by-case basis; impacts to refuge resources from these activities would likely be minimal, due to their infrequency and stipulations attached to these uses designed to eliminate or minimize any adverse effects.

Alternative B would gradually open the refuge to the public as it is cleared of unexploded ordnance and other hazards. This would increase the benefits the refuge provides to the public. Public safety would be maintained by ensuring that access is restricted to those areas that have been certified or designated by the Corps of Engineers as safe for all public entry.

ALTERNATIVE C - HABITAT AND WILDLIFE RESTORATION AND LIMITED PUBLIC USE (PROPOSED ALTERNATIVE)

Under Alternative C, habitat and wildlife restoration would occur alongside limited public use. Alternative C is the Service's proposed alternative, and the basis for the objectives in Chapter IV of the Draft CCP. Due to measures such as intensified habitat restoration and invasive species control, seabird presence on Desecheo NWR is likely to increase more than under Alternatives A or B. Moreover, there would be a greater chance of reestablishing nesting of one or more species on the island due to the use of decoys to actively attract breeding pairs. Desecheo NWR's terrestrial reptile populations may also increase due to habitat restoration. However, use of the refuge by nesting hawksbill turtles and the turtles' reproductive success are unlikely to change from the baseline of Alternative A.

The diversity and numbers of migratory landbirds may increase to the extent that habitat restoration is successful. The status of the higo chumbo cactus on Desecheo NWR would probably improve because of increased efforts at propagation, reintroduction, and removal of threats. In general, the increased removal of invasive species and increased forest monitoring would improve the probability that native forest habitat can be restored and expedite the process of restoration. Invasive species would be controlled more thoroughly and some may be eliminated entirely, but over time, the refuge would have to spend some level of staffing and budgetary resources to maintain vigilance in the face of the continuing, and probably increasing, threat posed by encroaching invasive species.

As in the case of Alternatives A and B, under Alternative C the refuge would also be subjected to uncertain effects from climate change, both direct and indirect. These are impossible to predict with any specificity, or to quantify, but could include exposure to more frequent or stronger hurricanes, sea level rise, and the appearance of non-indigenous species of plants and animals, which would interact with and possibly displace indigenous flora and fauna through competition for resources and space, or through predation and parasitism. Over the 15-year life of the CCP, impacts from climate change to the refuge's ecology would probably not be substantial, but even this cannot be stated with complete certainty. Under Alternative C, planning to monitor and mitigate the effects of climate change on the refuge may improve adaptive management, reduce adverse impacts, and increase prospects for possible beneficial effects.

Public use-related impacts of Alternative C would be like those of Alternative B. Alternative C's expanded environmental education opportunities would increase beneficial impacts for the public, as would an expanded interpretive program. There would also be increased opportunities for on-site wildlife observation and photography in this alternative. As in Alternatives A and B, non-wildlife-dependent activities would continue to be permitted on a case-by-case basis; impacts to refuge resources from these activities would likely be minimal, due to their infrequency and stipulations attached to these uses designed to eliminate or minimize any adverse effects.

Like Alternative B, Alternative C would gradually open the refuge to the public as it is cleared of unexploded ordnance and other hazards. This would increase the benefits the refuge provides to the public. Public safety would be maintained by ensuring that access is restricted to those areas that have been certified or designated by the Corps of Engineers as safe for all public entry.

UNAVOIDABLE IMPACTS AND MITIGATION MEASURES

Under Alternative A – the no-action alternative – there are various unavoidable impacts, including law enforcement that is not adequate for protecting refuge natural resources and any significant 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; and a continuing decrease 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 – the public use-oriented alternative – suffers from many of the shortcomings and unavoidable impacts listed for Alternative A, at least as pertains to conserving and restoring biodiversity and the health of the refuge's indigenous flora and fauna.

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 would employ to mitigate and minimize the potential impacts that would result from implementation of the proposed alternative.

SOIL DISTURBANCE IMPACTS ON VEGETATION AND WATER QUALITY

Soil disturbance, erosion, damage to vegetation from crushing and shearing, and siltation due to eventual low levels of 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 visitors to confine themselves to trails.

Foot traffic on new and extended foot trails is expected to have a negligible 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 disturbing 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 considered to be significant. As indicated, the refuge remains closed, and during the 15-year planning horizon, if areas are opened, it would be done 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, may 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 that require the clearing of non-sensitive vegetation along their length. This is expected to be a minor short-term impact. At present, no designated or formal trails are planned, but they are a possibility during the 15-year life of the CCP if 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.

Table 8. Summary of environmental effects by alternative for Desecheo NWR

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Public Use	Alternative C – Habitat and Wildlife Restoration and Limited Public Use (Proposed Alternative)
Seabirds	Seabird presence on Desecheo NWR likely to increase somewhat, but nesting unlikely.	Same as Alternative A.	Seabird presence on Desecheo NWR likely to increase more than under Alternatives A and B; higher chance of reestablishing nesting of one or more species on island.
Terrestrial reptiles	No changes in species diversity or numbers expected.	Same as Alternative A.	Terrestrial reptile populations may increase due to habitat restoration.
Sea turtles	Hawksbill turtles use, nesting, and reproductive success unlikely to change.	Same as Alternative A.	Same as Alternative A.
Migratory birds	Seasonal presence of migratory landbirds unlikely to change.	Same as Alternative A.	Diversity and numbers of migratory landbirds may increase due to habitat restoration.
Higo chumbo cactus	Status unlikely to change.	Same as Alternative A.	Status of cactus on Desecheo NWR would probably improve because of increased efforts at propagation, reintroduction, and removal of threats.
Native forest	Removal of invasive animal species would improve prospects for restoration of native forest habitat at Desecheo.	Same as Alternative A, but refuge might face additional risks from introduction of new invasive species due to increased public visitation.	Increased removal of invasive species and increased forest monitoring would improve probability that native forest habitat can be restored and expedite the process of restoration.
Invasive species	Invasive species continue to be controlled but continue to be a problem.	Same as Alternative A.	Invasive species would be controlled more thoroughly and some may be eliminated entirely.

Issues	Alternative A (Current Management – No Action Alternative)	Alternative B – Public Use	Alternative C – Habitat and Wildlife Restoration and Limited Public Use (Proposed Alternative)
Climate change	Refuge would be subjected to uncertain effects of climate change, both direct and indirect, which are impossible to predict with any specificity.	Same as Alternative A.	Planning to monitor and mitigate the effects of climate change on the refuge may improve adaptive management, reduce adverse impacts, and increase prospects for possible beneficial effects.
Environmental education (EE)	Continued environmental education services for the public would represent a beneficial impact.	Expanded EE opportunities would increase beneficial impacts.	Same as Alternative B.
Interpretation	Continued interpretive services for the public would represent a beneficial impact.	Expanded interpretive program would increase beneficial impacts.	Same as Alternative B.
Wildlife observation and photography	Wildlife observation and photography opportunities would continue to be restricted to those available offshore.	Increased opportunities for on-site wildlife observation and photography.	Same as Alternative B.
Non-wildlife-dependent activities	Would continue to be permitted on a case-by-case basis; impacts to refuge resources minimal.	Same as Alternative A.	Same as Alternative A.
Human health and safety	Closure to public access continues to protect the public from unexploded ordnance and other hazards.	Gradual opening of refuge to public as it is cleared of unexploded ordnance and other hazards; public safety maintained by ensuring that access is restricted to those areas that have been certified or designated as safe.	Same as Alternative B.

USER GROUP CONFLICTS

Even if authorized public use is allowed and begins to increase from essentially zero, 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.

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 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.

Desecheo NWR 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 and place 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 wildlife and habitat management, resource protection, public use, and administrative programs. These actions would result in both direct and indirect effects. Increasing resource protection, for example, directly affect (reduce) levels of poaching and indirectly affect (increase) wildlife populations.

Other indirect effects that may result from implementing the proposed alternative include minor impacts from siltation due to the disturbance of soils and vegetation if public use is allowed or one or more trails are constructed, as well as increased seabird nesting from habitat restoration and the use of decoys.

SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

The habitat protection and management 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 creation of new trails. While these activities would cause short-term negative 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.

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 the Draft CCP/EA.

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

A March 19, 2009, public scoping meeting was announced through local newspapers (*Primera Hora* [online] and *La Estrella*). Individual letters were sent to 17 Commonwealth officials; 7 municipalities, fifteen federal agency personnel, and 20 educational institutions, non-governmental organizations, and individuals. E-mail notification was sent to an additional 46 addressees. The meeting was attended by 16 individuals; two representing elected officials, three representing government agencies, three representing organizations, and the remainder as individuals. Approximately 26 comment sheets were received by mail, e-mail, or hand delivered.

Major issues identified during scoping were the following:

- Internal scoping: control of introduced species (monkeys, goats, rats and plants); illegal activities (smuggling of aliens and drugs and poaching); cleanup of military ordnance; restoration of habitat.

- Commonwealth of Puerto Rico: Representatives of elected officials (Commonwealth Senate and House) consider invasive species, ordnance cleanup, illegal aliens, and drug trafficking to be priority issues and also recommend opening of refuge to public and development of ecotourism projects.

- Tribes: None

- Partners: USACE FUDS investigation of ordnance hazard is ongoing. USACE representative recommends identification of areas to be used for student (scientific) investigation.

- Public: control or eliminate exotic species; open refuge to the public or at least permit limited access; provide for ecotourism; provide boat access; coordinate activities with Marine Reserve planning efforts; permit periodic access for ham radio operators; camping was both recommended and opposed.

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.

Comprehensive Conservation Plan:	A document that describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purposes of the refuge; helps fulfill the mission of the Refuge System; maintains and, where appropriate, restores the ecological integrity of each refuge and the Refuge System; helps achieve the goals of the National Wilderness Preservation System; and meets other mandates (Service Manual 602 FW 1.6 E).
Concern:	See Issue
Cover Type:	The present vegetation of an area.
Cultural Resource Inventory:	A professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined geographic area. Inventories may involve various levels, including background literature search, comprehensive field examination to identify all exposed physical manifestations of cultural resources, or sample inventory to project site distribution and density over a larger area. Evaluation of identified cultural resources to determine eligibility for the National Register follows the criteria found in 36 CFR 60.4 (Service Manual 614 FW 1.7).
Cultural Resource Overview:	A comprehensive document prepared for a field office that discusses, among other things, its prehistory and cultural history, the nature and extent of known cultural resources, previous research, management objectives, resource management conflicts or issues, and a general statement on how program objectives should be met and conflicts resolved. An overview should reference or incorporate information from a field office's background or literature search described in Section VIII of the Cultural Resource Management Handbook (Service Manual 614 FW 1.7).
Cultural Resources:	The remains of sites, structures, or objects used by people in the past.
Designated Wilderness Area:	An area designated by the U.S. Congress to be managed as part of the National Wilderness Preservation System (Draft Service Manual 610 FW 1.5).
Disturbance:	Significant alteration of habitat structure or composition. May be natural (e.g., fire) or human-caused events (e.g., aircraft overflight).
Ecosystem:	A dynamic and interrelating complex of plant and animal communities and their associated non-living environment.
Ecosystem Management:	Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and basic ecosystem processes are perpetuated indefinitely.

Endangered Species (Federal):	A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.
Endangered Species (State):	A plant or animal species in danger of becoming extinct or extirpated in the state within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.
Environmental Assessment (EA):	A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).
Environmental Impact Statement (EIS):	A detailed written statement required by section 102(2)(C) of the National Environmental Policy Act, analyzing the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources (40 CFR 1508.11).
Estuary:	The wide lower course of a river into which the tides flow. The area where the tide meets a river current.
Finding of No Significant Impact (FONSI):	A document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment, that briefly presents why a federal action will have no significant effect on the human environment and for which an environmental impact statement, therefore, will not be prepared (40 CFR 1508.13).
FTE:	Full Time Equivalent. The combined work hours of one of more employees that is equal to the number of hours that an individual employee would work during the course of a year.
Goal:	Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (Service Manual 620 FW 1.6J).
Habitat:	Suite of existing environmental conditions required by an organism for survival and reproduction. The place where an organism typically lives.
Habitat Restoration:	Management emphasis designed to move ecosystems to desired conditions and processes, and/or to healthy ecosystems.
Habitat Type:	See Vegetation Type.

Improvement Act:	The National Wildlife Refuge System Improvement Act of 1997.
Informed Consent:	The grudging willingness of opponents to “go along” with a course of action that they actually oppose (Bleiker).
Issue:	Any unsettled matter that requires a management decision [e.g., an initiative, opportunity, resource management problem, threat to the resources of the unit, conflict in uses, public concern, or other presence of an undesirable resource condition (Service Manual 602 FW 1.6K)].
Management Alternative:	See Alternative
Management Concern:	See Issue
Management Opportunity:	See Issue
Migration:	The seasonal movement from one area to another and back.
Mission Statement:	Succinct statement of the unit’s purpose and reason for being.
Monitoring:	The process of collecting information to track changes of selected parameters over time.
National Environmental Policy Act of 1969 (NEPA):	Requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision-making (40 CFR 1500).
National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57):	Under the Refuge Improvement Act, the Fish and Wildlife Service is required to develop 15-year comprehensive conservation plans for all national wildlife refuges outside Alaska. The Act also describes the six public uses given priority status within the Refuge System (i.e., hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation).
National Wildlife Refuge System Mission:	The mission is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

National Wildlife Refuge System: Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife, including species threatened with extinction; all lands, waters, and interests therein administered by the Secretary as wildlife refuges; areas for the protection and conservation of fish and wildlife that are threatened with extinction; wildlife ranges; game ranges; wildlife management areas; or waterfowl production areas.

National Wildlife Refuge: A designated area of land, water, or an interest in land or water within the Refuge System.

Native Species: Species that normally live and thrive in a particular ecosystem.

Noxious Weed: A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive or difficult to manage; parasitic; a carrier or host of serious insect or disease; or non-native, new, or not common to the United States. According to the Federal Noxious Weed Act (P.L. 93-639), a noxious weed is one that causes disease or had adverse effects on man or his environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.

Objective: A concise statement of what we want to achieve, how much we want to achieve, when and where we want to achieve it, and who is responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies. Making objectives attainable, time-specific, and measurable (Service Manual 602 FW 1.6N).

Plant Association: A classification of plant communities based on the similarity in dominants of all layers of vascular species in a climax community.

Plant Community: An assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site such as soils, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community.

Preferred Alternative: This is the alternative determined (by the decision-maker) to best achieve the refuge purpose, vision, and goals; contributes to the Refuge System mission, addresses the significant issues; and is consistent with principles of sound fish and wildlife management.

Prescribed Fire: The application of fire to wildland fuels to achieve identified land use objectives (Service Manual 621 FW 1.7). May occur from natural ignition or intentional ignition.

Priority Species: Fish and wildlife species that require protective measures and/or management guidelines to ensure their perpetuation. Priority species include the following: (1) State-listed and candidate species; (2) species or groups of animals susceptible to significant population declines within a specific area or statewide by virtue of their inclination to aggregate (e.g., seabird colonies); and (3) species of recreation, commercial, and/or tribal importance.

Public Involvement Plan: Broad long-term guidance for involving the public in the comprehensive conservation planning process.

Public Involvement: A process that offers impacted and interested individuals and organizations an opportunity to become informed about, and to express their opinions on Service actions and policies. In the process, these views are studied thoroughly and thoughtful consideration of public views is given in shaping decisions for refuge management.

Public: Individuals, organizations, and groups; officials of federal, state, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in service issues and those who do or do not realize that Service decisions may affect them.

Purposes of the Refuge: "The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge sub-unit." For refuges that encompass congressionally designated wilderness, the purposes of the Wilderness Act are additional purposes of the refuge (Service Manual 602 FW 106 S).

Recommended Wilderness: Areas studied and found suitable for wilderness designation by both the Director of the Fish and Wildlife Service and the Secretary of the Department of the Interior, and recommended for designation by the President to Congress. These areas await only legislative action by Congress in order to become part of the Wilderness System. Such areas are also referred to as "pending in Congress" (Draft Service Manual 610 FW 1.5).

Record of Decision (ROD): A concise public record of decision prepared by the federal agency, pursuant to NEPA, that contains a statement of the decision, identification of all alternatives considered, identification of the environmentally preferable alternative, a statement as to whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted (and if not, why they were not), and a summary of monitoring and enforcement where applicable for any mitigation (40 CFR 1505.2).

Refuge Goal: See Goal

Refuge Purposes:	See Purposes of the Refuge
Songbirds: (Also Passerines)	A category of birds that is medium to small, perching landbirds. Most are territorial singers and migratory.
Step-down Management Plan:	A plan that provides specific guidance on management subjects (e.g., habitat, public use, fire, and safety) or groups of related subjects. It describes strategies and implementation schedules for meeting CCP goals and objectives (Service Manual 602 FW 1.6 U).
Strategy:	A specific action, tool, technique, or combination of actions, tools, and techniques used to meet unit objectives (Service Manual 602 FW 1.6 U).
Study Area:	The area reviewed in detail for wildlife, habitat, and public use potential. For purposes of this CCP, the study area includes the lands within the currently approved refuge boundary and potential refuge expansion areas.
Threatened Species (Federal):	Species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.
Threatened Species (State):	A plant or animal species likely to become endangered in the state within the near future if factors contributing to population decline or habitat degradation or loss continue.
Tiering:	The coverage of general matters in broader environmental impact statements with subsequent narrower statements of environmental analysis, incorporating by reference, the general discussions and concentrating on specific issues (40 CFR 1508.28).
U.S. Fish and Wildlife Service Mission:	The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.
Unit Objective:	See Objective
Vegetation Type, Habitat Type, Forest Cover Type:	A land classification system based upon the concept of distinct plant associations.
Vision Statement:	A concise statement of what the planning unit should be, or what we hope to do, based primarily upon the Refuge System mission and specific refuge purposes, and other mandates. We will tie the vision statement for the refuge to the mission of the Refuge System; the purpose(s) of the refuge; the maintenance or restoration of the ecological integrity of each refuge and the Refuge System; and other mandates (Service Manual 602 FW 1.6 Z).

Wilderness Study Areas: Lands and waters identified through inventory as meeting the definition of wilderness and undergoing evaluation for recommendation for inclusion in the Wilderness System. A study area must meet the following criteria:

- Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation; and
- Has at least 5,000 contiguous roadless acres or is sufficient in size as to make practicable its preservation and use in an unimpaired condition (Draft Service Manual 610 FW 1.5).

Wilderness: See Designated Wilderness

Wildfire: A free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands (Service Manual 621 FW 1.7).

Wildland Fire: Every wildland fire is either a wildfire or a prescribed fire (Service Manual 621 FW 1.3

ACRONYMS AND ABBREVIATIONS

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
FWS	U.S. Fish and Wildlife Service (also Service)
TFT	Temporary Full Time
USC	United States Code

Appendix B. References and Literature Citations

Breckon, G. 1998. A report on the status of the biota on Desecheo Island. Seminar presented to the New York Botanical Garden.

Breckon, G. J. 2000. Revision of the flora of Desecheo Island, Puerto Rico. Caribbean Journal of Science **36**:177-209.

Chaytor J.D., U. S. ten Brink, 2010, Extension in Mona Passage, Northeast Caribbean, U.S. Geological Survey, Woods Hole Coastal and Marine Science Center, Woods Hole, MA 02543, USA, in Tectonophysics 493 (2010) 74–92

Dupree, A. Hunter, 1957. Science in the Federal Government: A History of Policies and Activities to 1940. Harvard University Press, Cambridge, Massachusetts. 460 pp.

Earsom, S.D., C. Hunter and S. Silander, eds. 2004. Caribbean Islands National Wildlife Refuge Complex Biological Review. US Fish and Wildlife Service internal document. 147 pp.

Gabrielson, Ira N. 1943. Wildlife Conservation. The Macmillan Company, New York, New York. 250 pp.

Heatwole, H. 1968. Herpetogeography of Puerto Rico. V. Description of a new species of *Sphaerodactylus* from Desecheo Island. Breviora:1-6.

Heatwole, H., R. Levins, and M. Byer. 1981. Biogeography of the Puerto Rican Bank. Atoll Research Bulletin:1-62.

Island Conservation. 2010. Invasive rodent trials and macaque monitoring: Desecheo Island, Puerto Rico,: June 1-6, 2010. Prepared by: M. Potts. July 2010. Island Conservation, Santa Cruz, CA.

Laycock, George. 1965. The Sign of the Flying Goose: A Guide to the National Wildlife Refuges. The Natural History Press, Garden City, New York. 299 pp.

Meier, A,J.; R.E. Noble and H.A. Raffaele, 1989, The Birds of Desecheo Island, Puerto Rico, Including a New Record for Puerto Rican Territory, Caribbean Journal of Science, Vol. 25, No. 1-2, 24-29, University of Puerto Rico, Mayaguez, PR

Meier, A. J.; R.E. Noble and P.M. Mckenzie. 1989, Observations of Autumnal Courtship Behavior in Peregine Falcons, J Raptor Res. 23(3):121-122. The Raptor Research Foundation, Inc.

Meier, A. J. and R. E. Noble. 1990. A range extension for Mabuya mabouya Lacepede (Reptilia: Lacertilia) to Desecheo Island, Puerto Rico. Caribbean Journal of Science Vol. 26, No.1-2, pp 66-67. University of Puerto Rico, Mayaguez, PR.

Morelock, Jack, W. Ramirez and M. Barreto. 2002. in The World's Coasts: Online - Puerto Rico. http://geology.uprm.edu/Morelock/wcpr8.htm

Morrison, J. A. and E. W. Menzel. 1972. Adaptations of a free-ranging rhesus monkey group to division and transplantation. Wildlife. Monographs 31:1-78.

New Employee Handbook. U.S. Fish and Wildlife Service.

Renken, Robert A., W.C.Ward, I.P. Gill, F. Gómez-Gómez, J. Rodríguez-Martínez and others. 2002. Geology and Hydrogeology of the Caribbean Islands Aquifer System of the Commonwealth of Puerto Rico and the U.S.Virgin Islands. U.S. Geological Survey Professional Paper 1419, 148 pp. U.S. Geological Survey, Branch of Information Services, Box 25286, Federal Center, Denver, CO 80225

Seiders, V.M., Briggs, R.P., Glover, L., 1972. Geology of Isla Desecheo, Puerto Rico, with notes on the Great Southern Puerto Rico Fault Zone and Quaternary stillstands of the sea. U.S. Geological Survey Professional Paper, 739. 22 pp.

Towns, D. R., D. A. Wardle, C. P. H. Mulder, G. W. Yeates, B. M. Fitzgerald, G. R. Parrish, P. J. Bellingham, and K. I. Bonner. 2009. Predation of seabirds by invasive rats: multiple indirect consequences for invertebrate communities. Oikos 118:420-430.

USDA, Animal and Plant Health Inspection Service (APHIS) and Wildlife Services (WS), 2008. Environmental Assessment, Managing Damage and Threats Associated With Invasive Patas and Rhesus Monkeys In the Commonwealth of Puerto Rico; Prepared In Cooperation with the P R DNER, PRDA and the USFWS. 100pp

U.S. Fish & Wildlife Service, 2010. Restoring Wildlife Habitat on Desecheo Island, Puerto Rico, Unpublished Draft Environmental Assessment, prepared by Island Conservation, 201pp.

Wetmore Alexander, Birds of Desecheo Island Puerto Rico, 1918, Auk Volume XXXV, 1918, pp 333-340

Appendix C. Relevant Legal Mandates and Executive Orders

STATUTE	DESCRIPTION
Administrative Procedures Act (1946)	Outlines administrative procedures to be followed by federal agencies with respect to identification of information to be made public; publication of material in the Federal Register; maintenance of records; attendance and notification requirements for specific meetings and hearings; issuance of licenses; and review of agency actions.
American Antiquities Act of 1906	Provides penalties for unauthorized collection, excavation, or destruction of historic or prehistoric ruins, monuments, or objects of antiquity on lands owned or controlled by the United States. The Act authorizes the President to designate as national monuments objects or areas of historic or scientific interest on lands owned or controlled by the Unites States.
American Indian Religious Freedom Act of 1978	Protects the inherent right of Native Americans to believe, express, and exercise their traditional religions, including access to important sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.
Americans With Disabilities Act of 1990	Intended to prevent discrimination of and make American society more accessible to people with disabilities. The Act requires reasonable accommodations to be made in employment, public services, public accommodations, and telecommunications for persons with disabilities.
Anadromous Fish Conservation Act of 1965, as amended	Authorizes the Secretaries of Interior and Commerce to enter into cooperative agreements with states and other 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.
Archaeological Resources Protection Act of 1979, as amended.	This Act strengthens and expands the protective provisions of the Antiquities Act of 1906 regarding archaeological resources. It also revised the permitting process for archaeological research.
Architectural Barriers Act of 1968	Requires that buildings and facilities designed, constructed, or altered with federal funds, or leased by a federal agency, must comply with standards for physical accessibility.
Bald and Golden Eagle Protection Act of 1940, as amended	Prohibits the possession, sale or transport of any bald or golden eagle, alive or dead, or part, nest, or egg except as permitted by the Secretary of the Interior for scientific or exhibition purposes, or for the religious purposes of Indians.

STATUTE	DESCRIPTION
Bankhead-Jones Farm Tenant Act of 1937	Directs the Secretary of Agriculture to develop a program of land conservation and utilization in order to correct maladjustments in land use and thus assist in such things as control of soil erosion, reforestation, conservation of natural resources and protection of fish and wildlife. Some early refuges and hatcheries were established under authority of this Act.
Cave Resources Protection Act of 1988	Established requirements for the management and protection of caves and their resources on federal lands, including allowing the land managing agencies to withhold the location of caves from the public, and requiring permits for any removal or collecting activities in caves on federal lands.
Clean Air Act of 1970	Regulates air emissions from area, stationary, and mobile sources. This Act and its amendments charge federal land managers with direct responsibility to protect the "air quality and related values" of land under their control. These values include fish, wildlife, and their habitats.
Clean Water Act of 1974, as amended	This Act and its amendments have as its objective the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters. Section 401 of the Act requires that federally permitted activities comply with the Clean Water Act standards, state water quality laws, and any other appropriate state laws. Section 404 charges the U.S. Army Corps of Engineers with regulating discharge of dredge or fill materials into waters of the United States, including wetlands.
Coastal Barrier Resources Act of 1982 (CBRA)	Identifies undeveloped coastal barriers along the Atlantic and Gulf Coasts and included them in the John H. Chafee Coastal Barrier Resources System (CBRS). The objectives of the act are to minimize loss of human life, reduce wasteful federal expenditures, and minimize the damage to natural resources by restricting most federal expenditures that encourage development within the CBRS.
Coastal Barrier Improvement Act of 1990	Reauthorized the Coastal Barrier Resources Act (CBRA), expanded the CBRS to include undeveloped coastal barriers along the Great Lakes and in the Caribbean, and established "Otherwise Protected Areas (OPAs)." The Service is responsible for maintaining official maps, consulting with federal agencies that propose spending federal funds within the CBRS and OPAs, and making recommendations to Congress about proposed boundary revisions.
Coastal Wetlands Planning, Protection, and Restoration (1990)	Authorizes the Director of the Fish and Wildlife Service to participate in the development of a Louisiana coastal wetlands restoration program, participate in the development and oversight of a coastal wetlands conservation program, and lead in the implementation and administration of a national coastal wetlands grant program.

STATUTE	DESCRIPTION
Coastal Zone Management Act of 1972, as amended	Established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans and requires that "any federal activity within or outside of the coastal zone that affects any land or water use or natural resource of the coastal zone" shall be "consistent to the maximum extent practicable with the enforceable policies" of a state's coastal zone management plan. The law includes an Enhancement Grants Program for protecting, restoring, or enhancing existing coastal wetlands or creating new coastal wetlands. It also established the National Estuarine Research Reserve System, guidelines for estuarine research, and financial assistance for land acquisition.
Emergency Wetlands Resources Act of 1986	This Act authorized the purchase of wetlands from Land and Water Conservation Fund moneys, removing a prior prohibition on such acquisitions. The Act requires the Secretary to establish a National Wetlands Priority Conservation Plan, required the states to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers to the Migratory Bird Conservation Fund amounts equal to import duties on arms and ammunition. It also established entrance fees at national wildlife refuges.
Endangered Species Act of 1973, as amended	Provides for the conservation of threatened and endangered species of fish, wildlife, and plants by federal action and by encouraging the establishment of state programs. It provides for the determination and listing of threatened and endangered species and the designation of critical habitats. Section 7 requires refuge managers to perform internal consultation before initiating projects that affect or may affect endangered species.
Environmental Education Act of 1990	This Act established the Office of Environmental Education within the U.S. Environmental Protection Agency to develop and administer a federal environmental education program in consultation with other federal natural resource management agencies, including the Fish and Wildlife Service.
Estuary Protection Act of 1968	Authorized the Secretary of the Interior, in cooperation with other federal agencies and the states, to study and inventory estuaries of the United States, including land and water of the Great Lakes, and to determine whether such areas should be acquired for protection. The Secretary is also required to encourage state and local governments to consider the importance of estuaries in their planning activities relative to federal natural resource grants. In approving any state grants for acquisition of estuaries, the Secretary was required to establish conditions to ensure the permanent protection of estuaries.

STATUTE	DESCRIPTION
Estuaries and Clean Waters Act of 2000	This law creates a federal interagency council that includes the Director of the Fish and Wildlife Service, the Secretary of the Army for Civil Works, the Secretary of Agriculture, the Administrator of the Environmental Protection Agency and the Administrator for the National Oceanic and Atmospheric Administration. The council is charged with developing a national estuary habitat restoration strategy and providing grants to entities to restore and protect estuary habitat to promote the strategy.
Food Security Act of 1985, as amended (Farm Bill)	The Act contains several provisions that contribute to wetland conservation. The Swampbuster provisions state that farmers who convert wetlands for the purpose of planting after enactment of the law are ineligible for most farmer program subsidies. It also established the Wetland Reserve Program to restore and protect wetlands through easements and restoration of the functions and values of wetlands on such easement areas.
Farmland Protection Policy Act of 1981, as amended	The purpose of this law is to minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. Federal programs include construction projects and the management of federal lands.
Federal Advisory Committee Act (1972), as amended	Governs the establishment of and procedures for committees that provide advice to the federal government. Advisory committees may be established only if they will serve a necessary, nonduplicative function. Committees must be strictly advisory unless otherwise specified and meetings must be open to the public.
Federal Coal Leasing Amendment Act of 1976	Provided that nothing in the Mining Act, the Mineral Leasing Act, or the Mineral Leasing Act for Acquired Lands authorized mining coal on refuges.
Federal-Aid Highways Act of 1968	Established requirements for approval of federal highways through national wildlife refuges and other designated areas to preserve the natural beauty of such areas. The Secretary of Transportation is directed to consult with the Secretary of the Interior and other federal agencies before approving any program or project requiring the use of land under their jurisdiction.
Federal Noxious Weed Act of 1990, as amended	The Secretary of Agriculture was given the authority to designate plants as noxious weeds and to cooperate with other federal, State and local agencies, farmers' associations, and private individuals in measures to control, eradicate, prevent, or retard the spread of such weeds. The Act requires each Federal land-managing agency, including the Fish and Wildlife Service, to designate an office or person to coordinate a program to control such plants on the agency's land and implement cooperative agreements with the states, including integrated management systems to control undesirable plants.

STATUTE	DESCRIPTION
Fish and Wildlife Act of 1956	Establishes a comprehensive national fish, shellfish, and wildlife resources policy with emphasis on the commercial fishing industry but also includes the inherent right of every citizen and resident to fish for pleasure, enjoyment, and betterment and to maintain and increase public opportunities for recreational use of fish and wildlife resources. Among other things, it authorizes the Secretary of the Interior to take such steps as may be required for the development, advancement, management, conservation, and protection of fish and wildlife resources including, but not limited to, research, development of existing facilities, and acquisition by purchase or exchange of land and water or interests therein.
Fish and Wildlife Conservation Act of 1980, as amended	Requires the Service to monitor non-gamebird species, identify species of management concern, and implement conservation measures to preclude the need for listing under the Endangered Species Act.
Fish and Wildlife Coordination Act of 1958	Promotes equal consideration and coordination of wildlife conservation with other water resource development programs by requiring consultation with the Fish and Wildlife Service and the state fish and wildlife agencies where the "waters of a stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted…or otherwise controlled or modified" by any agency under federal permit or license.
Improvement Act of 1978	This act was passed to improve the administration of fish and wildlife programs and amends several earlier laws, including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out volunteer programs.
Fishery (Magnuson) Conservation and Management Act of 1976	Established Regional Fishery Management Councils comprised of federal and state officials, including the Fish and Wildlife Service. It provides for regulation of foreign fishing and vessel fishing permits.
Freedom of Information Act, 1966	Requires all federal agencies to make available to the public for inspection and copying administrative staff manuals and staff instructions; official, published and unpublished policy statements; final orders deciding case adjudication; and other documents. Special exemptions have been reserved for nine categories of privileged material. The Act requires the party seeking the information to pay reasonable search and duplication costs.
Geothermal Steam Act of 1970, as amended	Authorizes and governs the lease of geothermal steam and related resources on public lands. Section 15 c of the Act prohibits issuing geothermal leases on virtually all Service-administrative lands.

STATUTE	DESCRIPTION
Lacey Act of 1900, as amended	Originally designed to help states protect their native game animals and to safeguard U.S. crop production from harmful foreign species, this Act prohibits interstate and international transport and commerce of fish, wildlife or plants taken in violation of domestic or foreign laws. It regulates the introduction to America of foreign species.
Land and Water Conservation Fund Act of 1948	This Act provides funding through receipts from the sale of surplus federal land, appropriations from oil and gas receipts from the outer continental shelf, and other sources for land acquisition under several authorities. Appropriations from the fund may be used for matching grants to states for outdoor recreation projects and for land acquisition by various federal agencies, including the Fish and Wildlife Service.
Marine Mammal Protection Act of 1972, as amended	The 1972 Marine Mammal Protection Act established a federal responsibility to conserve marine mammals with management vested in the Department of the Interior for sea otter, walrus, polar bear, dugong, and manatee. The Department of Commerce is responsible for cetaceans and pinnipeds, other than the walrus. With certain specified exceptions, the Act establishes a moratorium on the taking and importation of marine mammals, as well as products taken from them.
Migratory Bird Conservation Act of 1929	Established a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds. The role of the commission was expanded by the North American Wetland Conservation Act to include approving wetlands acquisition, restoration, and enhancement proposals recommended by the North American Wetlands Conservation Council.
Migratory Bird Hunting and Conservation Stamp Act of 1934	Also commonly referred to as the “Duck Stamp Act,” requires waterfowl hunters 16 years of age or older to possess a valid federal hunting stamp. Receipts from the sale of the stamp are deposited into the Migratory Bird Conservation Fund for the acquisition of migratory bird refuges.
Migratory Bird Treaty Act of 1918, as amended	This Act implements various treaties and conventions between the United States and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Except as allowed by special regulations, this Act makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, barter, export or import any migratory bird, part, nest, egg, or product.
Mineral Leasing Act for Acquired Lands (1947), as amended	Authorizes and governs mineral leasing on acquired public lands.

STATUTE	DESCRIPTION
Minerals Leasing Act of 1920, as amended	Authorizes and governs leasing of public lands for development of deposits of coal, oil, gas, and other hydrocarbons; sulphur; phosphate; potassium; and sodium. Section 185 of this title contains provisions relating to granting rights-of-way over federal lands for pipelines.
Mining Act of 1872, as amended	Authorizes and governs prospecting and mining for the so-called "hardrock" minerals (i.e., gold and silver) on public lands.
National and Community Service Act of 1990	Authorizes several programs to engage citizens of the U.S. in full- and/or part-time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. Among other things, this law establishes the American Conservation and Youth Service Corps to engage young adults in approved human and natural resource projects, which will benefit the public or are carried out on federal or Indian lands.
National Environmental Policy Act of 1969	Requires analysis, public comment, and reporting for environmental impacts of federal actions. It stipulates the factors to be considered in environmental impact statements, and requires that federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unqualified environmental values are given appropriate consideration, along with economic and technical considerations.
National Historic Preservation Act of 1966, as amended	It establishes a National Register of Historic Places and a program of matching grants for preservation of significant historical features. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register.
National Trails System Act (1968), as amended	Established the National Trails System to protect the recreational, scenic, and historic values of some important trails. National recreation trails may be established by the Secretaries of Interior or Agriculture on land wholly or partly within their jurisdiction, with the consent of the involved state(s), and other land managing agencies, if any. National scenic and national historic trails may only be designated by Congress. Several national trails cross units of the National Wildlife Refuge System.
National Wildlife Refuge System Administration Act of 1966	Prior to 1966, there was no single federal law that governed the administration of the various national wildlife refuges that had been established. This Act defines the National Wildlife Refuge System and authorizes the Secretary of the Interior to permit any use of a refuge provided such use is compatible with the major purposes(s) for which the refuge was established.

STATUTE	DESCRIPTION
National Wildlife Refuge System Improvement Act of 1997	This Act amends the National Wildlife Refuge System Administration Act of 1966. This Act defines the mission of the National Wildlife Refuge System, establishes the legitimacy and appropriateness of six priority wildlife-dependent public uses, establishes a formal process for determining compatible uses of Refuge System lands, identifies the Secretary of the Interior as responsible for managing and protecting the Refuge System, and requires the development of a comprehensive conservation plan for all refuges outside of Alaska.
Native American Graves Protection and Repatriation Act of 1990	Requires federal agencies and museums to inventory, determine ownership of, and repatriate certain cultural items and human remains under their control or possession. The Act also addresses the repatriation of cultural items inadvertently discovered by construction activities on lands managed by the agency.
Neotropical Migratory Bird Conservation Act of 2000	Establishes a matching grant program to fund projects that promote the conservation of neotropical migratory birds in the united States, Latin America, and the Caribbean.
North American Wetlands Conservation Act of 1989	Provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands between Canada, the United States, and Mexico. The North American Wetlands Conservation Council was created to recommend projects to be funded under the Act to the Migratory Bird Conservation Commission. Available funds may be expended for up to 50 percent of the United States' share cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on federal lands).
Refuge Recreation Act of 1962, as amended	This Act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife-oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.
Partnerships for Wildlife Act of 1992	Establishes a Wildlife Conservation and Appreciation Fund to receive appropriated funds and donations from the National Fish and Wildlife Foundation and other private sources to assist the state fish and game agencies in carrying out their responsibilities for conservation of non-game species. The funding formula is no more that 1/3 federal funds, at least 1/3 foundation funds, and at least 1/3 state funds.

STATUTE	DESCRIPTION
Refuge Revenue Sharing Act of 1935, as amended	Provided for payments to counties in lieu of taxes from areas administered by the Fish and Wildlife Service. Counties are required to pass payments along to other units of local government within the county, which suffer losses in tax revenues due to the establishment of Service areas.
Rehabilitation Act of 1973	Requires nondiscrimination in the employment practices of federal agencies of the executive branch and contractors. It also requires all federally assisted programs, services, and activities to be available to people with disabilities.
Rivers and Harbors Appropriations Act of 1899, as amended	Requires the authorization by the U.S. Army Corps of Engineers prior to any work in, on, over, or under a navigable water of the United States. The Fish and Wildlife Coordination Act provides authority for the Service to review and comment on the effects on fish and wildlife activities proposed to be undertaken or permitted by the Corps of Engineers. Service concerns include contaminated sediments associated with dredge or fill projects in navigable waters.
Sikes Act (1960), as amended	Provides for the cooperation by the Departments of Interior and Defense with state agencies in planning, development, and maintenance of fish and wildlife resources and outdoor recreation facilities on military reservations throughout the United States. It requires the Secretary of each military department to use trained professionals to manage the wildlife and fishery resource under his jurisdiction, and requires that federal and state fish and wildlife agencies be given priority in management of fish and wildlife activities on military reservations.
Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948	This Act provides that upon determination by the Administrator of the General Services Administration, real property no longer needed by a federal agency can be transferred, without reimbursement, to the Secretary of the Interior if the land has particular value for migratory birds, or to a state agency for other wildlife conservation purposes.
Transportation Equity Act for the 21st Century (1998)	Established the Refuge Roads Program, requires transportation planning that includes public involvement, and provides funding for approved public use roads and trails and associated parking lots, comfort stations, and bicycle/pedestrian facilities.
Uniform Relocation and Assistance and Real Property Acquisition Policies Act (1970), as amended	Provides for uniform and equitable treatment of persons who sell their homes, businesses, or farms to the Service. The Act requires that any purchase offer be no less than the fair market value of the property.

STATUTE	DESCRIPTION
Water Resources Planning Act of 1965	Established Water Resources Council to be composed of Cabinet representatives including the Secretary of the Interior. The Council reviews river basin plans with respect to agricultural, urban, energy, industrial, recreational and fish and wildlife needs. The act also established a grant program to assist States in participating in the development of related comprehensive water and land use plans.
Wild and Scenic Rivers Act of 1968, as amended	This Act selects certain rivers of the nation possessing remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values; preserves them in a free-flowing condition; and protects their local environments.
Wilderness Act of 1964, as amended	This Act directs the Secretary of the Interior to review every roadless area of 5,000 acres or more and every roadless island regardless of size within the National Wildlife Refuge System and to recommend suitability of each such area. The Act permits certain activities within designated wilderness areas that do not alter natural processes. Wilderness values are preserved through a "minimum tool" management approach, which requires refuge managers to use the least intrusive methods, equipment, and facilities necessary for administering the areas.
Youth Conservation Corps Act of 1970	Established a permanent Youth Conservation Corps (YCC) program within the Departments of Interior and Agriculture. Within the Service, YCC participants perform many tasks on refuges, fish hatcheries, and research stations.

EXECUTIVE ORDERS	DESCRIPTIONS
EO 11593, Protection and Enhancement of the Cultural Environment (1971)	States that if the Service proposes any development activities that may affect the archaeological or historic sites, the Service will consult with Federal and State Historic Preservation Officers to comply with Section 106 of the National Historic Preservation Act of 1966, as amended.
EO 11644, Use of Off-road Vehicles on Public Land (1972)	Established policies and procedures to ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.
EO 11988, Floodplain Management (1977)	The purpose of this Executive Order is to prevent federal agencies from contributing to the "adverse impacts associated with occupancy and modification of floodplains" and the "direct or indirect support of floodplain development." In the course of fulfilling their respective authorities, federal agencies "shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains."
EO 11989 (1977), Amends Section 2 of EO 11644	Directs agencies to close areas negatively impacted by off-road vehicles.
EO 11990, Protection of Wetlands (1977)	Federal agencies are directed to provide leadership and take action to minimize the destruction, loss of degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
EO 12372, Intergovernmental Review of Federal Programs (1982)	Seeks to foster intergovernmental partnerships by requiring federal agencies to use the state process to determine and address concerns of state and local elected officials with proposed federal assistance and development programs.
EO 12898, Environmental Justice (1994)	Requires federal agencies to identify and address disproportionately high and adverse effects of its programs, policies, and activities on minority and low-income populations.

EXECUTIVE ORDERS	DESCRIPTIONS
EO 12906, Coordinating Geographical Data Acquisition and Access (1994), Amended by EO 13286 (2003). Amendment of EOs and other actions in connection with transfer of certain functions to Secretary of DHS.	Recommended that the executive branch develop, in cooperation with state, local, and tribal governments, and the private sector, a coordinated National Spatial Data Infrastructure to support public and private sector applications of geospatial data. Of particular importance to comprehensive conservation planning is the National Vegetation Classification System (NVCS), which is the adopted standard for vegetation mapping. Using NVCS facilitates the compilation of regional and national summaries, which in turn, can provide an ecosystem context for individual refuges.
EO 12962, Recreational Fisheries (1995)	Federal agencies are directed to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities in cooperation with states and tribes.
EO 13007, Native American Religious Practices (1996)	Provides for access to, and ceremonial use of, Indian sacred sites on federal lands used by Indian religious practitioners and direction to avoid adversely affecting the physical integrity of such sites.
EO 13061, Federal Support of Community Efforts Along American Heritage Rivers (1997)	Established the American Heritage Rivers initiative for the purpose of natural resource and environmental protection, economic revitalization, and historic and cultural preservation. The Act directs Federal agencies to preserve, protect, and restore rivers and their associated resources important to our history, culture, and natural heritage.
EO 13084, Consultation and Coordination With Indian Tribal Governments (2000)	Provides a mechanism for establishing regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications.
EO 13112, Invasive Species (1999)	Federal agencies are directed to prevent the introduction of invasive species, detect and respond rapidly to and control populations of such species in a cost effective and environmentally sound manner, accurately monitor invasive species, provide for restoration of native species and habitat conditions, conduct research to prevent introductions and to control invasive species, and promote public education on invasive species and the means to address them. This EO replaces and rescinds EO 11987, Exotic Organisms (1977).

EXECUTIVE ORDERS	DESCRIPTIONS
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. (2001)	Instructs federal agencies to conserve migratory birds by several means, including the incorporation of strategies and recommendations found in Partners in Flight Bird Conservation plans, the North American Waterfowl Plan, the North American Waterbird Conservation Plan, and the United States Shorebird Conservation Plan, into agency management plans and guidance documents.

Appendix D. Public Involvement

SUMMARY OF PUBLIC SCOPING COMMENTS

The Commonwealth of Puerto Rico was notified of the initiation of the planning process on December 11, 2008. Representatives of the Commonwealth of Puerto Rico, Department of Natural and Environmental Resources were invited to participate as a part of the CCP planning team. In addition, Caribbean NWR personnel are participating with the Commonwealth during the preparation of the management plan for the Desecheo Marine Reserve which surrounds the island refuge.

The Service held a public scoping meeting on March 19, 2009. This meeting was announced through local newspapers [Primera Hora (online) and La Estrella]. Individual letters were sent to 17 Commonwealth officials; 7 municipalities; 15 federal agency personnel; and 20 educational institutions, non-governmental organizations, and individuals. E-mail notification was sent to an additional 46 addressees. The meeting was attended by 16 individuals; two representing elected officials, three representing government agencies, three representing organizations and the remainder as individuals. A total of 26 comment sheets was received by mail, e-mail, or hand delivered. In addition to the comments received during the scoping meeting and in correspondence, Service personnel identified major issues to be addressed during the planning process. These issues are listed below.

Internal: control of introduced species (monkeys, goats, rats and plants); illegal activities (smuggling of aliens and drugs and poaching); cleanup of military ordnance; restoration of habitat.

State (Commonwealth of PR): Representatives of elected officials (Commonwealth Senate and House) consider invasive species, ordnance cleanup, illegal aliens and drug trafficking to be priority issues and also recommend opening of refuge to public and development of ecotourism projects.

Partners: USACE FUDS investigation of ordnance hazard is ongoing. USACE representative recommends identification of areas to be used for student (scientific) investigation.

Public: control or eliminate exotic species; open refuge to the public or at least permit limited access; provide for ecotourism; provide boat access; coordinate activities with Marine Reserve planning efforts; permit periodic access for ham radio operators; camping was both recommended and opposed.

Appendix E. Appropriate Use Determinations

Desecheo 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.

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.

The Fish and Wildlife Service policy for appropriate uses on national wildlife refuges states that the policy does not apply to refuge management activities. These are activities that are designed to conserve fish, wildlife, and plants and their habitats and are conducted by the Refuge System or a Refuge System-authorized agent to fulfill a refuge purpose(s) or the Refuge System mission. These activities may include fish and wildlife population or habitat management such as, but not limited to: prescribed burns, water level management, invasive species control, routine scientific monitoring, law enforcement activities, and maintenance of existing refuge facilities. In addition, Commonwealth DNER activities are not subject to this policy when they: (1) Directly contribute to the achievement of refuge purpose(s), refuge goals, and the Refuge System mission, as determined by the refuge manager in writing; (2) are addressed in a document such as a memorandum of understanding or a comprehensive conservation plan (CCP), or; (3) are approved under national policy.

As noted in the first section of this Appendix, several public uses have been administratively determined to be appropriate on national wildlife refuges, Desecheo NWR is considered to be unsafe because of unexploded ordnance and hazardous terrain. The planning team for this CCP has determined that until such time as the unexploded ordnance and other hazards are addressed, the refuge will remain closed to all general public access and activities. During the term of this plan, only those activities necessary to accomplish management goals, objectives, and strategies will be permitted on Desecheo NWR.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Desecheo 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.

Appendix F. Compatibility Determinations

Desecheo National Wildlife Refuge Compatibility Determination

Introduction:

The Fish and Wildlife Service reviewed potential uses for compatibility during the Comprehensive Conservation Plan (CCP) process for the Desecheo National Wildlife Refuge (NWR).

Uses: The following use was found to be appropriate and evaluated to determine their compatibility with the mission of the Refuge System and the purposes of the refuge.

1. Research, Studies and Scientific Collection

Refuge Name: Desecheo National Wildlife Refuge.

Date Established: 1976

Establishing and Acquisition Authority(ies): 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 "…... particular value in carrying out the national migratory bird management program. 16 U.S.C. 667b (An Act Authorizing the Transfer of Certain Real Property for Wildlife, or other purposes)

National Wildlife Refuge System Mission:

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

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

Other Applicable Laws, Regulations, and Policies:

Antiquities Act of 1906 (34 Stat. 225)
Migratory Bird Treaty Act of 1918 (15 U.S.C. 703-711; 40 Stat. 755)
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
Migratory Bird Hunting Stamp Act of 1934 (16 U.S.C. 718-178h; 48 Stat. 451)
Criminal Code Provisions of 1940 (18 U.S.C. 41)
Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; 54 Stat. 250)
Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat.1119)
Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)
Wilderness Act (16 U.S.C. 1131; 78 Stat. 890)
Land and Water Conservation Fund Act of 1965

National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, et seq.; 80 Stat. 915)
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd, 668ee; 80 Stat. 927)
National Environmental Policy Act of 1969, NEPA (42 U.S.C. 4321, et seq; 83 Stat. 852)
Use of Off-Road Vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq; 87 Stat. 884)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
National Wildlife Refuge Regulations for the Most Recent Fiscal Year (50 CFR Subchapter C; 43 CFR 3101.3-3)
Emergency Wetlands Resources Act of 1986 (S.B. 740)
North American Wetlands Conservation Act of 1990
Food Security Act (Farm Bill) of 1990 as amended (HR 2100)
The Property Clause of the U.S. Constitution Article IV 3, Clause 2
The Commerce Clause of the U.S. Constitution Article 1, Section 8
The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, USC668dd)
Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System. March 25, 1996
Title 50, Code of Federal Regulations, Parts 25-33
Archaeological Resources Protection Act of 1979
Native American Graves Protection and Repatriation Act of 1990

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 Desecheo NWR do not require a “Compatibility Determination.” Other research activities and scientific studies may be periodically conducted by local, state, or federal agencies; schools, and universities; and non-profit organizations when these projects are shown to benefit the management of the refuge. The assistance provided 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.

Determination (check one below):

	Use is Not Compatible
X	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.

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

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

Mandatory 10-year Re-evaluation Date:

PUBLIC REVIEW AND COMMENT:

This draft compatibility determination will available for review and comment during the public review period established for the draft Desecheo Comprehensive Conservation Plan. All comments will be addressed in the final determination

Approval of Compatibility Determination

The signature of approval is for the compatibility determination considered within the Comprehensive Conservation Plan for Desecheo National Wildlife Refuge. If this descriptive use is considered for compatibility outside of the comprehensive conservation plan, the approval signature is part of the determination.

Refuge Manager: _____
(Signature/Date)

Regional Compatibility Coordinator: _____
(Signature/Date)

Refuge Supervisor: _____
(Signature/Date)

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

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: Desecheo 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
_X_ Refuges/Wildlife

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

III. Station Name: Desecheo National Wildlife Refuge

IV. Description of Proposed Action

The proposed action would result in the implementation of the Comprehensive Conservation Plan (CCP) for the Desecheo National Wildlife Refuge, composed of Desecheo Island, an island of approximately 301 acres, located in the Mona Channel 13 miles west of Rincon, Puerto Rico. Approval and subsequent implementation of the CCP will direct management actions on the Refuge for the next 15 years.

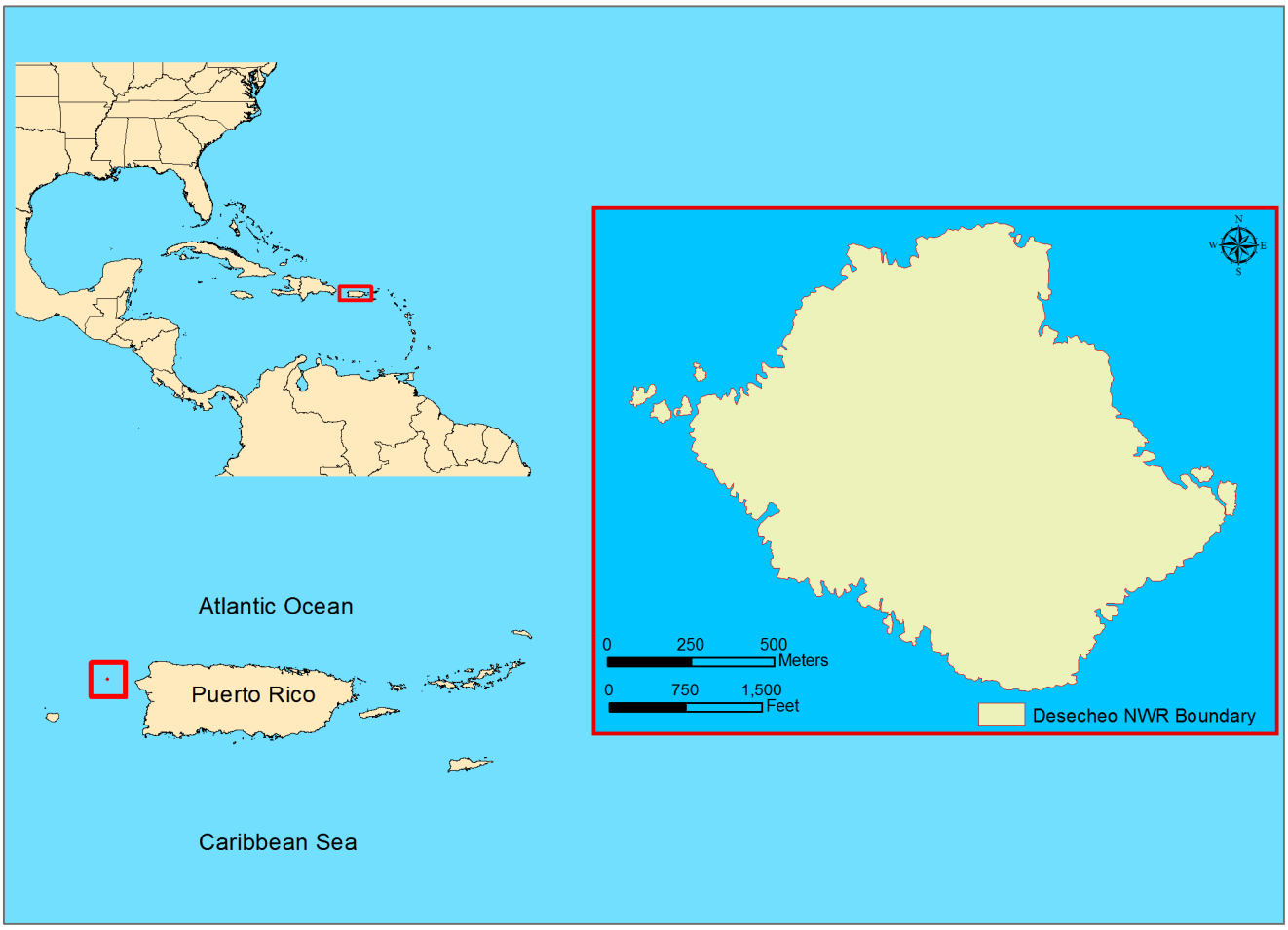
V. Pertinent Species and Habitat:

SPECIES/CRITICAL HABITAT	STATUS[1]
Higo Chumbo Cactus (*Harrisia portoricensis*)	T
Green Sea Turtle (*Chelonia mydas*)	T
Hawksbill Sea Turtle (*Eretmochelys imbricata*)	E

[1]STATUS: E=endangered, T=threatened, PE=proposed endangered, PT=proposed threatened, CH=critical habitat, PCH=proposed critical habitat, C=candidate species, S/A=Similar Appearance

VI. Location (attach map):

Location of Desecheo National Wildlife Refuge



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

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

C. **Section, township, and range (or latitude and longitude:** 18.37°N 67.48°W

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

E. Species/habitat occurrence:

Higo Chumbo Cactus – Habitat and species both occur.
Green sea turtle – Habitat and species both occur on or adjacent to refuge.
Hawksbill sea turtle - Habitat and species both occur on or adjacent to refuge.

VII. Determination of Effects:

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

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Higo Chumbo Cactus	Planned management activities involve propagation of *Harrisia* at the Cabo Rojo Refuge with replanting at appropriate sites on Desecheo. No negative impacts foreseen
Green Sea Turtle	Periodic monitoring of potential nesting sites and habitat adjacent to Desecheo. No negative impacts foreseen
Hawksbill Sea Turtle	Periodic monitoring of potential nesting sites and habitat adjacent to Desecheo. No negative impacts foreseen

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

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/MINIMIZE IMPACTS
Higo Chumbo Cactus	Plants on the refuge will be monitored and protected and, where possible, new populations in protected areas will be established to increase survival potential.
Green Sea Turtle	Monitoring, education and cooperation with partners will continue and enforcement of protection regulations will increase.
Hawksbill Sea Turtle	Monitoring, education and cooperation with partners will continue and enforcement of protection regulations will increase.

VIII. Effect Determination and Response Requested:

SPECIES/CRITICAL HABITAT	DETERMINATION[1]			REQUESTED
	NE	NA	AA	
Higo Chumbo Cactus		X		Concurrence
Green Sea Turtle		X		Concurrence
Hawksbill Sea Turtle		X		Concurrence

[1]DETERMINATION/ RESPONSE REQUESTED:
NE = no effect. This determination is appropriate when the proposed action will not directly, indirectly, or cumulatively impact, either positively or negatively, any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested is optional but a "Concurrence" is recommended for a complete Administrative Record.

NA = not likely to adversely affect. This determination is appropriate when the proposed action is not likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources. Response Requested is a" Concurrence".

AA = likely to adversely affect. This determination is appropriate when the proposed action is likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested for listed species is "Formal Consultation". Response requested for proposed and candidate species is "Conference".

_____ _____
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**

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 Desecheo NWR 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
PHAETHONTIDAE	White-tailed tropicbird	Rabijunco coliblanco	*Phaethon lepturus*
SULIDAE	Masked Booby	Boba enmascarada	*Sula dactylatra*
	Brown Booby	Boba parda	*Sula leucogaster*
	Red-footed Booby	Boba patirroja	*Sula sula*
PELECANIDAE	Brown Pelican	Pelícano pardo	*Pelecanus occidentales*
FREGATIDAE	Magnificent Frigatebird	Tijereta	*Fregata magnificens*
ARDEIDAE	Great Blue Heron	Garzón cenizo	*Ardea herodias*
	Green-backed Heron	Martinete	*Butorides striatus*
	Cattle Egret	Garza ganadera	*Bubulcus ibis*
	Great Egret	Garza real	*Casmerodius albus*
	Yellow-crowned Heron	Yaboa común	*Nycticorax violacea*
ACCIPITRIDAE	Northern Harrier	Aguilucho pálido	*Circus cyaneus*
	Red-tailed Hawk	Guaraguao colirrojo	*Buteo jamaicensis*
	Osprey	Aguila pescadora	*Pandion haliaetus*
FALCONIDAE	Peregrine Falcon	Falcón peregrino	*Falco peregrines*
	American Kestrel	Falcón común	*Falco sparverius*
	Merlin	Falcón migratorio	*Falco columbarius*
CHARADRIIDAE	Killdeer	Playero sabanero	*Charadrius vociferus*
HAEMATOPODIDAE	American Oystercatcher	Ostrero	*Haematopus palliatus*
RECURVIROSTRIDAE	Black-necked Stilt	Viuda	*Himantopus mexicanus*

Family	English Name	Spanish Name	Scientific name
SCOLOPACIDAE	Ruddy Turnstone	Playero turco	*Arenaria interpres*
	Upland Sandpiper	Ganga	*Bartramia longicauda*
	Spotted Sandpiper	Playero coleador	*Actitis macularia*
STERNIDAE	Bridled Tern	Gaviota monja	*Onychoprion anaethetus*
	Sooty Tern	Gaviota oscura	*Onychoprion fuscata*
	Royal Tern	Gaviota real	*Sterna maxima*
	Sandwich Tern	Gaviota piquiaguda	*Sterna sandvicensis*
	Brown Noddy	Cervera	*Anous stolidus*
LARIDAE	Laughing Gull	Gaviota gallega	*Leucophaeus atricilla*
COLUMBIDAE	White-crowned Pigeon	Paloma cabeciblanca	*Patagioenas leucocephala*
	Scaly-naped Pigeon	Paloma turca	*Patagioenas squamosa*
	Zenaida Dove	Tórtola cardosantera	*Zenaida aurita*
	Common Ground-Dove	Rolita	*Columbina passerina*
CUCULIDAE	Yellow-billed Cuckoo	Pájaro bobo piquiamarillo	*Coccyzus americanus*
	Mangrove Cuckoo	Pájaro bobo menor	*Coccyzus minor*
	Smooth-billed Ani	Judío	*Crotophaga ani*
NYCTIBIIDAE	Common Potoo		*Nyctibius griseus*
APODIDAE	Alpine Swift		*Apus melba*
TROCHILIDAE	Antillean Mango	Zumbador dorado	*Anthracothorax dominicus*
ALCEDINIDAE	Belted Kingfisher	Martín pescador	*Ceryle alcyon*
TYRANNIDAE	Gray Kingbird	Pitirre	*Tyrannus dominicensis*
HIRUNDINIDAE	Caribbean Martin	Golondrina de iglesias	*Progne dominicensis*
	Tree Swallow	Golondrina vientriblanca	*Tachycineta bicolor*

Family	English Name	Spanish Name	Scientific name
	Bank Swallow	Golondrina parda	*Riparia riparia*
	Barn Swallow	Golondrina de horquilla	*Hirundo rustica*
	Cave Swallow	Golondrina de cuevas	*Hirundo fulva*
MIMIDAE	Northern Mockingbird	Ruiseñor	*Mimus polyglottos*
	Pearly-eyed Thrasher	Zorzal pardo	*Margarops fuscatus*
BOMBYCILLIDAE	Cedar Waxwing	Picotera	*Bombycilla cedrorum*
VIREONIDAE	White-eyed Vireo	Julián Chiví ojiblanco	*Vireo griseus*
	Black-whiskered Vireo	Bien-te-veo	*Vireo altiloquus*
EMBERIZIDAE	Cape May Warbler	Reinita tigre	*Dendroica tigrina*
	Black-throated blue Warbler	Reinita azul	*Dendroica caerulescens*
	Yellow-rumped Warbler	Reinita coronada	*Dendroica coronata*
	Northern Parula	Reinita pechidorada	*Parula Americana*
	Yellow-throated Warbler	Reinita gargantiamarilla	*Dendroica dominica*
	Bay-breasted Warbler	Reinita castaña	*Dendroica castanea*
	Prairie Warbler	Reinita galena	*Dendroica discolor*
	Palm Wabler	Reinita palmera	*Dendroica palmarum*
	Blackpole Warbler	Reinita rayada	*Dendroica striata*
	Ovenbird	Pizpita dorada	*Seiurus aurocapillus*
	Common Yellowthroat	Reinita pica tierra	*Geothlypis trichas*
	Hooded Warbler	Reinita de capucha	*Wilsonia citrine*
	Indigo Bunting	Gorrión azul	*Passerina cyanea*
	Northern Waterthrush	Pizpita de mangle	*Seiurus noveboracensis*
	Shiny Cowbird	Tordo lustroso	*Molothrus bonariensis*

Family	English Name	Spanish Name	Scientific name
PASSERIDAE	House Sparrow	Gorrión ingles	*Passer domesticus*
ESTRILDIDAE	Orange-cheeked Waxbill	Veterano mejillianaranjado	*Estrilda melpoda*
	Bronze Mannikin	Diablito	*Lonchura cucullata*

Reptiles and Amphibians/Anfibios y Reptiles

English Name	Spanish Name	Scientific Name
Desecheo anole	Lagartijo	*Anolis desechensis*
Desecheo Dwarf Gecko		*Sphaerodactylus levinsi*
Slippery-back Skink		*Mabuya mabouya*
Desecheo ground lizard	Siguana	*Ameiva exsul desechensis*
Puerto Rican Racer	Culebra Corredora	Alsophis portoricensis
		Borikenophis ricardi
Green Sea Turtle	Peje Blanco	*Chelonia mydas mydas*
Atlantic Hawksbill Turtle	Carey	*Eretmochelys imbricata imbricata*

Flora

Desecheo Flora
(Prepared by Dr. Gary Breckon 2012)

The following listing is an abstracted update of Breckon's checklist for Desecheo Island (Breckon 2000). In parenthesis after the species name is the period or periods for which the plants were collected (1 = 1913-1914; 2=1967-1970; 3=1994-1997). Brackets around the period indicate a cited species was accepted without a voucher specimen being located. Breckon's collecting on Desecheo was exhaustive and indicates the chance of extirpation is very high for species not collected since period 1 or 2.

Dr. Breckon has noted that a number of the new records made during period 3 are probably adventives. The populations were very small and occurred at a time when predation by goats was very severe (*i.e.*, *Nephrolepis brownii*, *Tridax procumbens*, *Terminalia catappa*, *Melochia pyramidata*, *Oeceoclades maculata*, *Eragrostis pilosa* and *Pilea microphylla*). The continued success of these species on the island is questionable.

An asterisk before the species name indicates that it is known to be an exotic to the area.

PTERIDOPHYTES

LOMARIOPSIDACEAE (includes Nephrolepidaceae)
Nephrolepis brownii (Desv.) Hovenkamp & Miyamoto (3)
Nephrolepis multiflora (Roxb.) F.M. Jarrett *ex* C.V. Morton

PTERIDACEAE
Cheilanthes microphylla (Sw.) Sw. (1,2,3)

ANGIOSPERMS

AIZOACEAE
Sesuvium portulacastrum (L.) L. (1,2,3)
Trianthema portulacastrum L. (2,3)

AMARANTHACEAE (includes Chenopodiaceae)
Achyranthes aspera* L. var. *aspera (2,3)
Centrostachys indica (L.) Standl.
**Amaranthus blitum* L. (2)
Amaranthus dubius Mart. *ex* Thell. (1)
Celosia nitida Vahl (1,2)
Iresine angustifolia Euphrasén (1,2,3)
Iresine difusa Humb. & Bonpl. *ex* Willd. (2)
Iresine celosia L.

AMARYLLIDACEAE
**Crinum zeylanicum* (L.) L. (3)
Crinum latifolium (L.) L. var. *zeylanicum* (L.) Hook. *f.*

APOCYNACEAE (includes Asclepiadaceae)
Allotoonia agglutinata (Jacq.) J.F. Morales & J.K. Williams (1,2)
Echites agglutinatus Jacq.
Prestonia agglutinata (Jacq.) Woodson
**Calotropis procera* (Aiton) W.T. Aiton* (3)
Matelea marítima (Jacq.) Woodson (1)
Ibatia maritima (Jacq.) Decne.
Metastelma decipiens Schltr. (2,3)
Cynanchum cheesmanii Woodson
Metastelma fallax Schltr.
Metastelma grisebachianm Schlrt. (2,3) Note Acevedo-Rodríguez (2005) includes this species in *M. decipiens*; Axelrod (2011) recognizes both species as distinct.
Cynanchum grisebachianum (Schlrt.) Alain
Melastelma decaisneanum Schlrt.

ASTERACEAE (Compositae)
Chromolaena odorata (L.) R.M. King & H. Rob. (1,2,3)
Eupatorium odoratum L.
Osmia odorata (L.) Sch. Bip.
Conyza bonariensis (L.) Cronquist (2)
Leptilon bonariense (L.) Small
**Conyza canadensis* (L.) Cronquist (2)
Conyza canadense (L.) Cronquist var. *pusilla* (Nutt.) Cronquist
Leptilon canadense (L.) Britton
Leptilon pusillum (Nuttall) Britton
**Cyanthillium cinereum* (L.) H. Rob. (2,3)
Vernonia cinerea (L.) Less.
Lepidaploa glabra (Willd.) H. Rob. (1,2,3)
Vernonia albicaulis Pers.
Pectis linifolia L. var. *linifolia* (1,2,3)
**Sonchus oleraceus* L. (2,3) [Not found on subsequent visits.]
**Tridax procumbens* L. (3) [Not found on subsequent visits.]
Wedelia calycina Rich. (1,2,3)
Wedelia calycina Rich. var. *parviflora* (Rich.) Alain
Wedelia lanceolata DC.
Wedelia parviflora Rich.

BIGNONIACEAE
**Crescentia cujete* L. (Excluded)
Macfadyena unguis-cati (L.) A.H. Gentry ()1,2,3
Bignonia unguis-cati L.
Batocydia unguis Mart.

BORAGINACEAE
Bourreria succulenta Jacq. (2,3) [Cited in Britton and Wilson, NY material on loan]
Bourreria revoluta Kunth
Bourreria succulenta Jacq. var. *revoluta* (Kunth) O.E. Schultz
**Cordia sebestena* L. (Excluded) [This species is only known from cultivation in PR]
Sebesten sebestena (L.) Britton
Heliotropium angiospermum Murray (1,2,3)
Heliotropium parviflorum L.
Schobera angiosperma (Murray) Britton
Rochefortia acanthophora (DC.) Griseb. (3)
Tournefortia volubilis L. (1,2,3)
Tournefortia microphylla Bertero *ex* Spreng.

BRASSICACEAE (Cruciferae)
Cakile lanceolata (Willd.) O.E. Schulz (1)

BROMELIACEAE
Tillandsia bulbosa Hook. (2)
Tillandsia recurvata (L.) L. (1,2,3)
Tillandsia utriculata L. (1,2,3)

BURSERACEAE
Bursera simaruba (L.) Sarg. (1,2,3)
Elaphrium simaruba (L.) Rose

CACTACEAE
Harrisia portoricensis Britton (1,2,3)
Mammillaria nivosa Link ([1],[2],[3]) [The first two reports are with photos.]
Neomammillaria nivosa (Link) Britton & Rose
Melocactus intortus (Mill.) Urb. ([1],[2],[3]) [Only 1 individual was found in 1994.]
Cactus intortus Mill.
Opuntia moniliformis (L.) Haw. *ex* Steud. (1,[2],3)
Consolea moniliformis (L.) Britton
Opuntia repens Bello ([2],3)
Opuntia stricta (Haw.) Haw. (1,[2],[3])
Opuntia dillenii (Ker Gawl.) Haw.
Opuntia tricantha (Willd.) Buxb. (1,[2].3)
Pilosocereus royenii (L.) Byles & G.D. Rowley ([1],[2],3)
Cephalocereus royenii (L.) Britton & Rose
Stenocereus fimbriatus (Lam.) Lourteig (1,[2],3)
Lemairocereus hystrix (Haw.) Britton & Rose
Stenocereus hystrix (Haw.) Buxb.
Stenocereus peruvianus (Mill.) R. Kiesling

CAPPARACEAE (excluding Cleomaceae)
Cynophalla amplissima (Lam.) Iltis & Cornejo (Excluded)
Capparis amplissima Lam.
Capparis portoricensis Urb.
Cynophalla flexuosa (L.) J. Presl (1,2,3)
Capparis flexuosa (L.) L.
Quadrella cynophallophora (L.) Hutch. (1,2,3)
Capparis cynophallophora L.
Quadrella indica (L.) Iltis & Cornejo (2,3)
Capparis breynia Jacq.
Capparis indica (L.) Druce
Morisonia americana L. (1,[2])

CARICACEAE
**Carica papaya* L. [Not in original checklist.]

CLEOMACEAE (formerly in Capparaceae)
**Arivela viscosa* (L.) Raf. [Not in original checklist.]
Cleome viscosa L.
Cleome icosandra L.

CLUSIACEAE (Guttiferae)
Clusia rosea Jacq. (1,2,3)

COMBRETACEAE
Conocarpus erectus L. (1,2,3)
**Terminalia catappa* L. (3)

COMMELINACEAE
Commelina erecta L. (1,2,3)
Commelina elegans Kunth
Commelina virginica L.

CONVOLVULACEAE (including Cuscutaceae)
Convolvulus nodiflorus Desr. (1,2)
Jacquemontia nodiflora (Desr.) G. Don
Cuscuta americana L. (3)
Ipomoea indica (Burm.) Merr. var. *acuminata* (Vahl) Fosberg (2,3)
Ipomoea acuminata (Vahl) Roem. & Schult.
Ipomoea cathartica Poir.
**Ipomoea nil* (L.) Roth (Excluded)
Ipomoea pes-caprae (L.) R. Br. subsp. *brasiliensis* (L.) Ooststr. (2,3)
Ipomoea triloba L. (2)
Ipomoea violacea L. (1,2,3)
Calonyction tuba (Schltdl.)
Ipomoea macrantha Roem. & Schult.
Ipomoea tuba (Schltdl.) G. Don
Jacquemontia pentanthos (Jacq.) G. Don (2)

CYPERACEAE
Cyperus ligularis L. (2)
Mariscus ligularis (L.) Kunth
Cyperus planifolius Rich. (1,2,3)
Mariscus planifolius (Rich.) Urb.
Cyperus rotundus L. (3)

ERYTHROXYLACEAE
Erythroxylum brevipes DC. (1,2,3) [Included in *Erythroxylum rotundifolium* Lunan by some authors.]

EUPHORBIACEAE (excluding Phyllanthaceae)
Adelia ricinella L. (Excluded)
Ricinella ricinella (L.) Britton
Croton betulinus Vahl (Excluded) Reported as abundant and a preferred food by the goats.
Croton discolor Willd. (3)
Euphorbia articulata Aubl. (1,2,3)
Chamaesyce articulata (Aubl.) Britton
Chamaesyce vahlii (Willd, *ex* Klotzsch & Garcke) P. Wilson
Euphorbia vahlii Willd. *ex* Klotzsch & Garcke
Euphorbia hirta L. (2)
Chamaesyce hirta (L.) Millsp.
Gymnanthes lucida Sw. (1,2,3)
Ateramnus lucidus (Sw.) Rothm.
Hippomane mancinella L. (1,2,3)
Jatropha gossypiifolia L. (1,2,3)
Adenoropium gossypiifolium (L.) Pohl

FABACEAE–CAESALPINIOIDEAE (Caesalpiniaceae)
Chamaecrista nictitans (L.) Moench subsp. *patellaria* (Collad.) H.S. Irwin & Barneby var. *glabrata* (Vogel) H.S. Irwin & Barneby (1,2)
Chamaecrista aeschinomene (DC. *ex* Collad.) Greene
Senna occidentalis (L.) Link (1,2,3)
Cassia occidentalis L.
Ditremexa occidentalis (L.) Britton & Rose

FABACEAE-FABOIDEAE (Fabaceae)
Canavalia rosea (Sw.) DC. (2)
Canavalia lineata DC.
Canavalia maritima (Aubl.) Urb.
Coursetia caribaea (Jacq.) Lavin (1,2)
Benthamantha caribaea (Jacq.) Kuntze
Cracca caribaea (Jacq.) Benth.
Galactia dubia DC. (1,2)
Galactia striata (Jacq.) Urb. (2)
Rhynchosia reticulata (Sw.) DC. (2,3)
Tephrosia cinerea (L.) Pers. (1,2,3)
Cracca cinerea (L.) Morong

FABACEAE–MIMOSOIDEAE (Mimosaceae)
Cojoba arborea (L.) Britton & Rose (*Excluded*)
Pithecellobium arboreum (L.) Urb.
Desmanthus virgatus (L.) Willd. (1,2,3)
Acuan insulare Britton & Rose
Acuan virgatum (L.) Medik.
Desmanthus depressus Humb. & Bonpl. *ex* Willd.
Pithecellobium unguis-cati (L.) Benth. (1,2,3)

LAMIACEAE (Labiatae)
Salvia serotina L. (2,3)

MALPIGHIACEAE
Stigmaphyllon emarginatum (Cav.) A. Juss. (1,2,3)
Stigmaphyllon lingulatum (Poir.) Small
Stigmaphyllon periplocifolium (Desf. *ex* DC.) A. Juss.

MALVACEAE (includes Bombacaceae, Sterculiaceae, Tiliaceae)
Ayenia insulicola Cristóbal (1,2,3)
Ayenia pustulia L., misapplied
Bastardia viscosa (L.) Kunth var. *viscosa* (2,3)
Corchorus hirsutus L. ([1],2)
Malvastrum corchorifolium (Desr.) Britton *ex* Small (1,2)
Malvastrum coromandelianum (L.) Garcke (1,[2])
Melochia pyramidata L. (3)
Moluchia pyramidata (L.) Britton
Melochia tomentosa L. (1,2,3)
Moluchia tomentosa (L.) Britton
Pseudabutilon umbellatum (L.) Fryxell (2,3)
Abutilon umbellatum (L.) Sweet
Sida abutifolia Mill. (1,2)
Sida procumbens Sw.
Sida acuta Burm. *f.* (2)
Sida carpinifolia L. *f.*
Sida stipulata Cav., misapplied
Sida cordifolia L. (3)
Sida glabra Mill. (1,2,3)
Sidastrum multiflorum (Jacq.) Fryxell (1,2,3)
Sida acuminata DC.
Waltheria indica L. (2)
Waltheria americana L.
Wissadula hernandioides (L'Hér.) Garcke (1)
Wissadula amplissima (L.) R.E. Fr., misapplied

MORACEAE
Ficus citrifolia Mill. (1,2,3)
Ficus laevigata Vahl

MYRTACEAE
Eugenia axillaris (Sw.) Willd. (1,2,3)
Eugenia foetida Pers. (2,3)
Eugenia buxiflora (Sw.) Willd.
Eugenia rhombea (O. Berg.) Krug & Urb. (1,2,3)

NYCTAGINACEAE
Boerhavia coccinea Mill. (1,2,3)
Boerhavia diffusa L. (2)
Boerhavia paniculata L.C. Rich.
Guapira discolor (Spreng.) Little (1,2,3)
Torrubia discolor (Spreng.) Britton
Guapira fragrans (Dum. Cours.) Little (2)
Pisonia fragrans Dum. Cours.
Torrubia fragrans (Dum. Cours.) Standl.
Pisonia subcordata Sw. (**Excluded**)

OLEACEAE
Forestiera segregata (Jacq.) Krug & Urb. (2,3)

ORCHIDACEAE
**Oeceoclades maculata* (Lindl.) Lindl. (3)

PASSIFLORACEAE
Passiflora suberosa L. (1,2)
Passiflora pallida L.

PHYLLANTHACEAE (Traditionally included in the Euphorbiaceae)
Flueggea acidoton (L.) G.L. Webster (2,3)
Securinega acidoton (L.) Fawc. & Rendle
Phyllanthus amarus Schumach. (2,3)
Phyllanthus swarzii Kostel.
Savia sessiliflora (Sw.) Willd. (1,2,3)

PHYTOLACCACEAE
Petiveria alliacea L. (1,2,3)
Rivina humilis L. (1,2)

PIPERACEAE
Peperomia humilis A. Dietr. (1,2,3)
Peperomia questeliana Stehlé & Trel.

PLUMBAGINACEAE
Plumbago scandens L. (2,3)

POACEAE (Gramineae)
Andropogon leucostachyus Kunth (1)
Aristida adscensionis L. (2,3)
**Bothriochloa pertusa* (L.) Camus (2,3)
Cenchrus brownii Roem. & Schult. (2)
Cenchrus viridis Spreng.
Cenchrus echinatus L. (2)
Cenchrus myosuroides Kunth (2)
Cenchropsis myosuroides (Kunth) Nash
Chloris barbata Sw. (2)
Chloris inflata Link
Chloris paraguaiensis Steud.
Digitaria ciliaris (Retz.) Koeler (2)
Digitaria insularis (L.) Fedde (1,2,3)
Trichachne insularis (L.) Nees
Valota insularis (L.) Chase
**Eragrostis pilosa* (L.) P. Beauv. (3)
Heteropogon contortus (L.) Beauv. ex Roem. & Schult. (**Excluded**)
Lasiacis divaricata (L.) Hitchc. (1)
Leptochloa panicea (Retz.) Ohwi subsp. *brachiata* (Steud.) N. Snow (2)
Leptochloa filiformis (Lam.) P. Beauv., *nom. inval.*
**Megathyrsus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs (2,3) [Nearly extirpated by 1997.]
Panicum maximum Jacq.
Urochloa maxima (Jacq.) R.D. Webster
**Melinis repens* (Willd.) Zizka (2,3)
Tricholaena repens (Willd.) Hitchc.
Tricholaena rosea Nees
Pappophorum pappiferum (Lam.) Kuntze (1,2,3)
Paspalum laxum Lam. (1,2,3)
Paspalum glabrum Poir.
Setaria setosa (Sw.) P.Beauv. var. *setosa* (1,2,3)
Chaetochloa raiflora (Milkan) Hitchc. & Chase
Chaetochloa setosa (Sw.) Scribn.
Seteria rariflora Milkan
Setaria utowanaea (Scribn.) Pilg. var. *utowanaea* (1,2)
Panicum utowanaeum Scribn.
Sporobolus indicus (L.) R. Br. (Excluded)
Sporobolus angustus Buckley
Sporobolus berteroanus (Trin.) Hitchc. & Chase
Sporobolus jacquemontii Kunth (2) [This is probably the *S. indicus*, cited by Woodbury et al.]
Sporobolus indicus (L.) R. Br., misapplied
Sporobolus virginicus (L) Kunth ([1], [2])
Uniola virgata (Poir.) Griseb. (2,3)
Leptochloopsis virgata (Poir.) H.O.Yates
Urochloa adspersa (Trin.) R.D. Webster (2)
Brachiaria adspersa (Trin.) Parodi
Panicum adspersum Trin.
Urochloa fusca (Sw.) B.F. Hansen & Wunderlin (2,3)
Brachiaria fasciculata (Sw.) Parodi
Panicum fasciculatum Sw.

POLYGONACEAE
Coccoloba diversifolia Jacq. (2,3)
Coccoloba laurifolia Jacq.
Coccoloba uvifera (L.) L. (1,2,3)

PORTULACACEAE (Excluding Taliniaceae)
Portulaca oleracea L. (1,2,3)

RHAMNACEAE
Colubrina elliptica (Sw.) Brizicky & W.L. Stearn (1,2,3)
Colubrina reclinata (L'Hér.) Brogn.
Krugiodendron ferreum (Vahl) Urb. (1,2,3)

RUBIACEAE
Erithalis fruticosa L. (2)
Erithalis revoluta Urb.
Guettarda elliptica Sw. (1,[2],3)
Spermacoce verticillata L. (2)
Borreria verticillata (L.) G. Meyer

RUTACEAE
Amyris elemifera L. (1,2,3)

SALICACEAE (includes Flacourtiaceae)
Casearia aculeata Jacq. (Excluded)

SAPINDACEAE
Cardiospermum corindum L. (2,3)
**Melicoccus bijugatus* Jacq. (1)

SAPOTACEAE
Sideroxylon obovatum Lam. (1,2,3)
Bumelia krugii Pierre
Bumelia obovata (Lam.) A. DC.
Bumelia obovata var. *krugii* (Pierre) Cronq.

SIMAROUBACEAE
Castela erecta Turpin (**Excluded**) [Woodbury et al cite ROW 195 as for Desecheo, but no specimen has been located.]

SOLANACEAE
**Capsicum frutescens* L. (1)
Solanum bahamense L. (1,2,3)
Solanum persicifolium Dunal
Solanum racemosum Jacq.
Solanum rugosum Dunal (**Excluded**)

TALINACEAE (Traditionally in Portulacaceae.)
Talinum paniculatum (Jacq.) Gaertn. (1,2)

ULMACEAE
Celtis iguanaea (Jacq.) Sarg. (1,2,3)
Momisia iguanaea (Jacq.) Rose & Standl.
Celtis trinervia Lam. (2)

URTICACEAE
Pilea microphylla (L.) Liebm. (3)

VERBENACEAE
Citharexylum spinosum L. (1,2,3)
Citharexylum fruticosum L.
Duranta erecta L. (1,2,3)
Duranta repens L.
Lantana involucrata L. (1,2,3)

VITACEAE
Cissus verticillata (L.) Nicolson & C. E. Jarvis subsp. *verticillata* (1,2)
Cissus sicyoides L.

Literature Cited.

Acevedo-Rodríguez, P. 2005a. Vines and climbing plants of Puerto Rico and the Virgin Islands. Smithsonian Institution, Washington, D. C. 483 pp.

Acevedo-Rodríguez, P and collaborators. 1996. Flora of St. John, U.S. Virgin Islands. Memoirs of The New York Botanical Garden. Vol. 78: 1-581.

Axelrod, F.S. 2011 A systematic vacemecum to the vascular plants of Puerto Rico. Sida, Bot. Misc. Number 34.

Breckon, G.J. 2000. Revision of the flora of Desecheo Island, Puerto Rico. Caribbean Journal of Science 36:177-209.

Appendix K. List of Preparers

Susan R. Silander

Project Leader, Caribbean Islands NWR

Joseph Schwagerl

Refuge Manager, Desecheo NWR

James P. Oland

Contract Planner, (Retired FWS)

Gisella Burgos

Park Ranger, Visitor Services Specialist, Caribbean Islands NWR

William Hernandez

Fish and Wildlife Biologist (GIS), Caribbean Islands NWR

Dr. Gary Breckon

University of Puerto Rico (Professor, Retired Plant Taxonomist)